



**Australian Government**

**Australian Transport Safety Bureau**

**ATSB TRANSPORT SAFETY INVESTIGATION REPORT**

Aviation Occurrence Report –200506443

Final

**Collision – 2 km east of Coldstream (ALA)  
10 December 2005**

**Piper Aircraft Corp PA-28, Warrior, VH-BZA**

**Piper Aircraft Corp PA-28, Warrior, VH-UMB**





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### **Abstract**

On 10 December 2005, at about 0953, two Piper Aircraft Corp PA-28, Warrior, aircraft collided 2 km north-east of Coldstream Aerodrome.

The instructor and student on board one of the aircraft were conducting circuit training at Coldstream Aerodrome. The instructor reported that the aircraft had climbed above the nominated circuit height of 1,500 ft above mean sea level (AMSL), but was not certain of the maximum altitude their aircraft ultimately reached.

After the collision the instructor had initially considered an off airport landing; however, after some degree of control was regained he felt confident enough to return to Coldstream Aerodrome. The right wing leading edge and the vertical stabiliser of the aircraft sustained substantial damage in the collision.

The instructor and student onboard the other aircraft were returning to Lilydale Aerodrome after a period in the local training area. While transiting from the training area to Lilydale the aircraft overflew the Coldstream Aerodrome circuit area. After the collision, the instructor on board the aircraft took control of the aircraft and continued on to Lilydale Aerodrome located a short distance to the north-west. The aircraft sustained minor damage to the left wing tip, left aileron, and engine cowl and nose gear.

The local instructions for aircraft operated at Coldstream Aerodrome indicated a circuit altitude of 1,500 ft AMSL and an overfly altitude of 2,000 ft AMSL. The instructor reported that they overflew the Coldstream Aerodrome circuit area above 2,000 ft AMSL, which was consistent with the unverified radar data.

Following the collision, the instructor pilots landed their aircraft safely and none of the pilots were injured.

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# THE AUSTRALIAN TRANSPORT SAFETY BUREAU

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The Australian Transport Safety Bureau (ATSB) is an operationally independent multi-modal Bureau within the Australian Government Department of Transport and Regional Services. ATSB investigations are independent of regulatory, operator or other external bodies.

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. Accordingly, the ATSB also conducts investigations and studies of the transport system to identify underlying factors and trends that have the potential to adversely affect safety.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and, where applicable, relevant international agreements. The object of a safety investigation is to determine the circumstances in order to prevent other similar events. The results of these determinations form the basis for safety action, including recommendations where necessary. As with equivalent overseas organisations, the ATSB has no power to implement its recommendations.

It is not the object of an investigation to determine blame or liability. However, it should be recognised that an investigation report must include factual material of sufficient weight to support the analysis and findings. That material will at times contain information reflecting on the performance of individuals and organisations, and how their actions may have contributed to the outcomes of the matter under investigation. 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.

