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ATSB TRANSPORT SAFETY INVESTIGATION REPORT
Aviation Occurrence Report 200700304
Final

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Leongatha Aerodrome, Vic.
1 February 2007
Cessna 188B Agwagon, VH-BCT
Piper PA-28R Cherokee Arrow, VH-WDS

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Abstract

On the afternoon of 1 February 2007, a Piper PA-28R Cherokee Arrow, with the pilot, a flight instructor and a passenger was approaching to land on Runway 22 at Leongatha aerodrome, Vic. At the same time the pilot of a Cessna 188B Agwagon was taking off on Runway 18 at Leongatha.

Both aircraft were operating under the visual flight rules (VFR). When the Arrow was on base leg, the pilot of the Agwagon broadcast on the Leongatha common traffic advisory frequency (CTAF) that he intended to conduct aerial spraying operations on a property 2 NM to the north of the aerodrome and that he would depart from Runway 18. The instructor and the pilot of the Arrow heard that transmission but did not visually check the position of the Agwagon on the ground. After turning onto final, the pilot of the Arrow broadcast his intention to make a full stop landing on Runway 22, but that transmission was not heard by the pilot of the Agwagon. The pilot of the Agwagon reported that he visually checked the approach to Runway 22 before commencing his takeoff, but did not see the Arrow.

When the Arrow was on the landing roll on Runway 22 and the Agwagon had just become airborne on Runway 18, the two aircraft collided at the intersection of the runways. Both aircraft were substantially damaged but none of the occupants were injured.

The investigation found that the lookout by the pilots of both aircraft was not adequate to ensure that there was no conflicting traffic for their respective operations. Neither aircraft displayed landing lights that may have improved the chance of the pilots seeing each other. Sun glare may have increased the difficulty for the pilots of the Arrow seeing the Agwagon.

THE AUSTRALIAN TRANSPORT SAFETY BUREAU

The Australian Transport Safety Bureau (ATSB) is an operationally independent multi-modal Bureau within the Australian Government Department of Infrastructure, Transport Regional Development and Local Government. 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.

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.

Purpose of safety investigations

The object of a safety investigation is to enhance safety. To reduce safety-related risk, ATSB investigations determine and communicate the safety factors related to the transport safety matter being investigated.

It is not the object of an investigation to determine blame or liability. However, 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.

Developing safety action

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. The ATSB prefers to encourage the relevant organisation(s) to proactively initiate safety action rather than release formal recommendations. However, depending on the level of risk associated with a safety issue and the extent of corrective action undertaken by the relevant organisation, a recommendation may be issued either during or at the end of an investigation.

The ATSB has decided that when safety recommendations are issued, they will focus on clearly describing the safety issue of concern, rather than providing instructions or opinions on the method of corrective action. As with equivalent overseas organisations, the ATSB has no power to implement its recommendations. It is a matter for the body to which an ATSB recommendation is directed (for example the relevant regulator in consultation with industry) to assess the costs and benefits of any particular means of addressing a safety issue.

About ATSB investigation reports: How investigation reports are organised and definitions of terms used in ATSB reports, such as safety factor, contributing safety factor and safety issue, are provided on the ATSB web site www.atsb.gov.au.

FACTUAL INFORMATION

The Australian Transport Safety Bureau conducted an office investigation into the circumstances of this occurrence.

Sequence of events

On 1 February 2007, at approximately 1950 Eastern Daylight-saving Time[1], a Piper PA-28R Cherokee Arrow, registered VH-WDS, landing on Runway 22 and a Cessna 188B Agwagon, registered VH-BCT, taking off on Runway 18 at Leongatha aerodrome, Vic, collided at the intersection of the two runways. Both aircraft were substantially damaged but none of the occupants of the aircraft were injured.

The Arrow was operating under the visual flight rules (VFR). The handling pilot was a student pilot under the supervision of a Grade 3 flight instructor. Also in the Arrow was a non-licensed passenger. The pilot was completing an endorsement on the aircraft during a dual navigation training flight from Hamilton, Vic. The student and instructor routinely flew from Leongatha aerodrome. The Agwagon was operating under the VFR on a local airwork flight. The sole pilot of the Agwagon was an experienced agricultural pilot, based at the aerodrome.

The student in the Arrow broadcast on the Leongatha common traffic advisory frequency (CTAF) when inbound at 5 NM, joining crosswind for Runway 22, and turning on to base. After turning on to final approach, he broadcast his intention to make a full stop landing on Runway 22. Those transmissions were also heard by the pilot of a Piper PA-31 Navajo, conducting circuits from Runway 22. When they were on base leg, the instructor and the student in the Arrow reported hearing a weak and 'scratchy' transmission from the pilot of the Agwagon, broadcasting that he would be using Runway 18. The pilot of the Navajo also reported hearing a weak and 'scratchy' transmission from the pilot of the Agwagon that he intended to conduct aerial spraying operations 2 NM to the north of the aerodrome. None of the pilots reported hearing any further transmissions from the pilot of the Agwagon.

