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Australian Transport Safety Bureau

Near collision involving Pilatus BN2, VH-IOA, and Bombardier DHC-8, VH-ZZJ

Horn Island Airport, Queensland, 12 October 2016

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Addendum

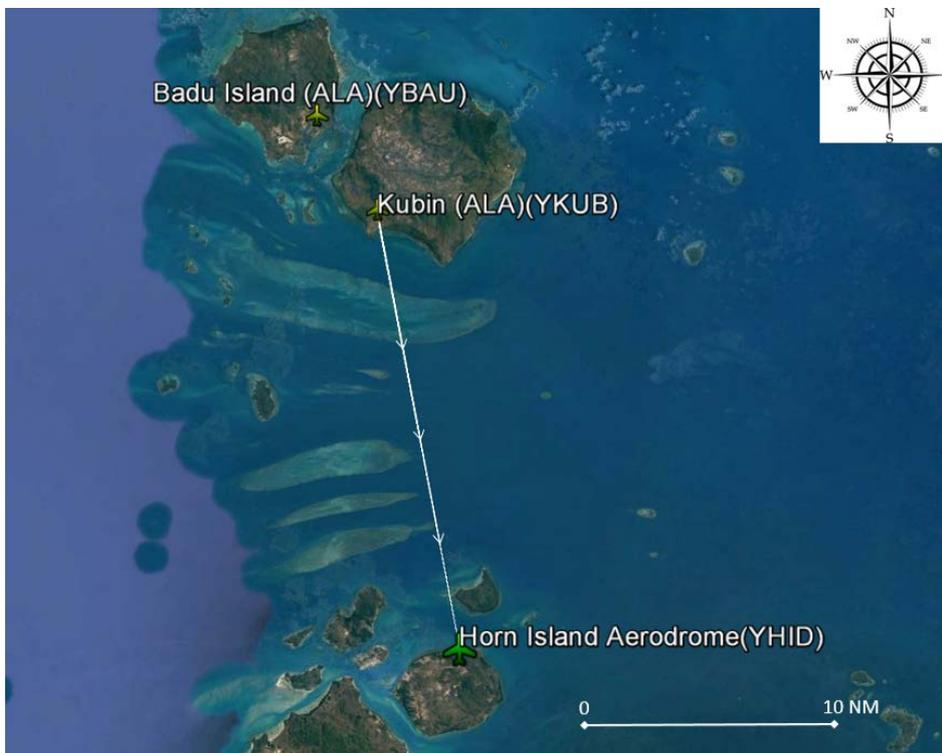
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Near collision involving Pilatus BN2, VH-IOA, and Bombardier DHC-8, VH-ZZJ

What happened

On 12 October 2016, at about 1330 Eastern Standard Time (EST), a Pilatus BN2A-20, registered VH-IOA (IOA), departed from Kubin on a charter flight to Horn Island, Queensland (Figure 1). On board IOA were one pilot and two passengers. At about the same time, a Bombardier DHC-8-202, registered VH-ZZJ (ZZJ), conducting surveillance operations, was preparing for departure from Horn Island. On board ZZJ were two pilots and three crewmembers.

Figure 1: IOA track from Kubin to Horn Island



Source: Google earth, annotated by ATSB

The Kubin authorised landing area (ALA) is within the Horn Island broadcast zone, and the pilot of IOA reported that they made their departure call on the Horn Island common traffic advisory frequency (CTAF). At the time IOA departed from Kubin, a faster company aircraft, registered VH-WOT (WOT), departed from Badu Island (Figure 1) on track to Horn Island. In addition to WOT, there was a training aircraft conducting circuits on runway 08 at Horn Island. While tracking to Horn Island, the pilot flying IOA heard a radio broadcast from WOT, which indicated they would join the runway 08 circuit as number 2 to the training aircraft. The area controller¹ then passed IOA traffic information about a DHC-8 (ZZJ) aircraft taxiing at Horn Island for departure from runway 08. The pilot flying IOA planned to join a straight-in approach to runway 14 from their track from Kubin. The pilot reported that they made all the required radio broadcasts for an arrival to

¹ IOA and ZZJ were both operating under instrument flight rules, which is why IOA received traffic information on ZZJ while operating outside controlled airspace.

