DATA SUMMARY

LOCATION

Date and time	**Wednesday, 23 May 2012; 17:05 h**[1]
Site	**Valle de Hecho, in the municipality of Borau (Huesca, Spain)**

AIRCRAFT

Registration	**G-CKAW**
Type and model	**DG 500 ELAN ORION**
Operator	**Midland Gliding Club**

Engines

Type and model	
Number	

CREW

	Instructor	Pilot
Age	**45 years old**	**72 years old**
Licence	**Glider pilot (GPL)**	**Glider pilot (GPL)**
Total flight hours	**857 h**	**563 h**
Flight hours on the type	**21 h**	**None**

INJURIES

	Fatal	Serious	Minor/None
Crew		**1**	**1**
Passengers			
Third persons			

DAMAGE

Aircraft	**Destroyed**
Third parties	**Several surrounding trees**

FLIGHT DATA

Operation	**General aviation – Instruction – Dual control**
Phase of flight	**Cruise**

REPORT

Date of approval	**28 November 2012**

[1] All times in this report are local. To obtain UTC, subtract two hours.

1. FACTUAL INFORMATION

1.1. History of the flight

An instructor and a student took off from the Santa Cilia Aerodrome at about 16:50 h onboard a DG-500 glider to conduct an instructional flight in the mountains. Previously he had performed a flight with another student of nearly 3 hours and then he had a break of aprox 30 minutes.

According to the instructor, they took off runway 27. The wind was from the west at an average speed less than 5 kt on the ground and under 2 kt aloft. No lift was encountered at local first stage[2] drop point and aerotow continued towards second stage local drop point. After release (between the first and second stages, aprox 1,500 m) enough lift was found to continue above local ridge lines to north but not to climb to high altitude (they managed to attain a maximum altitude of 50 m above the summits in an area where the average elevation is 1,300 m). In due course a shoulder was crossed in order to turn to starboard and access some south west facing slopes. An approach line was chosen above and towards a point with a more westerly facing flank

Figure 1. Photograph of the aircraft

[2] See Section 1.7. Additional information.

to port and a more southerly facing flank to starboard. On the approach a surge of lift was encountered under port wing. The glider roll control was not sufficient to immediately turn into that so with the crest line approaching (approx 300 ft below) an "escape" route turn – steep and accelerating was immediately executed to the starboard. Severe sink was encountered over and above the accelerated steep turn. Although the glider had completed enough of a turn to be headed south and with a bank angle in line with the southerly facing slope, the sink rate was such that there was not enough margin to avoid a crash close to the summit of the south facing flank.

The glider fell on a wooded hillside at an elevation of 1,353 m and struck several trees that cushioned the impact. The aircraft was destroyed. The debris field was compact, with the front part of the fuselage facing south. The cockpit was the only part that did not suffer significant damage. The surrounding trees exhibited signs of a mostly vertical flight path.

The instructor suffered minor injuries and exited the aircraft under his own power. The student had to be rescued by emergency personnel and was hospitalized with serious injuries.

1.2. Personnel information

The 45-year old instructor had a valid glider pilot license issued by the English authority. He had a total of 857 flight hours (engine and non-engine aircraft), of which 21 had been on the type. His experience as instructor was 294 h. He had approximately 68 h of experience flying in the mountains.

The 72-year old student also had a valid glider pilot license issued by the English authority. He had a total of 563 flight hours in non engine aircrafts but none on the type.

1.3. Aircraft information

The DG-500 ELAN ORION glider, registration G-CKAW, was manufactured with serial number 5E228X66 and had a valid airworthiness certificate issued by the English authority. It had been on 771 flights over the course of 387 h.

Its last weight and balance sheet was dated 21 November 2005.

1.4. Meteorological information

The National Weather Agency (AEMET) reported that there were a stable air mass over much of the peninsula, which translated into generally high temperatures and low humidity at all elevations.

The accident occurred 9 km north of the point of departure, Jaca; 15.5 km southwest of the Canfranc weather station, which is at an elevation of 1,160 m and 7 km south of the station at Aragües del Puerto, located at an elevation of 1,120 m.

The data recorded at Canfranc at the time of the accident indicate the wind was from the northeast at 1.7 kt, the temperature was 21.9 °C, humidity was 39% and there was no precipitation.

The Aragües del Puerto station also recorded northeasterly winds at a speed of 5.5 kt, a temperature of 23.5 °C, humidity was 28% and there was no precipitation.

