

**ACCIDENT**

<b>Aircraft Type and Registration:</b>	Schempp-Hirth Flugzeugbau GMBH Discus B, G-CHOM	
<b>No &amp; Type of Engines:</b>	None	
<b>Year of Manufacture:</b>	1985	
<b>Date &amp; Time (UTC):</b>	9 July 2009 at 1552 hrs	
<b>Location:</b>	West of Gransden Lodge Airfield, Cambridgeshire	
<b>Type of Flight:</b>	Private	
<b>Persons on Board:</b>	Crew - 1	Passengers - None
<b>Injuries:</b>	Crew - 1 (Fatal)	Passengers - N/A
<b>Nature of Damage:</b>	Aircraft destroyed	
<b>Commander's Licence:</b>	BGA Gliding Certificate with Bronze Badge and Cross-Country Endorsement	
<b>Commander's Age:</b>	64 years	
<b>Commander's Flying Experience:</b>	19,600 hours (of which 2 hours were on type) Last 90 days - 15 hours (gliders) Last 28 days - 8 hours (gliders)	
<b>Information Source:</b>	AAIB Field Investigation	

**Synopsis**

Approximately ten minutes into a flight following a winch launch, the glider was observed to be in a spin to the left. The indications were that it entered the spin while soaring and did not recover before it struck the ground. The pilot sustained fatal injuries.

**History of the flight**

Before taking a winch launch in the glider, the pilot received a brief on the latest BGA advice on winch launching. The briefing, with an instructor, did not include any discussion of intentional spinning during the pilot's forthcoming flight. The visibility was in excess of 10 km and there was cumulus cloud above 3,500 ft. One instructor described it as "a good soaring day".

Another instructor, who witnessed the glider's takeoff, commented that it was a "textbook" launch. The aircraft was not carrying water ballast.

Data recovered from GPS equipment carried in the aircraft, showed that the glider soared to the west of Gransden Lodge for approximately ten minutes after being released from the winch cable. Witnesses on the ground then observed the glider established in a spin to the left; the angle of their observation and the GPS evidence indicated that the glider was passing approximately 600 ft agl when they first saw it. The glider then passed out of their line of sight, still spinning. Shortly before the end of the flight, the GPS recorded a

series of positions close to each other, consistent with a spin.

An instructor, who was airborne and soaring nearby, saw the glider in a field and alerted another glider pilot by radio. They both landed, went by car to the accident site and found the glider in a field of rape. The pilot had sustained fatal injuries in the impact.

The radio in G-CHOM had been tuned to the same frequency as the radios in the instructors' gliders but no distress call was heard from the pilot.

### **Wreckage and impact information**

The glider came to rest in an upright position, on a heading of 170°M, in a field of rape on the western edge of Gransden Lodge Airfield. The lower section of the cockpit area had been extensively damaged and the top of the seat back frame had been forced upwards consistent with the glider sustaining a high vertical impact. The canopy frame had broken and the canopy's transparent material was found scattered around the nose area of the glider. Whilst the aero-tow hook was full of earth, there was no other damage to the nose section.

The inboard leading edge of the left wing had delaminated and there was compression damage along the top of the wing and damage on the inboard trailing edge of the lower surface. The right wing appeared to be undamaged. There was some damage to the leading edge and lower surface of the left side of the tailplane. The mainwheel was in the up position and the elevator trim was set 5 cm from the rear position the full range being 8 cm. All the flying controls were assessed as being serviceable prior to the impact.

The damage to the rape crop indicated that the left wing and tail section were moving anti-clockwise, as viewed

from above, when the glider made contact with the crop. The damage was also consistent with the glider having a relatively low forward speed at impact.

### **Centre of Gravity (CG)**

The position of the CG at the time of the accident was calculated by the AAIB to be 400 mm aft of the datum, which placed it at the aft limit. The manufacturer reported that during flight tests the aircraft had been flown with the CG 415 mm aft of the datum, ie 15 mm beyond the aft limit, and stated that:

*'no exceptional flight characteristics of the Discus has been reported in the test flight reports.'*

In calculating the CG during the investigation, it was noted that there was a discrepancy between the maximum and minimum seat weights recorded in the glider's weight and balance report, issued on 16 December 2004, and the placard found in the glider. This discrepancy had gone unnoticed since January 2005, with the risk that the glider might have been flown, unintentionally, with the CG outside of the approved limits. Whilst this discrepancy was not causal to this accident, it was brought to the attention of the BGA. They subsequently took action to advise their inspectors, and owners, of the importance of ensuring that the placard accurately reflects the status of the aircraft.

