ACCIDENT

Aircraft Type and Registration:	Cessna 172M Skyhawk, G-TRIO
No & Type of Engines:	1 Lycoming O-320-E2D piston engine
Year of Manufacture:	1976
Date & Time (UTC):	23 February 2008 at 1515 hrs
Location:	Farthing Common, Kent
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - 1
Injuries:	Crew - 1 (Minor) Passengers - 1 (Minor)
Nature of Damage:	Substantial
Commander's Licence:	National Private Pilot's Licence
Commander's Age:	58 years
Commander's Flying Experience:	225 hours (of which 121 were on type) Last 90 days - 9 hours Last 28 days - 4 hours
Information Source:	AAIB Field Investigation

Synopsis

The pilot was flying on a cross-country flight when the weather conditions deteriorated. When the aircraft entered cloud, the pilot tried to regain visual flight conditions by turning and descending. As he did so the aircraft flew into and came to rest in some trees. Both occupants escaped unassisted with minor injuries.

History of the flight

The pilot had arranged to fly the aircraft, from a flying club several days before the flight. On the day of the accident, when he arrived at the airfield, he asked another pilot, who had already been flying, about the height of the cloudbase in the local area. The reply from the other pilot was that he had been able to fly clear of cloud at 2,000 to 2,200 ft amsl.

Having decided that the weather was suitable, he planned a local cross-country flight of about one hour taking a passenger. Before departure he refuelled the aircraft to full tanks. He took off at 1447 hrs, having advised Rochester Information that his flight would be of approximately 60 minutes duration. This is a mandatory requirement at Rochester Airport to enable prompt overdue action to commence, introduced as a result of a previous AAIB investigation.

Only short sections of the aircraft's route were recorded on radar but the pilot advised that he initially flew south towards Bewl Water and then turned east towards Ashford and Dover. While enroute he had been able to maintain between 1,800 ft and 1,500 ft amsl and remain

below cloud, but occasionally he had needed to descend for a short time to remain clear. At 1510 hrs, overhead Ashford, the pilot contacted Manston ATC and advised that he was at 1,500 ft, maintaining VFR proceeding to Dover and then Canterbury. Manston ATC offered the pilot a Flight Information Service and assigned the aircraft a squawk of 4250.

A short while later the pilot descended in an attempt to keep below cloud but then found that there appeared to be a "wall of cloud" ahead. He decided to turn left towards Rochester and descended in an attempt to remain clear of the cloud. He recollected being at about 900 ft amsl at this time. He described looking through his side window towards the ground and noticed that his altimeter was reading 650 ft amsl. He then saw trees ahead that he was unable to avoid. The aircraft flew through the upper parts of a number of trees before finally descending into a large evergreen tree. These trees were at an elevation of approximately 600 ft amsl.

The pilot and his passenger were both able to escape from the aircraft unaided and suffered minor cuts and bruises.

Pilot information

The pilot held a National Private Pilot's Licence (NPPL) for which he qualified in 2003. In 2002 he had tried to obtain a Class II medical for a PPL but this was refused. Since qualifying for his licence he had flown regularly and for the last two years almost exclusively in a Cessna 172; all the recorded flights in his logbook for the last year were from and to Rochester. The pilot did not hold an IMC rating and said that normally when flying cross country he would fly at around 3,000 ft. On the day of the accident he had been concerned about the cloudbase but on hearing the other pilot's report, he was content that he would be able to maintain clear of cloud at 2,000 ft amsl.

The pilot, in a statement to the police, described himself as a regular heavy cannabis user, smoking a large amount each evening. Loss of precision skills and slowed reactions are two documented effects of cannabis use which make it incompatible with flying.

The Air Navigation Order, Article 65, states that:

> *'A person shall not, when acting as a member of the crew of any aircraft or being carried in any aircraft for the purpose of so acting, be under the influence of drink or a drug to such an extent as to impair his capacity so to act.'*

Meteorological information

The synoptic situation showed that the south-east of England was affected by a warm front, moving east to the southern North Sea. The Met Office forecast for the area indicated good visibility in most areas with occasional reductions to 3,000 m near sea coasts and upslopes, a broken or overcast layer of cloud with a base at 1,500 ft to 2,000 ft and tops at between 3,000 ft and 6,000 ft. Occasional broken stratus cloud with a base of 400 ft to 1,000 ft was forecast around sea coasts and upslopes.

The weather conditions at Rochester Airport (elevation 426 ft amsl) were such that aircraft in the circuit were able to maintain around 1,000 ft aal and remain just below the cloud. Reports from the local flying area were that visibility below the cloud was good.

The METAR's at Lydd, 10 nm to the south west of the accident site, were:

> 1450Z Surface wind from 230º/19 kt, visibility 9,000 m, drizzle, scattered cloud at 800 ft, broken cloud at 1,800 ft, temperature 9ºC, dewpoint 9º C, and pressure 1026 mb.

1520Z Surface wind from 220º/16 kt, visibility 10 km, few cloud at 800 ft, broken cloud at 2,100 ft, temperature 9ºC, dewpoint 8º C, and pressure 1025 mb.'

