

# Gulfstream AA-5A Cheetah, G-MSTC

## AAIB Bulletin No: 1/97 Ref: EW/C96/4/6 Category: 1.3

<b>Aircraft Type and Registration:</b>	Gulfstream AA-5A Cheetah, G-MSTC
<b>No &amp; Type of Engines:</b>	1 Lycoming O-320-E2G piston engine
<b>Year of Manufacture:</b>	1979
<b>Date &amp; Time (UTC):</b>	16 April 1996 at approximately 1010 hrs
<b>Location:</b>	Walkeridge Farm, Hannington, Hampshire
<b>Type of Flight:</b>	Private
<b>Persons on Board:</b>	Crew - 1 - Passengers - 1
<b>Injuries:</b>	Crew - None - Passengers - Serious
<b>Nature of Damage:</b>	None
<b>Commander's Licence:</b>	Private Pilot's Licence
<b>Commander's Age:</b>	37 years
<b>Commander's Flying Experience:</b>	425 hours (of which 31 were on type) Last 90 days - 8 hours Last 28 days - 8 hours
<b>Information Source:</b>	AAIB Field Investigation

The aircraft was on a flight from Lelystad (Netherlands) to Gloucestershire Airport. It landed in a field (elevation approximately 620 feet amsl) adjacent to Walkeridge Farm, close to the Hannington television transmitter mast (1,226 feet amsl). After landing, the pilot dialled the emergency services number on a mobile telephone in order to request an ambulance to attend to his passenger. The call was logged at 1019 hrs. The pilot said that he had carried out a forced landing in a field, the passenger had jumped off the front of the wing, walked into the propeller and was badly injured. In a lengthy call to the ambulance service, the pilot said that he did not know the location of the landing field and that he had not spoken to anyone on the aircraft's radio. The conversation continued whilst the pilot walked across to the farm buildings (Walkeridge Farm) to seek assistance. Workers at the farm were able to indicate their precise location to the ambulance service.

The passenger was taken to hospital with serious wounds to the left wrist and neck areas. The neck injuries left the patient paraplegic. He subsequently died in hospital on 24 May. The nature of the neck injury indicated that the passenger may have been leaning forward about 45 degrees at the time of the propeller strike, which was with a down-going blade.

The pilot indicated to Hampshire Police that he had landed in the field because he became lost in conditions of low cloud/poor visibility and that the passenger had panicked and jumped off the leading edge of the wing.

A large black plastic electronics case, damaged at one end, was found in a hedge some 77 metres to the right of the aircraft. The case was found to contain some 20 kg of herbal cannabis. A piece of broken plastic, found on the ground close to the aircraft's propeller, was found to match that of the black plastic case.

### **Pilot's Flying Records**

The pilot held a Private Pilot's Licence for microlight and light single engine aircraft, which was issued in October 1985. The majority of training on microlight aircraft had been carried out from Popham Airfield, Hampshire. The pilot's flying log book indicated that he had visited Hampshire landing sites at Hook, Chilbolton, Aldershot, Basingstoke and 'Arlesford' (Alresford) in microlight aircraft. The last recorded flight in a microlight aircraft was during October 1991.

The training course for flying light single engine aircraft was conducted at Bournemouth during 1985. After issue of the licence, the majority of the subsequent flying was undertaken from Popham Airfield. The pilot's log book indicated that he had flown from the Hampshire aerodromes at Thruxton, Blackbushe, Chilbolton and Southampton, and from 'Arlesford' (Alresford). A landing in a field at Stokenchurch was logged on 14 September 1990.

The pilot's Licence contained the following limitation:

*"The holder does not meet the colour perception standards of Annex 1 to the Chicago Convention and the privileges of this Licence may be exercised by the holder only in the following circumstances:*

*(a) flights by day only;*

*(b) flights within the United Kingdom, Channel islands and the Isle of Man, provided that flights within the territory of other contracting states may be made, subject to authorisation in writing by such states;*

*(c) use at aerodromes or landing grounds where if Air Traffic Control is provided, it is by means of radio communication;*

*(d) aircraft used by the holder for flights at aerodromes or landing grounds where Air Traffic Control is provided by means of radio communication must be equipped with radiotelephony equipment to be used by the holder to comply with Air Traffic Control instructions."*

The pilot held a Radio Telephony Rating for VHF transmissions. No written record was found to indicate that the pilot had obtained the permission of the Netherlands authorities to conduct the flight to Rotterdam and Lelystad in accordance with the limitation on the Licence.

There was no indication in the pilot's log book that he had undertaken any further training in instrument flying or radio navigation after the issue of his Licence.

