ACCIDENT

Aircraft Type and Registration:	Schleicher ASW 24, G-CGDU
No & Type of Engines:	N/A
Year of Manufacture:	1991 (Serial no: 24118)
Date & Time (UTC):	30 April 2012 at 1342 hrs
Location:	Near Dunstable, Bedfordshire
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - 1 (Fatal) Passengers - N/A
Nature of Damage:	Aircraft destroyed
Commander's Licence:	BGA Gliding Certificate
Commander's Age:	65
Commander's Flying Experience:	274 hours (of which 10 were on type) Last 90 days - 17 hours Last 28 days - 8 hours
Information Source:	AAIB Field Investigation

Synopsis

The pilot was carrying out his second flight of the day from a winch launch. He turned downwind and was seen to make an orbit to the right before continuing downwind. The glider made a brief, steep, wings-level climb before levelling off at a height of about 300 ft. It then banked to the left, before entering what was described as a spiral dive to the right. After turning through approximately 270°, the glider impacted the ground in a steep nose-down attitude. The pilot was fatally injured. The most likely cause of the accident was a stall leading to a loss of control, with insufficient height available to recover.

History of the flight

The weather conditions at the gliding site near Dunstable were good, but with a blustery wind from the south-east, estimated at 10 to 15 kt, with some stronger gusts. Recorded wind data from an anemometer located at a proposed wind farm site close to Stoke Hammond, some 8 nm north-west of the gliding site, indicated a wind around the time of the accident of generally 130° at 14 kt, gusting 24 kt. The visibility was in excess of 10 km and there was scattered cumulus cloud with a base of 4,500 ft. A red wind sock was being flown at the gliding site. This indicated to pilots that the weather conditions were such that it was recommended that only instructor pilots and those with a Silver standard gliding qualification should fly. Although the pilot was not an instructor and did not hold a Silver qualification,

he had recently returned from a club trip to the Pyrenees where he had flown in more challenging conditions.

The pilot had considered taking an aero-tow for his first launch, but given the wind direction, he elected to carry out a winch launch. He flew a circuit to the right and returned to the field. After lunch he carried out a second winch-launched flight. The glider released from the launch at 900 ft aal and made a right turn, flying along the line of the Dunstable Downs ridge. It then made a gentle, continuous turn to the right through approximately 180°, followed by a single orbit to the right, rolling out on a northerly heading. Shortly thereafter the glider was seen by a witness to pull up steeply and level off. It then banked to the left before entering a spiral dive which the witness thought was to the right.

The glider was seen by other witnesses to be in a steep nose-down attitude before impacting the ground in a field of crops, fatally injuring the pilot. One witness described the glider skidding or yawing with its nose to the right prior to impact.

Weight and balance

The glider maximum allowable takeoff mass was 500 kg. The empty mass was 253 kg, as shown on the Weighing Record. The pilot's weight plus parachute and equipment was 110 kg, giving an all up mass of 363 kg for the accident flight.

Aircraft operating manual

The operating manual contains two pieces of information relevant to the accident. These are:

The 1g stall speeds, which are promulgated at paragraph 5.2.2, shown in Table 1.

Paragraph 3.6 sets out the procedure for recovery from a spiral dive [sic]:

> *'Spiral Dive Recovery*
>
> *Depending on the aileron position during spinning with forward C.G. positions - that is: the C.G. range when the ASW 24 will no more sustain a steady spin – it will immediately or after a few turns develop a spiral dive, or slipping turn similar to a spiral dive.*
>
> *These conditions will both be terminated by:*
>
> *(1) applying opposite rudder*
>
> *(2) applying aileron opposite to direction of turn.'*

Stalls

The British Gliding Association (BGA) Instructor Manual, Chapter 18, provides a comprehensive description of stall recognition and recovery and lesson plans for teaching this.

Air Brake Setting	*320 kg*	*410 kg*	*500 kg*
Closed	*35 kt*	*39.5 kt*	*43.5 kt*

Table 1

Stall speeds at prescribed glider weights; airbrakes closed

Of significance in this accident is the combination of the glider's groundspeed and the tailwind component during the level-off after the steep pull-up manoeuvre, which would have placed the glider's airspeed close to the 1g stall airspeed of around 37 kt. A pull up will cause a loss of airspeed and levelling off results in a reduction in g. If the airspeed decays slightly below the normal 1g stall speed whilst levelling off, the glider will not stall. However, once the glider returns to the 1g state, it is in then danger of stalling unless corrective action is taken. If the glider is yawed or turning at this point, the stall may be accompanied by a wing drop. The Manual explains that recovery from this situation requires two actions: firstly, lowering the nose to unstall the wing and attain a safe airspeed and secondly, levelling the wings before pulling out.

Medical and pathological information

The post-mortem examination showed that the pilot had died of multiple injuries sustained as a result of the accident. The pathologist also reported that there was no evidence of drugs or alcohol having been consumed, nor was there any evidence of natural disease which could have contributed to the accident.

Engineering investigation

The aircraft damage and ground impact marks were consistent with the effects of the aircraft striking the ground in a right hand spiral dive.