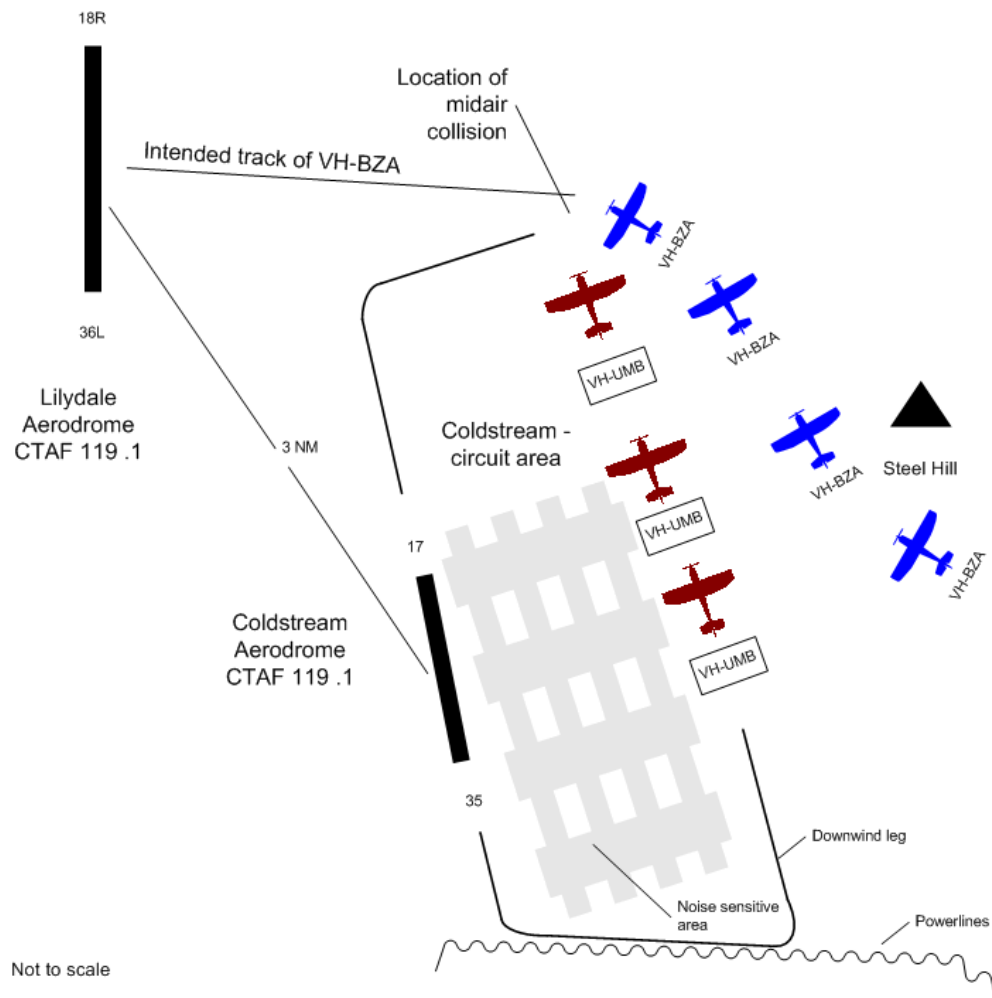
Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. While the Bureau issues recommendations to regulatory authorities, industry, or other agencies in order to address safety issues, its preference is for organisations to make safety enhancements during the course of an investigation. The Bureau prefers to report positive safety action in its final reports rather than making formal recommendations. Recommendations may be issued in conjunction with ATSB reports or independently. A safety issue may lead to a number of similar recommendations, each issued to a different agency.

The ATSB does not have the resources to carry out a full cost-benefit analysis of each safety recommendation. The cost of a recommendation must be balanced against its benefits to safety, and transport safety involves the whole community. Such analysis is a matter for the body to which the recommendation is addressed (for example, the relevant regulatory authority in aviation, marine or rail in consultation with the industry).

## FACTUAL INFORMATION

On 10 December 2005, at about 0953<sup>1</sup>, a Piper Aircraft Corporation PA-28-161 Warrior, registered VH-UMB (UMB), with an instructor and student pilot on board, was being operated under the visual flight rules on circuit training at Coldstream Aerodrome, Vic. Another Piper Aircraft Corporation PA-28-161 Warrior, registered VH-BZA (BZA), also with an instructor and student pilot on board and being operated under the visual flight rules, was transiting from the local training area to Lilydale Aerodrome, when the two aircraft collided about 2 km north-east of Coldstream Aerodrome (Figure 1). Following the collision, the instructor pilots landed their aircraft safely and none of the pilots were injured.

**Figure 1: Relative position of VH-UMB and VH-BZA<sup>2</sup>**



- <sup>1</sup> The 24-hour clock is used in this report to describe the local time of day, Australian Eastern Daylight-savings Time A (EST), as particular events occurred. Australian Eastern Daylight-savings Time was Coordinated Universal Time (UTC) + 11 hours.
- <sup>2</sup> Positions of the aircraft in the figure represent the estimated flight paths and not a position relative to the other aircraft at any given time.

The instructor on board UMB reported that he was instructing the student on his first session of circuit training. The circuit on which the collision occurred was the first of a series planned for the day. The instructor recalled making a broadcast when taxiing and prior to entering the runway. No recording was available of the Common Traffic Advisory Frequency (CTAF), nor was it required to be.

The instructor reported that as the aircraft proceeded on the downwind leg of the circuit, he was concentrating on assisting the student to maintain the correct spacing and orientation in the circuit and that the aircraft was 'a few hundred feet above circuit height'.

The circuit area at Coldstream Aerodrome did not conform to the typical aerodrome circuit pattern in shape or size. Due to the proximity of powerlines located a short distance to the south of the aerodrome, aircraft taking off from runway 17 were required to make an early left turn and the downwind leg was displaced further east than in a 'normal' circuit in order to maintain the aircraft clear of a noise sensitive area (Figure 1).

The student pilot of UMB climbed above the standard circuit height of 1,500 ft above mean sea level (AMSL) that was nominated in the Coldstream Aerodrome local instructions. The instructor of UMB was not certain of the maximum altitude reached. He reported that he did not see the other aircraft at any stage, nor did he recall hearing any inbound radio broadcast.

