

ACCIDENT

Aircraft Type and Registration:	Piper PA-32R-300, N101DW	
No & Type of Engines:	1 Lycoming IO-540 piston engine	
Year of Manufacture:	1976	
Date & Time (UTC):	4 July 2008 at 1009 hrs	
Location:	Runway 24, Southend Airport, Essex	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 3
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Propeller and flap damage, scrape on the underside of the fuselage and engine shock-loaded. Right wing light lens damaged	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	59 years	
Commander's Flying Experience:	595 hours (of which 226 were on type) Last 90 days - 34 hours Last 28 days - 2 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

The aircraft suffered a failure of its electric power generation system when five miles offshore on a flight from Panshanger to Oostend. This resulted in the loss of all electrical services. The aircraft diverted to Southend Airport where it landed with the landing gear retracted.

History of the flight

The aircraft was on a flight from Panshanger, Hertfordshire, to Oostend, Belgium, with four people on board. The weather was CAVOK, with a light wind. The aircraft had climbed to 5,000 ft amsl for the sea crossing and, initially, all the indications for the aircraft's

systems appeared normal. However, about five miles after crossing the English coast, the pilot tried to engage the autopilot without success and shortly after this, the primary GPS receiver failed. The radio reception then became garbled and the pilot became aware that all the aircraft electrical systems seemed to be failing. He turned back and, using his map to navigate, set course towards Panshanger. After making a radio call to Southend Airport ATC to advise them of his problem, the remaining aircraft electrical systems failed.

The passengers in the aircraft were becoming anxious, so the pilot decided to make an expeditious landing at

Southend. Using his hand-held radio, he made blind transmissions on the Southend frequency advising them of his intention to land there but he received no response. The pilot positioned the aircraft downwind for Runway 24 and, during his landing checks, selected the landing gear to DOWN. He observed emergency vehicles on the airfield and, as he could see that the runway was clear, he continued to land. During the touchdown it became apparent that the landing gear was not down. The aircraft initially slid along the runway centreline before turning towards its left edge, where it came to rest. There was no fire but, as a precaution, the airport fire service sprayed the aircraft with foam. The pilot and his passengers were uninjured and vacated the aircraft normally.

Southend ATC had, in fact, received the blind transmissions from the aircraft and had placed the emergency vehicles on a local standby and kept the runway clear. When they became visual with the aircraft on final approach for Runway 24, they could see the landing gear was retracted so made blind transmissions on the tower and approach frequencies to try to inform the pilot that the gear was not down.

Aircraft examination

Staff from a local maintenance organisation, who recovered the aircraft from the runway, found that after lifting the aircraft, when the manual override lever was selected, the landing gear deployed under gravity and locked down. The aircraft, supported normally by its landing gear, was later examined by the AAIB. From a general inspection it was apparent that damage had been caused to its underside, the flaps, engine cowlings and exhaust system and propeller.

Electrical system

At the time of the AAIB inspection, some of the interior trim had been removed by the maintenance organisation to inspect for damage, as they had been asked by the aircraft's insurer to quote for repairing the aircraft. The aircraft had an extensive avionics fit and it was noted that no specific low-voltage warning light was fitted. Prior to turning the master switch to ON, the aircraft's wiring in the fuselage was examined; no sign of damage or overheating was seen.

The battery had remained connected and, off-load, registered 11.6 volts when measured with a voltmeter. The avionics were all still selected to the ON position and, when the battery master switch was selected to ON, all electrical systems initially appeared to work normally. However, the battery voltage quickly dropped to 6.5 volts. It was apparent that the ALT caution, which illuminates whenever there is no output from the alternator, mounted between two other warning lights on the instrument panel, was very dim in comparison to these lights, Figure 1. Some of the ancillary instruments had a line drawn on the instrument glass, possibly indicating their normal operating position. It was apparent that, with no output from the alternator, the ammeter incorrectly indicated an output current of approximately 10 amps, Figure 2.

Examination of the alternator installation found it to be properly mounted with the drive belt correctly tensioned, but it was evident that several of the terminations of its associated wiring were of a poor standard. For example, the main power output cable had failed through most of its cross-sectional area where it attached to the lug connecting it to the alternator, Figure 3.



Figure 1
Alternator fail warning light



Figure 2
Ammeter zero error of approximately 10 amps

Maintenance history

The aircraft had completed its last Annual Inspection on 1 July 2008 and the work was certified in the aircraft and engine log books. The alternator had been replaced with a serviceable unit on 3 July 2008 and was certified as '*ground checked satis*'. No details of Part or Serial numbers were evident in the log book.

Discussion

The integrity of the charging system appeared to have been compromised by the condition of the electrical connections to the alternator and it is likely the alternator would not have been able to supply the total demand of the electrical system. As the flight began normally, it is likely that the battery was sufficiently charged when the engine was started. Any shortfall in the alternator output during the flight would have been made up for by the battery, which over the period of the flight, would have discharged, resulting in the failure of the electrical services. The 'zero error' on the ammeter, together with the dim ALT light, would probably have made it difficult for the pilot to appreciate that a problem existed with the electrical system, until the relatively rapid onset of failure of the electrically powered services.

Conclusions

The pilot considered the accident was caused by a failure of the aircraft's electrical system. Whilst this



Figure 3

Main alternator feed cable and alternator connecting lug

was certainly a contributory factor, the alternative system for lowering the landing gear was demonstrated to be serviceable during the recovery operation. It is likely, therefore, that the system would have successfully lowered the landing gear in-flight, had it been selected.