

No: 8/92

Ref: EW/C92/4/1

Category: 1c

**Aircraft Type and Registration:** Grob G115, G-BPKG  
**No & Type of Engines:** 1 Lycoming O-235-H2C piston engine  
**Year of Manufacture:** 1988  
**Date & Time (UTC):** 3 April 1992 at about 0950 hrs  
**Location:** Loch Muick near Ballater, Scotland  
**Type of Flight:** Private (training)  
**Persons on Board:** Crew - 2 Passengers - None  
**Injuries:** Crew - 2 Fatal Passengers - N/A  
**Nature of Damage:** Aircraft destroyed  
**Commander's Licence:** Commercial Pilot's Licence with Instructor Rating  
**Commander's Age:** 35 years  
**Commander's Flying Experience:** 1170 hours (of which 10 were on type)  
Last 90 days 150 hours  
Last 28 days 40 hours  
**Information Source:** AAIB Field Investigation

### History of the flight

The Chief Flying Instructor of the club operating the aircraft was completing the training for a Private Pilot's Licence (Aeroplanes) of a student who was a civilian instructor on powered gliders employed by the Royal Air Force. On the morning of the accident a VFR cross country flight to Inverness was planned. The aircraft departed Aberdeen at 0901 hrs with full fuel, giving an endurance of at least four hours. At 0918 hrs, the pilot asked RAF Lossiemouth radar to inform Inverness that he would not be landing there due to the adverse weather en-route. At 0937 hrs, the pilot informed Aberdeen ATC that he would be operating in the Ballater/Aboyne area not above 3,000 feet. This was the last transmission received from the aircraft. At 0950 hrs the controller, newly on watch, could not see the aircraft on his radar but was not concerned because of the known poor low level radar cover in the Ballater area. The controller called G-BPKG ('KG') but could get no reply. Again, he was not concerned because of known poor radio performance in that area at the operating height of the aircraft. Over the next 30 minutes, the controller tried on several occasions to contact 'KG' but without success and despite requesting an inbound commercial flight to relay his message. At this stage the controller

was still not unduly concerned because it was not uncommon for club aircraft to operate in the FIR while out of radio contact with ATC. The controller became slightly more concerned as time passed and, when he was relieved at 1133 hrs, both he and the oncoming watch supervisor started to make inquiries relating to the whereabouts of the aircraft. When he was informed by the flying club that 'KG' had been due back at 1100 hrs, the watch supervisor initiated overdue action at 1146 hrs. At 1203 hrs, the Full Distress phase was initiated and a major Search and Rescue operation involving three helicopters and three Mountain Rescue Teams began.

### **Meteorological details**

The weather at the time, obtained by a Meteorological Office aftercast, was a wind of 010°/38 kt at 2,000 feet, partial cloud cover with a general base of 2,500 feet falling to 1,000 feet in showers and a freezing level at 1,500 feet. Showers of rain, hail or snow were indicated in which the visibility would have fallen to 3,000 metres. Airframe icing would have occurred in cloud above the freezing level and carburettor icing was probable at cruise power at heights below 3,000 feet. The forecast available to the pilot before take-off was in general agreement with the aftercast and included warnings of moderate turbulence and icing. A strong wind warning was also in force at the time of the accident.

### **Radar traces**

A recording of the aircraft's transponder return displayed on the Aberdeen radar (see Figure 1) indicates that, after the pilot's call at 0937 hrs stating that he would be operating in the Ballater/Aboyne area, the aircraft headed south and then west towards Balmoral where, at 0945 hrs, it turned right towards Ballater. When about one mile west of Ballater, the aircraft turned right into Glen Muick. At 0948 hrs, when two and a half nautical miles south west of Ballater, the aircraft ceased to paint on the Aberdeen radar due to the obscuration generated by the high ground between the radar head and the aircraft. Calculation indicates that the minimum height at which an aircraft can fly in this position and produce a primary radar return on the Aberdeen radar is 2,400 feet. Flight trials indicated that in this position SSR responses could be observed on the Aberdeen radar down to 2,200 feet. Radar data subsequently obtained from an RAF aircraft operating in the North Sea was in good agreement with the Aberdeen data and was available later than 0948 hrs because this radar was not affected by the high ground adjacent to the aircraft's track. This data indicates that the aircraft continued to fly along Glen Muick until contact was lost at 0950 hrs in a position half way along Loch Muick. At about 0940 hrs, a witness located at Birkhall, which position was coincident with the last return from Aberdeen radar, heard an aircraft flying towards Loch Muick. She reported that the engine of the aircraft sounded rough and at one point made a loud 'bang'. She also reported that at the time there was a snow storm in the Glen Muick area.

