



Australian Government

Australian Transport Safety Bureau

Collision with terrain involving Air Tractor AT-400, VH-ACQ

80 km west-south-west of Moree, New South Wales, on 4 December 2021

ATSB Transport Safety Report

Aviation Occurrence Investigation (Defined)

AO-2021-052

Preliminary – 19 January 2022

Released in accordance with section 25 of the *Transport Safety Investigation Act 2003*

Publishing information

Published by: Australian Transport Safety Bureau
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Addendum

Page	Change	Date

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*.

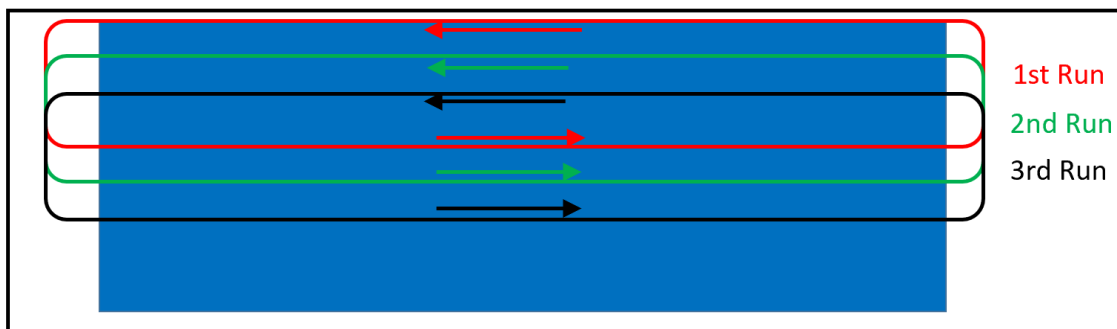
The occurrence

On 4 December 2021, the pilot of an Air Tractor AT-400 aircraft, registered VH-ACQ and operated by Aircair Aviation Operations, was conducting aerial spraying operations on a property 80 km west-south-west of Moree, New South Wales.

At about 0604 Eastern Daylight-saving Time,¹ the aircraft departed Moree Airport and tracked to the property's airstrip. The base operations manager observed from a GPS tracker that the aircraft was airborne and contacted the pilot using UHF radio to confirm they were flying straight to the property and not via the operational base, 43 km south-west of Moree Airport. A loader was stationed at the property's airstrip, whose role was to refuel the aircraft, and to mix and load chemical into the aircraft's hopper.

The GPS tracker onboard the aircraft recorded data at 15-second intervals. The data showed that, commencing at 0632, the pilot conducted 8 spray loads within sight of the loader. For those loads, the pilot sprayed the areas using a racetrack pattern (Figure 1). Each of the 8 loads took about 20 minutes, except the third load, which took 32 minutes as it included clean-up spray runs (across the direction of the pattern) and tracking to the next target area. Each time the aircraft landed at the airstrip, the loader mixed chemical and water totalling 1,200–1,300 L into the hopper and on 2 occasions refuelled the aircraft tanks to full.

Figure 1: Racetrack spray pattern



Source: ATSB

At 0914, while the pilot conducted the seventh load, the operations manager sent the pilot a text message advising that 4 of the target fields marked on the map were no longer to be sprayed (marked in orange in Figure 2). On the next (eighth) load, the pilot overflowed an area marked on the map to be sprayed that day, which was adjacent to a river and under water due to flooding. As a result, the pilot radioed the operations manager to ask whether to spray the water-affected area. The operations manager reported that they contacted the property owner but were subsequently unable to communicate with the pilot via radio to provide a response.

¹ Eastern Daylight-saving Time (EDT): Coordinated Universal Time (UTC) + 11 hours.

At 1015:30, the aircraft commenced the take-off for the ninth load. By that time, the air temperature had increased about 10 °C since the aircraft departed Moree and was recorded as 31.3 °C at the nearest local weather station, about 20 km to the west. The wind had also changed from a south to a south-westerly direction and increased in average speed and gust speed.

During the ninth load, the pilot completed spraying the last of the target areas north (and within sight) of the airstrip, then flew to the field marked on the pilot's map as blocks '127' and '128' (Figure 2). Recorded GPS data showed that the pilot commenced spraying blocks 127 and 128 from the western side in a north-south racetrack pattern. After completing 4 patterns, the aircraft was returned to the airstrip and the loader transferred chemical into the hopper.

Figure 2: Operating area including target spray blocks, location of airstrip, property boundary and neighbouring house



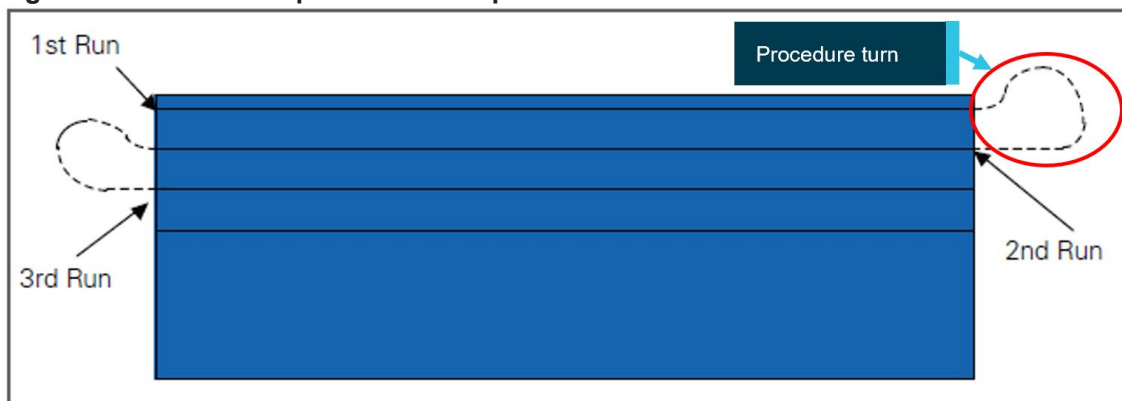
Source: Aircraft operator information overlaid on Google Earth, annotated by the ATSB

