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ATSB TRANSPORT SAFETY INVESTIGATION REPORT

Aviation Occurrence Report – 200501921

Final

Breakdown of Separation – Hobart Airport, Tas. 30 April 2005

VH-LAX

Boeing Company 717-200

VH-PVX

Cessna Aircraft Company A152

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Breakdown of Separation – Hobart Airport, Tas – 30 April 2005, VH-LAX, Boeing Company 717-200, VH-PVX, Cessna Aircraft Company A152.

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Abstract

On 30 April 2005, the pilot of a Cessna Aircraft Company A152 (C152) aircraft was conducting circuit training at Hobart. The C152 was on the downwind leg of the circuit when the crew of a Boeing Company B717–200 (B717) aircraft commenced the final leg of an instrument approach to the same runway.

The Hobart aerodrome controller was applying visual separation standards and had instructed the pilot of the C152 to make an orbit, and then continue downwind, to separate the C152 from other aircraft. The C152 pilot did not complete a full orbit, but turned onto the base leg of the circuit when the B717 was on final approach. The minimum distance between the converging aircraft reduced to between 400 and 500 m horizontally and 300 ft vertically and required the pilots of both aircraft to commence avoiding action. There was an infringement of separation standards.

The pilot of the C152 did not read back the instruction to continue on the downwind leg to the controller, nor did the controller request this read-back. There was no specific requirement in published documents for the read-back to be provided.

The controller did not provide the pilot of the C152 or the B717 with traffic information, or a number in the landing sequence as required by published documents. This led to a reduction in the situational awareness of the pilots of both aircraft and excluded them from participating effectively in the separation process.

Airservices Australia has advised that they are addressing the issue of obtaining read-backs, when necessary, through controller education and have developed a roving check and standardisation programme for regional towers. As part of that programme, check and standardisation officers place emphasis on the use of correct phraseology and read-back.

The ATSB issued a safety recommendation to Airservices Australia to enhance pilot situational awareness.

THE AUSTRALIAN TRANSPORT SAFETY BUREAU

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 30 April 2005, at about 1033 Eastern Standard Time,[1] a Cessna Aircraft Company A152 (152) aircraft, registered VH-PVX, was being operated on circuit flying training at Hobart Airport, Tasmania. On board were a student pilot and an instructor. The pilot had been issued with a clearance by the aerodrome controller (controller) to conduct right circuits from runway 30 and to operate not above 1,000 ft above mean sea level.

At 1037, a Boeing Company 717–200 (717) aircraft registered VH-LAX, en route from Melbourne to Hobart, commenced the final leg of the Hobart runway 30 VOR[2] instrument approach. The crew had been issued a clearance by the controller to conduct the final approach. The aircraft was being operated under the instrument flight rules. At about the same time, the controller instructed the pilot of the 152 to make a left orbit to enable the controller to visually separate the 152 with both the inbound 717 and another jet aircraft departing from runway 30. At that time the 152 was at the end of the downwind leg of the circuit.

At about 1039, the pilot of the 152 reported that the orbit was complete and the controller instructed the pilot to continue on the downwind leg and to report prior to turning on to the base leg. However, the pilot had not completed a full orbit but had 'rolled out' of the orbit after completing only a 270 degree turn, directly onto the base leg of the circuit. At that time the 717 was on the final approach leg of the circuit, 90 degrees to the left of the flight path of the 152 and converging.

At about 1041, when the pilots of both aircraft became aware of the potential conflict, the minimum horizontal distance between the two aircraft had reduced to between 400 and 500 m. The 717 was about 300 ft below the 152, and the pilots of both aircraft commenced avoiding action.

The Manual of Air Traffic Services (MATS) 4.5.1.1 stated that visual separation shall be achieved by the use of visual procedures, or by assigning visual separation responsibility to a pilot. The MATS did not specify any minimum distance requirement for the application of visual separation. As the controller was unable to continue to visually observe separation between the 152 and the 717, and had not assigned separation responsibility to the pilot of the 152, there was an infringement of separation standards.

The routine aerodrome weather report (METAR) for Hobart issued at 1030, recorded the cloud as few[3] at 3,000 ft and broken at 5,000 ft with visibility greater than 10 km. The pilot in command of the 717 and the controller later reported that the cloud was scattered at 4,000 ft while the 152 instructor believed the cloud base to be broken at about 3,000 ft.

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1 The 24-hour clock is used in this report to describe the local time of day, Eastern Standard Time (EST), as particular events occurred. Eastern Standard Time was Coordinated Universal Time (UTC) + 10 hours.

2 Very high frequency omnidirectional radio range.

3 Cloud amounts are reported in oktas. An okta is a unit of sky area equal to one-eighth of total sky visible to the celestial horizon. Few = 1 to 2 oktas, scattered = 3 to 4 oktas, broken = 5 to 7 oktas and overcast = 8 oktas.

The 152 instructor reported that he had a total of about 270 flying hours including 15 to 20 hours as an instructor. He was relatively new to Hobart and worked about 5 to 10 hours a week flying. He also worked casually in another non-aviation position with shifts that finished late at night or in the early morning.

