No: 9/92 **Ref: EW/C92/6/4** **Category: 3**

Aircraft Type and Registration:	Gemini Flash IIA, G-MTTO
No & Type of Engines:	1 Rotax 503 piston engine
Year of Manufacture:	1988
Date & Time (UTC):	27 June 1992 at 1012 hrs
Location:	Aldford, near Chester, Cheshire
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:	Private Pilot's Licence - Group A (lapsed)
Commander's Age:	58 years
Commander's Flying Experience:	155 hours (of which 4 were on microlight aircraft)
Information Source:	AAIB Field Investigation

The pilot started flying in May 1979 and by August 1980 had completed 73 hours. He had been issued with a Private Pilot's Licence (PPL) endorsed for Landplanes Group A and Self Launching Motor Gliders (SLMG). For the next six years he remained current by flying approximately 12 hours a year mainly on Cessna 150 aircraft. Between 1986 and 1989 he flew only six hours with his last recorded solo flight being in August 1987 and last dual flight being in August 1989. Until April 1992 all his flying experience had been on conventional 3-axis control aircraft.

In December 1991 he often visited the nearby farm landing strip at Waverton and talked to microlight owners and examined their aircraft. In February 1992 he bought a second hand Gemini Flash IIA microlight, a weight shift control aircraft, direct from the manufacturer. He was to receive the necessary flying instruction from a microlight instructor. The aircraft was stored, in its de-rigged condition, in farm buildings close to the landing strip. In mid March 1992 the manufacturer's test pilot flew the aircraft for its annual inspection check flight. The owner pilot accompanied the test pilot on this flight but acted only as an observer. After this flight the aircraft was de-rigged again and not flown for several weeks.

During April and May 1992, the pilot arranged for several lessons with a microlight instructor using the instructor's own aircraft. Three flights were completed in a total flight time of four hours. These flights covered mainly upper air handling with little practice in take-offs and landings. His instructor reported some over confidence in the air with his student wanting to "run before he could walk". He advised his student that a comprehensive microlight conversion course was necessary as it was possible for conventional control (3-axis) pilots with insufficient weight shift experience to make incorrect control inputs when under a heavy workload or in turbulent conditions. However, due to unsuitable weather conditions the pilot did not complete any further tuition.

In May 1992 he prepared his own aircraft for flight from the local farm. Following some discussion of the pilot's microlight experience, the farmer suggested that they fly together so that he, an experienced microlight pilot, could advise and assist if necessary. During the subsequent flight the farmer, seated in the rear seat, was obliged to take control several times and particularly during the landing.

On the day of the accident the pilot prepared the aircraft for flight from a field adjacent to his house. He secured a 40 kg sandbag, used as ballast, into the rear seat and was seen to check every part of the machine. Prior to flight the pilot telephoned Hawarden, the local airfield, for traffic advice as there was to be an air display later that day. With this information he carried out pre take-off checks and, at approximately 0930 hrs took off climbing and turning to the south. The pilot carried with him a hand held VHF radio which was found later to be tuned to 123.35 MHz, the Hawarden approach frequency.

An aftercast obtained from the Meteorological Office at Bracknell confirmed the general weather situation at the time as high pressure over England and Wales with light and variable winds. Visibility was 20 km with a surface temperature of 21°C producing moderate thermal activity over open fields.

The aircraft was next seen at 1010 hrs by several witnesses in the vicinity of Aldford, six miles south of Chester. The aircraft was quite high but started to circle to the left and commence a gentle descent. One witness then saw the aircraft travelling in a westerly direction over his garden and a nearby pine wood at a height estimated to be 200 to 300 feet. The witness reported that "the engine sounded normal and the aircraft appeared under control". As the aircraft continued over the wood it started to fly erratically, described by a second witness as "swaying from side to side as if under the control of a novice". The aircraft was then seen to pitch up for several seconds and then pitch down with increasing engine noise.

Realising that the aircraft had crashed, two witnesses made their way to the wreckage in order to assist the pilot. The aircraft had come to rest inverted in a ploughed potato field with the sail and engine on

top of the pilot. The pilot's helmet had become dislodged in the impact but the pilot was still within the cockpit restrained by his lap harness. The emergency services were in attendance within 22 minutes but the pilot had received fatal injuries.

