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AAIB
Air Accidents Investigation Branch

AAIB Bulletin S8/2013 *SPECIAL*

ACCIDENT

Aircraft Type and Registration:	Pilatus Britten-Norman BN2B-21 Islander, G-CIAS
No & Type of Engines:	2 Lycoming IO-540-K1B5 piston engines
Year of Manufacture:	1982 (Serial no: 2162)
Location:	Near Devil's Hole, approximately 2.5 nm north of Jersey Airport, Channel Islands
Date & Time (UTC):	3 November 2013 at 1908 hrs
Type of Flight:	Private (Search and rescue)
Persons on Board:	Crew - 1 Passengers - 4 (Search crew)
Injuries:	Crew - None Passengers - None
Nature of Damage:	Significant damage to wing, left main landing gear and forward fuselage
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	65 years
Commander's Flying Experience:	25,200 hours (of which 60 were on type) Last 90 days - 101 hours Last 24 hours - 2 hours
Information Source:	AAIB Field Investigation

The investigation

The Air Accidents Investigation Branch was notified of the accident by Jersey Air Traffic Control at 1920 hrs on Sunday 3 November 2013 and an investigation was commenced under the provisions of the Civil Aviation (Investigation of Air Accidents and Incidents) (Jersey) Order 2000.

This Special Bulletin is published to provide details of the initial facts surrounding the accident. The investigation is ongoing and a final report will be published in due course.

Background

The aircraft was operated by a charitable organisation staffed by volunteers whose purpose was to carry out search operations in and around the Channel Islands. It was equipped for its role with aviation and maritime communication equipment, search radar, and infra-red and video cameras, as well as smoke flares, lights and loudhailers, and an air-droppable dinghy.

History of the flight

At approximately 1820 hrs on 3 November 2013, the organisation was alerted to carry out a search for two fishermen who were in difficulties near Les Écréhous, a group of rocks north-east of Jersey. The pilot, accompanied by the search director, and three observers, gathered at the aircraft's base at Guernsey Airport, and made preparations for flight. There was no moon and the Channel Islands were affected by poor weather, with strong southerly winds, low cloud, and poor visibility. The pilot reported encountering "strong turbulence" during the flight.

The aircraft took off at 1847 hrs and, taking account of the cloud base and visibility, the pilot levelled the aircraft at approximately 700 ft amsl on track towards the search area.

When the aircraft was approximately six miles north of Jersey Airport, the right engine rpm began to vary, repeatedly reducing and then increasing. The observer seated to the right of the pilot, observed the fuel pressure fluctuating but this was not noticed by the pilot. The pilot selected the alternate intake air but the engine then stopped. The pilot feathered the propeller and then completed the engine shutdown checks. Following a brief conversation with the search director, the pilot turned the aircraft towards Jersey Airport and declared a MAYDAY to ATC, while the search director made a similar call on the maritime frequency. The pilot applied full power on the left engine and put the aircraft into a climb.

The aircraft had climbed to approximately 1,100 ft amsl when the left engine rpm began to fluctuate before the engine ceased to produce power. The pilot informed ATC that the aircraft was "going down" and the search crew stowed their equipment. No attempt was made to re-start either engine.

An offshore lifeboat operating nearby changed its course to be in attendance should the aircraft ditch. As the aircraft descended, the radio altimeter issued an alert prompting the pilot to switch on the landing lights and instruct the crew to brace. As it continued its descent the aircraft's landing lights suddenly illuminated ground ahead and the pilot manoeuvred for a touchdown.

The north coast of Jersey is characterised by rocky cliffs and roughly undulating terrain, however, the aircraft's descent brought it towards one of the very few relatively benign areas suitable for a forced landing. Following a ground roll of 140 m, during which the left main landing gear collapsed rearwards, the aircraft's progress was halted when its nose lodged, in a gentle impact, in the base of a tree.

The pilot and search crew were uninjured. After making the aircraft safe they made their way to nearby habitation, where they were met by emergency services personnel who had been dispatched to search for them.

Initial examination of the aircraft

The aircraft was examined at the accident site. Both main fuel tanks were found almost full and the tip tanks were empty. Switches in the cockpit, which select the

fuel supply to the engines from either the main or tip tanks, were found in the 'tip tank' position. A further switch, associated with the fuel system, serves two purposes, depending on which tanks are selected to feed the engines. With the main tanks selected, it disables lights which indicate tank selection. With the tip tanks selected, it dims lights which show that the tip tanks are in use. The switch was found in the position that would dim the tip tank indicator lights.

Fuel

The aircraft was routinely refuelled after each flight to leave 18 USG in each tip tank and 55 USG[1] in each main tank. Although calibrated 'dip sticks' were available, they were not routinely used to measure physically the quantities of fuel on board. Initial enquiries indicate that routine calculations were not made to predict fuel uplift and compare predicted and actual values. Further, it was not the custom to record in-flight fuel checks. A placard in the cockpit stated that *'tip tanks are to be filled first - used last'*, and a flight manual restriction required that 13.5 USG of fuel should remain in the tip tanks until the main tanks were empty, to provide wing bending relief.

Previous flight

On 2 November 2013, the day before the accident flight, the aircraft flew a routine search exercise of 55 minutes duration. Interviews with those involved in the operation, and examination of relevant records, established that prior to this flight the tip tanks were selected ON.

Fuel consumed on this flight therefore came from the tip tanks. The amount consumed was probably of the order of 12-13 USG per side. Although fuel checks were made in the course of the flight, these checks simply established that the main tank quantities were sufficient for continued flight; the absence of a change in the main tank quantities, and the reducing quantities in the tip tanks, were not noticed.

No reconfiguration of the fuel system selections was made before the aircraft departed on the accident flight on 3 November 2013. At the commencement of the accident flight, each tip tank therefore contained approximately 5-6 USG.

Analysis

AAIB investigation to date indicates that the fuel supply to the right engine, and then the left engine, became exhausted and the engines ceased producing power approximately 15 minutes after the aircraft became airborne on the accident flight. The selection of alternate intake air had no effect and no action was taken to select an alternative fuel source for the engines after their power loss.

Further investigation

The AAIB investigation continues, focussing on operational procedures, training, safety management, and fuel quantity alerting.

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Footnote

[1] The main tanks were usually replenished after flight so that the fuel filled the tank to just below the neck of the fuel filler; this allowed for expansion of the fuel when the aircraft was parked outside in warm weather.