The instructor believed that his inexperience, together with the cockpit workload involved in instructing the student pilot and controlling the aeroplane in moderately difficult crosswind conditions, reduced his situational awareness. He reported that he was not aware of the 717 on final, and believed he would not have had any opportunity to observe the aircraft until it was established on the final approach because of the low cloud in the area.

The controller had extensive experience in the provision of aerodrome control services at Hobart, and reported that the workload at the time of the occurrence was both moderately busy and complex.

The controller reported that he was applying visual separation between the 152 and several other aircraft. The MATS specified that:

> 4.5.2.3 When aircraft are operating visually as aerodrome traffic or in an Aerodrome Traffic Zone, ATC shall issue clearances designed to maintain separation; and/or sequencing instructions and/or relevant traffic information.
>
> 4.5.2.4 Pilots shall be advised of their number in the landing sequence to assist in identification of traffic.
>
> 4.5.2.5 The pilot will position the aircraft in such a manner that, while complying with ATC instructions, they maintain separation from other aircraft.

The requirement to provide traffic information was changed from 'mandatory (and)' to 'optional (and/or)' by Airservices Australia in April 2003. On 1 September 2005, Airservices Australia amended the MATS to completely remove the previously amended section 4.5.2.3 relating to the provision of aerodrome traffic information, with the concurrence of the Civil Aviation Safety Authority (CASA), to remove ambiguity over separation responsibilities in the aerodrome traffic zone.

On 16 September 2005, the Civil Aviation Safety Regulation Part 172 Manual of Standards was amended, after agreement between CASA and Airservices Australia, to state:

When aircraft are operating visually as aerodrome traffic ATC must issue 1 or more of the following:

(a) clearances designed to maintain separation

(b) sequencing instructions

(c) relevant traffic information

The issue of the provision of traffic information is subject to an Australian Transport Safety Bureau (ATSB) safety recommendation[4] (see also Safety Actions section of this report).

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4 ATSB occurrence investigation report 200205540 and associated safety recommendation R20040063 available at www.atsb.gov.au .

The Aeronautical Information Publication (AIP) GEN 2.14.3 also specified that:

> ATC will provide relevant traffic information to aerodrome traffic to enable pilots, while complying with ATC instructions, to maintain separation from other aircraft.

The controller reported that the initial orbit instruction given to the pilot of the 152 was to allow for the departure of another jet aircraft and his plan was for the 152 to then extend on a downwind leg until it was possible for the 152 to safely follow the 717 on final. He had intended to pass the pilot of the 152 a number in the landing sequence when the pilot reported prior to turning base. However, as this report was not received, the pilot was not provided with either a number in the sequence or traffic information.

AIP GEN 4.4.1 specified that 'pilots must transmit a correct read-back of ATC clearances, instructions and information which are transmitted by voice' and ensure 'sufficient detail is included to indicate compliance'. The MATS 6.1.13 specified that ATC 'shall ensure that a correct read-back in sufficient detail is obtained'.

Both documents indicated that only key elements relating to certain clearance items must be read back, including 'level instructions, direction of turn, heading and speed instructions'.

The pilot of the 152 did not read back the instruction to continue on the downwind leg, nor did the controller request the read-back. There was no specific requirement in either the AIP or the MATS for the read-back to be provided.

The controller later acknowledged that a sequence number and traffic information should have been provided to the pilot of the 152 and that he believed that a read-back of the downwind instruction would have been beneficial.

Airservices Australia had an annual refresher training program for tower controllers that detailed several mandatory and optional training modules. One mandated module relating to separation assurance was not available to the Hobart controllers at the time of the occurrence.

The 717 flight crew was not provided with traffic information by the controller, but reported that they had been monitoring the radio transmissions between the controller and other pilots. Additionally they had observed the 152, initially on the traffic alert and collision avoidance system (TCAS),[5] then visually, before commencing avoiding action.

5 TCAS is an independent onboard collision avoidance system. It is designed as a backup to the ATC system and the 'see and avoid' concept.

ANALYSIS

Although there was no applicable minimum distance standard specified for visual separation, the controller was unable to maintain continuous visual separation between the 152 and the 717. The decision by the pilot of the 152 to turn directly onto the base leg of the circuit, and not continue on the downwind leg as instructed, contributed to the infringement of separation standards.

This analysis examines the development of the occurrence and highlights the safety issues that became evident as a result of the investigation.

The controller did not provide the pilots of the 152 or the crew of the 717, with traffic information or a number in the landing sequence as required by the Manual of Air Traffic Services (MATS). The provision of traffic information was not mandatory and the MATS did not provide any guidance to controllers on the circumstances under which the provision of traffic information would be appropriate. While the controller had intended to provide this information to the pilot of the 152, he relied on a pilot report prior to turning base as a prompt, and this report was not received.

Without the timely provision of traffic or sequence information, the situational awareness of the pilots of both aircraft was reduced. They were effectively excluded from participating in the separation process as described in the Aeronautical Information Publication (AIP) and the MATS. Consequently, the pilots of the 152 were not aware of the broader consequences of their actions once they turned their aircraft onto the base leg. They simply did not recognise that a potential conflict between their aircraft and the 717 existed.