Wreckage examination

Examination of the wreckage and analysis of the the accident site showed the microlight to have been on a heading of 340°M and in a left wing low attitude at the time of impact. The trike unit had struck the ground on its nose and left side, slightly before the left wing tip, following which the microlight yawed to the left. It then continued and inverted as it came to rest some 80 feet from the initial point of impact. The microlight's forward speed at impact was estimated at between 40 kt and 50 kt and it was apparent that it had been descending at a medium to low rate. There was no fire.

It was established that the microlight had been intact prior to impact, that the engine had been producing a high level of power and that adequate fuel remained in the tank. All damage and failures to the tubular structure of the trike and wing were attributable to the impact with the ground and the only failures to rigging wires had occurred to the aft 'A' frame support wires as a result of contact with the rotating propeller. The ASI fitted to the aircraft was check calibrated, in conjunction with its venturi, and found to be serviceable.

The Gemini Flash IIA microlight is designed with wingtips that may be adjusted, when on the ground, such that the angle of incidence of the tip areas of the wing can be set to correct any inbuilt tendency of the wing to turn in flight. The tips can be set at three reduced angles from neutral but only one increased angle. Instructions contained in the owner's manual state that adjustment should be carried out on the tip opposite to the direction of turn by reducing the angle of incidence, one setting at a time, following which a flight test must be carried out.

It was established from the wreckage that this microlight had been flying with the right wing tip set to maximum incidence, but with the left at one setting of reduced incidence from neutral. On 17 March 1992, when G-MTTO had been examined and test flown by the manufacturer's pilot prior to the revalidation of the microlight's Permit to Fly, the person concerned reported that both wing tip adjusters were set at the neutral position and that there was no apparent need for any change. No record of any such change was contained in the microlight's log book. The wing would have had a tendency to turn left in flight unless the change had been made (incorrectly) to counteract an inherent right turn. Advice from the BMAA is that a high positive incidence on the right tip, in relation to the left, is likely to precipitate a right wing drop at the stall from which recovery would be difficult at low level.

At the time of the accident the microlight possessed a current Permit to Fly, the engine hours meter showed that it had operated for approximately two hours since being inspected in March 1992. Total time recorded in the log book at that time was 110.54 hours.

Post Mortem Examination

An autopsy revealed that the pilot was suffering from severe coronary artery disease. Controlling the aircraft in moderate turbulent thermal activity, combined with out of trim forces brought about by asymmetric wing tip incidences, would have demanded considerable physical activity. It is possible that this physical activity, combined with his medical condition, may have brought about some degree of incapacitation in flight prior to impact. The autopsy also revealed that the pilot had a small amount of alcohol in his blood (20 mg/dl) but its effect upon perception and co-ordination was considered to be marginal.

Private Pilot's Licence Privileges

The pilot's licence and log book showed that he held a valid medical certificate but his last recorded Certificate of Experience (C of E) had been signed in March 1986.

Civil Aviation Publication (CAP) 53 provides information relevant to all Private Pilot's Licences. Relevant extracts are reproduced below:

Periods of Validity

The UK PPL is an unexpiring licence but the privileges conferred by it, and by any ratings in it, may only be exercised when the licence and the appropriate ratings are valid. For the licence to be valid, the pilot must have a current Medical Certificate and a valid Aircraft Rating. The Aircraft Rating is valid if either a current Certificate of Test (C of T), or a Certificate of Experience (C of E) for the appropriate Class and, where applicable, for types or Groups of Aircraft has been stamped in the pilot's log book and signed by an authorised Examiner. The C of T or C of E remains valid for 13 months respectively from the date of test or the date on which the C of E was signed. The holder of a PPL who has not flown as Pilot in Command (PIC) for a period exceeding 26 months but not more than five years will be required to undergo the training and Flight Test specified. Training and testing requirements must be conducted in an aircraft of the Type or Group included in the Aircraft Rating on the Licence.

Aircraft Rating Privileges

A Group A Aircraft Rating entitles the holder to act as PIC of all single-engine aeroplanes not exceeding 5700 kg maximum total weight authorised. As all microlights are aeroplanes of a maximum total weight authorised of 390 kg they are also included in Group A. However, because of the variety of microlight types and flight control systems it is important that pilots undertake adequate conversion training with a microlight instructor to qualify on each type of microlight they intend to fly.

Safety Recommendation No 92-79

It has been recommended that the CAA introduce a requirement for a General Flight Test, conducted by an authorised examiner, before a UK PPL holder with a Group A Aircraft Rating can fly a microlight aircraft with a control system that differs significantly from that of a conventional 3-axis control aircraft.