RAF 2000 GTX, G-BXMG

AAIB Bulletin No: 11/2003	Ref: EW/C2003/02/07	Category: 1.4
Aircraft Type and Registration:	RAF 2000 GTX, G-BXMG	
No & Type of Engines:	1 Subaru EA82 piston engine	
Year of Manufacture:	1993	
Date & Time (UTC):	8 February 2003 at 1255 hrs	
Location:	Long Marston Airfield, Warwicks	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Extensive	
Commander's Licence:	FAA Commercial Pilot's Licence with Instructor's Rating	
Commander's Age:	63 years	
Commander's Flying Experience:	2,418 hours (of which 47 were on type)	
	Last 90 days - 4 hours	
	Last 28 days - 2 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and subsequent AAIB enquiries	

History of Flight

The pilot took off from Runway 22 at Long Marston for a local flight at which time the surface wind was estimated to be south-westerly at about 10 kt, but with the wind strength increasing noticeably at altitude. After takeoff the pilot found he had to apply full left roll trim and some additional left roll control input to maintain his track, and he maintained the full left trim for the remainder of the flight.

On returning to the airfield some 15 minutes later, the pilot made an uneventful approach to Runway 22, describing the wind as being straight down the runway. During the flare, with the aircraft approximately one foot above the ground, the pilot stated that he encountered a gust of wind from the left at which point the machine started to roll to the right. He immediately applied full left roll input on the controls, but the aircraft continued to roll to the right until it was lying on its side on the runway.

Wind limitations

The aircraft has a crosswind limitation of 7 kt which was imposed by the CAA. In addition a Mandatory Permit Directive, also issued by the CAA and effective on 23 January 2003, imposed the following additional limitations:

"Unless the handling pilot has logged at least 40 flying hours on the RAF 2000 gyroplane following the issue of his/her licence the limitations below are to be observed:

1. *Flight when surface winds exceed 15 knots is prohibited.*
2. *Flight when surface wind gust speeds exceed 10 knots is prohibited.*
3. *Continued flight in moderate, severe or extreme turbulence is prohibited. Adjust forward airspeed to 55 knots (63 miles per hour) or below upon inadvertently encountering moderate, severe or extreme turbulence."*

Because at the time of the accident the pilot had accumulated a total of 43 hours on the RAF 2000, he was not obliged to comply with the limitations contained in the Mandatory Permit Directive. This was, however, his first flight as handling pilot in the type since July 2001.

Wind conditions

Prior to the flight the pilot had obtained the weather forecast for Birmingham Airport, which is 19 nm to the north of Long Marston. The forecast wind for this period at Birmingham was 200°/12 kt with an actual wind reported at 1250 hrs of 210°/12 kt. No mention was made of any gusts and the wind conditions at Birmingham suggested that the crosswind component at Long Marston was likely to be significantly less than the 7 kt limit.

The pilot's own assessment of the wind was based purely on previous experience. He stated that although there were windsocks on the airfield they were not easily visible and, due to their position, he questioned their relevance to the wind actually affecting the runway. An eyewitness at Long Marston however, who had access to a weather station installed on an airfield clubhouse, stated that it had been a windy day at the airfield. He recalls the mean wind speed was about 17 kt with gusts up to about 25 kt.

Probable Cause

The aircraft's previous flight had been the successful completion of its Permit to Fly air test. No work had been carried out on the aircraft since that flight and the pilot stated that he did not believe a mechanical failure or mis-rigging of the flying controls had contributed to the accident. The most probable cause, therefore, of the gyroplane rolling over was a lack of control authority due to excessive crosswind during the landing flare.

Survival Aspects

In order to issue the original Airworthiness Approval Note for the RAF 2000, the CAA required an acceptable means of escape from the cockpit in the event of an accident. After a period of consultation with the aircraft's importer, the following requirement was added to the type's Airworthiness Approval Note No: 23911 under Section 4, 'Compliance with Requirements':

l) The outside of the cabin has been placarded to indicate where to pull on the doors in an emergency to gain access to the cabin.

The inside of the door is placarded to indicate the procedure to be used to enable the doors to be forced open from the inside in an emergency.

Applicants mod. No. RAF/UK/S6

The intention was that in the event of an emergency landing, the occupants would unlatch the uppermost door latch on each door during their descent. This would allow a gap to occur between the door and the door frame in this position, enabling someone outside the aircraft to prise open the door should the occupants become trapped or incapacitated. The external placard instructing where to pull to gain access in an emergency was placed beside the uppermost internal latch as shown below:

Informal enquiries by the AAIB suggest that this procedure is not fully understood by operators. Moreover, on two aircraft inspected the internal placard was either missing or illegible. More importantly, the procedure would be of no use in the event of an unforeseen accident such as this where the occupants would have no time to open the internal latch prior to the impact occurring. In such cases the latch would remain fastened and the external instruction to a rescuer would focus their efforts on one of the points of most resistance when trying to force the door open. This would achieve the direct opposite of the original intention behind the requirement for the placards.

On this occasion the pilot, who was wearing a crash helmet, remained uninjured and managed to free himself from the damaged cockpit. He was, however, concerned about the length of time it took him to release the three catches securing the door shut in order to effect his escape, which he estimates was one minute, especially since during that time petrol was leaking through the fuel tank breather hole. Had the aircraft been lying on its left side instead of its right, he pointed out that this fuel would have been running over the hot engine.

Safety action

The CAA requirement to fit placards to the RAF 2000 gyroplane in order to facilitate rescue of the occupants may have the opposite effect to that intended if the occupants have been unable to undo the top door latch. Consequently, the present external placards should be removed, repositioned or perhaps amended to show the positions of the internal latches, thereby allowing a rescuer better to judge the most effective position for prising open a latched door.

Safety Recommendation 2003-93

It is recommended to the Civil Aviation Authority that the Authority's requirement for 'IN EMERGENCY PULL' external placards adjacent to the top latches of the exit doors of RAF 2000 gyroplanes on the UK register should be reviewed.