



Australian Government

Australian Transport Safety Bureau

# Collision with terrain involving Wolf Pitts S1-11X, VH-PVX

Avalon Airport, Victoria, on 28 March 2025



**ATSB Transport Safety Report**  
Aviation Occurrence Investigation  
AO-2025-017  
Preliminary – 9 July 2025

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# Preliminary report

This preliminary report details factual information established in the investigation's early evidence collection phase, and has been prepared to provide timely information to the industry and public. Preliminary reports contain no analysis or findings, which will be detailed in the investigation's final report. The information contained in this preliminary report is released in accordance with section 25 of the *Transport Safety Investigation Act 2003*.

## The occurrence

On 28 March 2025, at about 1710 local time, the Sky Aces formation aerobatics team, which consisted of 4 Pitts type aircraft operated by Paul Bennet Airshows, became airborne to perform a display at the Australian International Airshow, Avalon Airport, Victoria. The 4 aircraft began their planned routine and flew several aerobatic manoeuvres in 2 and 4 ship<sup>1</sup> configurations.

At about 1715, the pilot of VH-PVX departed the formation, as planned, and began a solo routine while the formation of the 3 remaining aircraft relocated to the south for their next manoeuvre. At about 1717, while conducting their solo routine, the pilot began a 'triple avalanche' manoeuvre<sup>2</sup> and entered the aircraft into a loop (example shown in Figure 1, 2 days prior using a smoke system). At the top of the loop and from an inverted position, the pilot performed 3 snap rolls<sup>3</sup> with one wing aerodynamically stalled.<sup>4</sup> The snap rolls were completed and the aircraft returned to stable flight while still inverted. It then entered the back half of the loop, however, the aircraft's descent rate was unable to be arrested before it collided with terrain. The pilot was seriously injured.

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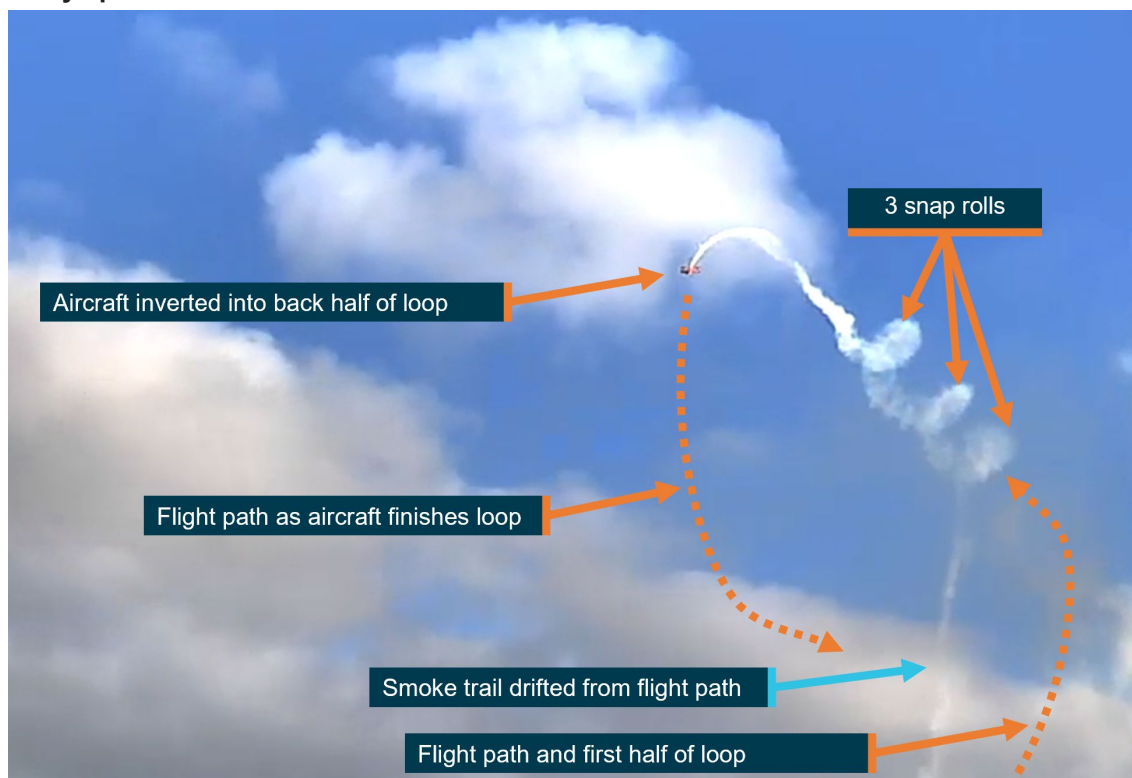
<sup>1</sup> Ship: refers to multiple aircraft flying in formation together. The preceding number refers to the number of aircraft in the formation.

