

Aircraft type and registration:	Slingsby T67M Firefly G-SFTY (light single engine fixed wing aircraft)	
Year of manufacture:	1983	
Date and time (GMT):	30 January 1984 at about 1205 hrs	
Location:	Torquhan, near Galashiels, Scotland	
Type of flight:	Navigation training	
Persons on board:	Crew — 1	Passengers — Nil
Injuries:	Crew — 1 (fatal)	Passengers — N/A
Nature of damage:	Aircraft destroyed	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	23 years	
Commander's total flying experience:	80 hours (of which 10 hours were on type)	

The pilot, a military student from overseas, was attending an intermediate flying course at Carlisle aerodrome. Prior to this he had completed a basic flying course and had qualified for the issue of an United Kingdom Private Pilot's Licence. The purpose of the intermediate stage is to enable students to achieve the requirements for an Instrument Meteorological Conditions (IMC) Rating, one of which is to have completed, as pilot in command, not less than five hours on point-to-point cross-country flights.

Pre-flight briefing

Prior to the day of the accident, the pilot had not flown during the previous 10 days. He was therefore required to fly a dual check, with a flying instructor, before being authorised to carry out a solo navigation exercise. Before the dual check flight the pilot had completed the flight planning for the subsequent solo cross-country navigation flight. The route for this exercise was Carlisle—NW Hexham—Longframlington—Beal—Kelso—Longtown—Carlisle, and is depicted in the diagram at the end of this bulletin. A weather forecast for the area centred 30 nautical miles (nm) around Carlisle was available, together with forecast and actual conditions at Carlisle, Newcastle, and Edinburgh aerodromes. The planned cruising level was 3,000 feet above mean sea level, at which height the forecast wind was 230°/25 knots. The planned cruising speed was a true air speed (TAS) of 120 knots, and the estimated flight plan time to complete the route was about 1 hour and 15 minutes.

The pilot's flight plan and routing were checked by the flying instructor, who also briefed him on emergency procedures and the action to be taken should he become uncertain of his position. Students are also specifically briefed not to enter or fly above total cloud cover, except as a last resort. Should such conditions be encountered during a navigation exercise, students are advised to turn around and retrace the route in the opposite direction. The pilot had previously flown this route in the opposite direction, with a flying instructor, 10 days before this flight. Before all navigation exercises, the aircraft's tanks are filled to capacity (24 gallons), providing an endurance of some 3 hours and 45 minutes.

History of the Flight

From an analysis of radar recording and the transcripts of RTF messages throughout the flight, it has been possible to establish a reasonably accurate assessment of the actual track flown by the pilot; this is included in the diagram at the end of this bulletin.

The aircraft took off from Carlisle aerodrome at 1048 hrs, climbed to 3,000 feet on the regional barometric pressure setting (995 mb), and was observed to set course towards Hexham. At about 7nm to the west of the first turning point the aircraft started to drift to the south of the planned track, and subsequently overshot this turning point by 1½ nm before turning north. The pilot recognised this position and, at 1108 hrs, reported to Newcastle Air Traffic Control (ATC) that he was passing the disused aerodrome at Ouston. Nine minutes later he reported passing Eshott on a heading of 347° for Holy Island. The final positive primary radar contact on the aircraft on this sector showed that, at the time, the aircraft was 2 nm west of the planned track. At 1129 hrs the pilot reported that he was at Holy Island and turning onto a heading 258° for Kelso. At this point radio position reporting was transferred to Scottish Information.

In the prevailing conditions the sector from the turning point to the west of Holy Island to Kelso should

have taken 11 minutes, resulting in a time overhead Kelso of 1140 hrs. At 1145 hrs the pilot reported that he was overhead Kelso and turning onto a heading of 217° for Longtown. However, at this time the aircraft re-appeared on primary radar, and its actual position (from the radar recording) was 9 nm west of Kelso and turning onto a heading of approximately 217°. At 1147 hrs the pilot requested the 3,000 feet wind overhead Longtown, and this was subsequently passed as 200°/30 knots. In response to a query from the Scottish Information Controller the pilot confirmed that at that time he had the ground in sight. At 1154 hrs the pilot informed Scottish information that he was 'transferring to Kelso and wished to divert to Newcastle'. He further stated that he did not require any assistance at that time. The Scottish Information Controller advised the pilot to select a transponder code of 7240 and change to Newcastle Approach Control.

At 1158 hrs the pilot re-contacted Newcastle ATC, and said that he was lost and flying between layers of cloud. When asked if he was heading for Newcastle he replied 'I am going to Kelso but I can't see the ground'. The aircraft was identified approximately 52 nm northwest of Newcastle, on a northerly heading, its last reported height still being 3,000 feet. Two-way radio communication between the aircraft and ATC became intermittent and finally impossible. Although Newcastle ATC attempted to relay instructions via other traffic, these were not acknowledged. The final transmission from the aircraft was at 1201:30 hrs when the pilot transmitted 'Golf Tango Yankee I need radar.' The final radar return from secondary radar positioned the aircraft, still heading north, about 6 nm north of Galashiels and 57 nm northwest of Newcastle Airport.

