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Australian Transport Safety Bureau

TCAS event between an ATR72, VH-FVH and a Bombardier DHC-8-315, VH-TQZ

Port Macquarie, New South Wales, 12 February 2013

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Addendum

Page	Change	Date

TCAS event between an ATR72, VH-FVH and a Bombardier DHC-8-315, VH-TQZ

What happened

On 12 February 2013, a Skywest Airlines ATR72 aircraft, registered VH-FVH (FVH), departed Sydney on a scheduled passenger service to Port Macquarie, New South Wales, under the instrument flight rules (IFR). The crew consisted of the captain, who was being checked to-line and was designated as the pilot flying, the first officer (FO), who was the pilot monitoring, and the check captain.

The crew planned to enter the Port Macquarie non-directional (radio) beacon (NDB)¹ holding pattern at 3,600 ft and then conduct an NDB approach to runway 21 (Figure 1 and Figure 2).

At about 1648 Eastern Daylight-saving Time,² the crew broadcast a call on the Port Macquarie common traffic advisory frequency (CTAF) advising they were intending to track overhead the airport for an NDB approach to runway 21, descending not below 3,500 ft, and with an expected arrival time of 1656.

At about 1651, the crew broadcast another call on the CTAF advising they were 16 NM to the south on descent, not below 3,500 ft, and with an expected arrival time of 1657. The check captain reported that there was a high amount of traffic operating in the area at the time.

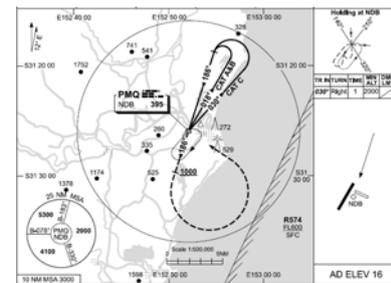
About 1 minute later, the crew heard a taxi call from the crew of an Eastern Australia Airlines Bombardier DHC-8-315 aircraft, registered VH-TQZ (TQZ), operating an IFR scheduled passenger service from Port Macquarie to Sydney. Immediately after, the crew of TQZ broadcast they were entering and back tracking for a departure on runway 03. At that time, FVH was established in the NDB holding pattern, maintaining 3,600 ft.

The check captain of FVH reported that the aircraft was in-and-out of instrument meteorological conditions (IMC)³ and the FO was busy communicating with the traffic in the area.⁴

Shortly after, the crews of both FVH and TQZ discussed their respective positions and intentions and the crew of TQZ stated that they would advise FVH when they were about to take off.

At 1656, when lined up on runway 03, the crew of TQZ observed FVH on the aircraft's traffic alert and collision avoidance system (TCAS),⁵ positioned directly overhead the airport and turning outbound in the holding pattern. The crew of TQZ broadcast a call advising FVH they were about to commence the take-off run and intended to conduct a left turn at 600 ft.

Port Macquarie NDB approach



Source: Aircservices Australia

¹ A radio transmitter at a known location, used as a navigational aid. The signal transmitted does not include inherent directional information.

² Eastern Daylight-saving Time (EDT) was Coordinated Universal Time (UTC) + 11 hours.

³ Describes weather conditions that require pilots to fly primarily by reference to instruments, and therefore under IFR, rather than by outside visual references. Typically, this means flying in cloud or limited visibility.

⁴ Port Macquarie is classified as a non-towered aerodrome; an aerodrome at which air traffic control is not operating. Pilots are responsible for maintaining aircraft separation with other aircraft.

⁵ TCAS is an aircraft collision avoidance system. It monitors the airspace around an aircraft for other aircraft equipped with a corresponding active transponder and gives warning of possible collision risks.