### **Recorded information**

A Garmin II Plus GPS was recovered from the aircraft. There were a number of tracks saved in its data log, including the accident flight but, due to the model of the GPS equipment, altitude information was not recorded. The accident log started at 1504:08 hrs at Gransden Lodge Airfield and ended at 1552:11 hrs

near the accident site, just to the west of the airfield. The evidence indicated that the glider commenced its takeoff at 1542:15 hrs. Radar data was requested but nothing was detected during the period of the accident, at or within the vicinity of the airfield.

Figure 1 shows the GPS track for G-CHOM, which is consistent with the glider soaring. The accident site was very close to the last recorded GPS position. The indications were that the aircraft's track at the point of impact was approximately 170°M.

The average groundspeed between each GPS track point is presented in Figure 2 and shows that the groundspeed during the majority of the flight oscillated between 30 and 60 kt. The wind at 1552 hrs at 1,000 ft, 1,500 ft and 2,000 ft agl was estimated to

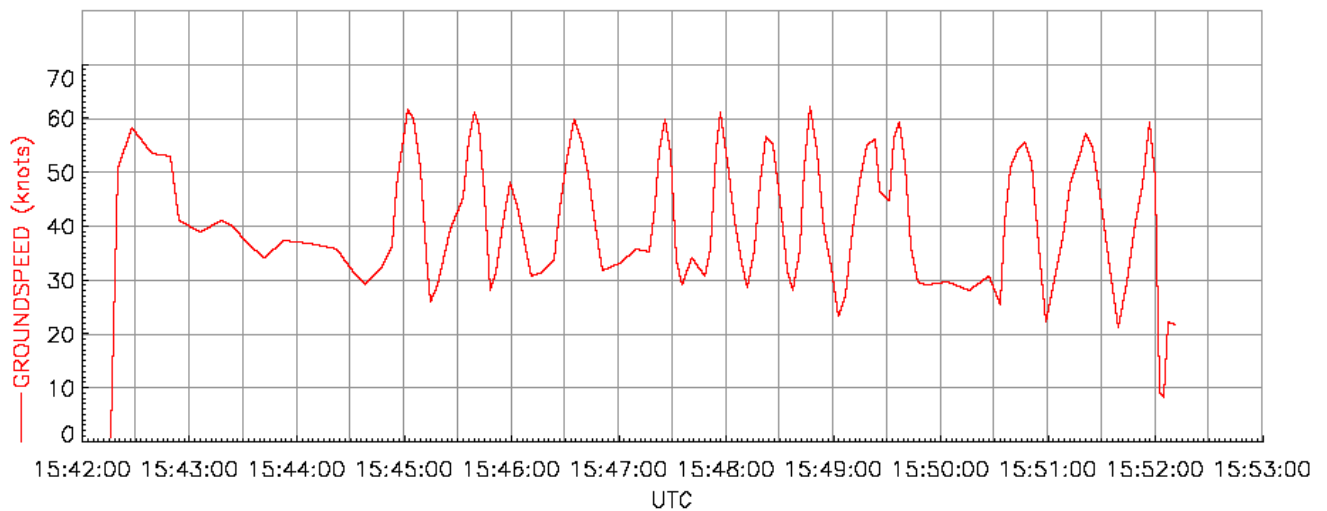
be from 300° at 15 to 20 kt. There was no indication of the glider's rate of climb or descent.

### The pilot

The pilot learned to fly with a University Air Squadron in the mid-1960s, before training as a commercial pilot and working for a number of airlines, flying jet aircraft on international routes. On his retirement from professional flying, he took up gliding and undertook his first solo glider flight (in a K21 glider) after 17 launches. He then converted onto the Junior single-seat glider followed by the Discus. Instructors who flew with the pilot described him as having good, accurate flying skills and exercising very sound judgement, consistent with his background as a professional pilot. He was developing his ability to find lift and maintain soaring flight for extended periods but most of his



**Figure 1**  
GPS track of G-CHOM



**Figure 2**

Speed of G-CHOM over the ground

winch-launched flights were of short duration. His last annual refresher flight, in March 2008, included a spin check. The instructor on that occasion commented in the pilot's log book:

*'Spin check for annual refresher exceptionally well done.'*

The pilot was also a regular tug pilot at the gliding club and had flown a number of aero-tows on the day of the accident. He had a share in a Chipmunk aircraft which he flew a number of times a year.

### Pathology

The postmortem examination report stated that the pilot died of multiple injuries, sustained in the accident, and that the accident was not survivable. No evidence of incapacitation was found.