A satellite photograph for the area at the time of the accident showed general cloud cover over southern England with an additional layer lying along the coast from Folkestone to Ramsgate.

Witnesses and recorded information

There were two witnesses, both qualified pilots, who reported seeing the aircraft during its flight. One saw it flying "low", he estimated at 500 ft to 600 ft agl, close to the M20 motorway east of Ashford. The other saw it flying in an area about 2 nm to the south of the accident site, heading in a north-north-westerly direction. He had first seen the aircraft low to the south, then saw it climb a little to clear a line of pylons before it disappeared from his view to the north.

Recordings of the radiotelephony communications between G-TRIO and Manston ATC were available. Small sections of the track of the aircraft were recorded on radar, however, the lowest recorded coverage of primary returns in the area, in the prevailing conditions, was around 1,300 ft amsl. There were no secondary radar contacts.

Site and wreckage examination

The aircraft passed low over the roof of a house before impacting a succession of four mature trees immediately beyond it and extending over a distance of 46 m into the garden of a neighbouring house. It also severed a set of mains electricity distribution cables. Its height at this stage remained constant, at approximately 8 m above ground level. It then continued a further 20 m, following a descending trajectory and passed through the canopy of smaller trees at a height of about 5 m above ground level before falling through the canopy and coming to rest in the forked base of a sixth tree, a short distance beyond and 70 m from the first impact. The aircraft was brought to rest in a steep nose-down attitude with its cabin two metres above ground level, wedged into the multi-forked base of the tree. The deceleration during its final arrest was sufficient to cause the engine to tear from its mountings and fall to the ground and the aircraft came to rest with one of the tree's multiple trunks very close to the passenger's head position.

In the initial tree impact, the right outer wing struck the trunk of a conifer some 10 cm in diameter, breaking it and severing the outermost 30 cm of the wing and tip fairing and tearing away the outer half of the right aileron. The subsequent tree impacts, involving a mixture of conifer and deciduous trees, caused the progressive disruption and separation of most of the remaining right wing, including most of the wing strut and the right fuel tank. These latter items followed a separate ballistic trajectory before coming to rest against the side of a large commercial greenhouse approximately 25 m beyond the resting place of the main wreckage, ie some 95 m from the initial tree impact.

Despite the disruption of the right wing and fuel tank, and the severing of the mains electricity distribution cables, there was no fire.

The path of the aircraft through the trees, and the pattern and distribution of damage, suggested that the aircraft was banked to the right at an angle of at least 35° when it struck the first tree. The extent of its initially horizontal trajectory through the trees, together with overall throw of the wreckage, was indicative of significant momentum consistent with a high airspeed: it certainly was not

suggestive of a loss of engine power, nor of a reduced airspeed.

The wreckage was examined in detail in situ. It was confirmed that the aircraft had been intact when it first struck the trees, with all flying controls attached and their operating circuits connected. The flaps were fully retracted. The elevator trim indicator in the cockpit showed a setting approximately 40% between neutral and fully nose-down and the angle of the trim tab surface was consistent with this setting. The magneto was switched to BOTH and the throttle, mixture, and hot air controls were all fully forward; however, these controls could have been pulled into their fully forward positions by the engine as it tore from its mounts in the final impact. The altimeter pressure setting was 1024 mb, and the transponder was set to ALT. The transponder code setting knobs had all been broken off in the impact, and the digits showing in the display windows had evidently moved slightly as a consequence: post-accident, they read '4-3', '3-2', '1', and '0'.

The passenger's seat was partially detached from its floor rails but both seat harnesses, which were of a modified type each having dual shoulder straps branching from a single retention strap fixed to the structure, survived intact and the buckle of each had been opened.

There was no fire and the occupants' survival was attributed to the progressive deceleration imparted to the aircraft by its passage through each of the tree canopies and subsequently during its decent into the canopy of the final tree before it was caught in its forked base. By chance, the aircraft suffered no significant frontal impacts or penetrations of the cabin space by tree or wing debris.

Analysis

The pilot reported that he had been turning to the left in an attempt to regain VMC when the aircraft hit trees. The evidence from the accident site suggested that the aircraft had been in a banked turn to the right of at least 35º at the time of impact.

The weather at the time of departure from Rochester appeared to the pilot to be reasonable for a cross-country flight. Other aircraft were flying under VFR in the area. As the aircraft tracked to the east, the weather deteriorated necessitating a track reversal to maintain VMC. The pilot described being suddenly confronted with a wall of cloud, although he had already descended below his chosen altitude several times.

The radar evidence suggests that most of the flight was conducted below 1,500 ft amsl although the pilot had wanted to maintain 2,000 ft amsl. Two witnesses saw the aircraft flying low below cloud in the final five minutes. Therefore the conditions for much of the flight were worse than those anticipated by the pilot.

The pilot considered the weather and made the initial decision to go on the flight but then appears to have delayed his decision to turn back as the conditions deteriorated.

The possibility that cannabis may have impaired his judgement and/or handling of complex tasks cannot be excluded.