

ACCIDENT

Aircraft Type and Registration:	DG-300 Elan, G-CKJH	
No & Type of Engines:	None	
Year of Manufacture:	2004 (Serial no: 3E506)	
Date & Time (UTC):	7 July 2022 at 1730 hrs	
Location:	Near Winchcombe, Gloucestershire	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - 1 (Fatal)	Passengers - N/A
Nature of Damage:	Impact damage to lower forward fuselage, broken canopy, and damage to both wings. Main landing gear forced back into wheel well	
Commander's Licence:	N/A	
Commander's Age:	85 years	
Commander's Flying Experience:	Approximately 3,900 hours Last 90 days - 24 hours Last 28 days - 13 hours	
Information Source:	AAIB Field Investigation	

Synopsis

With the end of the flying day approaching, the pilot of G-CKJH decided to land in a field. The field chosen was uphill with a rough surface which the pilot had not fully appreciated until he was committed to the landing. On the first touchdown, the glider landed heavily and bounced. The pilot felt his neck had been injured in this first touchdown. The glider ended up embedded in a stock fence. The pilot was able to extract himself from the glider but after a few steps he began to lose feeling in his limbs and fell to the ground. Having been discovered by the landowner, he was flown by air ambulance to hospital where scans revealed a fracture in his C7 vertebrae and a large haematoma which was pressing on his spinal cord causing the paralysis. Although the pilot began to recover feeling in his limbs, complications from his injuries and underlying medical conditions lead to his death 20 days after the accident.

Given the experience of the pilot, the choice of field was out of character. However, the position of the sun, the size and colour of other fields and their crops as well as the possibility of dehydration during a warm day may have contributed to the decisions that the pilot made.

History of the flight

The pilot of G-CKJH was taking part in an annual gliding competition from Long Mynd Airfield, Shropshire. Having received their briefing on the day's competition, the pilots taking part then waited for the weather to improve before launching for their flights. With

an improvement in the weather, G-CKJH launched from the airfield at 1448 hrs. Having thermalled near the airfield to gain height, the pilot then set off in a roughly south-easterly direction. Over the next one and a half hours the flight continued in that south-easterly direction, reaching a maximum altitude during the flight of approximately 4,000 ft. As the glider approached Cheltenham at around 1720 hrs, the pilot turned east, passing to the north of Winchcombe. The pilot decided that he needed to land the glider as the day was drawing to a close and he was aware that he would not be able to make it back to the launch site. Having completed a 360° turn to the right, he made an approach to a field. Although he realised once on the approach that the field was rough and sloped steeply upwards, he was committed to landing.