<sup>2</sup> The triple avalanche aerobatic manoeuvre is a basic loop with 3 snap rolls at the top of the loop.

<sup>3</sup> Snap roll: is similar to an accelerated horizontal spin and is essentially an autorotation with one wing stalled.

<sup>4</sup> Aerodynamic stall: occurs when airflow separates from the wing's upper surface and becomes turbulent. A stall occurs at high angles of attack, typically 16° to 18°, and results in reduced lift.

**Figure 1: A successful triple avalanche manoeuvre performed by the pilot in VH-PVX 2 days prior to the accident**



*Note: This is a still image extracted from a video recording of the validation flight (refer to section titled Flight validation). Source: AMDA Foundation, annotated by the ATSB*

## Context

### Pilot information

The pilot held a valid commercial pilot licence (aeroplane) and class 2 aviation medical certificate. They successfully completed a private instrument rating in August 2023, which satisfied the requirements of a flight review for single-engine aircraft. Additionally, they had the required flight activity and aircraft design feature endorsements to conduct a formation aerobatic display in the Pitts S1-11X aircraft without a minimum altitude limitation. Their formation aerobatics flight activity endorsement was issued in July 2015.

The pilot's logbook, which was completed up to 17 March 2025, showed a total flying experience of 2,248.6 hours. It recorded multiple aerobatic preparation flights in VH-PVX and evidence of participation in other airshows. The pilot had also conducted practice flights for the Avalon airshow between 17 March 2025 and the accident flight.

### Aircraft information

The aircraft was a single-seat aerobatic Pitts S1-11X amateur-built biplane, modified from the Pitts S1-11B and constructed in Germany in 2010 by Wulf (Wolf) Aircraft. It was powered by a Ly-Con AEIO-540-EXP experimental engine and fitted with a 3-bladed, MTV-6 constant-speed propeller of laminated wood construction. The aircraft was a combination of fabric-covered wood and metal, and composite fibre structure and designed for unlimited aerobatics up to +/-10 G.

The aircraft was first registered in Australia in 2015 and issued with a special certificate of airworthiness in the experimental category.<sup>5</sup> It had been operated by Paul Bennet Airshows since that time. The aircraft was to be maintained as per Civil Aviation Safety Authority Schedule 5 and required a periodic inspection every 100 hours or 12 months, whichever came first. The most recent periodic inspection was conducted by an authorised maintenance organisation on 28 February 2025. At the time of the accident the aircraft had accumulated 303 hours total time-in-service, about 5 hours since the previous periodic inspection. There were no defects listed on the aircraft maintenance release.<sup>6</sup>

## Meteorological information

The Bureau of Meteorology provided automated weather observations taken at 1-minute intervals at Avalon Airport during the aerobatic display. Between 1710 and 1717, the highest recorded windspeed was 5 kt with gusts up to 6 kt. The temperature was 30°C, visibility greater than 10 km, and the atmospheric pressure ranged 1015–1014 hPa for the period.