### **History of the flight**

Prior to 1996, the pilot's previous flight was in November 1993. In order to regain the currency of the Licence, the pilot undertook some refresher training with an instructor at Biggin Hill during January and March 1996. The third such flight took place on 4 April 1996. On that occasion, the instructor, who was an examiner of private pilots, indicated that the pilot had reached a sufficient standard to qualify for a Certificate of Test, which was stamped and signed in the log book.

The pilot did not then fly again until 15 April, when he hired G-MSTC from the same flying school. The authorisation sheet indicated that the estimated departure time was 1030 hrs on 15 April, with a planned return at the same time on 16 April. The indicated destination was Rotterdam (Netherlands) and the aircraft had full fuel tanks (199 litres) on departure. The Biggin Hill weather at departure time was CAVOK with a QNH of 1025 mb.

A computerised flight log for the outbound journey was recovered after the accident and indicated that the routing was direct from Biggin Hill to Rotterdam with an estimated flight time of 1 hour 43 minutes. The aircraft actually departed from Biggin Hill at 1014 hrs and arrived at Rotterdam at 1205 hrs, a flight time of 1 hour 51 minutes. The aircraft was refuelled at Rotterdam with 36.7 litres of Avgas. It departed Rotterdam at 1711 hrs bound for Lelystad, arriving there at 1745 hrs. No flight log for this sector was recovered.

The aircraft remained overnight at Lelystad and was again refuelled, uplifting 27 litres of Avgas. A VFR Flight Plan was filed for the flight to Gloucestershire Airport with an indicated routing via Ostend, Calais, Lydd and Bembridge. The planned altitude was 1,500 feet with a planned True Air Speed of 100 kt. The estimated elapsed time for the flight was quoted as 2 hours 30 minutes, and the flight planned alternate aerodromes were Bristol and Biggin Hill. The quoted fuel endurance was 5 hours and the flight plan indicated that the aircraft had two persons on board.

Calculations made by AAIB using the flight plan route, together with the forecast upper winds for the day, indicated that the planned time to complete the flight to Gloucestershire should have been 3 hours 49 minutes.

The aircraft actually departed at 0701 hrs with two persons onboard. Weather reports from Amsterdam and Rotterdam for the period of the flight indicate that the weather conditions there were CAVOK with a QNH of 1019 mb.

During the course of this investigation, no record could be found to indicate that the pilot had communicated with any airport within UK airspace before landing in the field at Hannington. Radar recordings were examined to establish whether the aircraft's track could be identified, based on calculations of the aircraft's planned progress and routing to the accident site. A track was identified on the Pease Pottage (West Sussex) and Heathrow Airport primary radars which corresponded to the calculated timings for the aircraft. These were plotted and it was established that G-MSTC came into the Pease Pottage primary radar cover at 09:19:58 hrs UTC at a position some 13 nm east of the Mayfield VOR, tracking west towards the beacon. After passing Mayfield, the aircraft turned onto a track of about 300° M, entering the Gatwick Control Zone at 0931 hrs. On approaching the curving section of the M23 Motorway to the south east of Crawley the aircraft turned left onto a southwesterly track and left the Control Zone at 0934 hrs. Gatwick Air Traffic Control was not contacted by the aircraft and did not observe the infringement of the Control Zone on their primary radar. At the time of zone infringement, the current Gatwick weather was a surface wind from 180° at 7 kt, visibility greater than 10 km, with less than one quarter cloud at a base of

2,200 feet, and broken cloud base 4,500 feet. The surface temperature was +14°C and the QNH altimeter setting was 1016mb.

On leaving the Gatwick Control Zone, the aircraft then turned onto a westerly track towards the Midhurst VOR, overflying that station at 0944 hrs. On passing Midhurst, the aircraft turned onto a north westerly track, towards Farnborough Airfield. On approaching Aldershot, some 2.5 nm from Farnborough Airfield, the aircraft made a left turn to pass between Farnborough and Odiham Airfields. Neither received any radio contact from the aircraft, despite the fact that Farnborough Radar operates a Lower Airspace Radar Service and has a secondary radar facility with the ability to immediately identify the location of an aircraft by virtue of a uniquely applied transponder code. The Farnborough weather at the time of passage of the aircraft was a surface wind from 170° at 9 kt, visibility 7,000 metres (3.7 nm) scattered cloud base 1,200 feet, scattered cloud base 4,500 feet, broken cloud base 25,000 feet. The surface temperature was +15°C and the QNH 1014 mb. Odiham Airfield recorded a surface wind from 150° at 13 kt, visibility 8,000 metres (4.3 nm) in haze, less than one quarter cloud at a base of 1,200 feet, scattered cloud base 6,000 feet and overcast cloud base 25,000 feet. The surface temperature was +14°C and the QNH 1014 mb.

