# Hawker Hunter F6A, G-KAXF

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| **Aircraft Type and Registration:** | Hawker Hunter F6A, G-KAXF |
| **No & Type of Engines:** | 1 Rolls-Royce Avon 20701 turbojet engine |
| **Year of Manufacture:** | 1956 |
| **Date & Time (UTC):** | 25 July 1999 at 1800 hrs |
| **Location:** | London-Luton Airport |
| **Type of Flight:** | Private |
| **Persons on Board:** | Crew 1 - Passengers - None |
| **Injuries:** | Crew None - Passengers N/A |
| **Nature of Damage:** | Left flap, left aileron, left underwing tank, minor skin damage to left wing |
| **Commander's Licence:** | Airline Transport Pilots Licence |
| **Commander's Age:** | 55 years |
| **Commander's Flying Experience:** | 5,996 hours (of which 2,760 were on type)<br>Last 90 days - 31 hours<br>Last 28 days - 10 hours |
| **Information Source:** | Aircraft Accident Report Form submitted by the pilot and detailed examination by the aircraft maintenance company |

## History of flight

The aircraft was returning to Cranfield from RAF Brize Nortonfollowing appearance at the Fairford Air Display. On arrival at Cranfield, at about 1745 hrs and after holdingto allow a light aircraft to land, G-KAXF was positioned downwind. On selecting the landing gear down on thenormal system, the DOWN button depressed but there was no change in thestatus of the landing gear; all indicator lights, red and green, remained unlitand there were none of the sounds normally associated with the landing geartravelling.

The hydraulic system pressure was checked and was indicatingin the correct range, 2,800 to 3,000 psi. After consulting the Flip Cards, further selections were made withouteffect. It was apparent to the pilotthat there was some form of selector fault, probably electrical although allelectrical system indications were normal throughout. Having cycled the landing gear selector a number of times withoutsuccess, he elected to blow the landing gear down using the pneumaticemergency system. Having checked theemergency system pressure gauge, which was indicating slightly over therequired 2,000 psi, the emergency selector handle was pulled. The landing gear extended quickly as isusual, except that the left main indication stayed RED as the nose and rightmain gear GREEN indicators illuminated. The pilot checked and he was unable to see the left main gear,confirming that it had not fully extended.

Fuel was, by now, becoming a critical factor and this, plusthe fact that there was no fire cover at Cranfield as it was outside the normalairfield operating hours, led the pilot to decide to divert to Luton. During the

transit to Luton attempts weremade to extend the left main leg by application of positive and negative gand by side slipping the aircraft, all to no avail.

Having used the emergency extension system the pilot wasleft with two options; land with the gear in its current configuration oreject. Given his knowledge of theHunter aircraft having a good record of landing with various combinations oflanding gear position, particularly with external fuel tanks fitted, the pilotwas confident that whilst the aircraft may leave the runway, the landing wouldbe completed with minimum danger to himself or others.

Despite some communication difficulties due to anintermittent aircraft radio fault, following his PAN the pilot was of theopinion that he received a first class service from Luton ATC.

The landing went much as the pilot had anticipated. After touching down at 140 kt on theright side of the runway, the brake chute was deployed and the enginestop-cocked. The left wing dropped butwas supported by the underwing tank and use of the right brake kept theaircraft on the runway until the speed decayed. At about 40 to 50 kt, with the aircraft close to the leftside of the runway, directional control was finally lost and the aircraft swunggently to the left and onto the grass. It continued to slow and came toa halt at right angles to and some 50 to 60 yards from the runway leftedge. As the aircraft departed therunway the left underwing tank broke-up and a short flash fire ensued. After coming to a halt the pilot wentthrough the shut down drill, made the ejector seat safe and then vacated theaircraft. The Luton Airport FireService were quickly on the scene and dealt with the limited external fuel tankfire.

The aircraft was raised to a wings level position with airbags and it was apparent that the left main gear remained jammed about half wayextended. By releasing hydraulic fluidvia a bleed point it was possible to fully lower the leg.

**Landing gear system**

The landing gearconsists of two inwardly retracting main legs and a forward retracting nose legpositioned in normal operation by hydraulic actuators. The landing gear is controlled from thecockpit by a selector switch, which consists of two inter-locked push-switches,the operation of either one ejecting the other. The upper push switch is used to retract and the lower to extendthe gear. Selection supplies 24 voltsto either the extend or retract connector pin of an electro-hydraulic valve,which has a common earth return. Withinthis common earth line there is a micro-switch, operated on selection of theemergency landing gear extension system, to isolate the normal operatingsystem. Under normal operations, theelectro-hydraulic valve ports hydraulic fluid from the pressure and returnlines to the landing gear actuators to position the gear in response to a cockpitselection.

In the event of hydraulic or electrical failure the landinggear can be lowered using a pneumatic system. When the emergency extension control is operated, the electro-hydraulicvalve is isolated as above and high

pressure air is directed to two shuttlevalves which operate to cut off the hydraulic supply circuit and permit highpressure air to flow to the extend side of the landing gear actuators. Additionally the high pressure air opens anoil jettison valve which permits oil in the landing gear retract lines to bevented to atmosphere.

# Engineering examination

Engineering examination to identify why the landing gearfailed to operate on the normal system was hampered by the transient nature ofthe fault. Following replenishment ofthe hydraulic fluid and bleeding of the system, the landing gear functionednormally when first tested subsequent to the accident. It was only after a period of testing anddetailed diagnostic work that an intermittent fault with the microswitch in thecommon earth line to the electro-hydraulic valve was identified. This fault, when active, effectivelyisolated the valve inhibiting it from responding to cockpit selections.

Further examination of the pneumatic lines of the emergencylowering system revealed a significant leak at a pipe joint in the leftwing. The wire locking at the joint wasintact but the wire had pulled through the corner of one of the joint nutsand the joint had subsequently loosened. The leak had depleted the supply of high pressure air before theemergency extend cycle was complete and also allowed the oil jettison valveto close, trapping hydraulic fluid in the left main leg retract line. The presence of trapped fluid on the retractside of the jack jammed the leg in an intermediate position.