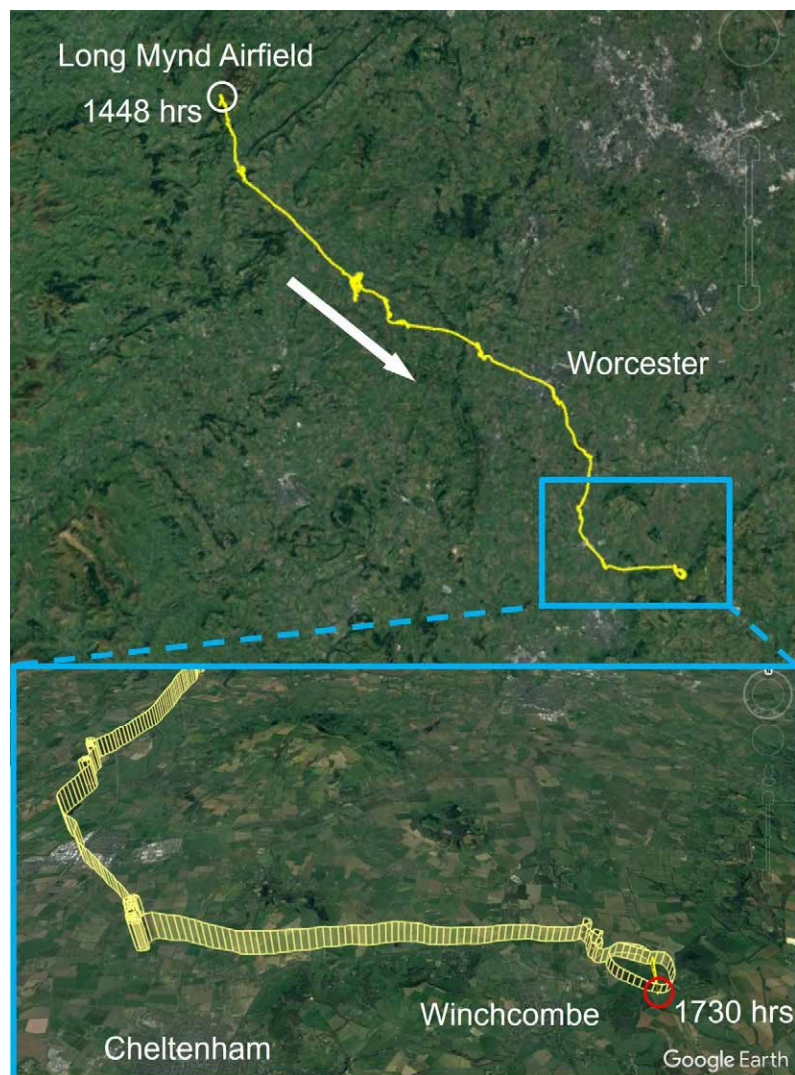


Figure 1

Ground track of accident flight recorded on IGC logger

The glider touched down in the field at 1730 hrs and immediately struck something causing the glider to jerk violently. The glider came to rest embedded in a stock fence at the top of the field. The violent jerk on the initial touchdown had caused a neck injury to the pilot. He was able to extract himself from the cockpit, by climbing through the broken canopy, and

climb over the fence but soon started to lose feeling and function below the neck. He had managed to send a message with his location to his retrieval team, but they were a significant distance away. The owner of the field noticed a large white object whilst driving home and went to investigate, finding the pilot laying near the glider, conscious but paralysed. The pilot was airlifted to hospital but died 20 days later due to complications from his injury.

Accident site

The glider came to rest in a hedge at the uphill end of a grass field at Haile on the Hill, approximately 6 nm northeast of Cheltenham, Gloucestershire (Figure 2). The hedge contained a wire stock fence which the nose of the glider penetrated, breaking the canopy transparency and trapping the canopy frame in the closed position.



Figure 2

Accident site looking south (left image) and accident location (right image), with approach direction into field indicated with a red arrow. © 2022 Ordnance Survey

The surface of the field was undulating grass pasture, with a steep upslope of approximately 20% (Figure 3).



Figure 3

Accident site, looking north-west

Recorded information

An IGC flight recorder and a FLARM¹ unit (which also logged flight data as an IGC file) were recovered from the glider. Both units were downloaded, and the recorded ground track log of the accident flight is illustrated in Figure 1.

Figure 4 plots the track angle, groundspeed and vertical speed, derived from the flight path data in the IGC file, together with the altitude and ground height below the glider, for the last part of the flight as the glider circled and descended toward the landing field. The circuit was at about 1,300 ft amsl (between 800 and 1,000 ft agl over undulating terrain). The descent started from 1,200 ft amsl (about 550 ft higher than the accident site elevation), during which the vertical decent rate peaked at about 1,900 ft/min before reducing to about zero, and the groundspeed from just under 90 kt to about 50 kt.