## Wreckage and impact information

The aircraft collided with terrain on a grassed area west of runway 18/36,<sup>7</sup> in an area of the airport designated as the pyrotechnics box<sup>8</sup> (Figure 2) where multiple pyrotechnics were live and were planned to be used in the show. Additionally, there were many boxes of fuel positioned in the pyrotechnic box that were planned to be ignited during the ‘wall of fire’ display later that evening.

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<sup>5</sup> Experimental category: the Civil Aviation Safety Authority can issue experimental certificates to allow specific operations of aircraft, which are not by their nature type certificated or have modifications incorporated that are not yet approved.

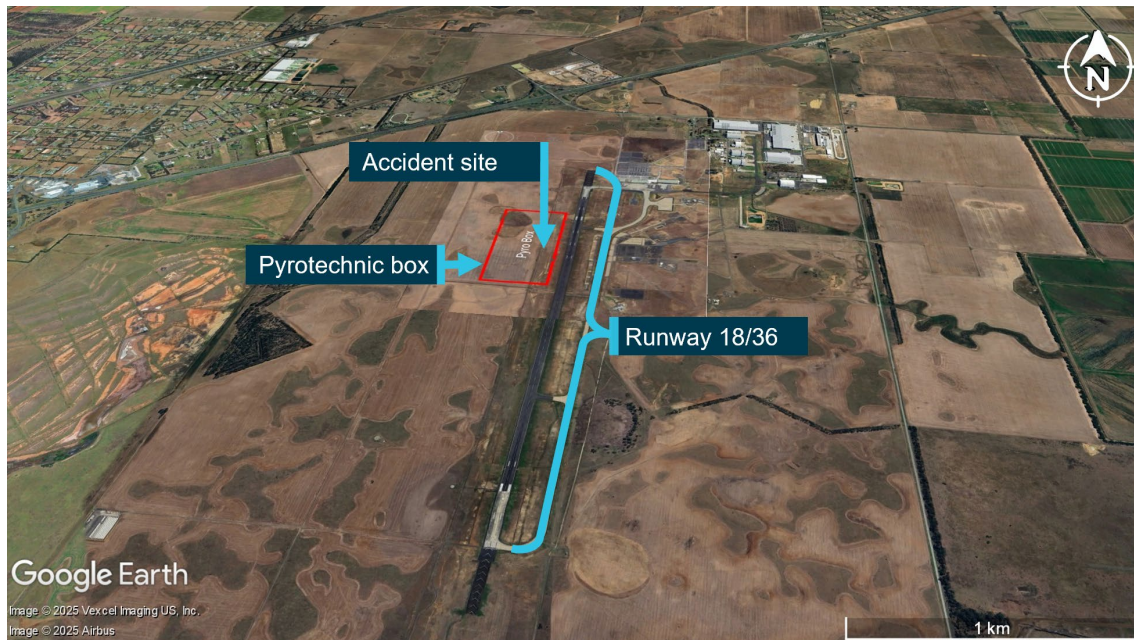
<sup>6</sup> Maintenance release: an official document, issued by an authorised person as described in Regulations, which is required to be carried on an aircraft as an ongoing record of its time in service and airworthiness status. Subject to conditions, a maintenance release is valid for a set period, nominally 100 hours’ time in service or 12 months from issue.

<sup>7</sup> Runway number: the number represents the magnetic heading of the runway – in this case, 176° and 356°.

<sup>8</sup> Pyrotechnics box: an area of the airport designated for pyrotechnics which were used during the airshow to be set-up and detonated.



