DATA SUMMARY

LOCATION

Date and time	**Sunday, 2 October 2011 at 16:14 h**[1]
Site	**Sayerri Peak, in Borau (Huesca)**

AIRCRAFT

Registration	**OH-1000**
Type and model	**Schempp-Hirth Flugzeugbau DUO DISCUS Glider**
Operator	**Private**

Engines

Type and model	
Serial Number	

CREW

	Pilot in command	Copilot
Age	**65 years old**	**54 years old**
Licence	**GPL, MGPL, UPL**	**GPL, UPL**
Total flight hours	**2.100 h**	**670 h**
Flight hours on the type		

INJURIES

	Fatal	Serious	Minor/None
Crew	**2**		
Passengers			
Third persons			

DAMAGE

Aircraft	**Heavily damaged**
Third parties	

FLIGHT DATA

Operation	**General aviation – Private**
Phase of flight	

REPORT

Date of approval	**28th June 2012**

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

1. FACTUAL INFORMATION

1.1. History of the flight

The glider, a DUO DISCUS model, registration OH-1000, had taken off on a local flight from the Santa Cilia Aerodrome (Huesca) at 14:09 with two occupants onboard. Weather conditions were favorable for the flight, with slight winds from the south, a 2600-m high cloud ceiling and thermals between 1 and 2 m/s.

Approximately two hours later, while flying near Sayerri Peak in Borau (Huesca), the glider's vertical stabilizer impacted a vulture head-on, causing the stabilizer to break and its upper segment, which was joined to the horizontal stabilizer, to detach.

According to statements from another pilot who was flying some 3 km to the west, the airplane fell while turning clockwise and impacted a steep hillside.

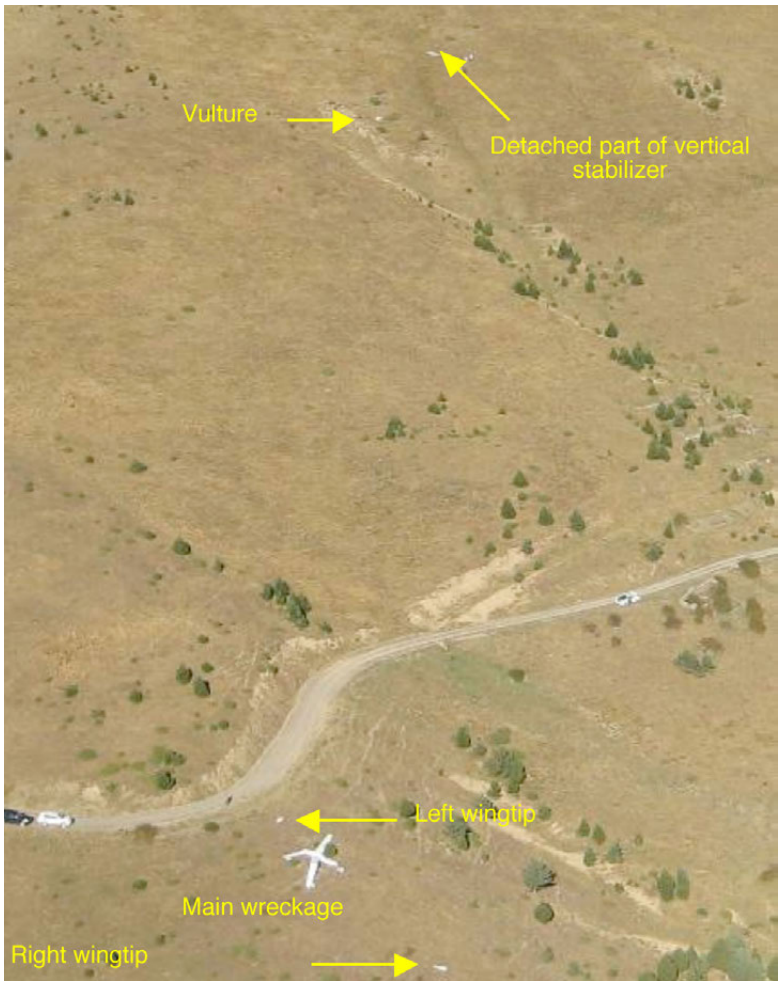

Figure 1. Wreckage at accident site

Both occupants died and their bodies were ejected from the gliderfound next to the aircraft wreckage. They were found in the vicinity of the wreckage. The aircraft was severely damaged as a result of the impact with the ground.

The part of the tail assembly that had detached was found at a higher elevation on the same hillside, over 300 m away from the main wreckage. The remains of a griffon vulture were found nearby.

