Australian Government
Australian Transport Safety Bureau

Near collision involving Cessna 210L, VH-TCI, and Cessna 208, VH-PGA

46 km NNE of Broome Airport, Western Australia, 15 July 2015

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Aviation Occurrence Investigation
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Addendum

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Near collision involving Cessna 210L, VH-TCI, and Cessna 208, VH-PGA

What happened

On 15 July 2015, a Cessna 210L aircraft, registered VH-TCI (TCI), was inbound to Broome Airport from Cockatoo Island, Western Australia. The pilot was the only person on board. At about 1037 Western Standard Time (WST), when the aircraft was about 40 NM from Broome, the pilot made an inbound call on the Broome air traffic control (ATC) Tower frequency. The Tower controller was unable to hear what the pilot said, and responded by broadcasting that the calling aircraft was transmitting a carrier wave only, with no voice modulation.[1] Even though there appeared to be a problem with radio transmissions, the pilot could hear the Tower controller and the pilots of other aircraft communicating on the frequency.

The pilot checked the aircraft radio equipment, but was unable to identify any faults. They tried using another radio and calling the pilots of other aircraft, but were still unable to establish two-way communications. The pilot set the transponder code to indicate a loss of two-way communications,[2] and established the aircraft in a holding pattern to the north of Broome, just outside Broome Class D airspace.[3] The pilot stated the holding pattern was between 25 and 27 NM (remaining outside 25 NM, then turning inbound in the pattern at 27 NM) from Broome and at an altitude of about 5,000 ft. The pilot continued to try to establish contact with the Tower controller and other aircraft in the area without success.

Without having been able to establish two-way communications via radio, the pilot used a mobile telephone to contact the operator, who provided a telephone number for Broome Tower. The pilot subsequently discovered that the number was incorrect, so asked the operator to search for the correct number.

At about 1046 (about 9 minutes after the pilot of TCI reported making an inbound call that was only transmitting a carrier wave) the pilot of a Cessna 208, VH-PGA (PGA) made an inbound call on the Broome Tower frequency. At that time, the aircraft was about 43 NM from Broome, on the 021° bearing (from the Broome non-directional beacon). PGA was inbound to Broome at about 6,500 ft after conducting a scenic flight, having departed Talbot Bay for Broome via Cape Leveque and Willies Creek (Figure 1). On board were the pilot and 12 passengers. The Tower controller acknowledged the call and cleared PGA to enter controlled airspace (Class D airspace), tracking to Broome via Willies Creek, and descending to 1,500 ft.

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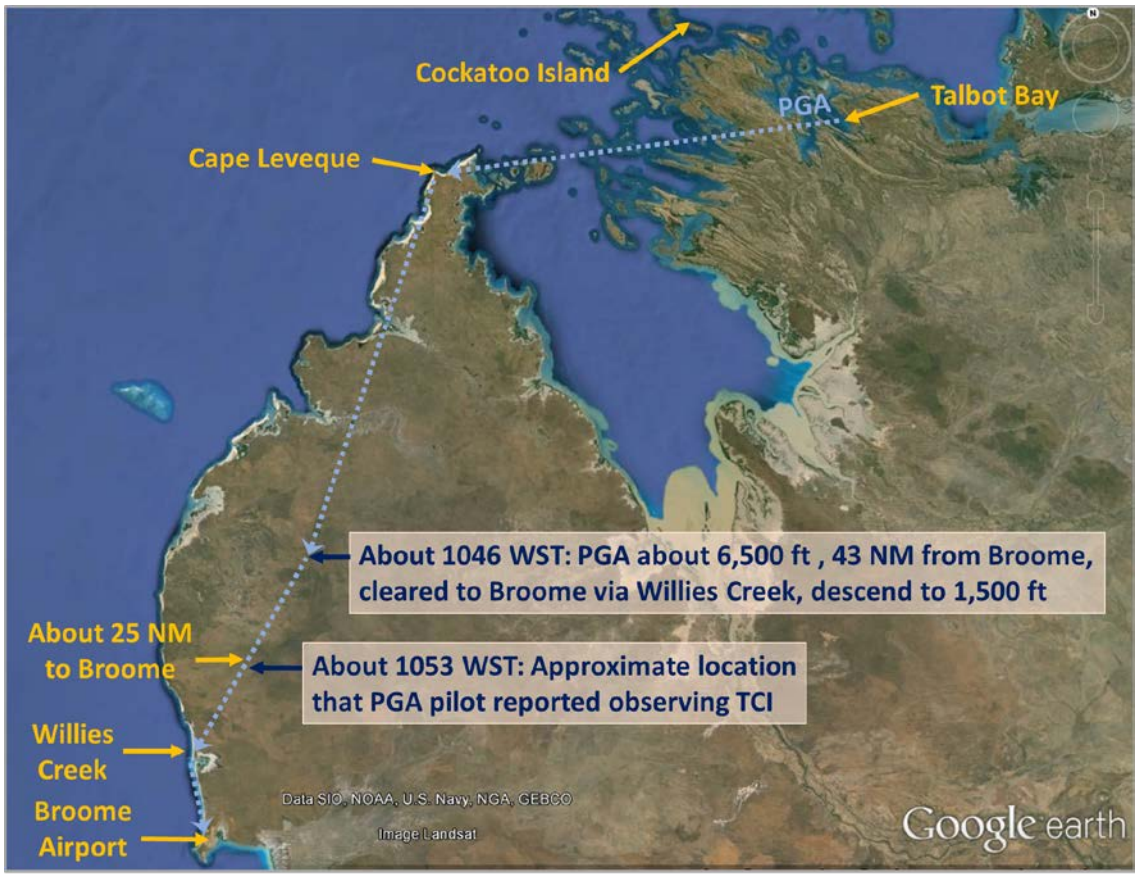
1 Only the transmitted radio wave is heard, without the voice. In effect, this means that the Tower controller was aware that someone was attempting to transmit on the frequency, but the controller was unable to hear what was being said.