Horn Island including broadcasts at 10 NM, 5 NM and 3 NM before they joined the final approach for runway 14.

The first officer on board ZZJ made a broadcast they were entering and backtracking runway 14 at Horn Island for a departure from runway 08 (position 1 on Figure 2). Just prior to the intersection of the two runways, ZZJ held short of runway 08 to allow the training aircraft to complete a touch-and-go landing on runway 08. The first officer then broadcast ZZJ was entering and backtracking runway 08. While backtracking runway 08 (position 2 on Figure 2), ZZJ's flight crew heard a broadcast that WOT was joining the circuit as number 2 to the training aircraft and then observed a third aircraft appear on their traffic collision avoidance system (TCAS) display. The captain of ZZJ asked the first officer to contact the third unknown aircraft.

When the pilot flying IOA heard a broadcast from ZZJ, which indicated it was directed at them, they responded that they were approaching a 3 NM final for runway 14 and ZZJ would have time to depart from runway 08 if they were quick. At about this time, ZZJ was approaching the threshold of runway 08. The captain lined ZZJ up for departure and the crew completed their pre-take-off checklist items (three items). At about this time, another two aircraft, 20 NM away from Horn Island, started communicating with each other on the Horn Island CTAF.

By the time the pilot flying IOA heard ZZJ broadcast 'rolling for departure from runway 08', IOA was at about 400 ft on final approach for runway 14. The pilot of IOA reported that at about 300 ft, they broadcast 'hold short' to ZZJ. However, the captain of ZZJ reported they heard the pilot of IOA say 'land and hold short of runway 08'.² Consequently, ZZJ continued their take-off. As IOA approached 100–150 ft on final approach, ZZJ had not crossed the runway intersection and the pilot flying IOA conducted a left climbing turn away from the runways to join the downwind circuit leg for runway 08. The captain of ZZJ looked out their left window when they were in the initial climb overhead the threshold of runway 26 and saw IOA turning through east at about the same level (position 4 on Figure 2). IOA then joined the circuit for runway 08 and landed after WOT without further incident.

Figure 2: Sequence of movements



Source: Google earth, annotated by ATSB

² Horn Island Airport experienced a temporary loss of power on the day of the incident. None of the transmissions from the incident aircraft were captured on the available CTAF recorded data.

Horn Island Airport and CTAF

The Horn Island Airport is located at the northern end of Cape York Peninsula. The airport acts as the hub for access to the outer islands in the Torres Strait. Mainland services fly into Horn Island and passengers are then transferred onto the local operators' smaller aeroplanes and helicopters for transfer to and from the outer islands. Runway 08/26 is the main runway and runway 14/32 is shorter and narrower. Smaller aircraft, such as IOA, operate to both runways, but larger aircraft, such as ZZJ, restrict their operations to runway 08/26.

The airport apron is located adjacent to the threshold of runway 32 and there are no taxiways to separate ground movements from aircraft taking off and landing. There is also higher terrain located to the south east of the airport, which has resulted in the following additional restrictions to airport movements published in the Horn Island aerodrome chart:

Take-off runway 14 and landing runway 32 not permitted due terrain.

Consequently, the smaller local aeroplane operators' have adopted the local practice of departing from runway 08 and landing on runway 14, weather conditions permitting.

The CTAF boundary extends laterally to 40 NM from Horn Island, which encapsulates the outer islands, and vertically from the surface to 8,500 ft.

ZZJ TCAS settings

The flight crew on board ZZJ had their TCAS set to the 12 NM range scale while backtracking runway 08. The captain reported that they could have improved their picture of the relative bearing and distance of IOA if they reduced the scale to 6 NM while backtracking runway 08. However, their normal procedure is to set the 6 NM range scale for controlled airspace and set the 12 NM range scale for departure from a non-controlled aerodrome to improve situational awareness of inbound traffic.