1.2. Injuries to persons

Injuries	Crew	Passengers	Total on aircraft	Third persons
Fatal	2			
Serious				
Minor				N/A
None				N/A
TOTAL	2			

1.3. Damage to aircraft

The aircraft was heavily damaged.

1.4. Personnel information

The pilot, a 65 year old Finnish national, had glider pilot (GPL), motor glider pilot (MGPL) and ultralight pilot (UPL) licenses. He was also rated as a glider pilot flight instructor (FI(GP)) and a motor glider pilot flight instructor (FI(MGP)). All of the pilot's licenses and ratings, as well as the corresponding medical certificate, which were in good standing, had been issued by the Finnish Authority.

He had 2,100 h of flight experience. In the days before the accident he had flown six times from the Santa Cilia Aerodrome over a total of 18 h.

The copilot, 54, was also a Finnish national. He had glider pilot (GPL) and ultralight (UPL) licenses, both of which, along with the corresponding medical certificate, had been issued by the Finnish Authority and were valid.

He had 670 h of flight experience. In the days before the accident he had flown seven times from the Santa Cilia Aerodrome over a total of 19 h.

1.5. Aircraft information

The glider, a Schempp-Hirth Flugzeugbau Duo Discus, registration OH-1000, had been manufactured with serial number 149. On this type of airplane, the horizontal stabilizer is mounted at the top of the vertical stabilizer.

The accident airplane had a valid and in force airworthiness certificate issued by the Finnish Authority.

1.6. Flight recorders

The aircraft was not equipped with a conventional flight data recorder or with a voice recorder for the pilot's position. Relevant aeronautical regulations did not require any type of recorder to be installed onboard.

The crew did, however, have a GPS logger onboard that provided geographical coordinates, altitude and speed. Data taken from this logger allowed investigators to reconstruct the glider's flight path. Based on these data, the glider had taken off from the Santa Cilia Aerodrome (Jaca) at 14:09 and had been on a local flight for some 2 hours in the area to the north and northeast of the aerodrome.

At 16:14:19, the aircraft was near Sayerri Peak at an altitude of 2,200 m heading southeast at a speed of 132 km/h (see figure 2).

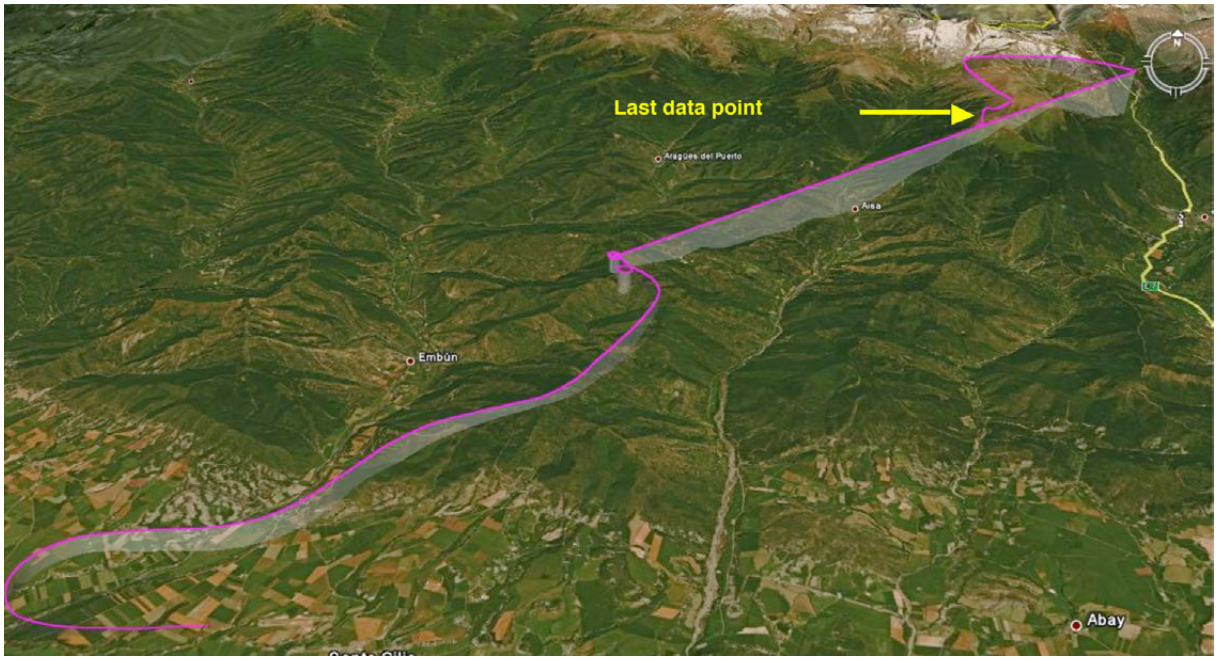

Figure 2. Final moments of the trajectory

Just then it encountered an updraft and its speed dropped to 122 km/h. At 16:14:24, while at coordinates 42° 41′ 32″ N - 00° 32′ 35″ W, the glider started a sharp descent at a vertical speed of up to 52 m/s until it impacted the ground at 16:14:44.