**Figure 2: Accident site location**

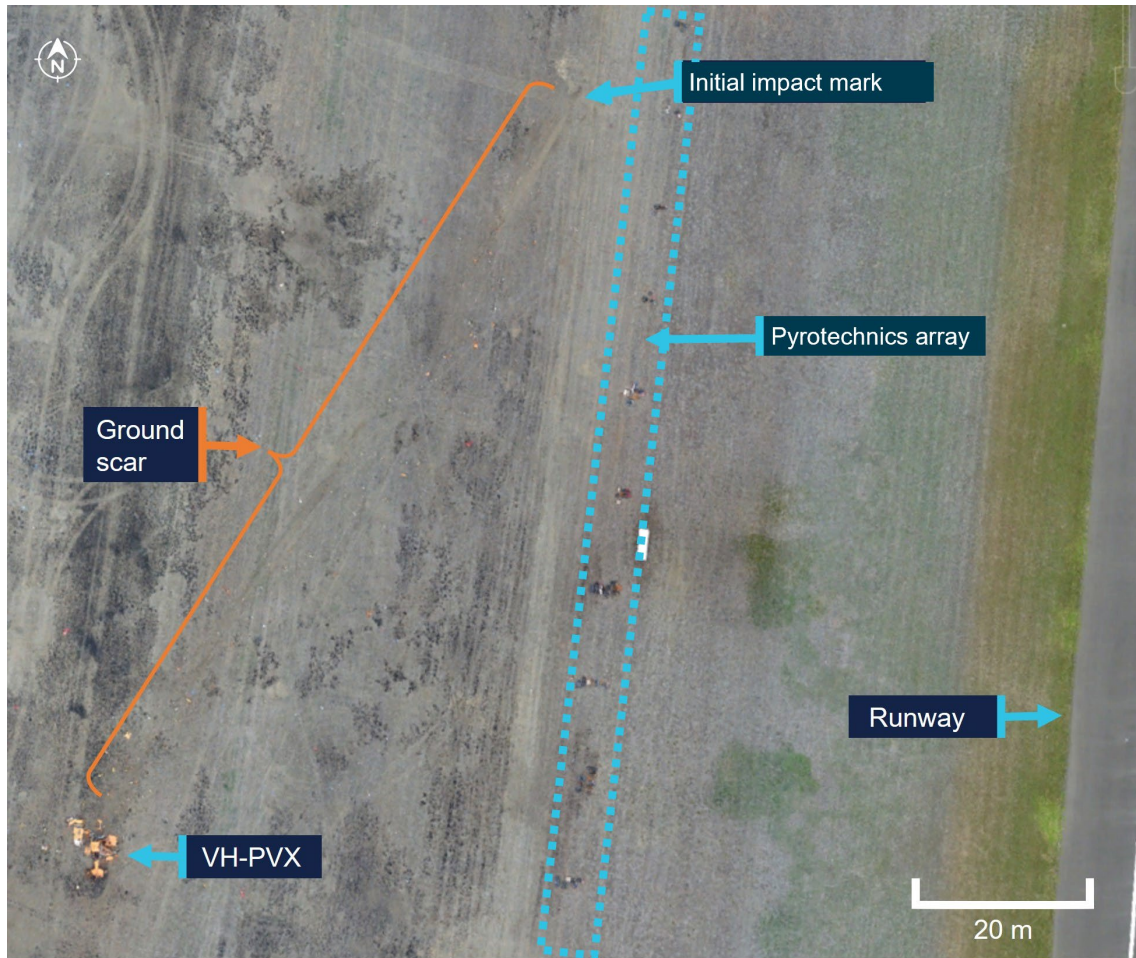


Source: Google Earth, annotated by the ATSB

A ground scar, approximately 95 m long, was on a south-south-west heading (Figure 3). The aircraft came to rest upright and oriented toward north, almost opposite the direction of the impact sequence and debris trail. The initial impact point occurred several metres from the fuel boxes within the pyrotechnics array.

While the ATSB conducted a preliminary examination of the accident site, due to access restrictions for the operational airport and airshow, the aircraft wreckage was relocated to a secure facility for detailed examination.