At 1053, the aircraft took off with the tenth load and continued to fly north-south racetrack patterns from the western side of blocks 127 and 128, followed by an inspection of the northern end of the target area, before returning to land at the airstrip again at 1120. The loader then filled the aircraft with fuel and again loaded 1,200 to 1,300 L of chemical into the hopper. While the loader did those tasks, the pilot had a snack and a drink, and conducted a walk-around of the aircraft, which they had done consistently during refuelling breaks throughout the day.

At 1126:15, the aircraft departed on the eleventh load and tracked towards the target blocks (127 and 128). The pilot commenced a run to the south before the aircraft climbed and turned left. The aircraft then overflowed the northern boundary of the field, which was also the property boundary. The operations manager heard the pilot on the radio expressing concern about the potential for chemical spray to drift towards a house on the neighbouring property due to the wind. The aircraft then tracked north and overflowed the flood-affected area (top of Figure 2), before returning to the north-eastern end of blocks 127 and 128.

A witness reported that, on the first run for that load, which was towards the south along the eastern boundary of the block, the pilot used smoke to assess the drift from the wind before commencing spraying on the next run. Instead of a racetrack pattern, the pilot conducted back-to-back spray runs with a procedure turn at each end (Figure 3), to position the aircraft on the reciprocal heading for the next spray run.

Figure 3: Back-to-back patterns with a procedure turn



Source: *Aerial Application Pilots Manual* (Aerial Application Association of Australia, 2011), annotated by the ATSB

The fourth run (on the eleventh load) to the south commenced at 1145. At the end of the spray run, the aircraft climbed. The last recorded position was at 1145:30 with the aircraft about 170 m beyond the southern end of the field and about 180 ft above the ground. A witness ('Witness 1', Figure 3) located in the neighbouring paddock to the east observed the aircraft enter a right procedure turn above trees. During the turn, the aircraft was observed to descend rapidly, right-wing down and disappear behind the trees (Figure 4). The witness reported seeing a black plume of smoke rise almost immediately afterwards.

Figure 4: Aerial photo of target spray area taken 10 December 2021, showing accident site and witness location



Note: The yellow lines represent the block boundaries.
Source: Aircraft operator, annotated by the ATSB

Another witness positioned about 1 km south of the accident site, observed the aircraft's distinct yellow colouring as it descended among trees and impacted the ground. The witness estimated

this was followed within about 2 seconds by flames and smoke. The pilot was fatally injured and the aircraft was destroyed.

Context

Pilot qualifications and experience

The pilot held a valid Class 1 Aviation Medical Certificate and a Commercial Pilot Licence (Aeroplane), having completed the flight test on 24 March 2021.

The pilot commenced training for an aerial application rating and endorsement on 15 June 2021 and achieved those on 30 June 2021. On 22 November 2021, the pilot completed the requisite 110 hours of aerial application under supervision, in a (piston engine) Cessna A188B aircraft. Following additional training, the pilot commenced operating the (turbine engine) Air Tractor AT-400 on 29 November 2021.

The pilot also held low-level and single-engine aeroplane ratings, and tailwheel and turbine-engine endorsements. At the time of the accident, the pilot had about 300 hours total aeronautical experience.

Site and wreckage

The wreckage was located at the southern end of a stand of trees. There were no powerlines in the area and there was no evidence of tree, or bird, strike prior to the collision with terrain. Preliminary investigation of the accident site found that the aircraft collided with terrain upright, in a slight nose down and right wing down attitude. Ground scars were indicative of the aircraft being on an approximate 350° heading at impact.

The main wreckage had been subject to a significant post-impact fuel-fed fire. Where possible, continuity of the flight controls was established. Examination of the damage to the engine and propeller blades was consistent with the engine producing power at impact.

Further investigation

The investigation is continuing and will include review and examination of:

- electronic components recovered from the accident site
- pilot qualifications and experience
- weather conditions
- operational documentation
- relevant regulations
- survivability aspects.

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.

A final report will be released at the conclusion of the investigation.

Acknowledgements

The ATSB would like to acknowledge the assistance of the local workers and landowners in their rapid response to the accident and the New South Wales Police Force in recording, securing and maintaining the integrity of the accident site prior to the ATSB team's arrival.

General details

Occurrence details

Date and time:	4 December 2021 – 1145 Eastern Daylight-saving Time	
Occurrence class:	Accident	
Occurrence categories:	Loss of control, collision with terrain	
Location:	80 km west-south-west of Moree, New South Wales	
	Latitude: 29° 45.949' S	Longitude: 148° 4.874' E

Aircraft details

Manufacturer and model:	Air Tractor AT-400	
Registration:	VH-ACQ	
Operator:	Aircair Aviation Operations	
Serial number:	400-0285	
Type of operation:	Part 137 Aerial application operations	
Activity:	General aviation/recreational – Aerial work – Agricultural spreading/spraying	
Departure:	near Moree, New South Wales	
Destination:	near Moree, New South Wales	
Persons on board:	Crew – 1	Passengers – 0
Injuries:	Crew – 1 (fatal)	Passengers – 0
Aircraft damage:	Destroyed	