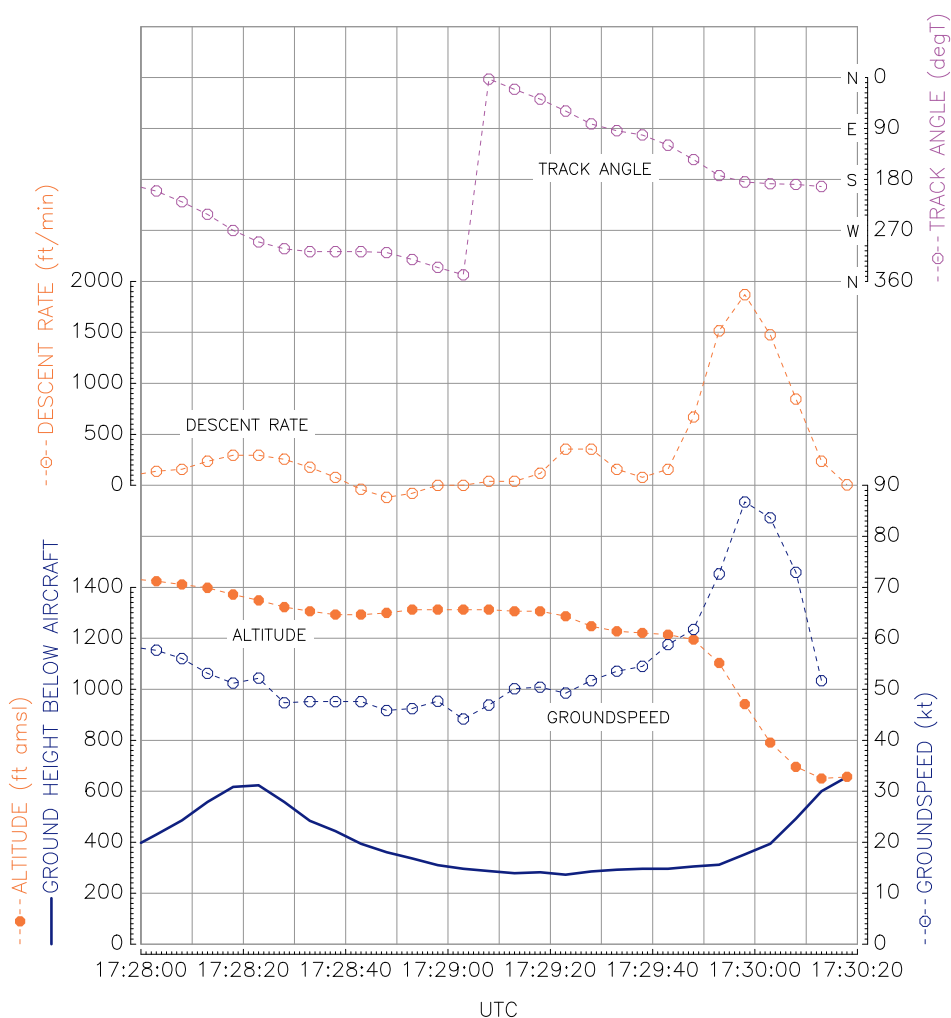


Figure 4

IGC recorded/derived data for circuit and descent to field

Footnote

¹ FLARM (an acronym based on 'flight alarm') is the proprietary name for an electronic device which is in use as a means of alerting pilots of small aircraft, particularly gliders, to potential collisions with other aircraft which are similarly equipped.

The pilot was also using an IGC approved flight computer with moving map display. The unit could be connected to the glider to ensure its battery remained charged; however, the pilot had noted that the device did not seem to be charging properly. The investigation was provided with a copy of the IGC file from the device which showed that it had stopped recording to the west of Worcester, about 40 minutes before the accident. There were no other electronic navigation devices on the aircraft although a paper aeronautical chart was recovered from the wreckage.

Aircraft information

The DG-300 Elan is a single-seat glider constructed mainly from glass fibre composite materials. It has a wingspan of 15 m and a retractable main landing gear. The cockpit has a single-piece canopy that hinges upwards at the nose to provide entry and egress. An annual maintenance inspection was completed on 15 November 2021 and the glider had a valid Airworthiness Review Certificate when the accident occurred.

Aircraft examination

All parts of the glider were present at the accident site and the flying controls were found to be correctly connected prior to disassembly and recovery of the glider. It had sustained impact damage to the wings and forward fuselage caused by sudden deceleration into the hedge and wire fencing during the accident. The lower fuselage skin was fractured and had surface scoring caused by a heavy impact with the ground whilst the glider was yawed to the right by approximately 20°. The main landing gear had been extended prior to landing but impact forces had pushed the wheel rearwards, into the wheel well. The wheel brake was examined and found to function correctly when tested.

The cockpit was fitted with an energy-absorbing cushion of 30 mm thickness. The energy-absorbing foam was examined and found to be in good condition. The four-point seat harness and buckle were in good condition with no evidence of overload damage.

Survivability

The pilot recalled that he felt the damage to his neck occur during the sudden jerk during the first touchdown. Examination when he reached the hospital noted a fracture in the C7 vertebrae. The pilot was able to extract himself from the cockpit and move a short distance from the glider before being paralysed. This would indicate that he did not suffer a spinal cord injury due to the fracture. Hospital scans showed a large haematoma, caused by bleeding into the spinal column pressing on the spinal cord, to be the cause of the paralysis.

Although the pilot began to regain feeling in his limbs, complications from the injury and longer-term medical conditions caused a deterioration in his health and he died in hospital 20 days after the accident.

Medical history

The pilot had been suffering from a condition known as ankylosing spondylitis for many years. This is a long-term condition in which the spine and other parts of the body become

inflamed. It often causes the fusion of bones in the spine. It can lead to the weakening of bones (osteoporosis) and spinal fractures. Whilst the progress of the condition in the pilot had seemed to have reached a plateau, it is likely that his spine was significantly weaker than those without the condition. The pilot's age also meant that his bones were likely to be less dense than someone of a younger age.

The C7 vertebrae is the lowest part of the cervical spine at the base of the neck which supports the head and neck. A fracture of C7 is most often caused by a high energy trauma such as a car accident. In this case it was likely a whiplash type movement was responsible for the injury. The ankylosing spondylitis made the pilot's spine stiff and inflexible meaning the pilot's neck was not able to flex or extend to any great extent. Often described as 'chalk stick' or 'carrot stick' fractures they are the result of the fused segments of the spine acting as a lever arm. This then places greater than normal stresses on the spine. These fractures can often occur following minimal trauma due to the altered biomechanics of the spine.