1.7. Wreckage and impact information

The aircraft experienced an in-flight loss of part of the tail assembly, namely, of the top part of the vertical stabilizer, which detached while joined to the horizontal stabilizer and fell to an elevation of 1,960 m (see figure 3). The left side of the detached portion of the vertical stabilizer was fractured. The horizontal stabilizer did not exhibit any damage.

At the same altitude and 20 m away from the detached tail assembly component was a dead griffon vulture weighing 9.55 kg, with a wingspan of 2.8 m and a length of 91 cm. There was a deep impact wound on the front of the left clavicle. The wound was elongated and vertically perpendicular to the wing.

The aircraft fell down the hillside to an elevation of 1,910 m, stopping 340 m away from the detached tail assembly. The fuselage was pointing south and was broken a third of way from the tail (see figure 4).

There was a fracture on the right side of the vertical stabilizer that matched that on the detached vertical stabilizer. The rudder was not damaged.

Figure 3. Detached tail assembly

Figure 4. Detached tail assembly

The right wing was broken at a point 4 m away from the root but it was not detached. The wingtip was found 21.4 m southwest of the fuselage. The bolt used to fasten it to the wing was torn off.

The left wing was only slightly damaged. The wingtip also detached and was found 12 m north of the fuselage. The stringer connecting it to the fuselage was torn off.

The cockpit retained its integrity and was not heavily damaged. The safety harnesses were not fastened and the canopy was open.

1.8. Survival aspects

The bodies of both occupants were found outside the cockpit ejected on impact. The pilot was found 19 m southwest of the main wreckage, and the copilot 24.5 m south of the wreckage. The bodies were 10 m away from each other.

They were not wearing their safety harnesses, which were verified to be in good working order.

Each occupant was wearing a parachute. The occupants did not wear them at the time of the impact. Probably they released them in the last minute with the intention to jump, as the canopy was open. They wore both parachutes and during the post-accident inspection it was noted that the pilot had activated the deployment mechanism on his parachute.

1.9. Additional information

The griffon vulture *(Gyps fulvus)* is a large bird of prey that scavenges during the day. Adults can be up between 96 and 110 cm long and have a wingspan of 250 to 280 cm and a weight of between 4.5 to 7 kg.

It is a gliding bird that generally inhabits mountainous regions with deep valleys that produce updrafts, which it uses to reach altitudes of between 1,800 and 3,500 m. It flies in circles in the same direction as that flown by the largest specimens.