There were few clouds over the north side of the Pyrenees, with occasional clouds at the tops of the valleys on the south side.

During the onsite investigation, information was gathered from aerodrome officials and from some of the more experienced instructors in the area, who confirmed that on the day of the accident, conditions in the high mountain were good for flying, but that at lower elevations the conditions were worse.

The crew had received a weather forecast for the area from an information meeting that is held every morning by flight supervisors at the aerodrome. This forecast called for low-intensity winds from the west at all elevations at the time of the accident.

1.5. Flight recorders

The aircraft was not equipped with a conventional flight data or voice recorder for the pilot's seat. The relevant aviation regulations did not require any type of recorder to be installed onboard[3].

The glider was, however, outfitted with a GPS logger whose data weren't able to be extracted by investigators.

The instructor also had with him a portable GPS unit that was undamaged and that recorded position and altitude information, allowing investigators to reconstruct the flight path, as shown in Figure 2[4].

The last information was recorded with the aircraft at an altitude of 1,371 m.

[3] Commission Regulation (EC) no. 8/2008 of 11 December. Common technical requirements and administrative procedures applicable to commercial transportation by aeroplane. OPS 1: Commercial Air Transport: Aeroplanes. valid since 16 July 2008 (known as the EU OPS regulations). Subpart K. Paragraphs OPS 1.700 and OPS 1.715.

[4] Image taken from Google Earth.

