

**Aviation Safety Investigation Report
199502098**

**Scott Winton
Sapphire**

03 July 1995

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Occurrence Number: 199502098**Location:** Benambra**State:** VIC**Date:** Monday 03 July 1995**Time:** 1720 hours**Occurrence Type:** Accident**Inv Category:** 4**Time Zone:** EST**Highest Injury Level:** Fatal**Injuries:**

	Fatal	Serious	Minor	None	Total
Crew	1	0	0	0	1
Ground	0	0	0	0	0
Passenger	0	0	0	0	0
Total	1	0	0	0	1

Aircraft Manufacturer: Scott Winton**Aircraft Model:** Sapphire**Aircraft Registration:** REG_1995020981**Serial Number:** 0267**Type of Operation:** Non-commercial Pleasure/Travel**Damage to Aircraft:** Destroyed**Departure Point:** Benambra VIC**Departure Time:****Destination:** Benambra VIC**Crew Details:**

Role	Class of Licence	Hours on		
		Type	Hours	Total
Pilot-In-Command	Student		2.0	136

Approved for Release: Thursday, March 21, 1996

The unregistered single-seat Sapphire ultralight aircraft took off from the town airstrip at 1700 EST. The pilot had borrowed the aircraft from the owner who expected him to practise flying the aircraft in the vicinity of a private airstrip at the outskirts of the town. At 1720 the aircraft crashed within 2 km of the town airstrip and about 500 m from the private airstrip.

This aircraft was unique. The designer had built it during the developmental stage of the aircraft type. Since then it had been significantly modified including being retrofitted with a 40 horsepower Rotax 447 two-stroke engine, mounted upright. This is in contrast to the current Sapphire model which has the same Rotax engine installed inverted. The engine mounts were modified to enable the engine to be installed upright and a specially designed engine cowl had been fitted. The shape of the engine cowl may have affected the aerodynamics of the aircraft.

Even though the propeller reduction gearbox had been installed inverted, the propeller thrust line was slightly higher than in the current model. The higher thrust line may have caused handling differences compared with the current model. The aircraft was fitted with a larger diameter propeller which rotated at lower RPM than propellers installed on current Sapphire models due to different gearing in the reduction gearbox. Whether the thrust produced was the same as the current model is unknown.

This aircraft did not have flaps and was fitted with full-span ailerons. Later Sapphire models have flaps and half-span ailerons. According to the current manufacturer, the full-span ailerons would have had a significant effect on the tendency for spin entry if the pilot inadvertently used aileron, in lieu of rudder, in an attempt to counteract wing drop. The main wing was fully fibreglass covered and appeared to be the same size and shape as the current model. The aircraft was equipped with a vacuum-driven airspeed indicator (ASI) sourced from a small venturi mounted on the nose of the aircraft. The owner had previously tested this ASI in flight and noted that it indicated 35 kts at the stall. Current Sapphires are fitted with a standard pitot/static system and the stall occurs at 36 kts.

The owner stated that when he test flew the aircraft it maintained straight and level flight, hands and feet off the controls, at 65 kts indicated airspeed. However, the effect of any differences between the accident aircraft and the current-model Sapphire concerning tendency to spin, spin entry, the established spin, or spin recovery is unknown.

The owner and the pilot had only flown this modified version of the Sapphire. The owner had a total flying experience of 80 hours in ultralight aircraft, with about 8 hours recent flying experience in the modified Sapphire. He stated that he had discussed the attributes of his Sapphire with the pilot before allowing him to fly it.

Witnesses saw the right wing drop and the aircraft enter a spin at a height estimated to have been between 200 ft and 500 ft. They heard the engine continue to operate until ground impact. One witness stated that the aircraft entered the spin from straight and level flight and spun three times before impact. Another witness stated that the aircraft may have just commenced a slight climb to the right when the right wing dropped and spinning commenced.

At the time of the accident the temperature was about 10 degrees C, the wind was a north-westerly at about 5 kts, and visibility was good with no sun glare because of high cloud cover. Official last light was 11 minutes after the time of the accident. The surrounding terrain was an obstruction-free mud flat.

There was adequate fuel on board and examination of the airframe and the engine found no defects which may have contributed to the accident.

The aircraft's centre of gravity and gross weight at the time of the accident are unknown. The owner and the pilot were unaware of the aircraft's empty weight and centre of gravity prior to the accident flight. Despite this lack of knowledge, pilots had successfully flown the aircraft for about 10 hours since it was modified.

According to other Sapphire pilots, the aircraft type does not exhibit a pre-stall buffet which would warn the pilot of an imminent stall. The Sapphire is not fitted with a stall warning horn. The investigation found that the pilot was wearing large boots and that the very small rudder pedals were located in a confined area of the cockpit pod. This may have made rudder application difficult. Spin recovery was probably not achievable if spin entry was as low to the ground as reported.

The pilot regularly flew his privately owned Jeep ultralight aircraft. Compared with a Sapphire, the Jeep has high drag, a slower cruise speed and a much slower stall speed. The pilot's logbook contained no entries for past Sapphire flights. However, according to the aircraft owner, the pilot had flown this aircraft four times and had accrued about two hours in it before the accident. None of the pilot's logbook entries indicated spin recovery training.

Spinning is currently banned in ultralight aircraft. However, the Australian Ultralight Federation's pilot ground training theory syllabus includes stall and spin recovery procedures, and the inflight stall training syllabus includes recovery from wing drops.

The Sapphire is known to be more sensitive to fly than the Jeep or similar high drag ultralights. It stalls at a higher airspeed and has sensitive handling characteristics. In the stall, the Sapphire normally mushes and then starts oscillating, but it may drop a wing and enter a stable spin. To stop the spin, a pilot must apply standard spin recovery drill. The manufacturer likens Sapphire handling characteristics to a modern glider. He recommends that, before flying a Sapphire, pilots should experience three hours dual instructional flying, including full spin recovery, in a two place glider, or undertake equivalent training in powered aircraft.

The modified Sapphire stalled and entered a spin at a low altitude from which recovery was not considered possible. The reason the aircraft entered a spin could not be determined.

SAFETY ACTION

On 14 July 1995, the Australian Ultralight Federation (AUF) issued an Operations Bulletin to all training schools requesting them to ensure that the flight training syllabus coverage of stalling is followed. During routine inspections of operators, the AUF is ensuring that this is done.

The Operations Bulletin also requested instructors to impress upon students the need to undergo additional training when upgrading to a higher-performance aircraft. The aircraft manufacturer recommends three hours dual instruction in a glider prior to upgrading to the Sapphire.