Right of way provision

Civil Aviation Regulation (CAR) 162 lists the rules for prevention of collision. CAR 162 paragraph 8 states:

An aircraft that is about to take-off shall not attempt to do so until there is no apparent risk of collision with other aircraft.

The captain of ZZJ reported that they relied too heavily on their TCAS and did not place sufficient importance on the 'see' element within the 'see-and-avoid' philosophy of operations at non-controlled aerodromes. Consequently, they started their take-off before sighting IOA.

Safety analysis

Prior to the near collision event, the flight crew of both aircraft were aware of the presence of the other aircraft and their approximate position. When ZZJ was backtracking runway 08, the captain was conscious of the fact that they were occupying the main runway that was being used by other aircraft in the circuit.

The broadcast from IOA, that ZZJ could depart before IOA landed, supported the motivation of the captain of ZZJ to avoid delaying their departure from runway 08. The captain of ZZJ also relied on an approximate position of IOA from their TCAS when they elected to take-off. However, as reported by the captain, the range scale set on the TCAS was 12 NM, where a 6 NM range scale could have provided a more accurate picture of the relative position of IOA.

During the take-off, the flight crew probably also misheard the broadcast from the pilot in IOA, to hold short of runway 14, and therefore did not reject the take-off. However, it was not determined if the radio broadcast was before or after ZZJ reached their decision speed (V1) to safely reject the take-off.

Findings

These findings should not be read as apportioning blame or liability to any particular organisation or individual.

- The captain of ZZJ was motivated to expedite their departure from the main runway, which in conjunction with the broadcast from IOA that they had time to take-off before IOA landed, contributed to them starting their take-off before they sighted IOA.
- The flight crew probably misheard the broadcast from the pilot of IOA to hold short of runway 14 and did not reject the take-off.
- IOA and ZZJ made the required CTAF broadcasts and were aware of the approximate position of each other prior to the near collision event.
- Concurrent operations to different runways at Horn Island is a normal local practice, which is employed to facilitate traffic movements.

ATSB comment

The ATSB notes that the horizontal and vertical dimensions for standard CTAF boundaries are published in the Aeronautical Information Publication (AIP). However, the dimensions for non-standard CTAF boundaries are currently only published in the Enroute Supplement Chart LOW.

Safety message

This serious incident highlights that pilots and operators need to consider how best to employ and integrate the sources of information available to them in order to develop an accurate mental model of a potential traffic threat. In the 'see-and-avoid' environment, radio broadcasts and TCAS information can be used to hone the visual scan to sight other traffic, which might pose a threat.

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.

Further information on [safety around non-controlled aerodromes](#) is available from the ATSB website.

Further information on [operations at non-controlled aerodromes](#) is available from the Civil Aviation Safety Authority's website.



General details

Occurrence details

Date and time:	12 October 2016 – 1347 EST	
Occurrence category:	Serious incident	
Primary occurrence type:	Near collision	
Location:	Horn Island Aerodrome, Queensland	
	Latitude: 10° 35.18' S	Longitude: 142° 17.40' E

Aircraft details – VH-IOA

Manufacturer and model:	Pilatus Britten-Norman LTD BN2A-20	
Registration:	VH-IOA	
Operator:	McGilvray Aviation PTY LTD (Cape Air Transport)	
Serial number:	842	
Type of operation:	Charter - passenger	
Persons on board:	Crew – 1	Passengers – 2
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Nil	

Aircraft details – VH-ZZJ

Manufacturer and model:	Bombardier Incorporated DHC-8-202	
Registration:	VH-ZZJ	
Operator:	Surveillance Australia PTY LTD (Cobham Aviation Services)	
Serial number:	551	
Type of operation:	Aerial work – survey / photographic	
Persons on board:	Crew – 5	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.