

Australian Government Australian Transport Safety Bureau

Flight instrument issue in IMC involving a Piper PA-27, VH-DTL

near Flinders Island aerodrome, Tasmania, 18 April 2014

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Addendum

Page	Change	Date

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What happened

On 18 April 2014, the pilot of a Piper PA-27 aircraft, registered VH-DTL, was preparing for a private flight from Moorabbin, Victoria to Flinders Island, Tasmania, under the instrument flight rules (IFR), with five passengers. The pilot performed a weight and balance calculation based on accurate passenger weights and estimated baggage weights, and assessed that the aircraft would be within the operating limits, but the centre of gravity would be towards the forward limit. He then directed the passengers to load the majority of the baggage in the rear cargo locker to move the centre of gravity further aft.

Flinders Island, Tasmania



Source: Google earth

The pilot obtained the appropriate weather forecasts and noted that a front would pass through at about the proposed time of the flight. The cloud tops were forecast at 8,000 ft above mean sea level (AMSL) and the pilot planned to conduct the flight at 9,000 ft AMSL to remain above the cloud. Prior to departure, the front passed over Moorabbin Airport, producing a moderate amount of rain and wind.

At about 1200 Eastern Standard Time (EST), the aircraft departed Moorabbin. When at about 2,000 ft above ground level (AGL), the aircraft entered cloud. The aircraft momentarily exited cloud and the pilot observed that, although the primary artificial horizon (AH) indicated level flight, the aircraft was in a descending turn. He then cross-checked the secondary AH, which was consistent with the descending turn. The pilot disconnected the autopilot as it was directed by the primary AH and operated the aircraft with reference to the secondary AH. He reported that he had considered turning back to Moorabbin at that time, however, the primary AH appeared to settle and accurately reflect the aircraft state and he re-engaged the autopilot.

The pilot reported that the aircraft appeared to travel with the weather front en-route to Flinders Island and encountered some light hail and moderate to severe turbulence. He was advised by air traffic control (ATC) that thunderstorms were observed to be forming in Bass Strait. The aircraft was in cloud throughout the cruise and the pilot reported that severe turbulence intermittently caused both AHs to provide unstable indications.

The pilot set up the global positioning system (GPS) to track for the runway 05 area navigation global navigation satellite system (RNAV (GNSS)) approach to Flinders Island, via waypoint 'FLIWC', abeam Prime Seal Island (Figure 1). As the aircraft passed overhead the waypoint, the aircraft was clear of cloud and the pilot cancelled his SARTIME¹ with ATC. He was advised by ATC that there was no relevant IFR traffic. Shortly after, the pilot heard an aircraft departing Flinders Island and he broadcast an inbound call on the common traffic advisory frequency (CTAF).

¹ Time nominated by a pilot for the initiation of Search and Rescue action if a report from the pilot has not been received by the nominated unit.

After passing overhead the waypoint, the pilot reported that the GPS did not sequence to the next waypoint, 'FLIWI', for the approach. He had AvPlan² on an iPad and continued to fly the approach using AvPlan. After passing the subsequent approach points and when at about 1,000 ft AGL on approach to runway 05, the aircraft encountered heavy rain. Although clear of cloud and visual with the ground, the pilot was unable to maintain forward visibility and therefore unable to sight the runway. Aware of rising terrain to the south of the aerodrome (Mt Strzelecki), the pilot commenced a left turn in an attempt to circle back to approach the runway, using the iPad to indicate the runway location.





When at about 500 ft AGL, the aircraft encountered severe turbulence, which resulted in a high angle of bank and the stall warning horn activating. The pilot regained control of the aircraft. With both AHs not providing accurate information, the aircraft entered cloud. As the aircraft was below the lowest safe altitude and the pilot was uncertain of the aircraft's position, he elected to turn to the west, toward the ocean, and climb. During the encounter with turbulence, the iPad screen went blank and the pilot was unable to restore it.

0,6

Source: Airservices Australia

² AvPlan is a flight planning application approved by the Civil Aviation Safety Authority (CASA) under Civil Aviation Regulation (CAR) 233-1(h).

