Australian Government
Australian Transport Safety Bureau

Near collision involving a Cessna 152, VH-NKL and a Starduster SA300, VH-XRS

Tyabb Airport, Victoria, 2 January 2015

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Aviation Occurrence Investigation
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Addendum

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Near collision involving a Cessna 152, VH-NKL and a Starduster SA300, VH-XRS

What happened

On 2 January 2015, at about 1400 Eastern Daylight-saving Time, the pilot of a Starduster SA300 aircraft, registered VH-XRS (XRS), commenced pre-flight preparations for a local private flight at Tyabb Airport, Victoria (Figure 1). The pilot of XRS observed the windsock indicating calm conditions. The pilot elected to follow the airport operator's procedures for nil wind, and use the preferred runway, runway 17. During the next 30 minutes, no aircraft operated in the circuit. The pilot did not hear any broadcasts on the common traffic advisory frequency (CTAF) during that time.

Figure 1: VH-XRS

Source: Aircraft owner

At about 1430, a Cessna 152 aircraft, registered VH-NKL (NKL), conducted pre-taxi checks prior to a dual training flight. The instructor and student pilot planned to conduct circuits at Tyabb. During the pre-taxi checks, the student pilot selected Tyabb common traffic advisory frequency (CTAF) on the radio, and checked the squelch,[1] to verify that the radio was operating. The instructor reported that the wind was less than 5 kt and from the east-northeast. Although the preferred runway in those conditions was runway 17, they elected to use runway 35. This runway selection provided an opportunity for the student to practice backtracking on the runway. The student pilot broadcast taxiing for runway 35 and commenced taxiing south from the apron towards the threshold of runway 35.

The pilot of XRS did not hear the taxi broadcast from the pilot of NKL, or sight NKL at that time, and commenced taxiing from the hangar to the apron area. At the apron, the pilot of XRS conducted engine run-ups, then broadcast taxiing for runway 17 and commenced taxiing north towards the threshold of runway 17. Neither the student pilot nor instructor of NKL heard the taxi broadcast from the pilot of XRS.

[1] Pilot control of volume or signal/noise ratio.

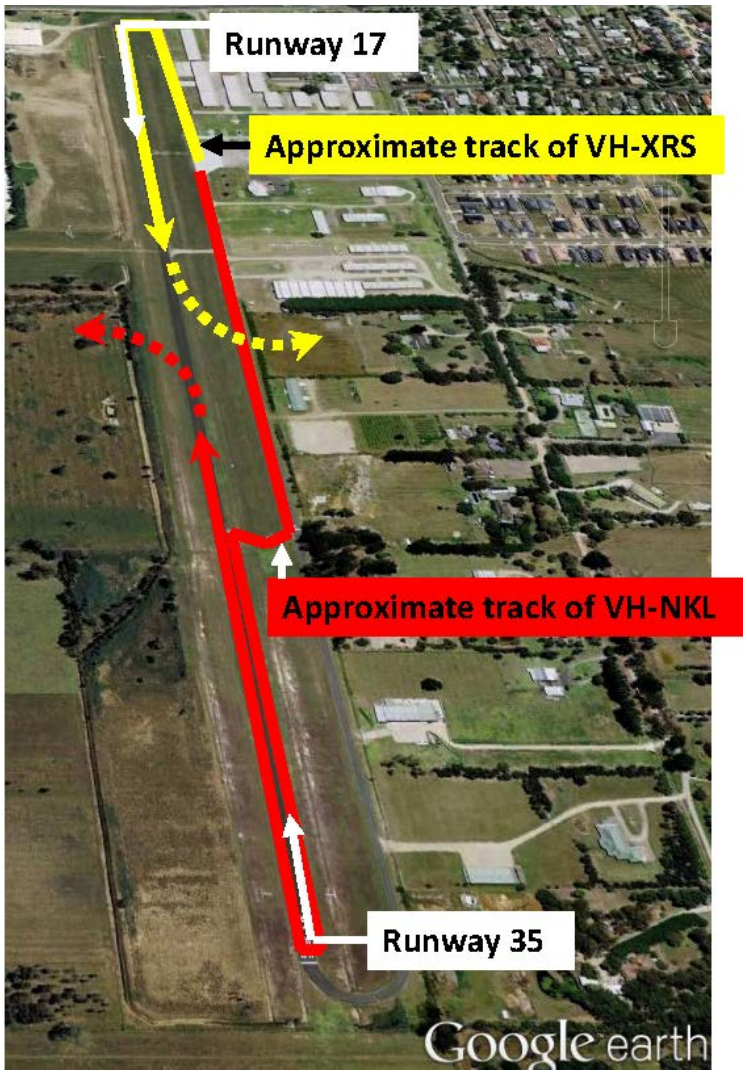
The student pilot of NKL then broadcast entering and backtracking runway 35, and NKL entered the runway and taxied to the southern threshold. After reaching the threshold, the student pilot turned the aircraft, broadcast lining up and departing runway 35 for circuits. The pilot of XRS did not hear that broadcast, but was by then at the threshold of runway 17 and broadcast lining up and departing runway 17. The pilots of NKL did not hear that broadcast.