2 In accordance with the requirements outlined in AIP Australia, the pilot of an aircraft losing two-way communication is required to set the transponder to code 7600.

3 The area in which VH-TCI was holding was Class E airspace. Aircraft operating under the Visual Flight Rules are required to maintain two-way continuous communication in Class E airspace, but do not require an air traffic control clearance to operate in Class E airspace. Aeronautical Information Package (AIP) *ENR 1.1 19.12 Avoiding Controlled Airspace* indicates that '…where there is a risk of an airspace infringement, the pilot in command should consider…altering track to remain well clear.'

Figure 1: Map showing the location of Cockatoo Island where TCI departed for Broome and the location of Talbot Bay where PGA departed for Broome via Cape Leveque and Willies Creek (blue track). Map also shows the approximate location of PGA from the aircraft's real-time satellite tracking system as provided by the operator.



Source: Google earth, modified by the ATSB.

At about 1053, the pilot of PGA heard the aircraft's traffic information system[4] alert 'traffic 12 o'clock[5] same level' (or similar words), indicating that an aircraft (subsequently identified as TCI) was directly ahead of PGA, at the same altitude, and within 0.25 NM. The pilot of PGA sighted the aircraft (subsequently identified as TCI) and observed it flying in the opposite direction on the right side, in close proximity. At about the same time, the pilot of TCI recalled that an aircraft (later identified as PGA) was seen to fly overhead.

After the aircraft had passed each other, the pilot of PGA advised the Tower controller that an aircraft had 'passed at 26 miles through 5,000 same level looked like a 210.' The Tower controller was subsequently able to establish limited one-way communication with the pilot of TCI (who was still unable to transmit voice communication), asking for confirmation of intentions, and using two short clicks/transmissions to acknowledge receipt of the Tower controller's transmissions. The Tower controller then broadcast a telephone number for the pilot, and asked the pilot to make contact on that number if possible.

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4 PGA had two global positioning systems (GPS) – a Garmin 650 and a Garmin 750 installed in the aircraft. Both units had a traffic information system, which provided an aural voice alert when another aircraft was within 0.25 NM.

5 The clock code is used to denote the direction of an aircraft or surface feature relative to the current heading of the observer's aircraft, expressed in terms of position on an analogue clock face. 12 o'clock indicates that the traffic is directly ahead.

Note: The pilot of TCI recalled holding over land, near James Price Point, outside of Class D airspace. Communications between ATC and the pilot of PGA immediately following the point at which the aircraft passed, suggested that the incident occurred further to the east, at about 26 NM from Broome. A later communication between ATC and the pilot of PGA suggested that the incident occurred about 23 NM from Broome. Information provided to the ATSB by the pilot for the incident flight from the tracking data from PGA's real-time satellite tracking system also suggested that the incident occurred near the latter location (Figure 2).

Figure 2: Broome Visual Terminal Chart depicting the area where the pilot of each aircraft believed they were located at the time of the occurrence.

Source: Airservices Australia, modified by the ATSB

The pilot of TCI contacted the Tower controller by telephone on the number provided, and was cleared to follow PGA to Broome, via Willies Creek. They also agreed to make a long transmission when TCI was 10 NM from Broome, and to 'transmit blind'[6] beyond that point. The controller then advised the pilot of PGA of the aircraft TCI, a Cessna 210, and advised that TCI would track inbound to Broome behind PGA. The pilot of PGA acknowledged this information.

[6] A 'blind' transmission from one station to another in circumstances where two-way communication cannot be established, but it is believed that the called station is able to receive the transmission.