**Figure 3: Accident site overview showing the location of the initial impact mark, pyrotechnics array, and the wreckage of VH-PVX**



Source: No 1 Security Forces Squadron, annotated by the ATSB

The aircraft sustained substantial damage from the impact with terrain (Figure 4). Examination of the wreckage at a secure facility identified:

- no evidence of pre-impact defects with the flight control system or fuselage structure to the extent that could be determined
- the uppermost section of the canopy was fractured and parts of the airframe had departed the main structure
- the engine had separated from the airframe
- the propeller blades had fragmented, however, the propeller hub remained attached to the engine
- the front landing gear was distorted
- the upper and lower wings had separated, and the lower fuselage section had sustained compression damage
- the rigid outlet lines from the fuel tanks were fractured resulting in post-accident leakage of fuel.



**Figure 4: Aircraft wreckage at the accident site**

Source: ATSB

## Aerobatic manoeuvre

### Practice flights

A review of training videos showed that previous triple avalanche manoeuvres performed by the pilot in VH-PVX were started at approximately 200 ft above ground level (AGL)<sup>9</sup> and an airspeed of 165 kt. The recordings showed the aircraft would reach an altitude of approximately 800 ft prior to entering the snap rolls. The aircraft would climb during the rolls to about 1,100 ft before beginning the back half of the loop. After the accident, the pilot reported that their normal minimum altitude for commencing the snap rolls was 1,000 ft.

### Accident flight

The ATSB recovered a GoPro video camera from within the cockpit of the aircraft that was forward facing and operating during the accident flight. Flight instruments including the altimeter and airspeed gauges were visible in the recording. The recording identified that the pilot set the altimeter to 0 ft (runway reference height) prior to take-off, in accordance with their standard practice when conducting aerobatic manoeuvres.<sup>10</sup>

During entry to the triple avalanche, the indicated airspeed was approximately 165 kt and the altitude was 100 ft. Just before the aircraft reached its peak altitude, the altimeter was

<sup>9</sup> Altitude above ground level: as the altimeter setting is set to 0 ft, the altitudes in this report are given above ground level unless otherwise stated.

<sup>10</sup> Altimeter setting: setting the altimeter to 0 ft on the ground gives the pilot an accurate representation of their altitude above the ground level in that area.



showing 700–800 ft (Figure 5). After this point, the altimeter was blocked from the camera's view by the pilot's body position just prior to the collision with terrain.

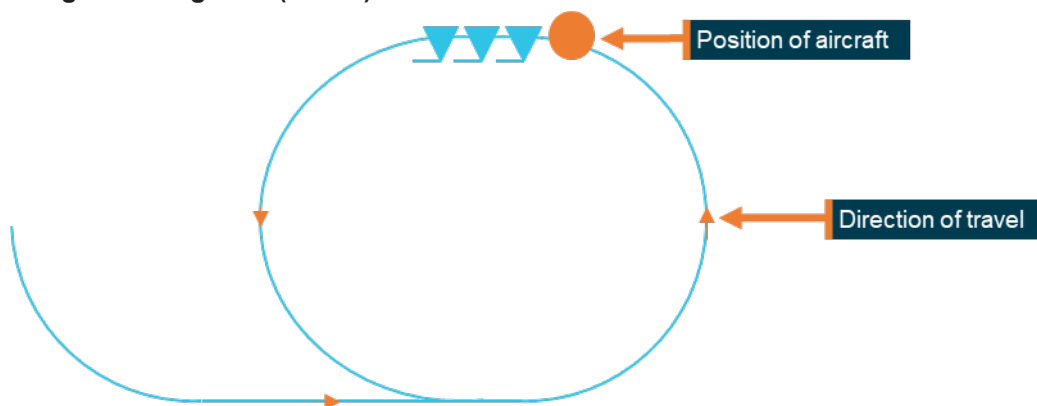
**Figure 5: Still image from the accident flight recording showing the altimeter just prior to the first snap roll during the triple avalanche manoeuvre**



Source: ATSB

Figure 6 provides a representation of the triple avalanche manoeuvre, showing the loop with the 3 snap rolls (indicated by inverted triangles) and the approximate position where the image shown in Figure 5 was taken.