The pilot of another Cessna aircraft, then at the apron, heard both 'lining up' broadcasts on the CTAF. This pilot immediately attempted to broadcast a conflict alert, to advise the pilots that the aircraft were on opposing runways. The pilots of XRS and NKL did not hear that broadcast. The student pilot of NKL broadcast 'rolling runway 35' at the same time, which may have over-transmitted the other call.

When about 500 m along the runway and at rotate speed, the instructor of NKL pointed out the airspeed to the student and the aircraft lifted off. The instructor then sighted XRS in the take-off run on the opposite runway. The instructor immediately took control of the aircraft from the student and commenced a left climbing turn, while keeping XRS in sight (Figure 2).

When about 300 m along the runway, XRS lifted off. When at about 10 ft above ground level, the pilot of XRS sighted NKL, about 300 m ahead and banking to the left. He also commenced a left turn to increase separation between the two aircraft, which then passed about 50 m from each other, with NKL slightly higher than XRS. The pilot of XRS then joined the circuit for runway 35 on the crosswind leg, and broadcast that he was joining the circuit to return to land at Tyabb.

Figure 2: Tyabb Airport and aircraft tracks



Source: Google earth

The instructor of NKL then requested a radio check, which the pilot of the other Cessna operating in the area heard and responded to.

Radio broadcasts

The CTAF at Tyabb was not recorded and the ATSB was unable to verify broadcasts made, other than those reported by the pilot of another aircraft operating at the airport at the time. The CTAF did not have an aerodrome frequency response unit (AFRU). An AFRU assists in indicating selection of the correct VHF frequency at non-towered aerodromes, by automatically responding with either a pre-recorded voice message, if no transmission has been received in the last five minutes or otherwise a 'beep-back', on the CTAF.

Preferred runway in nil wind conditions

The En Route Supplement Australia (ERSA) for Tyabb,[2] indicated under noise abatement procedures, that the preferred runway was 35/17 and that runway 08/26 was only to be used when operationally required. The page layout may have been considered to be misleading with 35 printed above 17, but that was not designed to imply that runway 35 was the preferred runway in the event the wind did not favour either direction.

The Chief Flying Instructor at Tyabb provided the ATSB with a copy of the runway diagram and local instructions. He reported that this was issued to pilots operating at the airfield. In the notes section, it stated 'Preferred runway in nil wind conditions, Runway 17'. Both the pilot of XRS and the instructor of NKL were local pilots and aware of the local instruction for the preferred runway in nil- or cross-wind conditions.

Pilot comments

Pilot of XRS

After the incident, as XRS was returning to land, the pilot of XRS heard the second Cessna aircraft pilot broadcast lining up and departing. He was able to hear broadcasts from aircraft on the ground while XRS was in the air, but is unsure whether an aircraft at one end of the runway could hear a broadcast from an aircraft at the opposite end. The VHF radio requires line-of-sight, and a pilot in an aircraft at the threshold at one end of the runway is unable to see an aircraft at the opposite threshold, due to a slope in the runway.

Pilot of other Cessna

The pilot of the Cessna at the apron reported that the radio transmissions from XRS were of poor quality.