At about 1103, the Tower controller cleared TCI for a visual approach as number two to land, and asked the pilot to make 'one click on left base'. The pilot of TCI acknowledged the controller with two short clicks/transmissions. PGA landed ahead of TCI at about 1104. About 3 minutes later, the pilot of TCI made a short click/transmission on the Tower frequency to indicate that they were on left base. The Tower controller responded by acknowledging that TCI was 'transmitting blind', and cleared TCI to land. TCI landed without further incident.

Radio failure

After the event, the operator investigated the reason for the radio failure in TCI. They found that an electrical cable for the microphone plug had come loose, resulting in the failure of that part of the communication system.

Pilot of TCI comment

The pilot of TCI reported that when they detected the radio failure, they were on descent from 8,000 ft. The pilot elected to hold at 5,000 ft outside Class D airspace, to remain clear of aircraft operating at 4,500 ft and 5,500 ft,[7] and to enable mobile telephone reception (to contact the operator and air traffic control).

The pilot of TCI reported hearing the pilot of PGA make an inbound call, and was monitoring the position of PGA using an application on an iPad. The pilot commented that although the iPad application did not provide real-time information, and that the accuracy of the information was limited, it nonetheless provided general information about aircraft in the vicinity. Based upon their understanding of the circumstances, the pilot believed that there was some distance between the area in which they were holding and the planned track of PGA.

Having identified that there was a communication problem, the pilot consulted the En Route Supplement Australia (ERSA), but considered the guidance available in that document to be of limited relevance under the circumstances.

When the two aircraft crossed, the pilot of TCI believed that PGA was about 500 ft above and about 1 NM (1.9 km) horizontally separated, at the closest point.

Pilot of PGA comment

The pilot of PGA reported that they had been maintaining a listening watch on the Broome Tower frequency from about 65 NM out, to gain situational awareness of the traffic operating in the area. The pilot heard the Broome Tower controller broadcast that an aircraft was only transmitting carrier wave, with no voice modulation.

The pilot estimated at the closest point when passing, TCI was about 50 m (0.03 NM) horizontally separated from PGA, and slightly below. After landing, the pilot indicated that several of the passengers made comments regarding the other aircraft (TCI).

The pilot obtained the tracking data from PGA's real-time satellite tracking system for the flight that showed the location of PGA at the time of the occurrence. That location is consistent with the approximate location, as shown in Figure 2, that the pilot of PGA observed TCI.

Based upon their experience flying in the Broome area, the pilot strongly believed radar facilities should be available to assist with management of the large volume of diverse air traffic that operates at Broome.

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[7] Aircraft operating under the Visual Flight Rules must flight plan to cruise at altitudes like 4,500 ft at 5,500 ft, Aircraft operating under the Instrument Flight Rules must flight plan to cruise at altitudes like 5,000 ft (see AIP ENR 1.7 *Tables of Cruising Levels*).

Safety message

This occurrence highlights the fundamental importance of communication – where the quality of communication is compromised for any reason, an effective pilot lookout becomes increasingly important. Awareness of the limitations of the see-and-avoid principle may assist pilots in developing effective lookout techniques. The ATSB publication *Limitations of the See-and-Avoid Principle* provides information on the limitations of seeing and avoiding another aircraft and measures that can be taken to increase the chance of sighting other traffic. The Civil Aviation Safety Authority (CASA) publication *CAAP 166-2(1) Pilots' responsibility for collision avoidance in the vicinity of non-controlled aerodromes using 'see-and-avoid'* also contains information on measures that can be taken to increase the chance of sighting other traffic.

Communication difficulties can generate a high workload and stressful environment for all concerned, and have the potential to escalate into a more serious situation if not handled effectively. Pilots are encouraged to familiarise themselves with the actions outlined in the ERSA, that may be appropriate when dealing with communication difficulties. Although in this case, the pilot considered the guidance to be of limited relevance, the information may be important in guiding pilot decision making under other circumstances. A common understanding between air traffic control and pilots experiencing radio difficulties, with regard to the intended actions of the pilot, may be critical to a safe outcome.

Additional information on loss of radio communications can be found in the US Aircraft Owners and Pilots Association (AOPA) *Flight Training* magazine, October 2005, *Can you hear me now?*

General details

Occurrence details

Date and time:	15 July 2015 – 1053 WST	
Occurrence category:	Serious incident	
Primary occurrence type:	Near collision	
Location:	46 km NNE of Broome Airport, Western Australia	
	Latitude: 17° 33.93' S	Longitude: 122° 21.67' E

Aircraft details – VH-TCI

Manufacturer and model:	Cessna Aircraft Company 210L	
Registration:	VH-TCI	
Serial number:	21060548	
Type of operation:	Charter - Test & Ferry	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Aircraft details – VH-PGA

Manufacturer and model:	Cessna Aircraft Company 208	
Registration:	VH-PGA	
Serial number:	20800312	
Type of operation:	Charter - Passenger	
Persons on board:	Crew – 1	Passengers – 12
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 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.