

AAIB Bulletin No: 10/93

Ref: EW/C93/6/4

Category: 1.1

**Aircraft Type and Registration:** Hawker Hunter T7, G-BTYL

**No & Type of Engines:** 1 Rolls Royce Avon turbojet engine

**Year of Manufacture:** 1958

**Date & Time (UTC):** 11 June 1993 at about 1451 hrs

**Location:** Open country 8 nm northwest of Sheffield, Yorkshire

**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:** Commercial Pilot's Licence with Instrument Rating and CAA Exemption to fly the Hunter T7

**Commander's Age:** 46 years

**Commander's Flying Experience:** About 5,600 hours  
(of which about 8 hours were on type)

**Information Source:** AAIB Field Investigation

### Background

The pilot/owner had purchased the aircraft, XL 595, from the Royal Air Force in December 1991. It had previously been placed in long term storage at RAF St Athan, and after the purchase was completed it was dismantled and transported to RAF Coltishall in Norfolk where the new owner had negotiated facilities for the restoration of the aircraft to flying condition. Restoration was completed in December 1992 when the CAA issued a Permit to Fly and the aircraft was allocated the civil registration, G-BTYL. The pilot then completed an approved course of instruction carried out by an experienced RAF flying instructor who was qualified on type. After a flight check by a test pilot nominated by the CAA, the pilot was issued a formal exemption to fly the aircraft solo. Two restrictions included in this exemption were that the aircraft must be flown at altitudes below 10,000 feet and in VMC only.

The purpose of the flight on 11 June 1993 was for the pilot to position his aircraft from Coltishall to Warton, Lancashire so that a CAA approved display pilot could fly it on display at the Blackpool Air Show on the following day.

## History of the flight

At about 0945 hrs on 11 June 1993 the pilot visited the meteorological briefing office at RAF Coltishall and requested a verbal briefing from the duty forecaster for a VMC flight from Coltishall to Warton. The weather at Coltishall was sunny and clear however, the duty forecaster advised him that VMC for the route was not possible and produced the relevant weather charts and the radar rainfall display which showed an extensive area of rainfall stretching from the Wash to the Warton area where visibility was down to 1,000 metres and cloud bases generally 500-800 feet amsl. The pilot appeared satisfied that VMC flight along his intended route was not possible and advised that he would return for a weather update in the afternoon.

At about 1350 hrs the pilot returned to the meteorological office for a further forecast and was again informed that VMC flight along his intended route was not possible. Examination of the various weather charts and station reports showed that, although there had been an improvement in conditions in the Warton area, the radar rainfall picture showed that thunderstorms had developed over the east Midlands and were becoming extensive across the aircraft's planned track. The weather at Coltishall remained sunny and clear and the pilot left the forecast office with the words - "I'll have to think about it". (Fuller details of the actual weather conditions and aftercast are contained in a later paragraph.)

Shortly after 1400 hrs the pilot boarded his aircraft, where he was assisted in strapping into the ejection seat by an RAF ground technician. The technician knew and recognised the pilot and confirms that he was the sole occupant on board. Having assisted the pilot, he removed the ejection seat top safety pin, stowed the lower safety pin and confirms that the seat was armed. At 1420 hrs the pilot contacted Coltishall by VHF radio and requested engine start clearance for a VFR flight to Warton at FL 105. Start clearance and departure instructions were transmitted to the pilot and acknowledged correctly by him. At 1427 hrs the Hunter was observed to taxi to the holding point of Coltishall Runway 22 where take off clearance was approved at 1431 hrs.

The weather conditions at Coltishall were still fine and sunny with no cloud and unlimited visibility and the aircraft was observed to make a normal take off and climb out on a direct track for Warton. Its position after take off was positively identified on radar by transponder code and "ident." At 1435 hrs, after the pilot had reported level at FL 105 he was requested to change to an Eastern Radar frequency for further radar advisory service. Initial radio contact with the Eastern Radar controller was clear and the pilot confirmed his flight level and route and destination. Thereafter the clarity of radio transmissions from the aircraft to Eastern Radar deteriorated to an extent that they became unintelligible and it is also apparent that the pilot was not receiving radio

transmissions from the controller. At 1447 hrs the Eastern Radar controller requested the pilot to change his radio frequency to Manchester Control. This request, although repeated on three occasions does not appear to have been received by the pilot and there were no further radio transmissions recorded from him on that radio frequency. At 1448.45 hrs the pilot contacted Waddington Radar and, after reporting his position as 55 nm from Warton at FL 105, requested a radar information service.

Positive identification of the aircraft's position established that it had entered controlled airspace without ATC clearance. The Waddington controller informed the pilot that he was in controlled airspace and instructed him to make a 'REVERSE TURN LEFT ONTO 140°'. The pilot acknowledged this instruction at 1449.50 hrs and the radar recording shows that the aircraft then commenced a turn to the left. This was the last radio transmission recorded from the pilot and the aircraft disappeared from radar at 1450.03 hrs. It was later established that the aircraft had struck the ground at high speed some 500 metres from the position of the final radar return. Shortly before the accident the aircraft had flown into an area of severe weather.