A number of years before the accident, it had become apparent that some members of the pilot's family had a genetically-determined heart condition, which could produce abnormalities in heart rhythm or, possibly,

sudden death. The health of the pilot's heart had been regularly investigated and this had revealed occasional abnormalities, for which he had been prescribed medication. For a short time between 2005 and 2006, the pilot's Class One medical certificate had been restricted to multi-crew operations. In 2008, when he had retired from professional flying, his certificate was changed from Class One to Class Two.

The pathologist stated in the postmortem report:

*'Although no significant cardiac pathology was evident at the autopsy, the possibility that the pilot may have suffered an incapacitating abnormal heart rhythm cannot be entirely discounted, as this can occur without leaving any pathological evidence. However to invoke this as a likely cause of the accident would require other strands of the investigation to suggest that medical incapacitation of the pilot was probable.'*

## Spinning the Discus Glider

No official data relating to the height loss per turn in a spin in the Discus B could be obtained. However, data from tests on similar glider types suggested that the duration of a turn in a developed spin would be of the order of two to five seconds, and the height loss would be about 200 to 360 ft.

The manufacturer provided extracts of a flight test report which stated that recovery from the spin is effected in not more than half a turn. The report added that the loss of height from the point at which recovery is initiated, by the standard method, to the point at which normal level flight is first regained is approximately 262 ft.

An experienced Discus pilot commented that the Discus B glider exhibited “entirely normal” characteristics when spinning. He offered the opinion that the aircraft was not likely to enter a spin without being provoked by its pilot. However, he added that if a thermal turn is mishandled and uncommanded roll occurs, the ailerons must be centralised. If, instead of centralising the controls, the pilot attempts to maintain the desired roll attitude with aileron, a spin may be provoked. Furthermore, he commented that a spin in the Discus is similar to that experienced in a Puchacz glider, in which the pilot of G-CHOM had flown his most recent annual check.

### BGA analysis of spinning accidents

The BGA provided a comprehensive analysis of glider accidents in the United Kingdom since 1974, when their current records began. The analysis showed a total of 163 fatal or serious injury accidents involving stalling and/or spinning. Approximately half the accidents occurred during winch launches. The other accidents included a very small number resulting from intentional spins but, commenting on the remainder, the report stated:

*‘The overwhelming majority were cases of an inadvertent stall or spin near the ground.’*

In examining accidents not related to winch launches, distraction was often a factor. Discussion with the BGA, glider pilots, and instructors, indicated that the importance of centralising the controls in the event of uncommanded roll is well-publicised and generally well understood by glider pilots. During the discussions, some opinion was offered that a spin entry during thermalling flight was likely to be the result of mishandling the controls. However, as gliders are not equipped with flight recorders which measure control inputs, no data was available to support this.

### Analysis

The flight appeared to have progressed normally until the glider entered a spin to the left from which it did not recover. The investigation established that the glider was serviceable and that the controls were intact prior to the accident. The dense crop of rape at the accident site appeared to have dampened the motion of the glider on impact. Nevertheless, there was sufficient evidence to establish that the glider struck the ground with relatively little forward speed, in a nose-down and left wing low attitude. The evidence at the accident site was consistent with the glider being in a spin to the left at the moment of impact.

The CG of the glider was calculated after the accident to have been on the aft limit and therefore in the permissible range. The manufacturer advised that the aircraft had been tested with a CG 15 mm beyond the aft limit and that no ‘*exceptional flight characteristics*’ had been reported. The advice given also indicated that recovery from a spin would be achieved in not more than half a turn, during which the height loss would be about 260 ft.

No malfunction or failure was identified to account for the entry into the spin, which was either intentional or unintentional, and the pilot did not make any distress call on the radio during the accident sequence.

#### *Intentional spin*

The absence of height data meant that it was not possible to determine the vertical profile of the accident flight. The weather conditions were suitable for a spinning exercise and it is conceivable that the pilot soared to a safe height from which he could have executed an intentional spin and recovery. However, there was no evidence that the pilot planned to spin during the accident flight and, if the entry to the spin was intentional, it is not clear why a successful recovery was not achieved. He had demonstrated '*exceptional*' skill in recovering from a spin during his last annual check in 2008, when it had been a planned manoeuvre.

#### *Unintentional spin*

There was no evidence to suggest a cause for an unintentional spin. Distraction may have been a factor, though no distracting event could be identified. An unintentional spin may have begun at too low a height to permit recovery but the level at which the glider was first observed in a spin to the left suggests that there was sufficient height remaining for the pilot to effect a successful recovery.

In summary, there was insufficient evidence to account for the entry into the spin and the absence of a recovery from it. The possibility that the pilot may have suffered an incapacitating abnormal heart rhythm could not be entirely discounted as this can occur without leaving any pathological evidence.