AAIB Bulletin No: 1/95	**Ref: EW/C94/10/2**	**Category: 1.3**

Aircraft Type and Registration:	Grumman AA-5B Tiger, G-BFJA
No & Type of Engines:	1 Lycoming O-360-A4K piston engine
Year of Manufacture:	1978
Date & Time (UTC):	9 October 1994 at 1116 hrs
Location:	Sixhills Walk Farm, North Willingham, Lincolnshire
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - Fatal Passengers - N/A
Nature of Damage:	Aircraft destroyed
Commander's Licence:	Private Pilot's Licence with IMC Rating
Commander's Age:	73 years
Commander's Flying Experience:	332 hours (of which 90 were on type) Last 90 days - 2 hours Last 28 days - 1 hour
Information Source:	AAIB Field Investigation

History of the flight

The pilot arrived at Blackbushe Airport well before the intended departure time of his flight to Binbrook Airfield. He appeared to be in normal health and was seen to go about his preparations for the flight in an unhurried, methodical manner. As part of these preparations the aircraft was refuelled; an amount of 74 litres was entered in the fuel log against the pilot's signature. At some point, he telephoned the Airmet Service for a weather forecast.

The aircraft left Blackbushe at 1014 hrs and there was no evidence to suggest that the flight progressed other than normally. At 1057 hrs, the pilot called Waddington Zone/LARS controller and gave his position as "1.7 MILES SOUTH WEST OF BOURNE AT 2,700 FEET ON 1019". The controller then told him to "SQUAWK 1752"; the pilot repeated this back incorrectly as "1052" but as the radar return label showed the correct SSR (secondary surveillance radar) code, she did not query the incorrect read back. The pilot requested a flight information service (FIS).

At 1109 hrs, the pilot passed his position as 17 nm from Binbrook and, after some discussion about the surface wind at Binbrook, he asked permission to descend "TO COME BELOW THE CLOUD". The controller replied that he could descend at his discretion and advised him that the Belmont television mast was in his one o'clock position at 8 nm; the mast is 1,676 feet amsl. At 1113 hrs, the pilot reported that he was at 1,800 feet and clear of the mast. The controller asked him to confirm that he had the mast visual and he replied "AFFIRM".

The Waddington controller's concentration then focused on another aircraft and when, a few minutes later, she looked again in the Binbrook area 'JA's' SSR code was no longer displayed. She called the aircraft and asked the pilot to confirm that he was visual with Binbrook; there was no reply. Two further unanswered calls were made. This did not cause particular concern as it is quite common for pilots receiving FIS to leave the frequency without telling the controller. She did, however, call the Humberside ATC to see if they had noticed the contact descending towards Binbrook; the Humberside controller had also been busy giving a surveillance radar approach and was last aware of 'JA's' SSR code being about 3 nm south of Binbrook. As Binbrook Airfield was not manned, it was not possible to check whether the aircraft had landed.

The alarm was raised by the pilot's daughter, who was waiting at Binbrook for the aircraft to arrive; she became concerned and telephoned Humberside ATC at 1155 hrs. The information was passed to the Waddington controller who, at 1200 hrs, informed the Distress and Diversion (D&D) cell at LATCC. A rapid radar replay was called for and this was analysed to determine the aircraft's track and last known position. Lincolnshire police were informed at 1229 hrs and a ground search was initiated. At 1316 hrs, the northern Rescue Co-ordination Centre scrambled a search and rescue helicopter from RAF Leconfield; the wreckage was located at 1358 hrs.

Radar plot of the aircraft's track

A plot of the aircraft's track derived from the Claxby radar head indicated that, at 1113 hrs, it was tracking 015°; no height information was available. At 1113:19 hrs, it started a left turn onto 352°T; it remained steady on this track, at a ground speed of 136 kt, until 1114:38 hrs when it started to turn right. For about 30 seconds the turn appeared to be stable at a rate of about 3°/second; the ground speed was about 138 kt and the radius was commensurate with a bank angle of about 20°. The last recorded radar return, at 1115:18 hrs, indicated that the rate of turn had reduced and the aircraft track was about 116°; this took it directly towards a disused airfield at Ludford Magna. This last radar contact was about 500 metres north of the accident site.

Meteorological data

An aftercast obtained from the Meteorological Office at Bracknell indicated that a ridge of high pressure covered the region and maintained a light or variable southerly airflow. There had been overnight mist or fog and, by 1115 hrs, the visibility varied between 1,500 metres and 7,000 metres; it was possible that, in isolated spots, where the fog was slow to clear the visibility was as low as 300 metres. The cloud was dependent on the dissipation of overnight mist or fog into low stratus. It was estimated that there would have been a scattered/broken layer, base 200 to 300 feet and a broken layer base 1,000 feet. The surface wind was calm and, at 2,000 feet it was variable at 5 kt or less; the temperature and dewpoint were +10°C and the mean sea level pressure was 1023 mb.