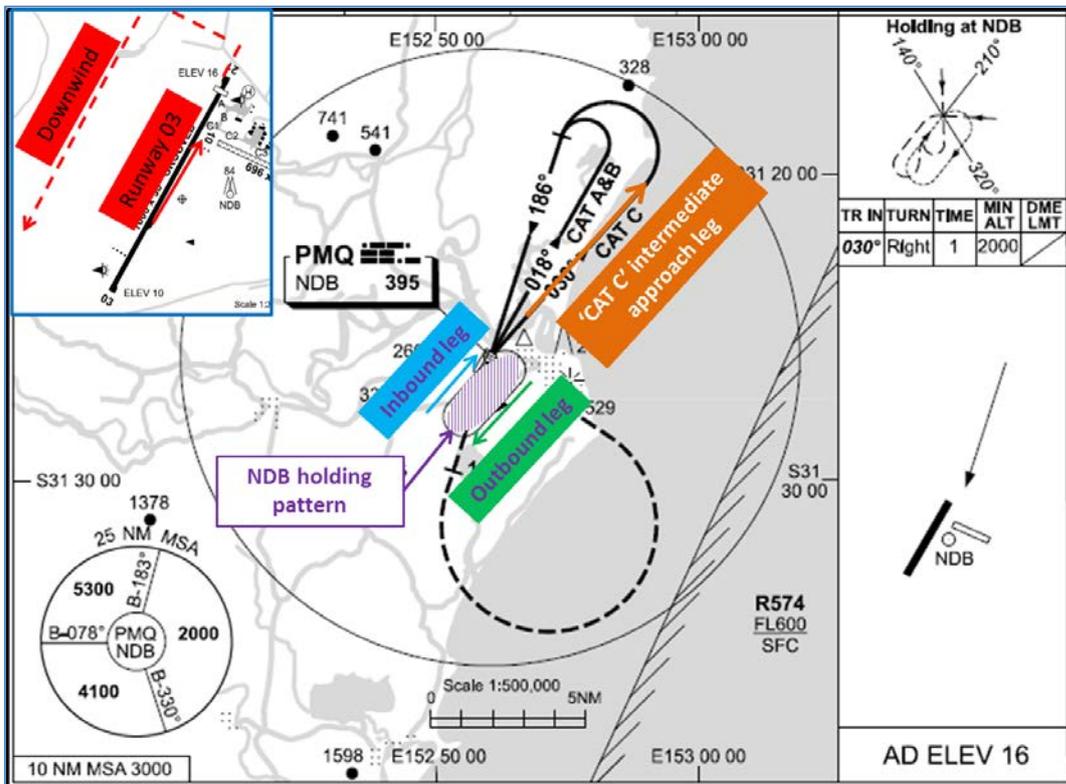
They further stated that they should be well clear and had them sighted on the aircraft's TCAS. The crew's intention was to depart on the downwind leg of the circuit as they were unable to track to the west due to visual flight rules (VFR) traffic operating in that area. The check captain of FVH reported that he could not recall hearing the pre-take-off broadcast made by TQZ. The recordings of the transmissions broadcast on the CTAF indicated that the crew of FVH responded, advising that TQZ was also sighted on their TCAS. Shortly after, the crew of FVH further advised TQZ that they would remain in the holding pattern at 3,600 ft until TQZ had departed.

The recorded CTAF transmissions also showed a number of other aircraft operating in the area at the time, and the crews of TQZ and FVH communicating with these aircraft for aircraft separation.

When on downwind, the captain of TQZ reported looking at the TCAS and having ensured that all known traffic had been accounted for. At 1658, the crew broadcast a call advising they were departing downwind, climbing through 2,600 ft, and appeared to be clear of FVH. The crew of FVH acknowledged the call and immediately after, advised that they were turning inbound in the holding pattern.

As TQZ approached 3,000 ft, in IMC, the captain observed an aircraft on the TCAS, above. The captain reported that, initially, he was unsure of which aircraft was being observed, but then identified it as FVH. The captain then instructed the FO to stop the climb and turn the aircraft to the right. Shortly after, the crew received a TCAS traffic advisory (TA)⁶ and then an initial resolution advisory (RA)⁷ to descend, followed shortly after by an RA to 'adjust vertical speed'. At the same time, while also in IMC, the crew of FVH also reported receiving a TCAS TA and then a TCAS RA to climb. The captain immediately responded and climbed the aircraft. The captain of TQZ reported that, according to the TCAS, there was about 400 ft vertical and 1 NM lateral separation between the aircraft. Both flights continued without further incident.

Figure 1: Port Macquarie NDB approach



Source: Airservices Australia

⁶ When a TA is issued, pilots are instructed to initiate a visual search for the traffic causing the TA.

⁷ When an RA is issued, pilots are expected to respond immediately to the RA unless doing so would jeopardize the safe operation of the flight.

Pilot comments (VH-TQZ)

The captain of TQZ provided the following comments regarding the incident:

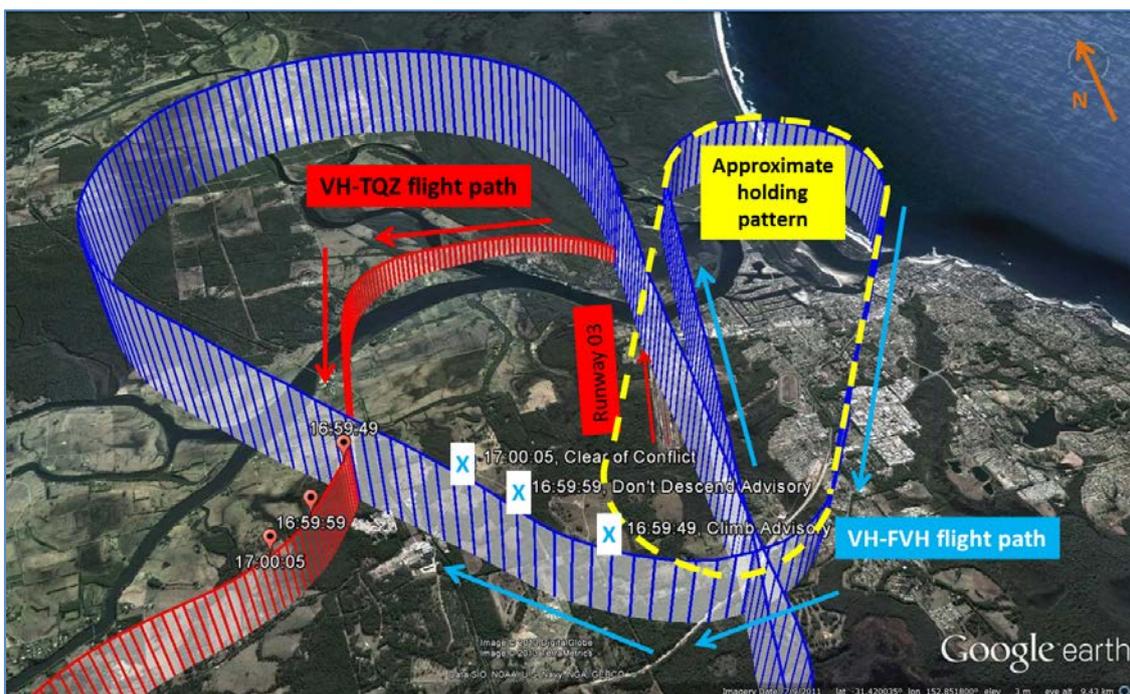
- The inbound leg of the NDB holding pattern was positioned west of the runway and was aligned with the intermediate approach leg of the 'CAT C'⁸ NDB approach (Figure 1). The captain was of the understanding that the inbound leg was directly aligned with the runway.
- There was a considerable amount VFR and IFR traffic operating in the area at the time.

Recorded information

The flight data recorders (FDR) were downloaded from TQZ⁹ and FVH and the data provided to the ATSB. The data showed the following (Figure 2):

- At 1659:49, while at 3,536 ft, the crew of FVH received a TCAS RA to climb.
- At 1659:53, FVH commenced a climb.
- At 1659:52, separation between FVH and TQZ reduced to about 290 ft vertically and 1.6 NM horizontally.
- At 1659:55, TQZ was observed commencing a descent.
- At 1659:59, the crew of FVH received a 'do not descend' TCAS RA.
- At 1700:05, the crew of FVH received a 'clear of conflict' TCAS message.

Figure 2: Summary of flight data



Source: Google earth

⁸ Instrument approach procedures are designed to accommodate varying aircraft performance by the use of an aircraft performance category based upon the aircraft's indicated airspeed at the threshold. CAT C speeds are from 121 kt to 140 kt.

⁹ The flight data obtained from TQZ did not contain any parameters relating to the TCAS system.

Safety message

Situation awareness can be broadly described as the continual monitoring of the environment, being aware of what is going on, and detecting any changes. It is essential that pilots monitor their surroundings and have an awareness of traffic disposition. It is important to know where the traffic is and where it will be in relation to you, so that potential issues can be identified and actioned, before they escalate. This is particularly important when operating at non-towered aerodromes, where aircraft separation is pilot responsibility.

An ATSB research report *A pilot's guide to staying safe in the vicinity of non-towered aerodromes* ([www.atsb.gov.au/publications/2008/ar-2008-044\(1\).aspx](http://www.atsb.gov.au/publications/2008/ar-2008-044(1).aspx)) highlighted the many challenges pilots faced when using, or flying in the vicinity of non-towered aerodromes. These can include:

- different operating procedures that are specific to non-towered aerodromes
- fitting into the circuit traffic
- communicating with other aircraft to arrange separation
- a mixture of aircraft types, performance levels, and operation types
- dealing with threats and hazards that may be encountered, such as unannounced traffic, or unexpected manoeuvres by nearby aircraft.

General details

Occurrence details

Date and time:	12 February 2013 – 1659 EDT	
Occurrence category:	Serious incident	
Primary occurrence type:	Aircraft separation – TCAS/ACAS	
Location:	Port Macquarie, New South Wales	
	Latitude: 31° 26.15' S	Longitude: 152° 51.80' E

Aircraft details: VH-FVH

Manufacturer and model:	ATR – GIE Avions de Transport Regional ATR72-212A	
Registration:	VH-FVH	
Operator:	Skywest Airlines	
Type of operation:	Air transport – high capacity	
Persons on board:	Crew – 4	Passengers – Unknown
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Aircraft details: VH-TQZ

Manufacturer and model:	Bombardier Inc. DHC-8-315	
Registration:	VH-TQZ	
Operator:	Eastern Australia Airlines	
Type of operation:	Air transport – high capacity	
Persons on board:	Crew – 4	Passengers – 47
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.