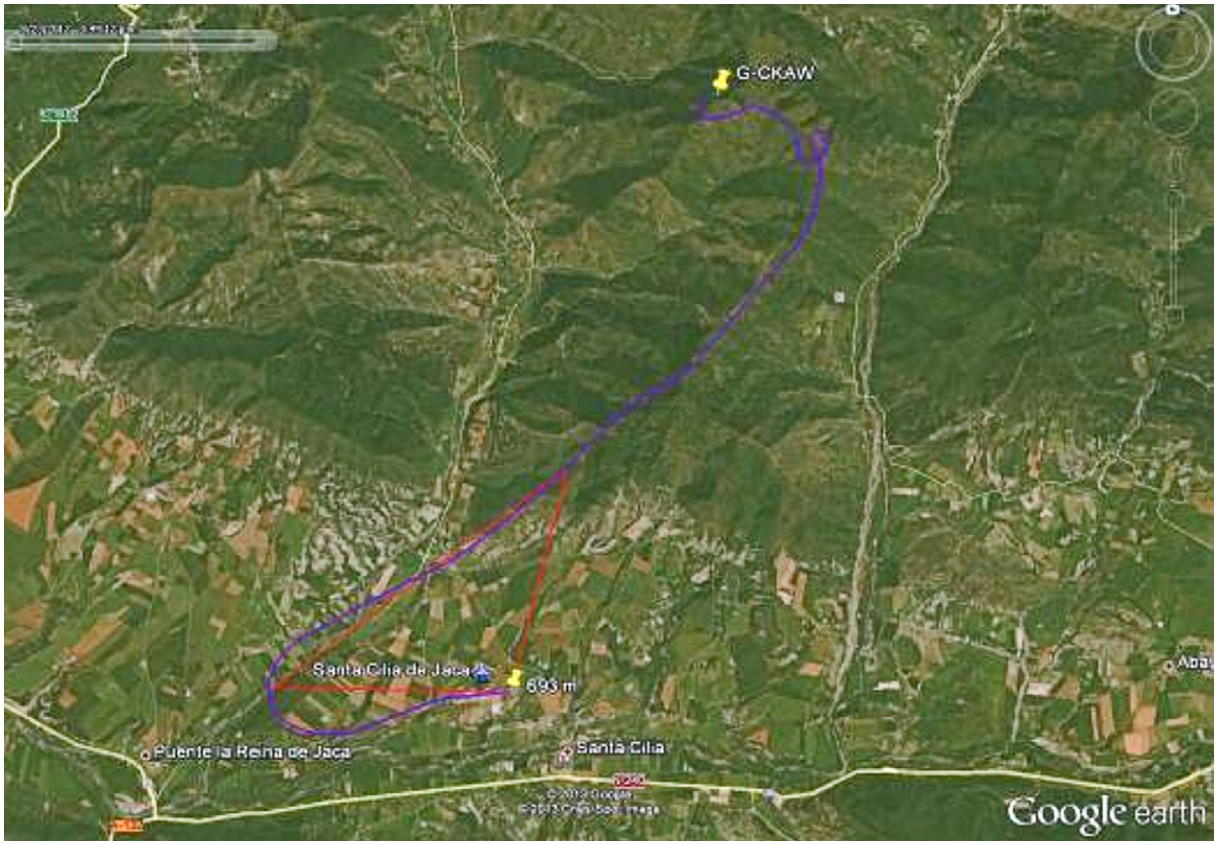

Figure 2. Flight path

1.6. Organizational and management information

Many of the operations carried out at the Santa Cilia Aerodrome involve pilots from abroad who belong to one of several clubs that organize courses of varying duration. These pilots usually have no experience flying in the mountains and are unfamiliar with the area surrounding the aerodrome, which is located in an area with high mountains.

Aerodrome officials typically assess the skills of the pilots who use the airfield by means of evaluation flights supervised by the airfield's own instructors, before these visiting pilots are allowed to fly solo. Instructors from foreign clubs are also supervised so that they themselves can lead the training flights with the members of their clubs.

Before being authorized to fly at the field, a pilot's previous experience (both general and in the mountains) and the aircraft types they normally use is assessed, along with the reports provided by the instructors.

Before going on any flights, aerodrome officials require glider pilots to attend a daily meeting where they are given information and guidelines are established for that day's operations.

1.7. Additional information

There are three levels of elevation around the Santa Cilia Aerodrome that can be used to practice gliding.

The lowest level is the plain on which the aerodrome is located. It is at an elevation of 649 m. The second level extends from about 3 to 25 km north of the airport, and consists of several mountain ranges with an average elevation of 1,300 m. Most of the valleys in this area are in a north-south orientation.

The third level is the Pyrenees mountain range. This is where the highest summits in the area are, with many mountains in excess of 2,500 m. This range usually features large air currents called mountain waves, whose winds are perpendicular to the line formed by the summits. These winds have speeds equal to or in excess of 15 km/h and allow gliders to travel large distances.

The gliders are normally released at the lowest level at an altitude of 500 m above the aerodrome elevation, which translates into an approximate altitude of 1,150 m.

Once the glider is flying untowed, it climbs by flying in a spiral within the huge columns of air created by thermal currents until it reaches the altitude of the second level. This process is repeated to reach the third level.

Generally, the thermal updrafts created by warm air form near the windward hillsides, even when there is little wind. As for the leeward side, while thermal updrafts can occur, pilots flying there run the risk of encountering turbulence and strong downdrafts.

2. ANALYSIS

Conditions were generally good for gliding on the day of the accident, though there were no large updrafts at either the first or second levels of elevation, as evidenced by the fact that the glider had to be released at an altitude that was higher than normal.

In order to take advantage of the thermal currents further north and at higher altitudes, the glider must first gain altitude by flying up through the two lower levels.

The pilot flying had very little experience on the type though yet he had in other similar ones, and also had little experience as a flight instructor in high mountain settings.

The pilot reported that the air was coming from the west, when in fact, based on the weather information gathered from the closest stations, the wind was from the northeast. This incorrect assessment by the pilot of the actual wind direction was undoubtedly conditioned by the information he had received early that morning at the

daily information meeting held at the aerodrome before any flights are allowed to take off, reinforced by the winds encountered during the previous flight performed and overall by orientation of the runway used for take-off.

Everything seems to indicate that he incorrectly assessed the wind direction, possibly because of the conflicting information he had, which led him to believe that he was going to find an updraft on the windward side when in fact he entered a downdraft of the type that forms near the leeward slopes, which propelled him to the ground.

The marks at the impact site indicate that the glider struck with a nose-down attitude with barely any horizontal speed. This would be consistent with being caught in a downdraft while flying at a low altitude and being propelled to the ground, giving the pilot no time to react by flying the airplane toward the valley and away from the mountainside.

The most typical maneuver in this situation is to fly away from the mountainside and gain altitude over the valley floor, thus avoiding the turbulence that is usually present at low altitudes.

3. CONCLUSION

The accident occurred when the pilot's misjudgment of the wind direction caused him to maneuver incorrectly by flying the glider into a downdraft as he was flying at a low altitude near a mountainside. The downdraft pushed him to the ground and the low altitude prevented him from recovering the flight attitude.

The pilot's confusion in estimating the wind direction likely stemmed from the different information he had before starting the flight.