AAIB Bulletin No: 10/94 **Ref: EW/C94/7/4** **Category: 1.3**

Aircraft Type and Registration:	i) Reims Cessna FA152 Aerobat, G-BGXZ ii) Grob Astir glider, BGA 2450
No & Type of Engines:	i) 1 Lycoming O-235-L2C piston engine ii) N/A
Year of Manufacture:	i) 1979 ii) 1979
Date & Time (UTC):	23 July 1994 at 1314 hrs
Location:	1 nm south west of Farnborough Airfield datum
Type of Flight:	i) Private (Training) ii) Private
Persons on Board:	i) Crew - 2 Passengers - None ii) Crew - 1 Passengers - None
Injuries:	i) Crew - None Passengers - N/A ii) Crew - Minor Passengers - N/A
Nature of Damage:	i) Substantial to left wingtip ii) Damaged beyond economic repair
Commander's Licence:	i) Basic Commercial Pilot's Licence ii) Glider Licence
Commander's Age:	i) 63 years ii) 27 years
Commander's Flying Experience:	i) 10,186 hours (of which 2,000 were on type) Last 90 days - 124 hours Last 28 days - 61 hours ii) 54 hours (163 launches)
Information Source:	AAIB Field Investigation

On the day of the accident Farnborough Airfield was being used for aero-towed glider operations. ATC, which is manned at weekends and on public holidays only to provide a service for business aircraft movements, was not in operation and the controller, who was taking an opportunity rest break in the visual control room, had delegated the use of the airfield and Air Traffic Zone (ATZ) to the gliding club. Club members were manning an Air/Ground radio station, operating on a glider frequency, to provide a radio service for their own gliders.

At approximately 1305 hrs the tug aircraft and the glider departed Farnborough from Runway 07, turned right and climbed downwind to the west. The Farnborough actual weather recorded at 1315 hrs was fine with a surface wind of 080°/10 kt, visibility 15 km, scattered stratocumulus cloud at 4,500 feet, scattered altocumulus at 11,000 feet and scattered cirrus at 25,000 feet. The temperature was 26°C with a sea level pressure of 1,018.8 mb.

The glider pilot reported that at approximately 1,800 feet agl, south west of the airfield, he released from the tug and manoeuvred to find lift. His search for lift, which involved a left-hand orbit, was unsuccessful so he adopted an easterly heading back towards the airfield. Moments later he encountered lift and, looking to the right, entered a right turn. He glanced momentarily over his left shoulder and immediately sighted a Cessna aircraft very close in a banked right turn. He then felt a collision and found that he had lost pitch control. He immediately opened the cockpit canopy and abandoned the glider over the left side of the fuselage and deployed his back parachute. The pilot estimated the height of the collision as being 1,800 feet agl. Although he bruised his ankle during the evacuation the pilot landed amongst trees on the airfield without further injury The pilotless glider entered a stall before descending and crashing on the airfield close to the gliding club launch site. The club radio operator transmitted to ATC that one of their gliders had crashed and the off duty controller alerted the airfield emergency services by activating the crash alarm. The emergency services attended the scene almost immediately. The pilot, suffering from shock, was taken to the airfield medical centre and then to hospital.

At approximately 1306 hrs the Cessna 152 departed Blackbushe, from Runway 08, with an instructor and student on board for a routine training flight. The purpose of the flight was for the student, who was the handling pilot, to revise stalling exercises and to reconnoitre the local flying area. Aircraft departing Blackbushe from Runway 08 normally climb on runway heading to 500 feet and then turn right downwind, remaining north of the M3 motorway and clear of the Farnborough ATZ, climbing clear of the Blackbushe circuit on a westerly heading. The instructor reported that after completing the crosswind leg and passing 800 feet the aircraft turned onto a downwind heading of 260° and continued to the west to within 1 nm of Hartley Wintney whereupon it turned onto a heading of 210° to avoid the village. Analysis of radar information (see figure), recorded from the Heathrow 23 cm radar, however, showed that the aircraft turned right onto a track of approximately 190° and continued on that heading entering the Farnborough ATZ as it crossed the M3 motorway. The aircraft, still climbing, crossed the extended centreline of Runway 07 at Farnborough 400 metres west of 07 threshold.

The glider was sighted just before impact approaching the Cessna from the 2 o'clock high position at a height estimated by the instructor to be just above 2,000 feet agl. The student, who saw the glider moments before the instructor, initiated a turn to the right. The instructor, on seeing the glider, took control and tightened the turn. This manoeuvre was not sufficient to prevent the left wingtip of the Cessna colliding with the 'T' tail of the glider.

The collision caused the Cessna to yaw violently and to decelerate, although the instructor was able to regain control and, by the use of full aileron, maintain level flight. The aircraft by now had turned onto a northerly heading and, with Blackbushe Airport in sight, the instructor decided to recover to his home base and allow himself time to assess any handling problems. He did not declare an emergency but informed Blackbushe ATC that he had control difficulties. The subsequent flapless landing was made without further incident.