## **Location of the wreckage**

During the day, a member of the public walking on a path beside the remote south-western end of Loch Muick noted a small white object in the water. As the walker did not know that a search was then in progress he attached no significance to the sighting. When, some hours later, he became aware that an aircraft was missing, he recalled the white object and notified the emergency services. At about this time heavy snow in the area made access to Loch Muick particularly difficult and it was not until the morning of 4 April 1992 that objects were recovered from the water and identified as being associated with a light aircraft. These items included a first-aid box, a number of sections of lower wing skin and fragments of the shattered wooden propeller blades.

A major search of the bed of the loch was then embarked upon by the Underwater Search Unit (USU) of Grampian Police. This work was hampered by the local weather, the difficult access, the remoteness of the loch (situated some 1,200 feet amsl) and the impossibility of transporting and launching other than the smallest of craft into the loch. In addition the size and depth of Loch Muick (some 2.5 miles long, 0.7 miles wide with a maximum depth of approximately 400 feet) required the police USU to carry out a total survey of the loch making use of sophisticated search equipment normally used in conjunction with large oil support vessels in the North Sea. Possible contacts detected by the survey equipment were then individually examined and eliminated using further specialised electronic devices.

It was therefore not until late on Sunday 26 April 1992 that the main aircraft wreckage was located. It was located approximately 300 metres from the south western end of the loch. The terrain on either side of the loch in this area rises steeply to between 3,000 and 3,500 feet as does the terrain beyond the south-western end. The depth of water at that point however is such that it was possible to access the wreckage with divers using their normal equipment. It was confirmed by the divers that the bodies of both occupants were still in the wreckage.

## **Examination of the wreckage**

On Monday 27 April 1992 an AAIB Engineering Inspector returned to the loch and viewed the wreckage with the aid of underwater video. It was noted that the aircraft was lying inverted and was extensively damaged. The complete forward section comprising the engine, the bulkhead and the instrument panel had broken away and was orientated incorrectly relative to the aircraft, remaining attached only by wiring, control rods and cables. In addition, the right wing had failed structurally at mid span although the outer section remained attached to the inner wing. The canopy was lying on the loch bed nearby.

The bodies of the occupants were freed from the wreckage and removed by the police divers. The aircraft was then lifted using air bags and moved approximately half a mile to a suitable shoreline. The weight of trapped water in well sealed areas of the structure was such that further break up of the aircraft occurred during the lifting and beaching operations. The wreckage was subjected to a preliminary examination on site before being further dismantled and transported to the AAIB facility at Farnborough. Damage to the structure indicated that the aircraft had struck the water in a right wing down attitude with considerable components of both forward and downward velocities, consistent with either a spin or a spiral dive.

A strip examination of the engine, together with its carburettor, revealed no evidence of pre-impact defect and, despite the prolonged immersion in water, both magnetos performed according to their specification requirements when subjected to rig testing. The ignition harness also performed correctly except in areas which had received obvious damage during impact or salvage. The shattered state of the wooden propeller further indicating that significant power was being delivered at the time of impact. Examination revealed that the flaps were retracted at the time of the accident. So far as could be established, the flying controls were free from any pre-impact defect or failure.

Strip examination of the vacuum pump indicated that it was in good operating condition. The vacuum driven attitude indicator and direction indicator together with the electrically driven turn co-ordinator were removed for detailed examination. Both the attitude indicator and the direction indicator had suffered some internal damage consistent with the effect of impact. The gyros of both units were subjected to normal vacuum pressure on a test rig and, notwithstanding the expected effects of water immersion on the bearings, both gyros rapidly gained speed and continued to coast for a prolonged period after the vacuum source was disconnected. The turn co-ordinator was connected to an electrical power source and found still to function correctly. No evidence was found elsewhere in the aircraft wreckage of any pre-impact defect.

