Australian Government
Australian Transport Safety Bureau

ATSB TRANSPORT SAFETY INVESTIGATION REPORT
Aviation Occurrence Report – 200604360
Final

Air-ground communication
2 km north-north-west Hamilton Island Aerodrome, Qld
29 July 2006
VH-ARU
de Havilland Aircraft DH-82A
VH-VQN
Airbus A320-232

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Figure 1 is an extract from the Whitsunday Visual Terminal Chart, effective 24 November 2005. The chart is copyright of Airservices Australia.

Abstract

On 29 July 2006 at approximately 0917 Eastern Standard Time, an Airbus A320-232 (A320) aircraft, operating under the instrument flight rules (IFR), was on a scheduled passenger service from Sydney, NSW, to Hamilton Island, Qld. The crew was conducting a runway 14 very high frequency omni-directional radio range (VOR) instrument approach to land at Hamilton Island Airport. At that time, a de Havilland Aircraft Pty Ltd DH-82A Tiger Moth (Tiger Moth) aircraft, operating under the visual flight rules (VFR), was seen to be near the A320's approach path to the north-west of Hamilton Island. The pilot of the Tiger Moth had not complied with a previous instruction to remain east of the eastern tip of Hamilton Island, which was well to the east of the instrument approach path.

The Hamilton Island aerodrome controller (ADC) issued clearances and instructions to the pilot of the Tiger Moth and to the pilot of the A320 to facilitate traffic management in accordance with published procedures. He was not required to apply a separation standard between an aircraft operating under the IFR and another aircraft operating under the VFR in class D airspace. He was required to provide traffic information to the pilots of both aircraft in class D airspace.

However, the aerodrome controller did not provide traffic information to the pilots of either aircraft in accordance with class D procedures. The pilot of the Tiger Moth did not comply with the air traffic control instructions. The provision of traffic information may have assisted the pilot of the Tiger Moth with situational awareness and helped to ensure that he did not proceed towards the A320 as it approached Hamilton Island.

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.

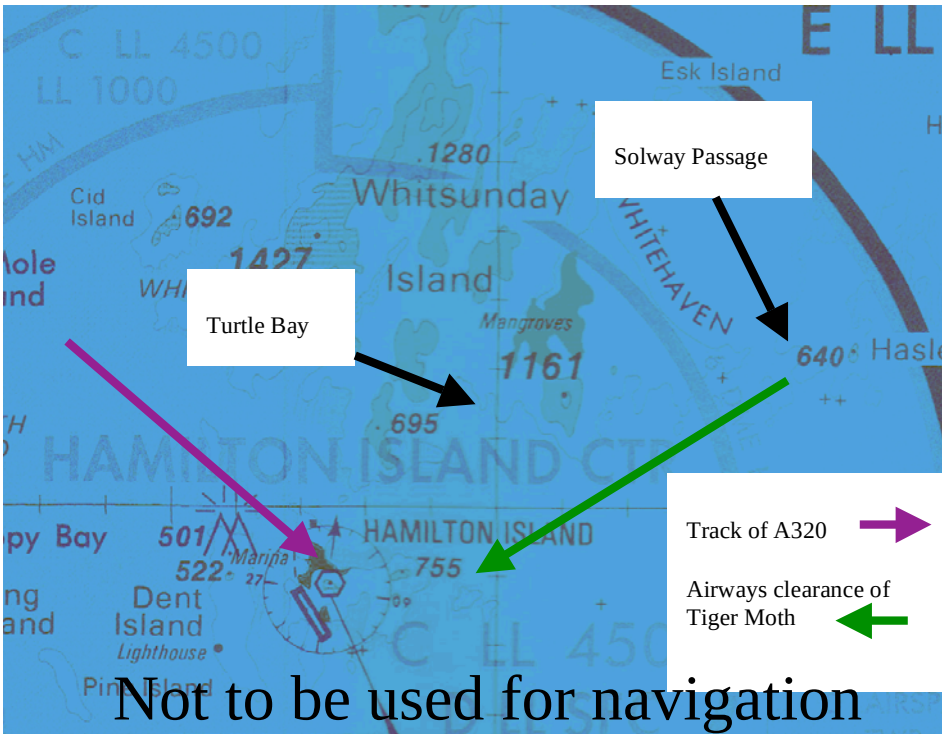
Central to ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. While the Bureau issues recommendations to regulatory authorities, industry, or other agencies in order to address safety issues, its preference is for organisations 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 29 July 2006 at approximately 0917 Eastern Standard Time[1], an Airbus A320-232 (A320) aircraft, operating under the instrument flight rules (IFR), was on a scheduled passenger service from Sydney, NSW, to Hamilton Island, Qld. The crew was conducting a runway 14 very high frequency omni-directional radio range (VOR) instrument approach to land at Hamilton Island Airport. At that time, a de Havilland Aircraft Pty Ltd DH-82A Tiger Moth (Tiger Moth) aircraft, operating under the visual flight rules (VFR), was seen to be near the A320's approach path to the north-west of Hamilton Island. The pilot of the Tiger Moth had not complied with a previous instruction to remain east of the eastern tip of Hamilton Island, which was east of the instrument approach path to the north of Hamilton Island (figure 1).