Examination of the Wreckage

The glider crashed onto rough ground inside the airfield perimeter about 350 metres west of Runway 07 threshold. It had evidently fallen in a flat spin with the empennage attached only by the control rods. It then struck the top of a tree removing the empennage which was found a few metres from the main wreckage. The pilot's parachute was found 200 metres to the south west of the fuselage, hanging from a tree with the harness almost touching the ground. With the prevailing wind conditions, this would put the point of collision just north of the Runway 07 undershoot.

There were clear blue and yellow paint deposits (the trim colours of the Cessna) on the left side and leading edge of the fin just under the 'T' tail. A piece of plastic Cessna wingtip fairing was found embedded in the fin/tailplane joint. The orientation of these witness marks suggested that the Cessna's left wingtip had struck the glider's fin at the top whilst the two aircraft were tracking at something less than right angles to each other and with about 10° right bank of the Cessna relative to the glider. The impact broke the glass fibre fuselage structure just ahead of the fin but the metal control rods remained intact until the glider hit the tree.

The Cessna was examined at Blackbushe Airport. Damage was confined to the left wing which had sprung backwards at the moment of impact sufficient to buckle the trailing edge upper skin above the flap. The most obvious damage was to the outboard section with about 1 metre of this crushed back to the front spar and associated distortion of the outboard end of the aileron. Although full aileron travel could be obtained on the ground, it was possible that under air loads there may have been some aileron restriction. Orange paint from the glider's fin registration numbers was clearly visible on the leading edge.

Rules of the Air Regulations 1991 (CAP 393)

The investigation looked at the regulations relating to Government aerodromes and their associated aerodrome traffic zones (ATZ). Since it may not be widely known that a Government ATZ can be active at all times, irrespective of the published operating hours, Section VII, Rule 39, of The Rules of the Air Regulations 1991 and UK AIP extracts are reproduced below:

39 (1) Paragraphs (2) and (3) shall apply only in relation to such of the aerodromes described in Column 1 of the following Table as are notified for the purpose of this rule and at such times as are specified in Column 2 thereof.

Column 1	Column 2
(a) A Government aerodrome	at such times as are notified
(b) An aerodrome having an air traffic control unit or an aerodrome flight information unit	during the notified hours of watch of the air traffic control unit or the aerodrome flight information unit
(c) A licensed aerodrome having a means of two-way radio communication with aircraft	during the notified hours of watch of the air/ground radio station

(2) An aircraft shall not fly, take off or land within the aerodrome traffic zone of an aerodrome to which this paragraph applies unless the commander of the aircraft has obtained the permission of the air traffic control unit at the aerodrome or, where there is no air traffic control unit, has obtained from the aerodrome flight information unit at that aerodrome information to enable the flight within the zone to be conducted with safety or, where there is no air traffic control unit nor aerodrome flight information unit, has obtained information from the air/ground radio station at that aerodrome to enable the flight to be conducted with safety.

(3) The commander of an aircraft flying within the aerodrome traffic zone of an aerodrome to which this paragraph applies shall:

(a) cause a continuous watch to be maintained on the appropriate radio frequency notified for communications at the aerodrome or, if this is not possible, cause a watch to be kept for such instructions as may be issued by visual means.

(b) where the aircraft is fitted with means of communication by radio with the ground, communicate his position and height to the air traffic control unit, the aerodrome flight information unit or the air/ground radio station at the aerodrome (as the case may be), on entering the zone and immediately prior to leaving it.

UK Aeronautical Publications

The UK AIP gives details relating to Farnborough Airfield (AGA 3-4-9). Farnborough is listed as a Government Airfield with operational hours (UTC), on Saturdays and Public holidays, as 0800 to 1200 hrs and 1300 to 1700 hrs (1200 to 1300 hrs by arrangement). A warning in Section 16 of the airfield information states that 'Intensive and varied aviation activity takes place outside published aerodrome hours and on weekends and public holidays during periods when ATC is not operating'.

UK AIP Section RAC 3-9-2-9 tabulates details on aerodrome status. Under the entry for Farnborough the ATZ is promulgated as being a circle (except that part of the circle located north of the M3 motorway) of radius 2.5 nm (centred on the notified mid-point of the longest runway) extending from the surface to a height of 2,000 feet above the level of the aerodrome. The table also shows that the hours of operation of the airfield in both summer and winter are 24 hours.

The section of the UK AIP relating to communications (COM 2-35) states that during the summer period Farnborough's ATC hours of operation on Saturdays and Public holidays are 0700 to 1100 hrs and 1200 to 1600 hrs (by arrangement 1100 to 1200 hrs). ATC on the day of the accident was not in operation as promulgated.

As a result of this investigation the published operating times for Farnborough ATC on Saturdays and Public Holidays will be amended in the AIP to 'by arrangement' to reflect actual practices adopted at Farnborough.

RADAR POSITIONS OF CESSNA 152 AND GLIDER AS RECORDED BY HEATHROW 23 CM RADAR