ACCIDENT

Aircraft Type and Registration:	Cessna T210M Turbo Centurion, G-BEYV
No & Type of Engines:	1 Continental Motors Corp TSIO-520-R piston engine
Year of Manufacture:	1977 (Serial no: 210-61583)
Date & Time (UTC):	20 July 2012 at 1130 hrs
Location:	Runway 20, North Weald Airfield, Essex
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - 1
Injuries:	Crew - None Passengers - None
Nature of Damage:	Damage to gear doors, left wing tip and aileron, left horizontal stabiliser
Commander's Licence:	Private Pilot's Licence
Commander's Age:	41 years
Commander's Flying Experience:	593 hours (of which 32 were on type) Last 90 days - 11 hours Last 28 days - 6 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

Synopsis

The pilot was unable to lower the main landing gear and, despite attempts by the pilot and passenger to lower the gear, the aircraft landed with the nose gear extended and the main landing gear still retracted. It is likely that the cause was either an in-flight loss of hydraulic fluid or an internal failure in the hydraulic pump.

History of the flight

Following an uneventful flight from Thurrock, in Essex, the pilot selected the landing gear down while approaching his destination airfield of Nottingham. However, the 'down and locked' indication for the main gear failed to appear and the pilot was aware that the electrically-operated hydraulic pump that powered the system continued to run. After over-flying the airfield the pilot received information from observers on the ground that the nose gear appeared to be down and locked, the main gear doors were open but the landing gear itself had remained within the wheel well.

The aircraft flew overhead the airfield while the pilot carried out the checks and actions in accordance with the Pilot's Operating Handbook. Dispite operating the manually-operated back-up pump, the main landing gear remained in the 'up' position.

The passenger was co-owner of the aircraft with the pilot and both had an in-depth knowledge of the aircraft

systems. The passenger was able to access the hydraulic reservoir, which was located in the right footwell, and pour in some hydraulic fluid. Further operation of the handpump failed to lower the gear, with virtually no resistance to the pumping action being felt, leading to the conclusion that no pressure was being generated. It was then decided to divert to North Weald Airfield where the aircraft conducted two low passes that allowed personnel in the tower and airfield fire service to make a visual assessment. Their observations accorded with those made earlier at Nottingham. Realising that the nose gear could not be retracted, and that as a consequence the aircraft would tip over on landing, the pilot burned off fuel from the right hand fuel tank, thus making the aircraft slightly 'left wing heavy'. Meanwhile the passenger moved his seat to its fully aft position, leaving the right hand door readily accessible for evacuation after landing.

After the emergency services had positioned themselves adjacent to the runway, the pilot brought the aircraft in to land, with the touchdown initially on the tie-down hook on the rear fuselage. He then lowered the nosewheel to the ground. As the aircraft slowed it tilted to the left, as the pilot had intended, causing the left wing tip and left horizontal stabiliser to contact the runway surface. The nosewheel then castored to the right, with the result that the aircraft turned right through 180º before coming to a halt. Both occupants, who were uninjured, evacuated the aircraft via the right hand door.

The investigation

During a subsequent inspection of the aircraft, the only obvious indication as to the potential cause of the landing gear problem was the left main landing gear door hydraulic actuator, in which the piston had been pushed clear of the actuator body. Whilst this would have allowed the hydraulic fluid to escape, thus dissipating the pressure, it was not clear whether the actuator failure had precipitated the incident, or had occurred during the ground slide.

As far as the main landing gear is concerned, a DOWN selection results in hydraulic pressure being applied to the door actuators. When these have extended, the system is sequenced so that pressure is then applied to the uplock actuator. This releases the uplocks which in turn allow the gears to extend under the action of the main gear actuators. However, it was confirmed after the accident that the main gears had remained engaged with the uplocks. In the event that hydraulic fluid was lost at some stage during the door deployment, either via the door actuator or elsewhere, it would not be possible to apply release pressure to the uplock actuator. The manually-operated lever would be similarly ineffective in progressing the gear lowering sequence – again, due to the loss of fluid (the manual system is generally only effective in the event of a failure of the electric motor that drives the hydraulic pump.) However, in addition to the possibility on an in-flight fluid loss, it is also possible that an internal hydraulic pump failure occurred, such that there was no delivery pressure to the system.

It is anticipated that the repair of the aircraft could take a number of months. The repair organisation intends to conduct a detailed inspection and test of the landing gear hydraulic system in order to determine the reason for the failure. Any pertinent information arising from this may be published in an Addendum to this Bulletin.

It is noteworthy that Cessna 210 series aircraft constructed during 1979 and onwards were equipped with a modified hydraulic system that deleted the main landing gear uplocks and doors. In this design, the gears are maintained in the UP position by means of hydraulic pressure.