Figure 1: Extract from the Whitsunday Visual Terminal Chart (VTC) depicting the location of Turtle Bay, Solway Passage and the approximate tracks of the A320 and the Tiger Moth.



The pilot of the Tiger Moth was conducting a scenic flight to Shute Harbour Aerodrome at 1,500 ft above mean sea level (AMSL). This was the first scenic flight undertaken by the pilot in the Whitsunday area. The pilot had received a briefing on operations at Shute Harbour Aerodrome but had not completed any other briefings on other potential areas of the operation.

The Hamilton Island aerodrome controller (ADC) instructed the pilot of the Tiger Moth to track 'from Solway Passage to Hamilton Island clearance limit is Hamilton

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

Island not above 1,500 [ft AMSL] and report approaching the eastern tip of Hamilton Island' (figure 1) to ensure that the Tiger Moth would not be in proximity to the A320 while the A320 was inbound on the VOR approach. After initially reporting that the ADC's radio broadcast was unreadable, the pilot of the Tiger Moth subsequently readback 'Solway Passage to Hamilton Island report eastern tip of Hamilton Island not above 1,500'. The pilot did not readback and the ADC did not confirm the pilot's receipt of the clearance limit of Hamilton Island.

As the Tiger Moth passed abeam Turtle Bay on Whitsunday Island, before it reached the eastern tip of Hamilton Island, the ADC amended the clearance and instructed the pilot of the Tiger Moth to remain in the Turtle Bay area. In accordance with the MATS 6.1.12 (p.6-13), the ADC was required to 'ensure that a correct readback in sufficient detail was obtained of ATC clearances, instructions and information…[including] an ATC route clearance in its entirety, and any amendments'. The pilot of the Tiger Moth did not readback that amended instruction and continued past Turtle Bay to towards the eastern tip of Hamilton Island. The ADC did not confirm that the pilot had received the amended instruction. The ADC later reported that he was unconcerned that the pilot of the Tiger Moth had not readback the requirement to hold in the Turtle Bay area as the previous clearance limit of Hamilton Island was suitable for traffic management purposes in accordance with the MATS.

The pilot of the Tiger Moth did not report approaching the eastern tip of Hamilton Island and continued tracking along the northern shore of Hamilton Island. That track eventually came in close proximity to the runway 14 VOR final approach path that crossed the western shoreline of Hamilton Island. The pilot of a helicopter tracking to Hamilton Island from the north, that had been provided with traffic information on the A320, reported to the ADC that the Tiger Moth 'was right in the approach path of the jet'. The ADC immediately instructed the pilot of the Tiger Moth to reverse the direction of travel and also provided traffic information to that pilot and to the crew of the A320. The crew of the A320 reported to the ADC that they could see the Tiger Moth and shortly after reported being visual with the airport.

