

ACCIDENT

Aircraft Type and Registration:	Rotorsport UK Calidus, G-ETOJ	
No & Type of Engines:	1 Rotax 914-UL piston engine	
Year of Manufacture:	2012 (Serial no: RSUK/CALS/021)	
Date & Time (UTC):	29 September 2012 at 1618 hrs	
Location:	Shoreham Airport, West Sussex	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - 1 (Serious)	Passengers - N/A
Nature of Damage:	Damaged beyond economic repair	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	65 years	
Commander's Flying Experience:	3,882 hours (of which 17 were on type) Last 90 days - 31 hours Last 28 days - 9 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

The pilot heard a bang and the gyrocopter rolled to the left on lift-off from the runway. It is thought that the pilot over-rotated and the main rotor blades struck the ground.

History of the flight

The gyroplane was in the process of taking off. As the pilot lifted the nosewheel off the ground, he heard a bang and the aircraft rotated rapidly to the left, turning onto its side and bouncing before coming to a halt on the grass beside the runway. The pilot was able to evacuate the aircraft through the shattered canopy but suffered injuries requiring several days in hospital to recover. He stated that he was unable to explain the accident.

The Calidus is a relatively new design of Gyrocopter, launched in 2009, and G-ETOJ had received its CAA Permit to Fly in July 2012. The manufacturer/importer conducted an examination of the aircraft and photographs taken by the airport authorities soon after the accident; this was apparently the first accident of its kind involving the type. They reported that there was no evidence of pre-impact structural or mechanical failures, the flying controls were intact and damage to the left mainwheel hub and tyre was consistent with it striking the ground during the rollover. Of particular note was the predominantly upward bending deformation of both main rotor blades. In the experience of the manufacturer, a hard ground contact by a blade at flying speed results in significant bending in the plane of rotation and possible

loss of the blade, whereas the observed upward bending is more characteristic of the rotors clipping the ground behind the aircraft. Such a situation would also account for a roll to the left as the blades rotate counterclockwise, causing left mainwheel contact.

Also noted was scuffing on the underside of the keel in an area where it could only occur with a nose-high attitude

with all three wheels off the ground. It was concluded that the evidence indicated an over-rotation on takeoff, causing almost simultaneous runway contact by the keel and main rotor disc. The torque reaction caused a loss of control of the gyrocopter in roll and yaw.

Addendum

An addendum was published to this report in the March 2013 Bulletin and is reproduced below:

Following the publication of the report into the accident to G-ETOJ in Issue 1/2013 of the AAIB Bulletin, the pilot has asked that it include mention of a possible factor which he feels may have contributed to the apparent over-rotation of the gyrocopter on takeoff. He stated that he was aware of a number of anecdotal reports where inadvertent operation of the electro-pneumatic trim system in a fully nose-up direction during the ground roll had been encountered.

G-ETOJ had a two-axis trim system, powered by an electrical pneumatic motor which builds up pressure in pitch and roll cylinders attached to the flying controls. The system is signalled by buttons on the top of the control column (stick), four for trim and one for pre-rotator engagement. Other models used a 'coolie hat' arrangement for trim. In the Calidus, when trimmed fully nose-down, the pitch cylinder is unpressurised but when nose-up trim is required, the pilot presses the aft button of the four, opening a valve and operating the electric motor. When sufficient pneumatic pressure has built up in the nose-up sense, the pilot releases the button, closing the valve and trapping the pressure. This pressure, which is displayed on a gauge mounted on the instrument panel, is therefore an indication of the

amount of nose-up trim applied. Pressing the forward nose-down button progressively releases the air in the cylinder.

The pilot of G-ETOJ stated that he had heard reports of one or more instances where, when applying fully aft stick at commencement of the takeoff roll, the nose-up trim button was accidentally pressed. This was reportedly more likely when the pilot was of larger build and could occur if the stick top made contact with the seat harness buckle. The AAIB consulted a recognised authority on gyroplane flying who had experience of the Calidus fitted with this type of stick top and he confirmed that inadvertent trim application had occurred to him on about six occasions, although apparently without incident.

It should be noted that the trim does not apply extra pitch authority when the stick is already fully back. It could, however, be construed as a restriction when checking forward as required when the nosewheel lifts off, which the pilot did not report. However, the agent has agreed to incorporate a caution in the next edition of the Pilot's Operating Handbook for the Calidus.