An aftercast from the Met Office indicated that at the time of the accident there was a weak frontal system lying from King's Lynn to Southampton, moving slowly northwards. There was no precipitation. The visibility was 5,000 metres to 8 km. The mean sea level pressure (QNH) was 1015 mb. The cloud was probably scattered/broken base 1,200 feet with overcast cloud base 9,000 feet. The surface wind was from 160° at 10 kt, with a surface temperature of +14°C.

The last radar contact with the aircraft was as it approached the Fleet Service area on the M3 Motorway at 09:54:03 hrs. During this continuous sequence of returns, the aircraft's transponder was not operated on any of the 4,096 available four digit codes. No emergency (code 7700) or radio failure (code 7600) secondary radar returns were received at any time. No distress or urgency radio calls were received from the aircraft on the distress frequency 121.5 MHz or on any other frequency.

Verification that the derived aircraft track information was that of G-MSTC was gained from a transcript of the tape recording of the initial Police interview with the pilot. During this interview, the pilot commented that he had indeed strayed into the Gatwick Zone and had altered course to leave the area without calling Gatwick ATC. The pilot also commented that he had conducted the flight at 1,500 feet indicated on the aircraft's altimeter, but that the actual height did not appear to be 1,500 feet. He indicated that the altimeter had last been reset in Holland and had not been changed since.

### **Post Accident Examination**

The aircraft altimeter subscale was set to 1024 mb. The QNH at Gatwick was 1016 mb, and that at Farnborough/Odiham was 1014 mb. Therefore, in the area of the accident the altimeter would have been over-reading the actual altitude (above sea level) by some 300 feet. The last occasion that a pressure of 1024 mb prevailed anywhere over the route of the aircraft was during the previous day in the Netherlands. Measurements of QNH are made half hourly at most airfields and are available to pilots by radio contact with the specific airfield or by reception of one of many general broadcast transmissions, known as VOLMET or ATIS facilities.

The pilot's maps covering the route were examined. For the southern UK, the chart in use was a half million scale topographical chart, edition 18 (dated 1992). The current chart for the date of the flight

was edition 21 (dated 1995). No track lines had been drawn to indicate the planned route. The chart had radio navigation plotting aids attached to it. These took the form of compass roses and short rulers located at various VOR locations around the south of England. Four plotters were attached, at Compton, Southampton, Seaford and Biggin VOR stations. Studs were also located at five other VORs to facilitate easy transfer of the plotters, these locations being Ockham, Midhurst, Bovingdon, Brookmans Park and Barkway VOR stations.

The charts covering the continental portion of the flight were new and in date. No flight log was recovered for the flight from Lelystad to the UK.

Examination of the aircraft's communication and navigation equipment indicated the following settings:

VHF1 120.7 MHz (Lydd Airport) Transmitter selected to VHF1.

VHF2 123.67 MHz (Lelystad Airport)

NAV1 117.0 MHz (Seaford VOR) Bearing 300 selected on OBS.

NAV2 111.2 MHz Not identified Bearing 060 selected on OBS

ADF 1262 kHz Not identified

DME 117.0 MHz (Seaford DME) Groundspeed/Time selected

Transponder 0060 (Netherlands VFR traffic general squawk)

All of the aircraft equipment was found to be serviceable during the subsequent recovery and positioning flight to Blackbushe.

The pilot had in his possession a Global Positioning System for accurate navigation and position fixing using satellite signals. On examination, the programmed destination in the unit was that of EGBJ (Gloucestershire Airport). The last position update location was interrogated and found to be a position some 6 miles west of Hook. Information from the Hampshire Police suggested that the unit had been operated by the pilot while within Basingstoke Police Station. The waypoint library was empty. There is a single key stroke command which can be used to erase all waypoints on this type of equipment.

The pilot also had a hand held VHF radio in his possession covering the aeronautical frequency band.

The aircraft was refuelled to full tanks on arrival at Blackbushe. A quantity of 122 litres was uplifted. With an allowance of 6.4 litres for the positioning flight from the accident location to Blackbushe, and the two refuellings made in the Netherlands, the aircraft had consumed approximately 179 litres of fuel during the entire series of flights since leaving Biggin Hill. At an average rate of consumption of 32 litres per hour, the aircraft had flown a total of 5 hrs 35 minutes, which closely accords to the 5 hrs 34 minutes derived from ATC records and the estimated landing time.

The accident site was adjacent to two farm landing strips. It was also some 6 nm from Popham, 14 nm from Thrupton or 15 nm from Blackbushe airfield.