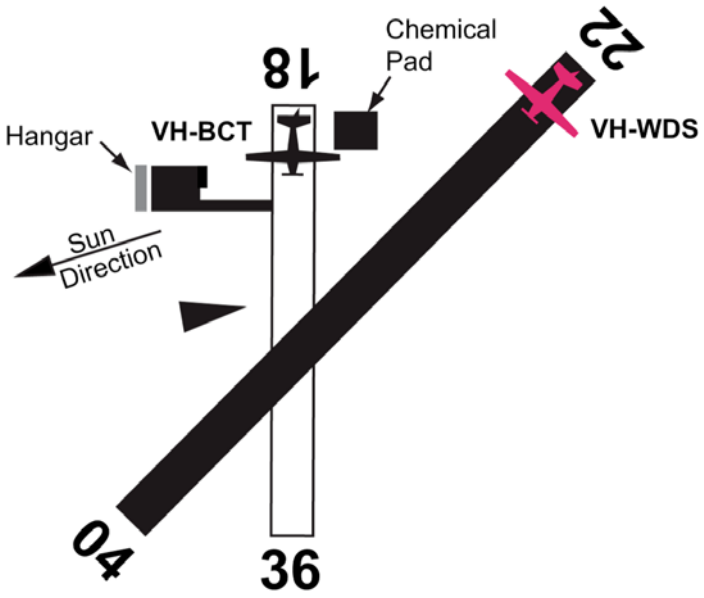
The instructor in the Arrow reported that he recognised the callsign as that of a locally-based Agwagon and thought that its pilot would be taxiing from the hanger and back-tracking along Runway 18 before lining up for takeoff (Figure 1). He also reported that, because of the tailwind component on the base leg, the Arrow's final approach was higher and steeper than normal, resulting in the aircraft touching down well beyond the threshold of Runway 22, and extending the landing roll beyond the runway intersection.

1 The 24-hour clock is used in this report to describe the local time of day, Eastern Daylight-saving Time (EDT), as particular events occurred. Eastern Daylight-saving Time was Coordinated Universal Time (UTC) +11 hours.

The pilot of the Agwagon reported that he had pre-positioned his aircraft on the chemical pad located at the northern end of Runway 18. After loading the aircraft, completing engine run-up and pre-flight checks, he transmitted his intention on the CTAF, before taxiing the short distance from the chemical pad onto the runway. He had not heard any radio transmissions[2] during that time.

While lining up for takeoff from Runway 18, the pilot of the Agwagon observed the Navajo conduct a missed approach from Runway 22. Before commencing the take-off roll, he reported looking over his left shoulder to check the approach to Runway 22, but did not see any other aircraft. He reported broadcasting that he was taking off from Runway 18 for aerial spraying operations to the north of the aerodrome and would be turning left below 500 ft above ground level. Having not heard any broadcasts, he believed that the Navajo was the only other aircraft in the circuit area and commenced the take-off.

Figure 1: Leongatha Aerodrome



The pilot of the Agwagon reported that he became airborne on Runway 18 about 200 m before the runway intersection and had levelled off just above the runway. The two aircraft collided at the intersection of Runway 18 and 22. The instructor in the Arrow reported that the collision occurred during the landing roll, following touchdown on Runway 22, well beyond the threshold.

The propeller of the Arrow struck the underside of the left wing, spray boom and flap of the Agwagon, causing substantial damage. The spray boom wrapped around one of the Arrow's propeller blades, stopping the engine. The tail wheel of the Agwagon contacted the cabin roof of the Arrow and the top of the cabin door, partially jamming it.

Following the collision, the student in the Arrow braked hard and stopped the aircraft on Runway 22. The three occupants forced open the cabin door and

2 The pilot reported that after the accident a ground-test of the Agwagon's radio and the helmet-installed microphone was made and was found to functional satisfactorily. Subsequently, the radio was reported to have been tested at an approved facility and found to be fully functional.

evacuated the aircraft. The pilot of the Agwagon landed the aircraft straight ahead on Runway 18. It was only after he alighted from the aircraft and saw the disabled Arrow that he realised he had collided with another aircraft.

Meteorological conditions

The pilots of both aircraft reported that weather conditions at the time were clear skies with a south-easterly wind between 8 to 10 kts. The instructor of the Arrow reported that, when looking toward the west, sun glare affected visibility, making it difficult to see traffic on Runway 18, especially during the final approach for Runway 22. At the time of the accident, the sun's azimuth was determined to be 253° M at an angle of 7 degrees above the horizon.

