Australian Government
Australian Transport Safety Bureau

VFR into IMC involving Piper PA-28, VH-BDB

33 km W of Bankstown Airport, New South Wales, 29 March 2016

ATSB Transport Safety Report
Aviation Occurrence Investigation
AO-2016-029
Final – 27 July 2016

Released in accordance with section 25 of the *Transport Safety Investigation Act 2003*

Publishing information

Published by: Australian Transport Safety Bureau
Postal address: PO Box 967, Civic Square ACT 2608
Office: 62 Northbourne Avenue Canberra, Australian Capital Territory 2601
Telephone: 1800 020 616, from overseas +61 2 6257 4150 (24 hours)
Accident and incident notification: 1800 011 034 (24 hours)
Facsimile: 02 6247 3117, from overseas +61 2 6247 3117
Email: atsbinfo@atsb.gov.au
Internet: www.atsb.gov.au

Addendum

Page	Change	Date

VFR into IMC involving Piper PA-28, VH-BDB

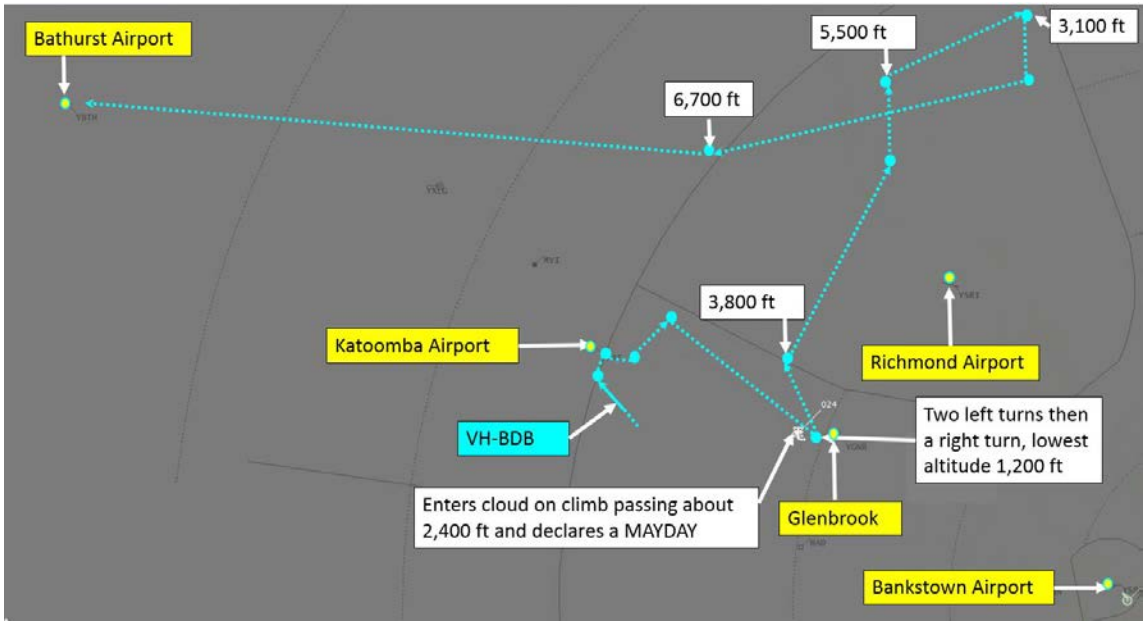
What happened

On 29 March 2016, the pilot of a Piper PA-28-181 aeroplane, registered VH-BDB, conducted a private flight from Aldinga, South Australia, to Hay, New South Wales (NSW), under the visual flight rules (VFR).[1] After refuelling in Hay, the pilot planned the next VFR flight to Bankstown, NSW.

The pilot obtained the latest weather forecast for the area, and for Bankstown and Bathurst airports. As the weather forecast for Bankstown indicated conditions would be marginal for VFR flight, the pilot planned for an alternate landing at Bathurst.

