

# AS355F1 Twin Squirrel, G-PASE and Shorts Tucano T1, ZF 164

**AAIB Bulletin No: 2/98 Ref: EW/G97/09/06 Categories: 2.3 & 1.2**

<b>Aircraft Type and Registration:</b>	i) AS355F1 Twin Squirrel, G-PASE ii) Shorts Tucano T1, ZF 164
<b>No &amp; Type of Engines:</b>	i) 2 Allison 250-C20F turboshaft engines ii) 1 Garret Turboprop engine
<b>Year of Manufacture:</b>	i) Not relevant ii) Not relevant
<b>Date &amp; Time (UTC):</b>	10 September 1997 at 1432 hrs
<b>Location:</b>	Wookey, Somerset
<b>Type of Flight:</b>	i) Police Operations ii) Military Training
<b>Persons on Board:</b>	i) Crew - 3 - Passengers - None ii) Crew - 2 - Passengers - None
<b>Injuries:</b>	None
<b>Nature of Damage:</b>	i) Tailskid detached and portion of skin missing from vertical fin ii) Damage to top of fin and rudder
<b>Commander's Licence:</b>	i) Airline Transport Pilot's Licence ii) RAF Instructor qualification
<b>Commander's Age:</b>	i) 47 years ii) 35 years
<b>Commander's Flying Experience:</b>	i) 8,500 hours (of which 125 were on type) ii) 3,073 hours (of which 207 were on type) i) Last 90 days - 58 hours

- ii) Last 90 days - 74 hours
- i) Last 28 days - 14 hours
- ii) Last 28 days - 11 hours

**Information Source:**

Aircraft Accident Report Form submitted by the pilots and RAF Unit Inquiry report

The helicopter pilot reported that the aircraft had departed from Filton Aerodrome when tasked with a search for a missing person in the vicinity of Wookey, Somerset. It carried a crew of one pilot and two police observers. At 1431 hrs, the aircraft was about to begin the search and was heading about 260° at an airspeed of 60 kt at 500 feet agl. The aircraft was in receipt of a Flight Information Service from Yeovilton Radar. The helicopter was not fitted with a High Intensity Strobe Light system.

Simultaneously, the pilot heard '*a whoosh*' and felt a jolt. He saw a Tucano aircraft flying away below the helicopter in the 'half past eleven' relative position and saw an object flying off the helicopter in his right peripheral vision.

There were no handling difficulties with the helicopter. The pilot informed Yeovilton of the situation, carried out a precautionary landing in the nearest available field and shut down. A mobile telephone was used to confirm with Yeovilton that the helicopter had landed safely and also to request engineering support from the operator's base at Filton. Yeovilton Radar were unaware of the presence of the Tucano.

The Tucano was on the low level portion of a training navigation sortie from its base at Linton-on-Ouse to St. Mawgan. The front seat was occupied by a 'fast-jet refresher' student pilot, who had a total of 206 hours flying experience, of which 140 hours were on the Tucano type. An instructor was occupying the rear seat. The aircraft had just completed a turn by the Wells television transmitter mast from heading 190° onto heading 243° using 60° bank and was in a gentle descent to return to its minimum operating height of 250 feet having just flown over a ridge. The instructor was 'head down' at the time re-folding his chart and did not see the helicopter at all. The student indicated that the helicopter '*appeared out of nowhere*' about 40 seconds after the completion of the turn. He initiated a hard push in order to pass underneath the helicopter before losing sight of it. No impact was felt in the Tucano, which continued its flight to St. Mawgan. When in contact with St. Mawgan Approach control, the crew were informed of the collision in the Wells area. With the aid of the rear view mirror, the damage to the top of the fin and rudder was noted. An external inspection was carried out by another Tucano aircraft on a similar sortie, a low speed handling check was carried out, followed by a successful landing.

A Royal Air Force Unit Inquiry was carried out. The Inquiry found that the cause of the accident was that neither pilot saw the other aircraft in time to avoid a collision and that incompatibility of the operational modes and the unsuitability of the 'see and avoid' principle in these circumstances failed to ensure the necessary separation. The Unit Inquiry made six Safety Recommendations, which are currently under consideration by the Royal Air Force and the Ministry of Defence.

The AAIB has also made previous Safety Recommendations aimed at reducing the risk of mid-air collisions under similar circumstances. These were reported in AAR 2/92 and AAR 2/94. In particular, Safety Recommendation 94-4 was as follows:- "The Ministry of Defence should give a high priority to the development and introduction of technology which provides low flying military FJs with an aircraft collision warning system and the CAA should give similar priority to the research project for an electronic strobe detector."

Civil Aviation Publication 674 (the most recent Progress Report on the CAA and DoT Responses to the AAIB Safety Recommendations) states that the second part of this recommendation is "Fully Accepted - Open" and outlines the following CAA action:

In 1993 the CAA commissioned a feasibility study to consider detection systems. In 1994 further work was commissioned to carry out ground and airborne measurements to confirm theoretical predictions. Further work to answer outstanding issues was completed in 1995 and a system was produced and fitted to a Piper Cadet in 1996. An extended operational evaluation is likely to be completed by late 1997. The performance of the system provides potentially useful warning of approaching fast jets although a greater detection range would be preferable. Early results from the operational evaluation indicate that the system is likely to be particularly useful at alerting general aviation pilots to other light aircraft in the vicinity. The RAF plans to equip a training aircraft with the system for evaluation in the military environment.

The first part of Safety Recommendation 94-4 was directed to the Ministry of Defence and is consistent with one of the recommendations made by the RAF Unit Inquiry.