At about 1205 hrs a witness, who was on horseback on a hill to the south of Torquhan Farm, caught a glimpse of the aircraft flying at low level in a southerly direction. The aircraft disappeared from view behind a line of small trees, and almost immediately afterwards there was the sound of an impact. The witness located the aircraft wreckage and found the pilot, who had been killed instantaneously, lying about 20 metres north of the impact area. The drogue section of his parachute was deployed. After checking that there were no further casualties, the witness reported the accident to the Lothian and Borders Police.

At 1315 hrs a Royal Air Force Wessex Search and Rescue helicopter landed at the accident site. Weather observations were recorded and the pilot's body then airlifted to a hospital near Galashiels. The subsequent post-mortem examination did not reveal any medical condition which would have contributed to the accident.

Examination of aircraft

The aircraft had impacted on snow-covered, frozen, grazing land at a height of approximately 1,050 feet above mean sea level. It was in a near vertical dive, heading 175°M, and travelling at high speed. The glass fibre re-reinforced plastic structure disintegrated immediately, and remained piled upon the crater, the engine having penetrated the frozen ground about 20 metres north of the aircraft position, where the pilot had landed. Two cushions from the aircraft cockpit were reported to have been recovered from an adjacent field north of the accident site; they were found respectively 91 and 174 metres from the wreckage. A quantity of paper and flight documents were recovered close to the impact position, however, the pilot's map and flight plan were not found.

During the on-site examination, the entire aircraft, including the canopy, was accounted for, thus precluding the possibility of an airborne structural failure or detachment. The aircraft's flying controls were examined in some detail, and although there were numerous failures consistent with severe ground impact, there was no evidence of pre-crash disconnection. The damage and fragmentation of the wooden propeller, together with the engine instrument post-crash readings, indicated that the engine was developing low power at impact. There was evidence of the presence of fuel. The pilot's safety harness was recovered, and all five retaining straps were found to be intact; the condition of the harness locking mechanism showed that it must have been operated manually, prior to the impact.

The aircraft wreckage was subsequently recovered from the hillside and transferred to the AIB facility at Farnborough for more detailed examination. The examination of the shattered canopy and its locking mechanism confirmed that the canopy had been open at impact, and that there was no evidence of any pre-crash defect within the mechanism. The external canopy locking/release handle was in the unlocked position (as found); however much of the operating levers and linkages had been distorted by impact. The latches on the airframe, together with the associated latch rollers on the canopy frame, did not exhibit any evidence of unusual dis-engagement, and it must be concluded that, prior to impact, the canopy must have been opened deliberately by the pilot.

The parachute was also examined in detail. The release handle had been pulled and the drogue chute had deployed, but the main chute had only just started to emerge from the pack. When inspected by an expert rigger/packer, the parachute did not exhibit any defect such as would prohibit normal deployment. The absence of any witness marks on the release handle or mechanism confirmed that it must have been operated manually.

The aircraft's flight and navigation instruments, communications radios and transponder were severely damaged by the impact. Nevertheless it was possible to establish that, prior to impact, the following facilities were selected:

No 1 VHF Radio	123.6 MHz (Carlisle aerodrome)
No 2 VHF Radio	**6.3 MHz (Newcastle Approach = 126.3)
VHF Navigation Radio	113.5 MHz (Newcastle VOR)
Automatic Direction Finding (ADF)	328 KHz (Carlisle NDB)
Transponder	7240

The barometric pressure setting on the pilot's altimeter was correctly set at 995 mb.