A special accident weather report was made for 1118 hrs at Waddington; it contained the following:

Surface wind:	Calm
Visibility:	1,800 metres (6 km to the south)
Weather:	Mist
Cloud:	4 octas base 400 feet

The accident site was about 16 nm to the north north east of Waddington.

Technical examination

Examination of the accident site showed that 'JA' had impacted while travelling in a direction of approximately 185°M, slightly nose down and with a bank angle of some 20° to the right. The initial impact was on the right wingtip. This caused the right wing to fail rearwards and the aircraft to rotate rapidly to the right. The left wingtip then dug into the ground and the aircraft pivoted about this point and came to rest inverted, some 290 feet after the first impact. The engine and propeller both separated from the airframe at impact, the engine travelling some 510 feet from the first impact. The degree of disintegration of the airframe and the spread of the wreckage both indicated a high speed at first impact, certainly over 150 kt.

There was no evidence at the site of fuel from the integral wing tanks. However, both wings had been heavily disrupted and the fuel in the wings would, therefore, have been atomised and dispersed during the impact. A simple reconstruction showed that the aircraft had been structurally intact and that the flying control system had been complete. There were witness marks on the elevator hinges indicating that, at impact, 'elevator up' control was being applied.

Both blades of the propeller, which was of fixed pitch, had suffered severe distortion as well as damage to the blade leading edges, showing that the engine was developing power at impact, confirmed by the separation of the propeller from the engine crankshaft. The actuating mechanism for the wing flaps showed positively that there had been no flap lowered and this was confirmed by the pattern of damage to the flaps. Damage to the canopy latching mechanism showed that the canopy, which detached from the airframe, had been in its fully closed and locked position.

In this design the restraint of the front seat occupants is by a combination of lap-type seat belts and a pair of upper torso restraints. These upper torso restraints attach to the lap belt and are each secured by three studs to the sidewall of the fuselage behind the front seats. In this accident, the lap belt remained secure but the upper torso restraints failed in the initial impact when the anchoring point detached from the fuselage sidewall.

Pilot's experience

The pilot started flying training in May 1987 and gained his Private Pilot's Licence, Group A, the following May; he gained a Group B rating in May 1990. The main type he flew from July 1988 until May 1991 was the Grumman AA-5, however, he then changed to flying the Fuji 200. He next flew the AA-5 on 7 September 1994 and again on the 10 September 1994, his last flight before the accident flight. He had flown into Binbrook on at least three occasions.

The pilot held an IMC Rating which was last validated on 15 June 1994; he had logged a total of 39 hours instrument flying, of which 27 hours were actual.

Medical and pathology

Post-mortem examination determined that the pilot died as a result of multiple injuries sustained in the impact. There were very severe head and chest injuries consistent with major decelerative forces. Abdominal marks clearly showed that the lap restraining harness was in place and functioned; it was less clear whether the shoulder restraint had fulfilled its function.

It also revealed the presence of severe ongoing coronary artery disease; although it is impossible to state unequivocally that this had produced subjective symptoms at some point prior to the start of the accident sequence, it is a strong possibility that such symptoms may have occurred.

The pilot's medical history revealed that, in 1984, he had experienced chest pain on exertion, for which he was referred to a consultant for further opinion. The conclusion of the various investigations was that he was not, at that time, suffering any heart disease. His blood pressure was slightly raised and treatment was started, but this was subsequently stopped without any recurrence of his hypertension.

The pilot was last examined by an authorised medical examiner (AME) on 13 June 1994; a Class 3 medical certificate was issued which, commensurate with the pilot's age, was valid for six months. It was valid only while correcting lenses for near vision were available; a pair of spectacles with such lenses were found in a case at the accident site.

An electrocardiogram (ECG) was made as a routine part of the medical examination; serial ECGs were available for the last five years. While the 1992 ECG was normal, both that of 1993 and 1994 were read as 'borderline' with non-specific intraventricular delay. The pilot appeared to have had no subjective symptoms of heart disease sufficient to cause him to consult his own doctor or to alert the AME. However, the serial ECGs did, in retrospect, show non-specific abnormalities developing in the last two years; with the benefit of hindsight these might reasonably have prompted more exhaustive further testing particularly in view of the subject's age. Whilst it is recognised that no system of medical examination will detect all cases of significant cardiac disease, it is recommended that the Medical Division of the CAA should review the cardiovascular requirements of the medical examination and certification of elderly private pilots. The review should consider the current international standards and recommended practices and the proposed JAA medical standards.
[Safety Recommendation 94-58]

Flight information service

Pilots using the FIS frequently fail to inform the controller when they are changing to another frequency or are descending to land at an airfield where no ATC service is available. Attention is drawn to the November 1994 issue of the CAA General Aviation Safety Information Leaflet (GASIL) in which the problems which can result from this omission are highlighted.