**Figure 6: Triple avalanche profile and the approximate position in the manoeuvre where the still image from Figure 5 (above) was taken**



Source: ATSB

## Flight validation

The event organiser required that participants in the airshow successfully complete a flight validation prior to the public display. On 26 March 2025, the formation group satisfied the flight validation requirement, which included the pilot completing the accident manoeuvre in VH-PVX. The event organiser validation report had not noted any concerns about the routine or ability of those involved to successfully perform it on the day of the show.

## Emergency response

Due to the location of the accident, the pyrotechnicians were nearby and therefore were first to arrive at the aircraft wreckage and assist the pilot. The pyrotechnicians reported that the pilot was wearing a 5-point safety harness, and the cockpit canopy remained closed. They also reported difficulties opening the canopy as there was not an obvious mechanism or external signage on the aircraft to assist them. The first responders reported smelling fuel and observing it leaking from the aircraft, however, there was no post-impact fire.

The Aviation Rescue Fire Fighting (ARFF) service was notified of the accident at 1718 and arrived onsite at 1721. The ARFF provided 3 tenders, 2 responding from the main southern base and one from the northern temporary base. They reported their response times were increased as, while the pyrotechnicians were busy providing first aid to the pilot, they were unable to be safely guided by the technicians through the pyrotechnics area. Additionally, the northern ARFF response vehicle had to deviate around a passenger-carrying jet aircraft on the northern taxiway. ARFF responders took control of the scene and continued providing first aid to the pilot until an ambulance arrived at 1731. The pilot was subsequently transported to hospital by helicopter.

## Further investigation

To date, the ATSB has:

- examined the accident site and aircraft wreckage
- interviewed the pilot, operator, and first responders
- reviewed the meteorological conditions during the display routine
- reviewed accident and training video recordings.

The investigation is continuing and will include review of:

- components recovered from the aircraft
- the aircraft maintenance records
- video recordings of the accident flight
- the emergency response plan and actions of the responsible organisations
- preparation for the display
- survivability factors.

A final report will be released at the conclusion of the investigation. Should a critical safety issue be identified during the course of the investigation, the ATSB will immediately notify relevant parties so appropriate and timely safety action can be taken.

# General details

## Occurrence details

Date and time:	28 March 2025 – 1717 EDT	
Occurrence class:	Accident	
Occurrence categories:	Collision with terrain	
Location:	Avalon Airport, Victoria	
	Latitude: 38.0348° S	Latitude: 144.4667° E

## Aircraft details

Manufacturer and model:	Amateur built aircraft Wolf Pitts S1-11X	
Registration:	VH-PVX	
Operator:	Paul Bennet Airshows Pty Ltd	
Serial number:	UB001	
Type of operation:	Part 91 General operating and flight rules-Other	
Activity:	General aviation/recreational-Sport and pleasure flying-Aerobatics	
Departure:	Avalon Airport, Victoria	
Destination:	Avalon Airport, Victoria	
Persons on board:	Crew – 1	Passengers – 0
Injuries:	Crew – 1 (serious)	Passengers – 0
Aircraft damage:	Substantial	



## About the ATSB

The **Australian Transport Safety Bureau** is the national transport safety investigator. Established by the *Transport Safety Investigation Act 2003* (TSI Act), the ATSB is an independent statutory agency of the Australian Government and is governed by a Commission. The ATSB is entirely separate from transport regulators, policy makers and service providers.

The ATSB's function is to improve transport safety in aviation, rail and shipping through:

- the independent investigation of transport accidents and other safety occurrences
- safety data recording, analysis, and research
- influencing safety action.

The ATSB prioritises investigations that have the potential to deliver the greatest public benefit through improvements to transport safety.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, international agreements.

## Purpose of safety investigations

The objective of a safety investigation is to enhance transport safety. This is done through:

- identifying safety issues and facilitating safety action to address those issues
- providing information about occurrences and their associated safety factors to facilitate learning within the transport industry.

It is not a function of the ATSB to apportion blame or provide a means for determining 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.

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