After the collision, the instructor on board UMB took over control of the aircraft from the student and after some difficulty the aircraft began to respond to his flight control inputs. He reported that he had initially considered an off-airport landing; however, after some degree of control was regained, he felt confident enough to proceed with a landing at Coldstream Aerodrome. The landing was conducted without extending flap. The right wing leading edge and the vertical stabiliser of UMB sustained substantial damage in the collision (Figure 2).

**Figure 2: VH-UMB showing significant damage to right wing leading edge**



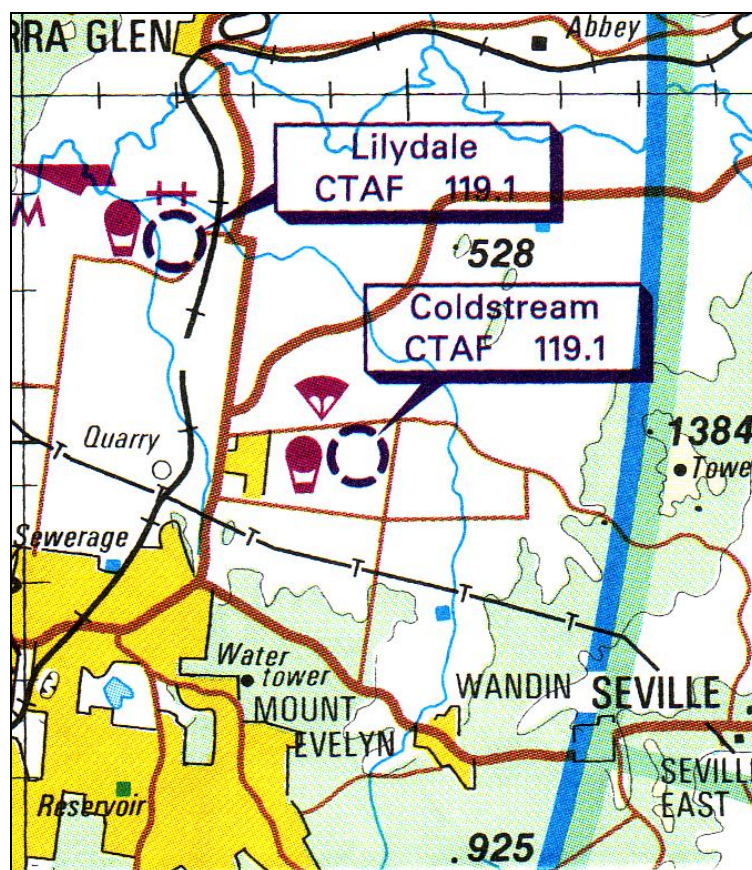
The instructor on board BZA reported that they were returning to Lilydale Aerodrome after conducting a lesson in the local training area. The student was manipulating the flight controls at the time. The instructor reported that they

overflowed the Coldstream Aerodrome circuit area above 2,000 ft AMSL, which was specified as the overfly altitude in the local instructions for Coldstream Aerodrome.

Both the instructor and student on board BZA reported that, in accordance with flight school procedures, a radio broadcast of 'Lilydale traffic, Warrior BZA is approximately 5 NM east, 2,500 inbound Lilydale' was made. It was reported that this was the first opportunity to make an inbound broadcast as the training was being conducted within 10 NM from Lilydale (at about 5 NM). The instructor reported that he did not hear any broadcasts from potential conflicting traffic.

The two aerodromes were located approximately 3 NM apart, with Coldstream to the south-east of Lilydale (Figure 3). Both had a CTAF of 119.1 Mhz. A CTAF is a radio frequency on which pilots make positional broadcasts when operating in the vicinity of a non-towered aerodrome. The Lilydale Aerodrome was equipped with an Aerodrome Frequency Response Unit<sup>3</sup> (AFRU) or 'beep back'.

**Figure 3: Location of Lilydale and Coldstream Aerodromes**



Both aircraft were of the low-wing design. The student on board BZA reported seeing the other aircraft as the collision occurred. The instructor reported that he did not see the other aircraft until after the collision. The instructor took over control of the aircraft from the student and after verifying that it was responding normally to flight control inputs, manoeuvred to observe the other aircraft.

<sup>3</sup> An automated recording which responds to broadcasts and indicates to the pilot that the radio is switched to the correct frequency and that the transmitter and receiver are working.