While the flight crew of the 717 was not provided with directed information by the controller, they had been monitoring the radio transmissions between the controller and the pilots of other aircraft in the area. That, together with active scanning of the circuit area for traffic using the traffic alert and collision avoidance system and visual observations, assisted in the resolution of the situation.

The MATS provided no guidance as to whether routinely issued sequencing and separation instructions, such as ‘continue downwind’, required a read-back. While it may be impractical for the controller to obtain a read-back for every circuit instruction, emphasis should be placed on obtaining a read-back of safety critical instructions. Had the controller requested a read-back of the instruction to continue downwind, and provided a reason for the action, the likelihood of any misunderstanding would have been significantly reduced.

The investigation could not establish whether any aspect of the occurrence sequence could be attributed to the effects of fatigue. However, due to the instructor’s non-aviation working commitments, the possibility that fatigue contributed to the occurrence could not be discounted.

SAFETY ACTIONS

Australian Transport Safety Bureau

Previous recommendation history

On 7 June 2004, the Australian Transport Safety Bureau (ATSB) issued the following recommendation to Airservices Australia:

R20040063

The Australian Transport Safety Bureau recommends that Airservices Australia review the Manual of Air Traffic Services (MATS) amendment decision that removed the mandatory requirement to provide traffic information to aerodrome traffic.

On 23 July 2004, the ATSB received the following response from Airservices Australia:

> This is agreed. A MATS amendment process has been initiated regarding the mandatory requirement to provide traffic information to aerodrome traffic. The current instruction is in contravention of the CASR Part 172 Manual of Standards (MOS) and is being rectified. This difference between the MATS and the Part 172 MOS was due to the MATS being amended and updated between the development and the implementation of the MOS.

The ATSB accepted the response and the recommendation remained on 'MONITOR' awaiting incorporation of the MATS amendment.

On 1 September 2005, Airservices Australia amended the MATS to completely remove the previously amended section 4.5.2.3 relating to the provision of aerodrome traffic information.

On 16 September 2005, the Civil Aviation Safety Regulation Part 172 Manual of Standards was amended, after agreement between CASA and Airservices Australia, to state:

> When aircraft are operating visually as aerodrome traffic ATC must issue 1 or more of the following:
>
> (a) clearances designed to maintain separation
>
> (b) sequencing instructions
>
> (c) relevant traffic information

On 15 September 2006, the ATSB classified the issue as 'CLOSED – NOT ACCEPTED'.

New recommendation

As a result of this, and other, investigations the Australian Transport Safety Bureau

considers that pilot situational awareness can be limited by controller actions and issues the following safety recommendation:

R20060018

The Australian Transport Safety Bureau recommends that Airservices Australia review guidance material and training for aerodrome controllers relating to the provision of relevant traffic information, to enhance pilot situational awareness.

Airservices Australia

Airservices Australia has advised that all mandated regional tower refresher training relating to Hobart tower, including a separation assurance module, has now been completed.

Airservices Australia has advised that they are addressing the issue of obtaining read-backs, when necessary, through controller education. The following article was published to all Airservices Australia tower staff in the February 2006 issue of 'Safety Talk' magazine.

> **Did the Pilot Really Understand?**
>
> A number of incidents have occurred in the circuit area when pilots have used a callsign to acknowledge an ATC instruction and then operated contrary to the instruction. eg.
>
> - An aircraft turned base after being instructed to maintain downwind or
> - An aircraft made a left circuit after being instructed to make a right circuit.
>
> In both of the incidents above the pilot acknowledged the controllers instructions with only a callsign.
>
> Read back requirements are clearly specified in MATS 6.1.13.1 (a-g). But have you really read the fine print?
>
> The first sentence of paragraph 6.1.13.1 requires ATSO [air traffic services officers] to ensure that a correct read back of ATC clearances, instructions and information 'in sufficient detail' is obtained. The second sentence then prescribes the read back requirements for some very specific ATC voice transmission types such as route clearances, hold short instructions, assigned runway, direction of turn etc.
>
> You are now probably wondering what 'read back in sufficient detail' means in relation to those instructions you give that are not covered by the seven types. A good rule of thumb is the more critical the clearance, instruction or information that is provided to the pilot then the more detailed should be the read back.
>
> In the original incidents if instead of only a callsign, the pilot responses have been 'ABC Roger maintain downwind' or 'ABC right circuit' then there would have been an increased possibility that the pilot actually understood what the controller really intended. Remember; if you do not get a read back that confirms the required action, then ask for one 'ABC Confirm……'. It may be too late when you next see what the pilot has actually done.

Airservices Australia has advised that as a follow-up to this article they have developed a roving check and standardisation programme for regional towers. As part of the programme, check and standardisation officers place emphasis on the use of correct phraseology and read-back.

Instructor pilot

The instructor advised that he has adjusted his aviation and non-aviation work commitments to ensure that he is adequately rested prior to undertaking flying operations.