Once clear of the area, the pilot attempted to select the frequency on the automatic direction finder (ADF), to conduct a non-directional (radio) beacon (NDB)³ approach to Flinders Island. The ADF did not identify and the pilot was unable to commence the approach.

The pilot then contacted ATC and reported that the aircraft was in cloud with unreliable AHs, GPS and ADF. The controller advised the pilot to keep the aircraft's wings level, and after communicating with other aircraft in the vicinity, advised the pilot to turn onto a heading of 150° and climb to 8,000 ft AMSL to fly clear of the cloud. After about 20 minutes, the pilot observed the coastline, and with assistance from ATC, identified the aircraft's position as over the north-east coast of Tasmania. ATC advised that both Flinders Island and Moorabbin had low cloud in the area and the pilot elected to divert to Saint Helens aerodrome, Tasmania.

Pilot comments

The pilot provided the following comments regarding the incident:

- Loading the baggage in the rear cargo locker moved the centre of gravity aft. However, this may have resulted in the centre of gravity being beyond the rear limit for the aircraft resulting in difficulties controlling the aircraft in turbulence.
- At about 0700, he contacted a boat operator in Flinders Island to obtain local expertise on the forecast weather. The boat operator did not think 'there was much in it'.
- He had not previously conducted an approach using the AvPlan software on the iPad, and this, combined with the deteriorating weather conditions increased his workload during the approach.
- He did not activate the runway lighting prior to the approach as it was daylight, and he had intended to conduct a visual approach as the aircraft was below cloud when at waypoint 'FLIWC'.
- He did not conduct the published missed approach procedure as he was uncertain of the aircraft position and cognisant of avoiding the high terrain to the south; he elected to turn left towards the coast.
- There were no thunderstorms forecast for the area or the destination. The weather conditions encountered were more severe than what was forecast.
- Engineers advised that, after the incident, the GPS was determined to be unserviceable, the primary AH was repaired and the vacuum gauge and hoses were replaced. The ADF may have failed due to static build up from the thunderstorm.

Safety message

This incident highlights the need for accurate weight and balance calculations, to ensure the aircraft is operated within its limits; and how unreliable or unserviceable instruments can increase pilot workload, particularly when in instrument meteorological conditions (IMC).

Furthermore, it demonstrates the importance of decision-making, prior to, and throughout a flight. Pilot decision making, particularly weather-related decision making, is complex. The ATSB report *Improving the odds: Trends in fatal and non-fatal accidents in private flying operations*, found that problems with pilots' assessing and planning were contributing factors in about half of all fatal accidents in private operations. The report encourages pilots to consider strategies such as: make decisions prior to the flight; continually assess the flight and particularly the weather conditions; set personal minimums; and seek local knowledge of the route and destination as part of the pre-flight planning. Becoming familiar with the aircraft's systems, controls and limitations may alleviate poor aircraft handling during non-normal flight conditions. The report is available from the ATSB's website at: www.atsb.gov.au/publications/2008/ar2008045.aspx

³ A non-directional (radio) beacon (NDB) is a radio transmitter at a known location, used as a navigational aid. The signal transmitted does not include inherent directional information.

General details

Occurrence details

Date and time:	18 April 2014 – 1235 EST		
Occurrence category:	Serious incident		
Primary occurrence type:	Flight instrument issue		
Location:	near Flinders Island aerodrome, Tasmania		
	Latitude: 40° 05.48' S	Longitude: 147° 59.57' E	

Aircraft details

Manufacturer and model:	Piper Aircraft Corporation PA-27		
Registration:	VH-DTL		
Serial number:	27-4033		
Type of operation:	Private		
Persons on board:	Crew – 1	Passengers – 5	
Injuries:	Crew – Nil	Passengers – Nil	
Damage:	Nil		

About the ATSB

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The ATSB is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; and fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to fare-paying passenger operations.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the safety factors related to the transport safety matter being investigated.

It is not a function of the ATSB to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

About this report

Decisions regarding whether to conduct an investigation, and the scope of an investigation, are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, a limited-scope, fact-gathering investigation was conducted in order to produce a short summary report, and allow for greater industry awareness of potential safety issues and possible safety actions.