Meteorology

A high-pressure system was centred to the west of the UK giving generally fine and settled weather. There was some low cloud around the launch site in the morning but as the temperature rose, the cloud dissipated leaving a fine and warm afternoon. No cloud was observed in the area below 5,000 ft altitude. The wind was light but from the northwest. A consistent temperature of 22°C was recorded throughout the late afternoon. The sun and the air temperature would have made the cockpit warm even with the ventilation window open. The pilot was carrying refreshments including fluid for drinking, but the investigation was unable to establish how much the pilot had consumed during the flight.

At the time of the accident, the sun was at a bearing of 270° and 29° above the horizon. During the final approach, with the pilot flying south, the sun would have been at his right shoulder. Sunset was at 2028 hrs.

Field choice

The pilot had extensive gliding experience including field landings (of which he had completed over 220). He had been gliding for over 70 years and had been a regular participant in competition gliding throughout the UK. There was some suggestion from witnesses who had spoken to the pilot after the accident that he had intended to head for a gliding club which was approximately north of his final position by 11 nm.

The pilot noted after the accident that there were some larger, flatter fields lower down in the valley, but they had corn growing in them, so he chose a pasture on the side of the hill (Figure 1). Information provided to the investigation showed that nearly all the flatter fields had unharvested crop in them which was mature and yellow in colour. Other flatter grass grazing fields were also by and large yellow in colour due to the extended drought and hot weather of 2022.

The pilot described to friends during his period in hospital after the accident that he had not appreciated the rough surface of the field, nor just how steep it was until he was on his final approach. At this point the pilot was committed to landing in the field, although he did close the airbrakes to try and land further up the field in what he considered to be a slightly smoother area.

Landing on an upslope always presents several challenges for a pilot. The visual illusion created by the upslope can make the pilot think they are higher than they are, this makes judging any flare more difficult. The flare also needs to be started sooner due to the rising ground below and of a greater pitch due to the relative change in attitude required. These factors can lead to a heavier landing on an upslope than might have occurred on a flat surface.

Analysis

The pilot was a very experienced glider pilot, current and well-practised in field landings. Given his experience, the choice of landing field would seem inexplicable. There are several factors which could have played a part in the pilot choosing an unsuitable field.

The pilot felt that the day was drawing to a close and that it was time to land. He had suggested to friends that he might have been planning to land at another gliding club which was approximately 11 nm to the north of the accident site. It is possible that after the failure of the GPS in the cockpit, the pilot was not able to locate the gliding site before he felt he needed to land.

The day had been warm with sunshine throughout the flight and so it is likely that the cockpit would have been quite hot. Whilst the pilot had taken refreshments with him, it is unknown whether dehydration could have affected his decision making at the end of the flight. The wind was light and from the north-west. The approach and landing were effectively downwind but the windspeed was so light that it was not considered as a factor in the accident.

Whilst positioning for the field landing the pilot completed a 360° turn to the right. This turn would have put him through the 270° heading in which he would have been looking into sun in front of the aircraft. It is possible that whilst completing this turn and identifying the field he intended to land in, the position of the sun affected how well he could assess the slope and surface of fields around him. He told friends that he avoided larger and flatter fields in the valley as they had crops growing in them. Once he had committed to the field and was on his final approach, the position of the sun on his right shoulder would have had less effect on his visual picture and he realised that the field was steeper and rougher than he had thought.

Once the pilot was on his final approach he was committed to landing in the chosen field. With a significant upslope, the field presented challenges for the pilot in judging his approach and flare. Given the severity of the slope, the landing may have been heavier than expected due to a late and/or insufficient flare. This would have been further exacerbated by the rough and uneven surface. Damage to the glider would indicate that it suffered a heavy

impact with the ground whilst yawed to the right. The initial impact was of sufficient energy to cause a fracture to the pilot's C7 vertebrae. Whilst this injury is most often seen in high energy trauma, given the pilot's medical history and age, this force might not have needed to be of great magnitude to cause the injury.

No defects with the glider were identified that could have contributed to the accident.

Conclusion

Having reached the end of the gliding day, the pilot elected to land the glider in a field. The field chosen had a rough surface and a steep slope which the pilot did not fully appreciate until he was committed to the landing. Having touched down heavily, the pilot's neck was injured and, although he was able to extract himself from the glider, he soon lost feeling in his limbs. He was airlifted to hospital but died of complications from his injury and underlying medical conditions.

Published: 19 January 2023.