Instructor of NKL

The instructor provided the following comments:

- He held a formation endorsement, and during formation flying there was an emphasis on keeping the other aircraft in sight. When he sighted XRS, he conducted a left turn to maintain visual contact with XRS.
- He did not hear any broadcasts from the pilot of XRS. After the incident, he heard the pilot of the other Cessna make the standard broadcasts.

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.

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[2] www.airservicesaustralia.com/aip/current/ersa/FAC_YTYA_13-Nov-2014.pdf

Aero club

As a result of this occurrence, the local aero club has advised the ATSB that they are taking the following safety actions:

Communication

The incident will be discussed at a monthly meeting, emphasising the use of the preferred runway in nil wind conditions. Pilots and instructors will be reminded that operating outside of the normal and expected procedures, requires higher levels of alertness.

ERSA

The ERSA entry for Tyabb will be amended as the layout may have been misleading.

AFRU

They will review the installation of an AFRU and possible means of recording the CTAF.

Accident emergency plan

The emergency management plan will also be reviewed.

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. One of the safety concerns is safety around non-towered aerodromes www.atsb.gov.au/safetywatch/safety-around-aeros.aspx.

As detailed in the booklet *A pilot's guide to staying safe in the vicinity of non-towered aerodromes*, available at www.atsb.gov.au/publications/2008/ar-2008-044(1).aspx, ATSB research found that, between 2003 and 2008, there were 709 airspace-related events at, or in the vicinity of non-towered aerodromes. This included 60 serious incidents and six accidents (mid-air and ground collisions). Most of the 60 serious incidents were near mid-air collisions.

Issues associated with unalerted see-and-avoid have been detailed in the ATSB research report Limitations of the See-and-Avoid Principle. The report highlights that unalerted see-and-avoid relies entirely on the pilot's ability to sight other aircraft. Broadcasting on the CTAF is known as radio-alerted see-and-avoid, and assists by supporting a pilot's visual lookout for traffic. An alerted search is more likely to be successful as knowing where to look greatly increases the chances of sighting traffic. The report is available at www.atsb.gov.au/publications/2009/see-and-avoid.aspx.

Civil Aviation Advisory Publication (CAAP) 166-2(1), www.casa.gov.au/wcmswr/_assets/main/download/caaps/ops/166-2.pdf, stated:

> 11.5 Pilots should be mindful that transmission of information by radio does not guarantee receipt and complete understanding of that information. Many of the worst aviation accidents in history have their genesis in misunderstanding of radio calls, over-transmissions, or poor language/phraseology which undermined the value of the information being transmitted.
>
> 11.6 Without understanding and confirmation of the transmitted information, the potential for alerted see-and-avoid is reduced to the less safe situation of unalerted see-and-avoid.

In this incident, the instructor of NKL diverged left on sighting XRS. When the pilot of XRS sighted NKL, it was already banking to the left and therefore he was able to also conduct a left turn to increase separation. However, the Civil Aviation Regulations 1988 – Reg162, *Rules for prevention of collision*,[3] stated:

[3] www.austlii.edu.au/au/legis/cth/consol_reg/car1988263/s162.html

> When two aircraft are approaching head-on or approximately so and there is danger of collision, each shall alter its heading to the right.

The risk of reduced separation events can be minimised through good communication by pilots. Most importantly, a good visual lookout should be maintained at all times, particularly when operating at aerodromes where the carriage of a radio is not mandatory.

A local procedure that improves safety, such as a preferred runway, should be well-documented, and communicated to all pilots operating at the aerodrome.

General details

Occurrence details

Date and time:	2 January 2015 – 1440 EDT	
Occurrence category:	Serious incident	
Primary occurrence type:	Near collision	
Location:	Tyabb (ALA), Victoria	
	Latitude: 38° 16.00' S	Longitude: 145° 10.50' E

Aircraft details: VH-NKL

Manufacturer and model:	Cessna Aircraft Company, 152	
Registration:	VH-NKL	
Serial number:	15280119	
Type of operation:	Flying training – dual	
Persons on board:	Crew – 2	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Aircraft details: VH-XRS

Manufacturer and model:	Amateur Built Aircraft, Starduster SA300	
Registration:	VH-XRS	
Serial number:	2620	
Type of operation:	Private	
Persons on board:	Crew – 1	Passengers – Nil
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.