The instructor on board BZA reported that he heard a MAYDAY<sup>4</sup> broadcast from the flight crew of UMB. The instructor on board UMB reported that prior to the impact, he recalled 'hearing on the radio a couple of aircraft doing circuits at Lilydale', but did not recall hearing any inbound broadcast.

When it appeared likely that UMB was capable of completing an approach and landing at Coldstream Aerodrome, the instructor in BZA continued on to Lilydale Aerodrome and landed. BZA sustained minor damage to the left wing tip, left aileron, engine cowl and nose gear.

Visibility at the time of the collision was not considered a factor in this occurrence with the student on board BZA stating that 'there was a bit of cloud around that day...but at 2,400 ft we could see quite clearly'.

Airservices Australia radar data indicated that as BZA overflowed the Coldstream circuit area the aircraft was descending. The minimum recorded radar altitude was 2,000 ft AMSL, which was the displayed altitude at the time of the collision<sup>5</sup>. Radar altitude data was not available for UMB until about one minute after the aircraft appeared to have collided, by which time the UMB was descending through 1,400 ft AMSL. The instructor on board UMB told the investigation that the aircraft transponder<sup>6</sup> was switched 'ON' for the duration of the flight, but that it had previous intermittent problems.

New procedures for operations at non-towered aerodromes were introduced as Stage 2c of the National Airspace System on 24 November 2005. Under the new procedures, defined volumes of airspace previously known as CTAF areas, were removed and replaced by new procedures. Under the new procedures, pilots of radio-equipped aircraft must continuously monitor and broadcast on the CTAF by no later than a distance of 10 NM from an aerodrome when operating in the vicinity of an aerodrome.

Although the carriage and use of radio was not mandatory at either Coldstream or Lilydale Aerodrome, the new procedures specified standard positional broadcasts including:

- by 10 NM when inbound to, or overflying an aerodrome
- just before turning onto the downwind leg of the circuit
- just before turning onto the base leg of the circuit
- just before turning onto final leg (with intentions).

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4 International radio broadcast for urgent assistance.

5 The accuracy of the radar displayed altitude information could not be verified.

6 Secondary Surveillance Radar (SSR) transmitter/receiver fitted to aircraft that transmits coded information when triggered by a correctly received signal.

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## ANALYSIS

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No recording was available of the Common Traffic Advisory Frequency. As both instructor pilots reported either hearing other aircraft completing circuits at Lilydale or of hearing the MAYDAY broadcast of the other aircraft, the investigation determined that both crews were most likely monitoring the correct radio frequency. The reason that radio broadcasts made by the crews of both aircraft were not heard by the other could not be determined. There should have been an opportunity for the crew of BZA to hear the downwind broadcast from the pilot of UMB, and for the crew of UMB to hear the inbound broadcast from the pilot of BZA when that aircraft was 5 NM east of Lilydale, noting that that position would equate to the aircraft being approximately overhead a late downwind position for runway 17 at Coldstream.

The instructor on board UMB was preoccupied with assisting the student to maintain the correct spacing on the downwind leg. The circuit area at Coldstream presented a number of challenges to the novice pilot, including powerlines located a short distance to the south of the aerodrome which necessitated an early left turn, and the downwind leg being displaced further east than normal in order to maintain the aircraft clear of noise sensitive areas. The instructor's focus during the circuit would have been directed towards the aerodrome and providing the student with visual pointers to maintain consistent circuit spacing. As a result, the instructor's attention to altitude keeping and maintaining a lookout for conflicting traffic may have been affected.

The instructor and the student pilot on board BZA reported that their aircraft maintained the appropriate height specified in the Coldstream local instructions, that is, they overflew the circuit area not below 2,000 ft. The altitude reportedly maintained by the student pilot of BZA when passing over the Coldstream circuit area should have been sufficient to provide the appropriate level of vertical separation from the Coldstream circuit traffic. The crew of BZA also had a responsibility to see-and-avoid other traffic during their overflight of the Coldstream Aerodrome. As the PA-28-161 Warrior is a low-wing aircraft, their possible view of the circuit area at Coldstream may have been slightly obscured.

Although altitudes specified in the Coldstream Aerodrome local instruction should have provided sufficient vertical spacing between the aircraft, receipt of radio broadcasts may have increased the likelihood of the crews being alerted to the potential conflict.

While recognising the limitations inherent in the see-and-avoid principle of collision avoidance, this accident serves as a reminder to all pilots to:

- maintain an effective lookout at all times, being particularly vigilant in areas of high traffic density and while overflying aerodromes
- maintain an effective listening watch
- ensure that appropriate and timely radio broadcasts are made
- maintain accurate altitude keeping.