Examination of the wreckage showed that the glider was structurally complete prior to impact, with the landing gear retracted and the airbrakes closed. No evidence of any pre-impact failure was found in the structure or controls. The aircraft damage was consistent with the expected effects of impacting the ground in a spiral dive.

Recorded data

Two GPS receivers and an iPAQ Personal Digital Assistant (PDA) were recovered from the glider.

The Garmin GPSIII Pilot did not record any data but was used to pass GPS data to the iPAQ which recorded the GPS position and GPS altitude once per second. The iPAQ recorded both the first flight of the day and the subsequent accident flight (Figure 1). The recording of the accident flight stopped whilst in the air in the vicinity of the accident site, most likely due to the loss of buffered data when the iPAQ was damaged in the impact. This installation used a GPS antenna mounted on the glider.

The Garmin GPSMAP 60Cx also recorded the accident flight. A new sample point was only recorded whenever there was sufficient change in the position or motion to trigger it. This resulted in a less comprehensive recording than the iPAQ recording. The portable unit used an integral GPS antenna; the location of the unit in the cockpit was unknown. The data extends to the ground but is unreasonable at the end, most likely due to the loss of sight of sufficient GPS satellites to generate an accurate position.

Figure 2 shows the iPAQ recorded GPS altitude data for the accident flight, as well as the derived altitude rate and derived groundspeed. The accident flight started at 1329 hrs and the recording ended approximately three minutes later.

Analysis

The pilot had completed a flight in the morning, the profile of which was recorded on the iPAQ. He did not raise any issues regarding that flight, which appears to have been conducted safely. He did not execute any pull-up manoeuvre on the first flight.

