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Australian Transport Safety Bureau

Near collision between Fairchild SA227, VH-MYI, and Cessna 150, VH- RZP

31 km N of King Island Airport, Tasmania, 26 February 2016

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Addendum

Page	Change	Date

Near collision between Fairchild SA227, VH-MYI and Cessna 150, VH-RZP

What happened

On 28 February 2016 at about 1642 Eastern Daylight-saving Time (EDT), a Cessna 150 aircraft, registered VH-RZP (RZP), departed from King Island Airport, Tasmania, for a flight to Barwon Heads Airport, Victoria (Figure 1). On board were a pilot and passenger.

The pilot had elected not to submit a flight plan for the visual flight rules[1] private flight. They planned to remain outside controlled airspace but make scheduled reports[2] to air traffic control (ATC) on the Melbourne Centre frequency during the overwater component of the flight.

At 1645, when passing through 1,600 ft above mean sea level, the pilot broadcast a departure call on the King Island common traffic advisory frequency (CTAF) using the only radio in the aircraft.

Figure 1: Approximate flight paths of Cessna 150 VH-RZP and SA227 VH-MYI

Source: Google earth annotated by the ATSB

About two minutes later, the crew of a regular public transport (RPT) aircraft ('Aircraft 2') also broadcast on the CTAF. The crew advised that they were at 30 NM inbound to King Island and on

[1] Visual flight rules 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] Scheduled reports are an option to meet search and rescue requirements for aircraft who do not meet the normal CAR 258 requirements for overwater flight. Information available in the Aeronautical Information Publication ENR 1.1.100.

descent through FL 115.[3] The pilot of RZP responded to this broadcast, and reported RZP's position and their intentions. After a brief radio discussion, the pilot of RZP agreed to advise the crew of Aircraft 2 when RZP was close to the northern coast of the island (Figure 1). The crew of Aircraft 2 had temporarily stopped their descent at 6,500 ft until they could confirm that they had safely passed RZP.

At 1650 the crew of a RPT Sharp Airlines Fairchild SA227 aircraft, VH-MYI (MYI), also made a 30 NM inbound broadcast on the CTAF. The pilot in command (PIC) was the pilot monitoring[4] for this sector, and handling the radio calls using two radios, one on the CTAF, and one on the Melbourne Centre frequency. At the time, MYI was on descent from FL 110. The crew of Aircraft 2 responded to this broadcast, with an update of their position and current intentions.

At the same time as the pilot in MYI was broadcasting on the CTAF, the pilot in RZP contacted ATC to arrange the overwater component of their flight. RZP was now about 17 NM from the King Island Airport and had selected the Melbourne Centre frequency on their radio. Therefore, the pilot of RZP did not hear the inbound broadcast by the pilot of MYI. The call to ATC included details of RZP's current position, the current passing altitude of 4,400 ft, and the intention to continue the climb to 5,500 ft. As they were still in the climb, the aircraft had a relatively high nose attitude, which restricted the pilot's forward vision.

Air traffic control (on Melbourne Centre frequency) confirmed with the crew of both inbound RPT aircraft (still monitoring both frequencies) that they had heard RZP's radio call. The crew of Aircraft 2 responded that they had, and when ATC asked again, the crew of MYI (who at the time had been broadcasting on the CTAF) advised that they had also heard the broadcast.

Air traffic control then confirmed with the pilot of RZP that they had heard both inbound RPT aircraft's broadcasts. The pilot of RZP (still in the climb) advised ATC that they were aware of both aircraft and that Aircraft 2 had just passed above them.

Almost concurrently, the flight crew in both Aircraft 2 and MYI were calling the pilot of RZP on the CTAF, attempting to establish RZP's current position. The pilot in RZP then momentarily switched back to the CTAF and contacted Aircraft 2 to inform them that they had just passed above RZP.

The crew of MYI unsuccessfully tried again, on the CTAF, to establish the position and altitude of RZP. MYI did not have a traffic alert and collision avoidance system[5] (TCAS) installed so although RZP was transponder equipped, the crew in MYI had to rely on radio transmissions to ascertain the other aircraft's position.

Not obtaining a response from RZP (as the pilot of RZP had switched the radio frequency back to Melbourne Centre) and unable to determine RZP's exact position, the crew of MYI elected to temporarily stop their descent at 5,300 ft.

Shortly after, as RZP had reached the top of climb and the pilot was reconfiguring the aircraft, the passenger alerted the pilot to the approaching aircraft (MYI) on a reciprocal heading. About the same time, the crew of MYI reported seeing RZP 'on a reciprocal heading and within a 100 ft of their altitude and about 200–300 m away'. The pilot of RZP quickly manoeuvred to the right, but the aircraft had passed MYI before the crew of MYI were able to react. There was a further radio exchange between the two crews after the pilot of RZP momentarily switched back to the CTAF.

Both RZP and MYI continued to their respective destinations and landed safely. Aircraft 2 had already landed some minutes earlier.

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[3] At altitudes above 10,000 ft in Australia, an aircraft's height above mean sea level is referred to as a flight level (FL). FL 370 equates to 37,000 ft.