The aircraft departed Hay and tracked towards Katoomba, NSW. When about 30 minutes from Katoomba, the pilot, who was the only person on board, contacted a flight instructor who was on the ground at Bankstown Airport for an appraisal of the current weather conditions. Based on the forecast and the instructor's comments, the pilot continued an indirect track towards Glenbrook via Katoomba and then planned to track to Bankstown (Figure 1).

Figure 1: Radar image annotated with approximate track of VH-BDB and relevant locations



Source: Airservices Australia – annotated by the ATSB

At about 1511, the pilot saw the cloud appear to be closing in on the planned track ahead. The pilot scanned from the left to the right and assessed that it would not be possible to continue on their current track and remain clear of cloud, so commenced a right turn. The aircraft then entered cloud.

At about 1512, the pilot contacted Bankstown Tower air traffic control and declared a mayday.[2] By the time the pilot had completed the transmission, the aircraft had flown clear of the cloud. About 90 seconds later, the pilot advised the tower controller that they had stabilised flight and that the

---

1 Visual flight rules (VFR) are a set of regulations which allow a pilot to only operate an aircraft in weather conditions generally clear enough to allow the pilot to see where the aircraft is going.

2 Mayday is an internationally recognised radio call for urgent assistance.

aircraft was then at 3,000 ft tracking into the Richmond restricted airspace without a clearance, to remain clear of cloud. According to the radar data, the aircraft entered Richmond airspace at about 1515, on climb passing 3,800 ft. The tower controller coordinated with Sydney Approach to provide the pilot with a clearance, then advised the pilot to contact Sydney Approach for assistance.

At about 1516, the approach controller assigned the aircraft a discrete transponder code, and asked the pilot to advise their current situation regarding visibility, and their intentions. The pilot responded that they were then on top of cloud and unable to find a way down. The pilot elected to continue tracking to the north where the weather was clearer and away from the rising ground to the west. The aircraft tracked north and then north-east (Figure 1).

The pilot then advised that the aircraft's current altitude was 5,000 ft and climbing. The controller responded with a clearance to continue on their current heading at 5,000 ft, which was well above the radar lowest safe altitude[3] on that track, and to advise if a change in level or heading was required. The controller subsequently advised the pilot to remain in visual meteorological conditions[4] (VMC) and to deviate around cloud if necessary.

At about 1519, the controller contacted Richmond and Williamtown air traffic control to obtain updated weather information to assist the pilot. The controller at Williamtown responded that it was hard to tell what the cloud was like due to the rain, but that there was a lower cloud band to the west than to the north-east.

About 2 minutes later, the pilot advised the controller that they could see the ground and were assessing their options to get down under the cloud. The controller asked the pilot to confirm that they could maintain separation from the cloud and terrain while descending through the gap.

The pilot then advised that they required a left turn to remain clear of cloud, and the controller asked the pilot to confirm they were maintaining 5,000 ft as the transponder was not displaying altitude. The pilot realised that they had inadvertently selected the altitude mode on the transponder off and switched it on, then advised the controller they were now maintaining 5,500 ft and required further left turn.

The aircraft was then heading west, and the pilot stated to the controller that their best option would be to get over the escarpment and divert to Bathurst. The controller asked the pilot what the aircraft's remaining fuel endurance was, but the pilot was unable to calculate the endurance due to the high workload to remain clear of cloud.

At about 1525, the aircraft was 10 NM north of Richmond aerodrome. The pilot advised that there was a large opening to their right and advised that they were turning onto a heading of 050° and shortly after, advised they were commencing a descent. The controller responded that the radar lowest safe altitude in the area was 3,500 ft and asked the pilot to confirm they were able to maintain visual contact with terrain on descent. The pilot confirmed they could maintain VMC through the gap in the cloud and was then cleared to descend visual with terrain.

At about 1527, the controller advised that they had confirmation of visual conditions towards Bathurst. The pilot stated that they would assess over the next 5 miles. In response to a request for their endurance, the pilot stated that they were busy keeping clear of cloud, and would get back with the endurance shortly. The aircraft was then tracking north-east at 5,000 ft, and descended to 4,200 ft by about 1529. The controller then advised that the radar lowest safe altitude on the aircraft's track was now 2,500 ft and confirmed the pilot was still visual with terrain. A minute later, the aircraft had descended to about 3,500 ft, and the controller advised that the radar lowest safe altitude was 2,700 ft on the aircraft's current heading, and again asked the pilot to confirm they were still visual with terrain and that at their current rate of descent, they had

---

[3] Lowest safe altitude (LSALT) is the lowest altitude which will provide safe terrain clearance at a given place.