Meteorological conditions

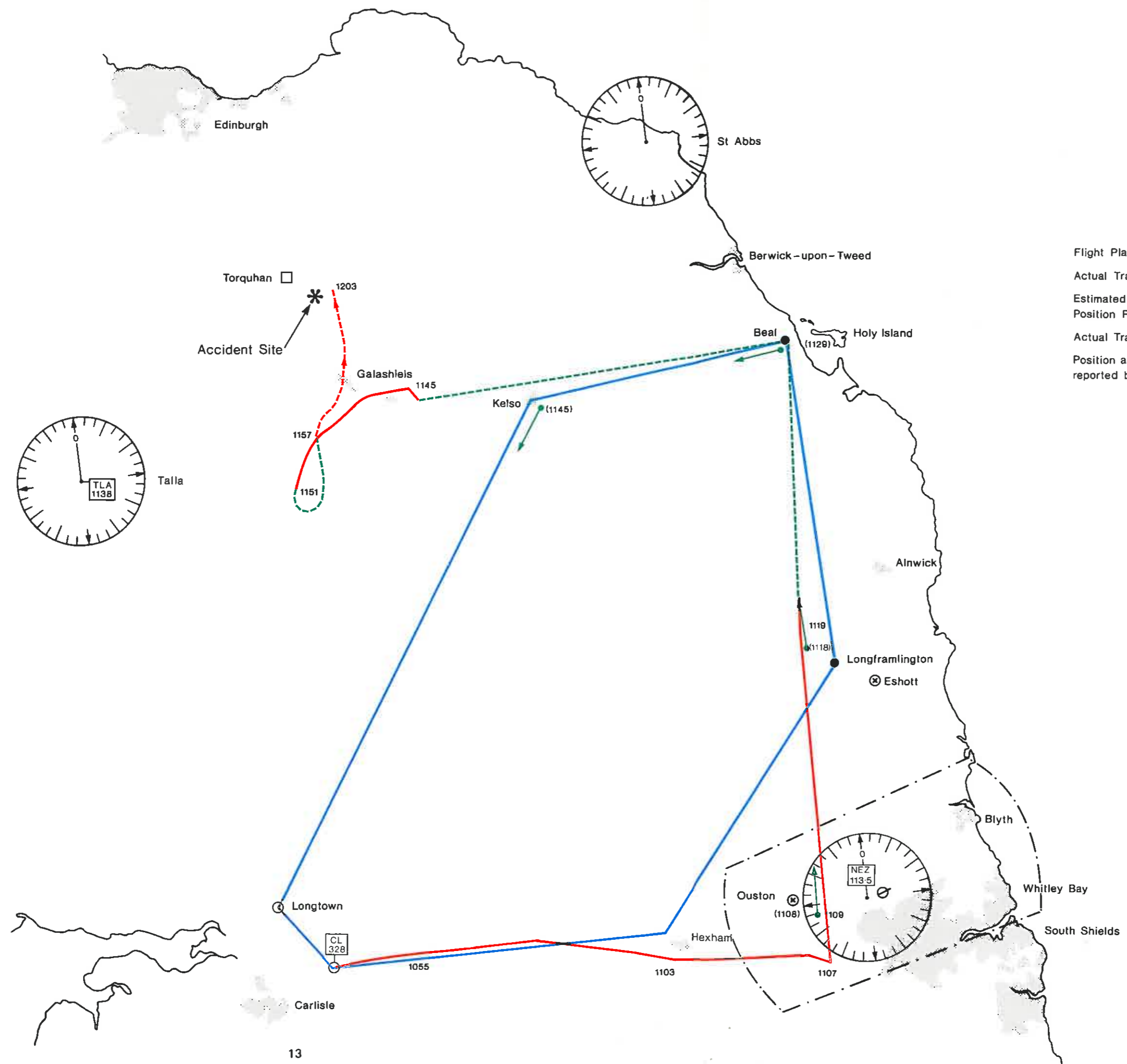
The weather forecast on the day of the accident for the area within a 30 nm radius of Carlisle was for generally cloudy conditions with 8 oktas strato-cumulus base 2,000 to 3,000 feet, with rain spreading from the west later. During the morning of the accident flight, two weather checks were flown from Carlisle aerodrome, when the lowest cloud base encountered was 3,200 feet. A third aircraft had previously flown from Carlisle to Newcastle and reported no cloud below 3,000 feet.

An aftercast of the weather conditions at the time of the accident was prepared by the Meteorological Office, Bracknell, and this confirmed that conditions were generally as, or better than, forecast. An observation taken at 1200 hrs at Peel Hospital, which is situated 10 nm south of the accident site recorded the actual weather as: Wind calm, visibility 20 kilometres, cloud 6 oktas at 1,900 feet, 6 oktas at 2,900 feet, air temperature plus 03°C. The Royal Air Force Search and Rescue helicopter crew recorded the weather at the accident site at 1315 hrs as: Surface wind 180°/5 to 10 knots, visibility 10 kilometres, cloud base 2,000 feet with isolated snow showers.

Conclusion

There is little doubt from the evidence that the canopy release catches and parachute deployment mechanism were both operated manually by the pilot, and that the attempt to abandon the aircraft was deliberate. The evidence from the RTF and radar recordings shows that at 1158 hrs, when the pilot had indicated his intention of returning to Kelso and diverting to Newcastle, the aircraft was flying between the lowest cloud layers, and he did not have the ground in sight. When the aircraft was transferred to Newcastle Approach Control, its position was about 52 nm northwest of Newcastle, still heading north at a reported altitude of 3,000 feet. At this position it was at the limit of VHF and secondary radar cover from Newcastle, and two-way communication was lost. It may well be that this loss of radio communication persuaded the pilot that not only was he lost and out of sight of the ground, but that he had also experienced complete radio failure. This would certainly have been an emergency situation and might possibly have caused an inexperienced pilot to consider abandoning the aircraft.

Even if this last supposition is correct, it is still difficult to understand how the pilot was unable to vacate the aircraft at a sufficient height for parachute deployment. Since the accident the aircraft manufacturer has conducted flight trials with the canopy open. Trials were flown at speeds of up to 105 knots, no particular problems were encountered, and it was concluded that abandoning the aircraft should not present undue difficulty.



- Flight Plan Track —
- Actual Track - Primary Radar —
- Estimated Track - DR & Pilot Position Reports - - -
- Actual Track - Secondary Radar - - -
- Position and Magnetic Heading reported by Pilot ←•

0 5 10
Nautical Miles