Communications

The *Aeronautical Information Publication* (AIP) stated that pilots of radio-equipped aircraft operating in the vicinity of non-towered aerodromes like Leongatha, where the carriage and use of radio was not mandatory, should monitor the published CTAF and make the recommended broadcasts.[3] Those broadcasts were:

- inbound before 10 NM transmit intentions
- when joining the circuit (crosswind or downwind)
- turning downwind, base and final.

When departing, pilots were to broadcast when:

- taxiing with their intentions and the runway they proposed using
- before entering the runway.

The Leongatha CTAF of 126.7 MHz was shared by numerous other aerodromes in the wider surrounding area. Although the pilots reported that transmissions from aircraft at other locations were occasionally heard in the circuit area, none of the pilots reported any over-transmitted broadcasts or 'squealing' that results from an over-transmitted broadcast. Transmissions on the Leongatha CTAF were not recorded.

Traffic identification and separation

Pilots of aircraft operating in the vicinity of CTAF aerodromes like Leongatha, were responsible for their own separation. Although the recommended CTAF broadcasts assisted pilots of radio-equipped aircraft to visually identify one another, non-radio aircraft operations were permitted and the possibility of unalerted traffic in the circuit meant that see-and-avoid was the primary means of ensuring separation between aircraft.

The use of landing lights to assist pilots in visually acquiring other aerodrome traffic, even during daylight conditions, was encouraged. Neither pilot reported having used their aircraft's landing lights, and neither aircraft was equipped with

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33 *Aeronautical Information Publication* ENR 1.1 section 21.

flashing strobe lights. The instructor in the Arrow reported that both the aircraft navigation lights and red, rotating, beacon were on and the pilot of the Agwagon reported that the aircraft's red, rotating, beacon was on.

ANALYSIS

The pilots in both aircraft that collided were familiar with operations at Leongatha aerodrome and should have been aware of the potential collision risks associated with aircraft using intersecting runways. Although the wind direction favoured the use of Runway 18, the student in the Arrow conformed to the preceding PA-31's circuit and used Runway 22. It was only after the Arrow had joined the circuit for Runway 22 that the pilot of the Agwagon broadcast his intention to use Runway 18.

The pilot of the Agwagon reported that he had seen the Navajo conduct a missed approach from Runway 22, and, despite looking along the final approach to Runway 22 to ensure there was no confliction with other aircraft, he had not seen the Arrow. It was possible that he had scanned the normal approach path and not seen the Arrow on a higher and steeper approach.

The reason that the pilot of the Agwagon had not heard the Arrow pilot's broadcast after turning finals could not be determined. It was possible that in the short period of time that elapsed between commencing a listening watch, broadcasting his intentions and commencing the takeoff, he had missed the Arrow pilot's previous transmissions.

The instructor and student in the Arrow both heard the taxi broadcast made by the pilot of the Agwagon, advising that he intended departing from Runway 18, even though the clarity of the transmission was poor. The instructor reported that he believed the Agwagon was backtracking on Runway 18 and neither he nor the student of the Arrow actually sighted the Agwagon. Sun glare may have made it more difficult for the pilots in the Arrow to see the Agwagon. However, by not actually sighting the Agwagon and ensuring there was no potential conflict, the pilots of the Arrow unknowingly transferred sole responsibility for separation to the pilot of the Agwagon.

The pilot of the Agwagon reported having made a second broadcast advising that he was taking off on Runway 18. That transmission was not heard by the pilots of the other aircraft. The instructor in the Arrow, having not heard any further broadcast from the pilot of the Agwagon, assumed that its pilot was not yet ready to takeoff. The investigation was unable to reach any determination about the Agwagon pilot's second transmission.

Neither pilot displayed their aircraft's landing lights. The use of landing lights, even in daylight conditions, was recommended and may have increased the likelihood of the Agwagon pilot visually detecting the Arrow on its final approach to Runway 22.

FINDINGS

Contributing safety factors

- The pilot of the Agwagon did not see the Arrow on a converging approach to Runway 22 before commencing the take-off run from Runway 18.
- The pilot of the Agwagon did not hear any of the transmissions from the pilot of the Arrow, which would have alerted him to the conflicting traffic.
- Both the instructor and the student in the Arrow heard the Agwagon pilot broadcast his intention to use Runway 18, but neither the instructor nor the student had seen the Agwagon and confirmed its position prior to the collision.

SAFETY ACTION

Local safety action

In May 2004, the Australian Transport Safety Bureau published research report B2004/0114 - *Review of Midair Collisions Involving General Aviation Aircraft in Australia between 1961 and 2003*. That report was initiated following the occurrence of three midair collisions in Australia during 2002. The report is available on the ATSB web site at:

http://www.atsb.gov.au/publications/2004/Review_of_midair_collisions.aspx