[4] Pilot flying (PF) and pilot monitoring (PM) are procedurally assigned roles with specifically assigned duties at specific stages of a flight. The PF does most of the flying, except in defined circumstances; such as planning for descent, approach and landing. The PM carries out support duties and monitors the PF's actions and aircraft flight path.

[5] Traffic collision avoidance system (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.

Table 1 below provides a summary of the radio calls made on both the King Island CTAF and the Melbourne Centre frequency.

Table 1: Summary of radio calls made on CTAF and Melbourne Centre

Calls made on King Island CTAF	Time	Calls made on Melbourne Centre
RZP makes a departure call advising traffic on their current altitude, the altitude they were climbing to and tracking intentions	1644:58	MYI contacts Melbourne Centre with altitude
	1645:47	ATC contacts MYI to pass IFR traffic to them
Aircraft 2 makes an inbound call at 30 NM and then arranges with RZP to report when they cross the northern end of King Island	1646:41	
	1648:38	MYI advises they have begun their descent
MYI makes an inbound call at 30 NM	1650:07	RZP contacts Melbourne Centre to arrange their overwater sector. They advise that they are on climb to 5,500 ft.
	1650.35	ATC contact both MYI and Aircraft 2 to ensure they have heard RZP's call
	1650:49	Aircraft 2 confirms they have
Aircraft 2 makes a broadcast advising of their distance from King Island Airport and requesting a distance from King Island Airport from RZP	1650 .56	
	1651:04	ATC contacts MYI to confirm they are aware of RZP
	1651:07	MYI has to be contacted a second time and then confirms they have heard RZP
MYI requests that RZP broadcast their altitude	1651:10	ATC contacts RZP to ensure they are aware of both Aircraft 2 and MYI on descent to King Island with an indication of where each aircraft is in relation to the coast of King Island
	1651.26	RZP confirms they have heard all traffic and that Aircraft 2 has just passed above them
RZP contacts Aircraft 2 Aircraft 2 requests that RZP advise them of their distance from King Island Airport RZP advises Aircraft 2 has just passed above their aircraft	1651.53	

MYI attempts to contact RZP advising their position and requesting their altitude	1652.14	
	1652:49	ATC contacts Aircraft 2 to advise them they are no longer being monitored on frequency
MYI attempts to contact RZP again	1652.32	
	1652:50	Aircraft 2 responds
	1652:52	ATC attempts to contact MYI to advise them they are no longer being monitored on frequency
	1652:57	ATC again contacts MYI to cancel contact
	1653:00	MYI responds
MYI attempts to contact RZP again	1653.08	
RZP contacts MYI advising them that they have just passed them	1653.38	

Weather

The King Island Terminal Aerodrome Forecast (TAF) valid from 1300 to 0100 the next day included a south-westerly wind of 15 kts, visibility of 10 km or greater, and showers of light rain with 6–7 okta[6] of cloud at 3,000 ft.

One of the King Island automated weather station reports (METAR) released during this period, reported a wind from the south-west at 14 kts, greater than 10 km of visibility and overcast[7] cloud at 1,900 ft.

Cessna 150, VH-RZP - Pilot experience and comments

The pilot held a Private Pilot Licence and had about 640 hours of total aeronautical experience.

The pilot reported the following:

- They were familiar with King Island and regularly flew from Barwon Heads to King Island and return in this aircraft.
- The pilot's recollection of the flight was that they had made all the appropriate radio calls both on the CTAF and on the Melbourne Centre frequency.
- The pilot recalled being advised by ATC that there were two inbound RPT aircraft, but did not have a full understanding of the position of MYI in relation to RZP.
- The pilot was unaware of MYI until they had switched to Melbourne Centre frequency to commence the overwater reporting segment.
- The pilot advised that although there was cloud around the King Island Airport, they were able to remain clear of cloud during the climb to 5,500 ft, and that it was clear blue sky above the cloud from about 3,000 ft.
- RZP was fitted with one radio, therefore could only be tuned to one frequency at a time (in this case, either Melbourne Centre or the CTAF). The pilot felt that this had probably contributed to the communication breakdown.

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6 A meteorological unit of measurement giving the amount of cloud present at any one location.
7 Overcast means a total sky coverage of this cloud (100%).

- The transponder in RZP was on and working. The pilot was under the impression that an RPT aircraft would be able to 'see' RZP on TCAS, or similar equipment.
- They used an iPad with a popular navigation application, and were able to maintain the flight-planned track far more accurately than relying on navigating using a map. There was no traffic awareness facility on this software application.
- The pilot commented that in future they would not fly an almost reciprocal track to the inbound IFR aircraft. Instead, they intend to track a coastal route once departing King Island and then track to a position west of Barwon Heads in order to provide sufficient separation.