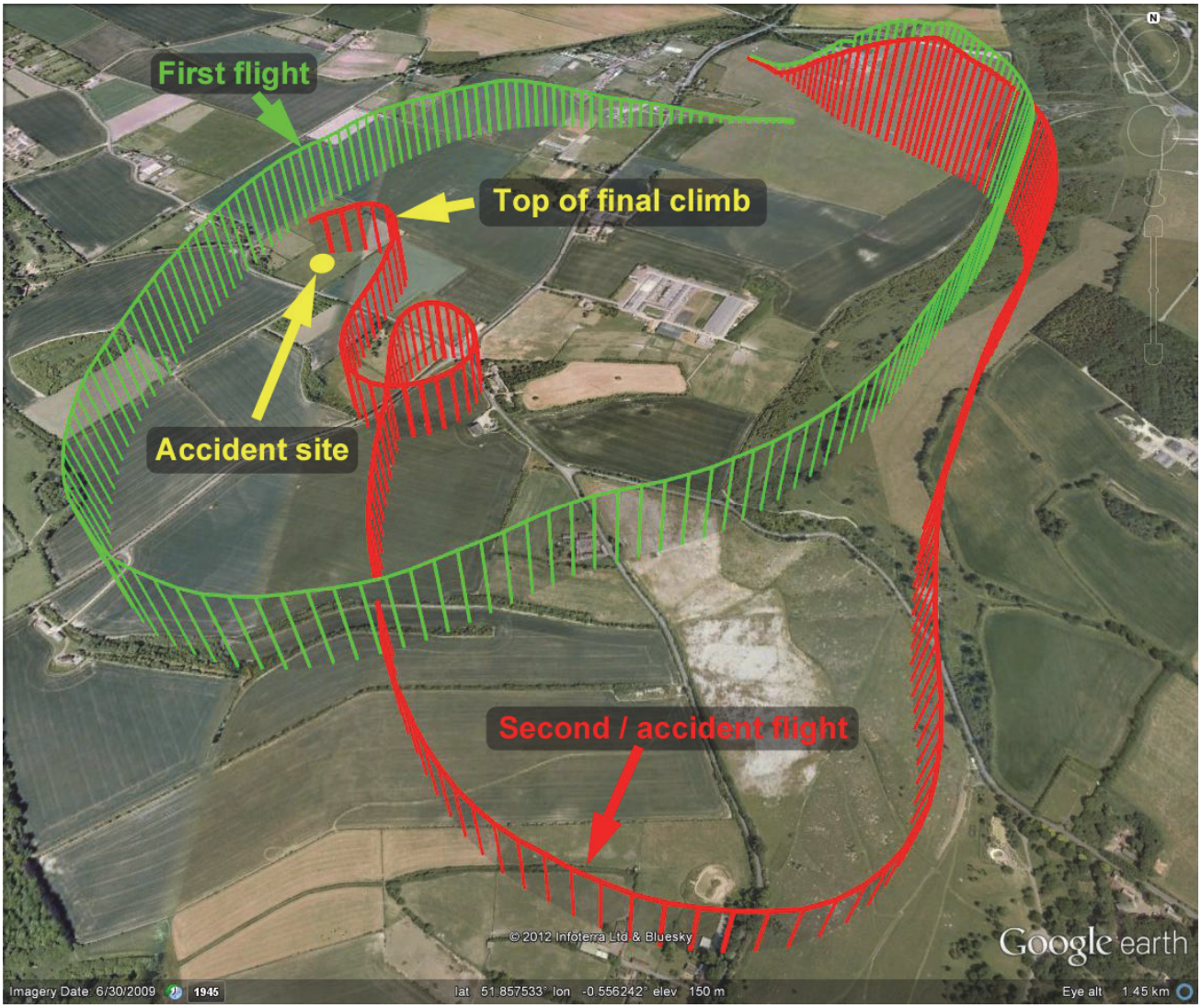

Figure 1

The first (green) and second/accident (red) flights

On the accident flight, for a reason that was not determined, the pilot elected to execute a pull-up manoeuvre. A possible explanation is that he was exploiting an area of lift, in order to gain height. The GPS data show that the glider's groundspeed reduced to 47 kt as it reached the top of the pull up, at which point it banked to the left. The wind direction and strength was such that it would have produced a tailwind component of 10 kt or possibly greater, given the gusty conditions. This, in combination with the low groundspeed, indicates that the glider's airspeed would have been close to, or possibly even below, the 1g stall speed of 37 kt for the given weight.

It is not known if the bank to the left was the pilot's intention or the result of a wing drop, but the witness evidence suggests that the glider then stalled and entered a spiral dive to the right, from which there was insufficient height to recover. The wreckage examination confirmed that the aircraft was in a right hand spiral dive on impact.

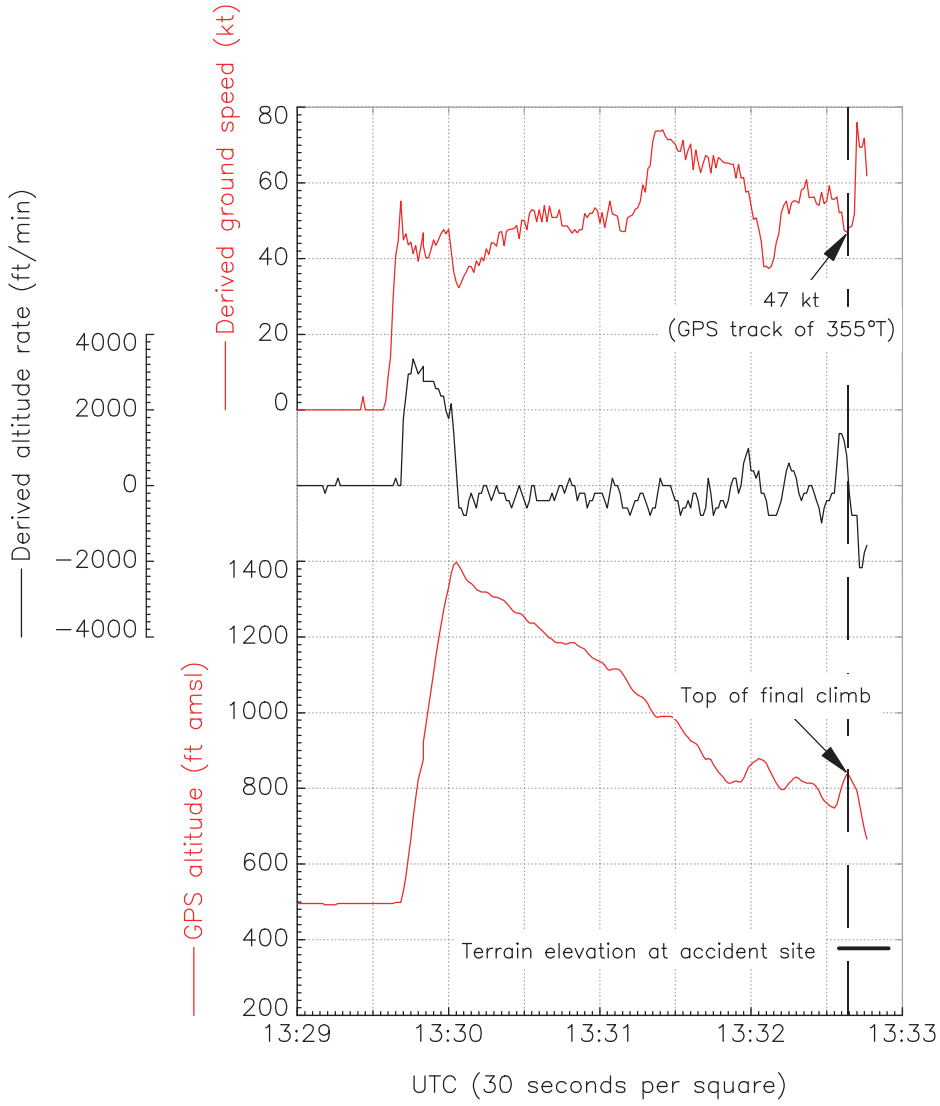

Figure 2

Recorded GPS altitudes and derived altitude rates and ground speeds for the accident flight, sourced from the iPAQ

Conclusion

The investigation concluded that the probable cause of the accident was a stall and loss of control due to an excessive loss of airspeed during a pull-up manoeuvre. There was insufficient height available to execute a recovery.