No: 12/88 **Ref: EW/C1076** **Category: 1c**

Aircraft Type and Registration:	Pitts Special SlD, G-BSIS	
No & Type of Engines:	1 Lycoming O-360-A4A Piston Engine	
Year of Manufacture:	1981	
Date and Time (UTC):	11 July 1988 at 1646 hrs	
Location:	Rushett's Farm, Chessington, Surrey	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - 1 (Fatal)	Passengers - N/A
Nature of Damage:	Aircraft substantially damaged	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	27 years	
Commander's Total Flying Experience:	201 hours (of which 75 were on type)	
Information Source:	AAIB Field Investigation	

G-BSIS departed Denham at 1600 hrs for a transit flight to Rushett's farm, where it was to have undergone an annual check for renewal of its Permit to Fly. The departure from Denham was uneventful and the aircraft arrived at Rushett's farm at about 1635 hrs. The grass strip that G-IS intended to use was located very close to the edge of the London Control Zone and surrounded by "noise-sensitive" areas, including a hospital. The orientation of the strip is 200° (Magnetic). On the day of the accident, there was approximately 400 metres of landing run available. The wind was 240° at 12 kt, with gusts to 18 kt.

Upon its arrival in the circuit, the aircraft was seen to make an approach to the strip and carry out a go-around from low level. As it did so, the engine was heard to increase in power, to a level estimated at less than full power. The aircraft climbed straight ahead to about 100 feet agl, before commencing a left hand climbing turn using no more than 30° of bank. At a position where G-IS would have been expected to roll-out on to the downwind leg, and at a height of about 200 feet agl, the left wing was seen to drop. An increase in the engine noise was then heard. Following the wing-drop, the aircraft rotated through approximately 390°, before striking the ground. The pilot, who was wearing a full "five-point" aerobatic harness, was killed by injuries sustained to his head from impact with the edge of the cockpit coaming, which was not padded.

The flight manual for the aircraft states that the stalling speed, in a 30° banked turn, is 69 mph. Experienced Pitt's pilots state that a speed of not less than 100 mph would be appropriate for a turn onto the downwind leg.

The aircraft had crashed approximately 100 metres from the end of the strip, and 400 metres to the left of the extended centreline. It had struck the ground on a heading of 330°, at the edge of a gently sloping field of standing crop. The attitude at impact was 15 to 20° "nose-down" and slightly left wing low. It had then skidded on its underside for some 40 feet through the crop, whilst yawing to the left, before coming to rest on a heading of 085°. Initial analysis of the accident site and wreckage indicated that the aircraft was not spinning at the time of impact; that the propeller was rotating at low power; and that all flying controls were properly connected.

The wreckage was recovered to AAIB Farnborough where a more detailed examination was carried out. This did not reveal any pre-impact defects which might have caused the accident. However, the following points were established:

Both magnetos were Slick 4000 series, a type which has been out of production for some time. These items had been remanufactured in the USA in 1977 before fitment to this engine. On test, it was established that the left (impulse) magneto failed to produce ignition sparks below approximately 1500 engine RPM, but did so, if slightly erratically, above that figure. Although at "1 atmosphere" pressure the impulse unit would generate weak sparks, when fitted to another O-360 engine, this engine failed to start. An internal examination of this magneto revealed that almost no "gap" existed at the contact points. The right magneto performed satisfactorily at all speeds during the test. According to the aircraft's records, the engine and magnetos had accumulated approximately 250 hours total running since being "zero-timed," in 1977.

"Self-adhesive" fabric tape had been applied to various parts of the aircraft, and in particular to seal the gaps between the tailplane/elevator and fin/rudder. It was apparent that this tape had "lifted" on one side of the fin over its full height such that, in still air, it protruded a full 2.5 cm on the left side. There was also some lifting of the tailplane/elevator hinge tape, particularly on the upper surface of the right elevator. The frayed edges of the tape, together with its loss of adhesive and smudges of red paint on the non-adhesive side, provided clear evidence that the tape had been "flapping" in flight, and had not come loose as a result of the impact.

The tail surfaces of G-BSIS were examined by aerodynamicists at the Royal Aerospace Establishment. They concluded that, at low airspeed with sufficiently large right-rudder deflections, the flapping tape could have disturbed the boundary layer and acted as a "spoiler", leading to flow-separation on the left side of the rudder, thus reducing the effectiveness of the rudder. In a similar manner, the power of the elevator would have been reduced in the downward-displacement sense.

Various items of debris were found in the very rear of the fuselage, close to the elevator linkage. This debris included items thought to have come from the cockpit and a section of hard rubber, approximately 2.5 cm square and 10 cm in length, which was later identified as one of the undercarriage "stops". The impact sequence, and general appearance of this debris, made it unlikely that it had accumulated as a result of the accident.

A post mortem examination of the pilot failed to reveal any pre-existing condition that could have caused, or contributed to, the accident.