Fairchild SA227, *VH-MYI – Pilot experience and comments*

The pilot in command (PIC) had almost 4,000 hours total aeronautical experience with just over 1,700 hours on SA227 aircraft. The PIC advised the following:

- Due to the forecast and in flight conditions of overcast layers of cloud for the descent, the crew had elected to conduct a Global Navigation Satellite System (GNSS) arrival, with a circling approach on to runway 28.
- As per the company standard operating procedures, all communication with company ground personnel at King Island was completed prior to the top of descent.
- The crew had incorrectly assumed that because RZP was a VFR aircraft, they would therefore be staying below the extensive layers of cloud and commencing the overwater segment well below MYI's descent profile. The crew reported that the inflight conditions they were experiencing of layers of overcast cloud had only re-enforced the belief that RZP, being VFR, would be under the layers of cloud and therefore not a conflict.
- This particular SA227 had yet to be fitted with ADS-B.[8] The pilot advised that much of the operator's fleet had already been fitted with this technology, but MYI was scheduled for fitment in the near future. This aircraft was also not fitted with TCAS.
- The pilot commented that King Island is a very busy airport, with an increasing number of commercial flights operating there. To date, the pilot had not had an issue operating there as the self-separation required was predominantly between other IFR commercial aircraft, and the system had worked well.

ATSB comment

This serious incident highlights the issues with different performance aircraft operating in the vicinity of non-controlled airports. Although the crew in all three aircraft were making all the required broadcasts, in this occurrence, the broadcasts were being made within seconds of each other on different frequencies. This meant that the crew of both RZP and MYI had missed the opportunity to gain a full appreciation of the other's position, resulting in a near collision.

In the last five years, the ATSB has received almost 100 reports of near collisions, where the pilots have reported that they were in the vicinity of a non-controlled airport. The ATSB is currently working on an update of the research report into safety in the vicinity of non-controlled aerodromes (previously published in 2010). A revised iteration is expected to be released in the 2016/17 financial year.

The ATSB is also compiling a special aviation short investigation bulletin involving several recent near collisions in the vicinity of non-controlled aerodromes.

Much of the information the ATSB has gathered through the reporting process and through related investigations points to a lack of understanding between pilots of different operation types operating to and from non-controlled aerodromes. Although broadcasting and reporting on the

[8] ADS-B, or automatic dependent surveillance – broadcast, automatically broadcasts the precise location of the aircraft via a digital data link. The data can be used by other aircraft and ATC to show the aircraft's position and altitude on display screens without the need for radar.

radio often occurs, the situational appreciation of the other aircraft's performance and positions has not occurred.

Situational awareness around high traffic routes in Class G airspace and non-controlled airports remains the responsibility of the pilot in command. The ATSB encourages pilots to consider other operations in a shared facility such as non-controlled aerodromes. The use of all available resources to confirm the intent of other aircraft by questioning transmissions which had not been fully heard or understood, as in this case, may avert a serious incident such as this.

Safety action

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following proactive safety action in response to this occurrence, bearing in mind the VH-RZP was a private operations aircraft.

Sharp Airlines

As a result of this occurrence, Sharp Airlines has advised the ATSB that they are taking the following safety actions:

To highlight human factors issues and the risks associated with operating into and out of King Island Airport, the details of the incident will be included in the company's quarterly newsletter.

Future flight crew human factors training courses will include the human factors associated with this occurrence.

Safety message

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.

The ATSB's Avoidable Accident series includes a publication, *A Pilot's Guide to safety in the vicinity of non-towered*[9] *aerodromes.* This publication captures many issues that occur around non-controlled aerodromes.

Section 4 of CASA's Civil Aviation Advisory Publication (CAAP 166-1(3)) encourages pilot's to consider issues surrounding the traffic mix in the vicinity of non-controlled aerodromes. Although the definition used for CTAF in this publication indicates a lateral dimension of 10 NM, Table 2 notes that higher performance aircraft will be making broadcasts earlier than this 10NM boundary. It is therefore important for all CTAF users, particularly pilots of those aircraft in the lower performance category, to understand this information.

The Airservices Australia Aeronautical Information Package (AIP) GEN 2.2-6, defines a CTAF as:

> 'A designated frequency on which pilots make positional broadcasts when operating in the vicinity of a non-controlled aerodrome.'

This definition may provide a more useful way for pilots to understand operations in and around non-controlled aerodromes.

[9] At the time of this publication, these aerodromes were known as non-towered. CASA have since updated this definition to include all aerodromes/airports where a control service is not currently in place. This can apply to Class C or D airports when Tower is not operating.

General details

Occurrence details

Date and time:	28 February 2016 – 1650 EDT	
Occurrence category:	Serious incident	
Primary occurrence type:	Near Collision	
Location:	31 km N of King Island Airport, Tasmania	
	Latitude: 39° 36.00' S	Longitude: 143° 57.20' E

VH-MYI

Manufacturer and model:	Fairchild Industries Inc. SA 227 DC	
Registration:	VH-MYI	
Operator:	Sharp Aviation Pty Ltd	
Serial number:	DC-869B	
Type of operation:	Air Transport Low Capacity - Passenger	
Persons on board:	Crew – 2	Passengers – 1
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Nil	

VH-RZP

Manufacturer and model:	Cessna Aircraft Company 150G	
Registration:	VH-RZP	
Serial number:	15066544	
Type of operation:	Private - Pleasure / Travel	
Persons on board:	Crew – 1	Passengers – 1
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.