[4] VMC is determined by the minimum flight visibility and minimum horizontal and vertical distances from cloud that the pilot in command (PIC) must maintain within certain classes of airspace..

plenty of space to remain in VMC. The pilot responded that they were still visual with terrain but needed a left turn to remain clear of cloud. The controller responded that the pilot could turn as required, and advised the pilot that the main thing was to maintain in VMC. The aircraft descended to 3,000 ft during the left turn.

At about 1532, the pilot stated that Bathurst was 'starting to look good'. The controller again reminded the pilot to maintain VMC at all times. The pilot responded that the gaps were closing up every time they approached one. The aircraft climbed and tracked west-south-west. The controller asked whether the pilot was using carburettor heat. Then the controller advised that the weather was CAVOK[5] at Bathurst and probably just climbing above the cloud, maintaining VMC and tracking to Bathurst would be the best plan from the information available at that stage. Again, the controller stated that the main thing was to stay in VMC.

The pilot then turned the aircraft onto a heading direct to Bathurst. The controller advised that they were now well above the lowest safe altitude in the area, and requested the fuel endurance. The pilot advised that they had sufficient fuel endurance to Bathurst with 45 minutes reserve and at present, were focused on flying the aircraft but could work out the actual endurance once clear of the cloud.

At about 1538, the controller advised that the aircraft had about 56 miles to run to Bathurst and was heading in a good general direction. The pilot reported that they had 5 km terrain visibility and were going to be doing a bit of cloud dodging to maintain the altitude (the aircraft was still at 6,700 ft).

At 1542, the controller asked whether they were visual with terrain in any direction and the pilot responded that they were visual with terrain directly below and behind, and bits ahead through quite a large gap in the cloud. The controller advised that there was report of overcast at Bathurst at 9,500 ft. Three minutes later, the controller asked how the weather directly in front looked, and whether the pilot had seen anywhere they might be able to descend to Bathurst. The pilot responded that everything was opening up ahead.

The aircraft exited controlled airspace at about 1546 tracking direct to Bathurst at 6,700 ft. At about 1550, the pilot reported they were commencing descent into Bathurst. The controller confirmed that the pilot would be able to maintain visual with terrain and advised the pilot to contact air traffic control on the area frequency.

The aircraft landed on runway 17 at Bathurst without further incident.

Weather information

Aerodrome terminal information service

The aerodrome terminal information service (ATIS)[6] current at Bankstown around the time of the incident included that pilots were to expect an instrument approach, the runways were wet, visibility was 5,000 m in rain, and there were layers of cloud with bases at 1,500 and 2,000 ft.

Forecast

The relevant area forecasts valid for the flight included Area 20 and Area 21. The forecast weather was for multiple layers of cloud, including low cloud with a base of 1,000 ft AMSL. The visibility included reducing to 4,000 m in showers of rain. At Mt Victoria, about 9 NM north-northwest of Katoomba, there was a forecast of cloud on the ground and showers of rain.

---

5 Ceiling and visibility OK, meaning that the visibility, cloud and present weather are better than prescribed conditions. For an aerodrome weather report, those conditions are visibility 10 km or more, no significant cloud below 5,000 ft or cumulonimbus cloud and no other significant weather within 9 km of the aerodrome.

6 An automated pre-recorded transmission indicating the prevailing weather conditions at the aerodrome and other relevant operational information for arriving and departing aircraft.

The forecast for Bankstown Airport included showers of rain with cloud bases at about 2,000 ft, with the chance of lower cloud at 1,000 ft. Bathurst Airport forecast included precipitation and the chance of low cloud 800 ft above the aerodrome.