### **Meteorological information**

The Meteorological Office, Bracknell were asked for an aftercast of the actual weather conditions prevailing in the accident area at 1450 hrs on 11 June 1993. The aftercast is as follows:-

Synoptic situation at 1500 hrs showed a frontal system lying from near Ronaldsway to Southampton moving slowly westwards with a trough lying from near Hull to Birmingham moving slowly northwards

Weather in the accident area: Rain, heavy at times with hail and thunder

Visibility: About 4,000 metres but falling to 800 metres in heavier rain and especially where low stratus has fallen to the surface on the higher ground

Cloud: Occasional broken stratus base 1,200 feet, broken cumulus base 2,000 feet, broken alto-cumulus base 9,000 feet with occasional cumulo-nimbus base 1,500 feet tops probably in excess of 35,000 feet

The aftercast also included copies of the Modified Radar Composites showing the radar rainfall images for 1500 hrs on 11 June 1993. The aftercast concludes that: " It is quite clear that a

thunderstorm was in progress at the crash site area and this is supported by reports of thunder from a ground station in the area".

### **Impact Parameters**

The aircraft had crashed some 1,500 feet amsl on a remote area of open moorland, the soft surface of which was formed by a heather covered layer of peat estimated to be up to 50 feet in depth. The point of impact had been amongst several natural water drainage gullies. The aircraft had struck the ground in a nose and left wing low attitude both estimated at between 45° and 50° below the horizon. The speed of impact was extremely high estimated at above 450 kt. Largely due to this high speed and the soft and deep nature of the surface most of the aircraft wreckage penetrated the peat to a great depth and in doing so formed a roughly circular crater of some 50 feet in diameter. Shortly after the impact this crater filled with water to a depth of approximately 8 feet, the natural water surface being several feet below the undisturbed ground level. A large quantity of peat material together with some items of wreckage, were ejected from the crater, forming a raised lip around the hole, in addition to being scattered locally in all directions. Seen from the air there was a bias to the spread of this material indicating that the aircraft had been on a track of 232°M at the time of the impact.

### **Wreckage Examination**

Recovery of the wreckage was severely hampered by the nature of the surface, the location and access to the site which was approximately 2.5 miles from the nearest suitable road. After several days, during which the crater was drained as far as practicable, it became apparent that none of the major parts of the aircraft would be accessible without deployment of significant resources. It was thus agreed amongst the authorities involved that the site would be cleared of all visible and accessible items associated with the aircraft and to leave the majority of the wreckage buried. The items which were recovered were transported to the AAIB at Farnborough for examination.

This examination revealed parts of the aircraft from the nose area, both outer wing areas and the tail, indicating the aircraft had not suffered any catastrophic structural failure whilst in flight. At least one item of wreckage was identified as belonging to aircraft XL 595. There was evidence in the wreckage that at least one wing mounted jettisonable fuel tank had been fitted but the location of fragments around the crater suggested that two were present, one on each wing. One tank explosive release unit was recovered which contained an unfired cartridge. Both artificial horizons from the cockpit were amongst the wreckage and both showed evidence consistent with the nose and left wing low attitude of the aircraft derived from analysis of the impact site. Thus failure of

the pilot's primary attitude reference instrument could be dismissed as a potential factor in the accident.

One of the electrically driven servo altimeters was also recovered which showed a height of 3,000 feet, an indication which, taking into account instrument lag and a very high rate of descent, was assessed as valid at the time of the impact. This also suggested that electrical power to drive these instruments must have been available on the aircraft up to the time of impact.

Little assessment could be made as to the serviceability of the engine or flying control systems. Evidence from the radar plot of the aircraft's speed together with the lack of any known distress call from the pilot and the high impact speed of the aircraft all suggest that normal engine power was available throughout the whole flight. Similarly, it might be expected that any significant malfunction of the control systems would have induced the pilot to eject or transmit a distress call.

Only one hydraulic jack was recovered which was one of two flap synchronisation units. This was indicating the flaps to be fully retracted at the time of impact. Parts of both ejector seats were recovered including both seat parachutes. Sufficient evidence was seen to establish that the right seat had been secured against firing by safety pins whilst the left seat parts recovered were not so secured. There was evidence to show that the left seat had not been fired. Evidence of five explosive cartridges from the ejection seats were recovered from the wreckage and were subsequently destroyed at the accident site.

## **Documentation**

After re-assembly of the aircraft at RAF Coltishall in 1992, it was issued with a Permit to Fly by the CAA on 22 January 1993 and was valid for one year. This was subsequently re-issued on 8 June 1993. An Operating Limitations document was also issued by the CAA which, amongst other items, required the aircraft to be operated and maintained in accordance with the appropriate RAF manuals and allowed for it to be flown for the purposes of public exhibition or demonstration (including associated practice, test and positioning flights). At the time of the accident, the aircraft had flown for a total of about 3,800 hours but only 8 hours 25 minutes since being re-commissioned.

Operating Limitations of significance were as follows:-

2. The aircraft shall not be flown over any assembly of persons.

3. The aircraft shall not be flown over any congested area of a city, town or settlement, except to the extent necessary in order to take off and land in accordance with normal aviation practice.

11.5 The aircraft shall be flown by day and under Visual Flight Rules only. Altitude limited to 10,000 feet. (This altitude limitation was applied at the time the Permit to Fly was issued due to the oxygen system not having been re-certificated).

The aircraft carried an exemption from the requirement to bear the nationality and registration marks assigned by the CAA, the identification marks being restricted to XL595. A Certificate of Approval of Aircraft Radio Installation was valid for the aircraft at the time of the accident which authorised the installation of VHF radio communication equipment. No reference was made by this certificate to transponder or radio navigational equipment.

### **Conclusion**

The pilot was experienced and qualified to fly in IMC although this particular aircraft was restricted to VFR flight by virtue of its Permit to Fly and Operating Limitations. In the absence of all the wreckage for examination, it was not possible to establish positively the serviceability of the aircraft prior to the accident. However, the areas of examination referred to above, together with the lack of any distress call from the pilot suggest that there had been no major failure of the aircraft or its systems. No technical reason could be established why the ejection system was not used.