A post mortem examination of both occupants did not reveal any pre-existing medical condition that could have caused or contributed to the cause of the accident and indicated that they had both died as a result of impact injuries rather than drowning.

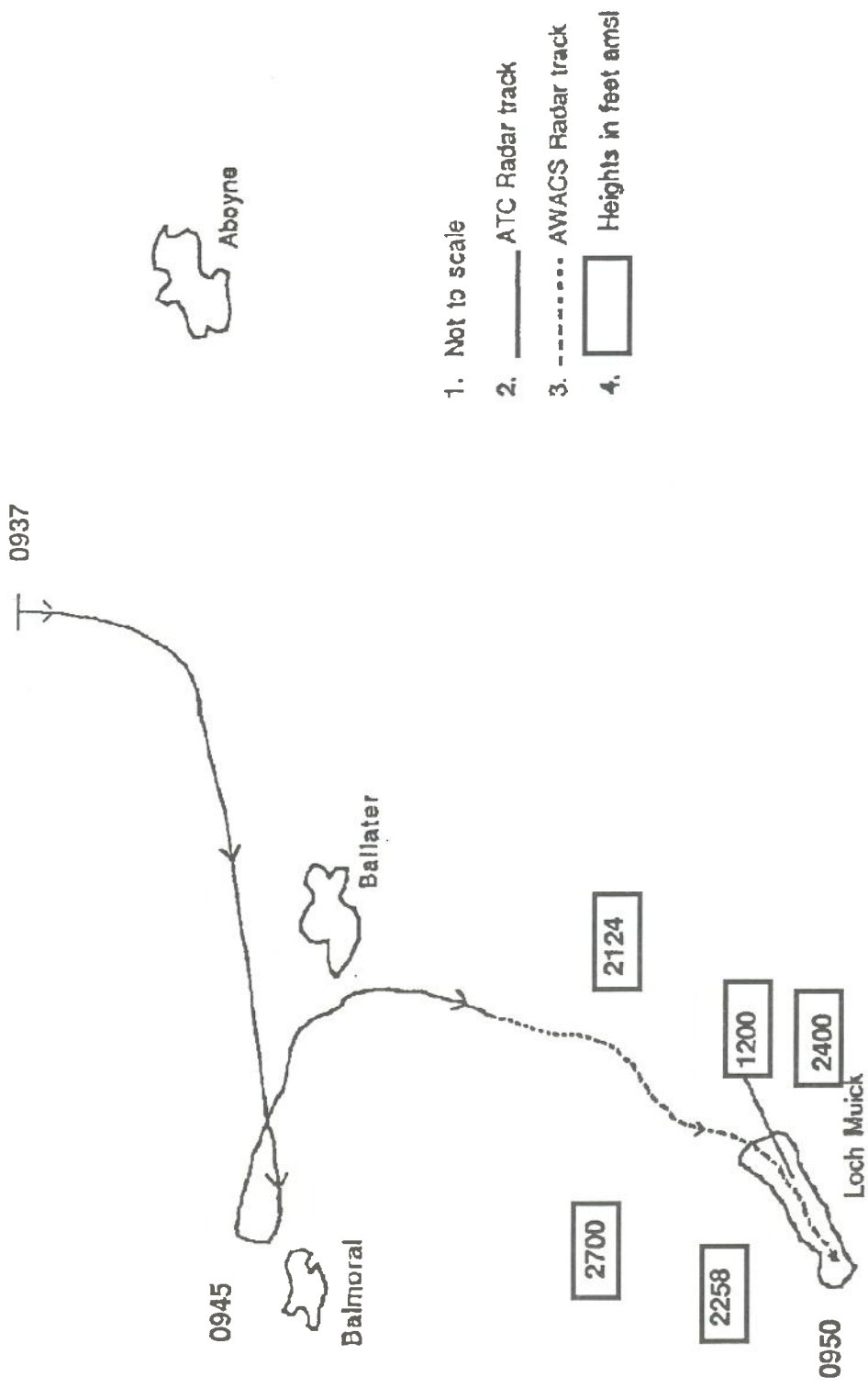


Figure 1