Pilot comments

The pilot provided the following comments:

- The aircraft was only in cloud for about 3 to 5 seconds, and the pilot felt confident in using the instruments to maintain control of the aircraft.
- When the aircraft entered cloud, instead of turning right, in hindsight the pilot thought they should have moved the aircraft to the right of the corridor between clouds and then turned left to remain clear of cloud.
- Air traffic control was 'brilliant' – the pilot did not feel alone, and was looked after. The controller provided the radar lowest safe altitude in the location, and the pilot found it reassuring. The visibility was about 5–6 km, and it was helpful to know that the weather was more open ahead.
- The weather conditions were in accordance with the forecast to Katoomba, but around Glenbrook, the pilot was expecting a cloud base of about 1,500 to 2,000 ft above ground level (AGL), but it was more like 500 ft AGL.
- Based on the forecast, the pilot assessed that the weather conditions were marginal, but it may be possible to land at Bankstown. The pilot had planned to divert to Bathurst if it did not look possible to get to Bankstown in VMC.

Safety message

This incident highlights the benefits of seeking assistance from ATC when a pilot is in difficulty. It enabled ATC to provide appropriate assistance including clearance into controlled airspace, and to prioritise their resources. Airservices Australia commented that under the circumstances, it would have been more effective for the pilot to broadcast a MAYDAY on the area frequency than on Bankstown Tower frequency. On the area frequency, ATC would have been able to provide more immediate and direct assistance.

Pilots are encouraged to make conservative decisions when considering how forecast weather may affect their flight. If poor weather is encountered en route, timely and conservative decision making may be critical to a safe outcome. VFR pilots are also encouraged to familiarise themselves with VMC criteria detailed in the *Aeronautical Information Publication (AIP) Australia*, and carefully consider available options where forecast or actual conditions are such that continued flight in VMC cannot be assured.

The ATSB SafetyWatch highlights the broad safety concerns that come out of our investigation findings and from the occurrence data reported to us by industry. *Flying with reduced visual cues* such as in this occurrence remains one of the ATSB's major safety concerns.

The ATSB publication *Accidents involving Visual Flight Rules pilots in Instrument Meteorological Conditions*, lists three key messages for pilots:

- Avoiding deteriorating weather or instrument meteorological conditions (IMC)[7] requires thorough pre-flight planning, having alternate plans in case of an unexpected deterioration in the weather, and making timely and decisions to turn back or divert.
- Pressing on into IMC with no instrument rating carries a significant risk of severe spatial disorientation due to powerful and misleading orientation sensations in the absence of visual cues. Disorientation can affect any pilot, no matter what their level of experience.

[7] Instrument meteorological conditions (IMC) describes weather conditions that require pilots to fly primarily by reference to instruments, and therefore under Instrument Flight Rules (IFR), rather than by outside visual references. Typically, this means flying in cloud or limited visibility.

- VFR pilots are encouraged to use a personal minimums checklist to help identify and manage risk factors that include marginal weather conditions.

Also available from CASA's online store are:

Weather to Fly DVD – highlights the dangers of flying in cloud and ways to avoid VFR into IMC.

Flight Planning – always thinking ahead. A flight-planning guide designed to help you in planning and conducting your flight. This guide includes a personal minimums checklist.

A similar incident occurred on 21 April 2016, and the pilot advised ATC they had entered cloud and requested assistance. The controller identified the aircraft using ADS-B and provided heading and turn guidance to the pilot. The aircraft landed safely.

General details

Occurrence details

Date and time:	29 March 2016 – 1512 EDT	
Occurrence category:	Incident	
Primary occurrence type:	VFR into IMC	
Location:	33 km W of Bankstown Airport, New South Wales	
	Latitude: 33° 45.75' S	Longitude: 150° 41.08' E

Aircraft details

Manufacturer and model:	Piper Aircraft Corporation PA-28	
Registration:	VH-BDB	
Serial number:	2843425	
Type of operation:	Private – Pleasure/Travel	
Persons on board:	Crew – 1	Passengers – 0
Injuries:	Crew – 0	Passengers – 0
Aircraft 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 operations involving the travelling public.

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.