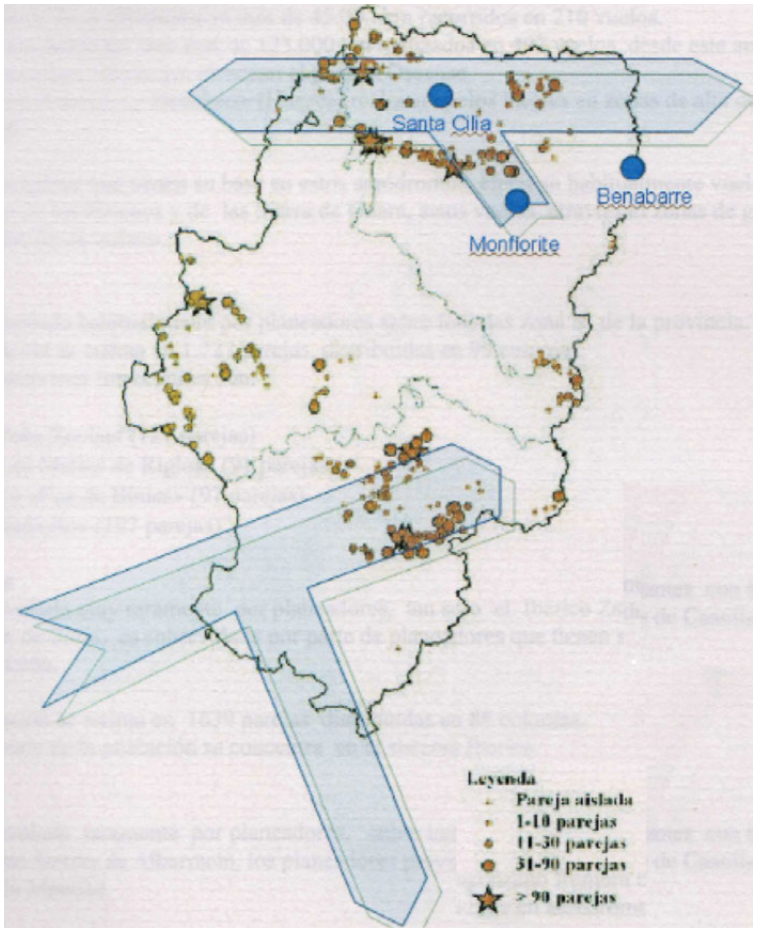

Figure 5. Vulture colonies and flying areas in Aragon

Griffon vulture populations in Spain have increased considerably in the last decade[2]. The last census, taken in 2008 by the Spanish Ornithology Society, estimated the population at around 95,000, with 21% of the specimens inhabiting the region of Aragon.

In the specific case of Huesca, the main colonies are found in the northwest of the province, in the mountain ranges on either side of the Gallego River middle course, on the border with Zaragoza and very close to the aerodromes at which most gliding activities take place (see figure 5).

2. ANALYSIS

The flight took place in an area where there are large colonies of griffon vultures and during the mid-day hours, when the updrafts are more frequent and intense, meaning that there were probably a large number of specimens flying at this time. This, along

[2] Data from a study of specimens of reproductive age conducted in 2008 by the Spanish Ornithology Society.

with the increase in vulture populations experienced in recent years, heightened the risk of a collision.

Such a risk is always greater for gliders than for other types of aircraft, given the similarities in the flying characteristics of gliders and vultures. As a result, it is very likely that the airplane flew close to a flock at a given moment, especially as it was circling upward.

The fact that a part of the tail assembly was found separate from the rest of the wreckage and alongside the large and heavy body of a dead vulture, which exhibited an elongated vertical impact wound to the front of one clavicle, almost certainly indicates that the glider impacted the vulture as they were flying in opposite directions. The impact tore off part of the horizontal and vertical stabilizers, making it impossible to control the airplane.

The data taken from the logger indicated a sudden change in the glider's flight attitude, presumably at the time of impact, and the subsequent loss of control. These same data also show that the collision took place as the glider was flying in a straight line on a southwesterly heading.

When confronted with a vulture, the safest evasive maneuver is to gain altitude, since vultures are heavy birds and, not being very agile, would likely try to avoid a collision by descending. Moreover, a climbing attitude protects the tail assembly, without which it is impossible to control the aircraft.

It could not be determined whether the crew sighted the vulture and attempted an evasive downward maneuver, contrary to what is recommended in these cases, or whether the crew was unaware of the animal's presence and collided with it while the glider was in a slightly nose-down attitude, exposing the tail assembly to a frontal collision.

Following the loss of the horizontal stabilizer, the airplane fell at a steep angle, as indicated by the eyewitness's statement. An inspection of the wreckage, however, showed that the impact with the ground took place at a shallow angle with respect to the terrain and with a certain right bank angle, since the cockpit retained its integrity and its front part did not exhibit the damage typically seen in a vertical impact. Also, both the fuselage and the right wing showed damage consistent with a crash at a low vertical speed. The highly sloping terrain made it possible for the airplane, which was falling at a steep angle, to impact practically parallel to the ground.

The fact that the canopy was open and that the occupants' harnesses were unfastened could indicate that they were perhaps preparing to jump, since they were wearing parachutes, though they did not have enough time given their low altitude.

Once the collision took place, the fact that their harnesses were not fastened and that the canopy was open caused them to be ejected from the cockpit.

3. CONCLUSION

3.1. Findings

- The airplane departed on a local flight from the Santa Cilia Aerodrome.
- The crew consisted of a pilot and copilot.
- The area where the flight took place is home to large numbers of griffon vultures.
- The weather conditions were favorable.
- The flight data was recorded in a logger and recovered, allowing investigators to reconstruct the flight path, speed and altitude.
- During the flight, the airplane lost a part of the tail assembly that included the top of the vertical stabilizer and the horizontal stabilizer.
- A large griffon vulture specimen with a broken left clavicle was found near the segment of the tail assembly that had detached.
- The main wreckage was found further downhill, 340 m away from the detached tail section.
- The airplane's cockpit retained its integrity and was not significantly damaged.
- The occupants were not wearing their safety harnesses.
- The bodies of the occupants were ejected from the cockpitfound next to the aircraft wreckage.

3.2. Causes

The accident was caused when the crew lost control of the airplane following the loss of a part of the tail assembly after the vertical stabilizer on the airplane struck a griffon vulture head-on.

4. RECOMMENDATIONS

None.