Both the Tiger Moth and the A320 were operating in the Hamilton Island control zone that was being managed by the Hamilton Island ADC. The control zone was Class D airspace. The Aeronautical Information Publication (AIP) ENR 1.1 paragraph 17.1.1-2 provided the following guidance to pilots and controllers in relation to the services provided to pilots operating in Class D airspace:

> In Class D airspace, IFR and VFR flights are permitted and all flights are provided with an air traffic control service. IFR flights…receive traffic information in respect of VFR flights. VFR flights receive traffic information in respect of all other flights. ATC will provide instructions, clearances and other information to pilots of VFR flights to facilitate traffic management.

The Manual of Air Traffic Services (MATS) (Pt 10. s 1.) stated that an air traffic control service was:

> A service provided for the purpose of:
>
> a. preventing collisions:
>
> 1. between aircraft; and…
>
> b. expediting and maintaining an orderly flow of air traffic.

If warranted, the ADC could apply non-radar, or procedural, control standards for the management of aircraft operating within the control zone. In that case, the ADC was reliant on pilot reports of aircraft positions in relation to navigation aids or geographical features and the observed position of aircraft by the ADC from the control tower for the application of those standards.

Airservices Australia advised that, in accordance with the MATS (p.10-23), traffic information was:

> Information issued by an air traffic services unit to alert a pilot to other known or observed air traffic which may be in proximity to the position or intended route of flight and to help the pilot avoid collision (ICAO)

and that traffic information was not mandated in all cases in class D airspace. The ADC did not provide traffic information to the flight crew/pilot of either the A320 or the Tiger Moth on the other aircraft.

A review of the Hamilton Island air traffic control voice recording revealed that the ADC advised the pilot of the Tiger Moth to remain east of Hamilton Island on two occasions subsequent to issuing the airways clearance. The pilot of the Tiger Moth made two broadcasts to the aerodrome controller. Those voice recordings were unintelligible due to wind noise from the cockpit of the Tiger Moth. However, the ADC reported that he understood those broadcasts from the pilot and acknowledged them on the basis that the pilot had received and understood the tracking requirements affecting his flight.

The pilot of the Tiger Moth later reported that there was considerable static on his radio, which affected his ability to receive and understand the instructions being issued by the ADC.

The Hamilton Island Automatic Terminal Information Service (ATIS) broadcast current at the time of the occurrence advised pilots:

> Hamilton Island Terminal Information Alpha, expect VOR approach runway 14, wind 130 degrees [True] 6 kts, visibility greater than 10 kilometres, cloud few[2] 600 [ft], broken 1,200 [ft], temperature 20 [degrees], QNH 1019.

While the cloud cover at the time of the occurrence may have limited the ability of the pilot of the Tiger Moth and the crew of the A320 to sight each other, the weather was not considered to be a factor in this occurrence.

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2 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.

ANALYSIS

The aerodrome controller (ADC) issued clearances and instructions to the pilot of the de Havilland Aircraft Pty Ltd DH-82A Tiger Moth (Tiger Moth) and to the pilot of the Airbus A320-232 (A320) to facilitate traffic management in accordance with published procedures. He was not required to apply a separation standard between an aircraft operating under the instrument flight rules (IFR) and another aircraft operating under the visual flight rules (VFR) in class D airspace. However, he was required to provide traffic information to the pilots of aircraft that 'may be in proximity to the position or intended route of flight and to help the pilot avoid collision'. This analysis will examine the factors that may have contributed to the pilot of the Tiger Moth not complying with the instruction to remain east of Hamilton Island and the ADC not complying with class D airspace procedures.

The readback requirements of the Manual of Air Traffic Services (MATS) required a pilot to readback to a controller any airways clearance and any amendment to that airways clearance. Although the ADC did not pursue a readback from the pilot of the Tiger Moth of the amended clearance to remain in the Turtle Bay area, he was satisfied that the pilot's acknowledgement of the previous clearance to 'report at the eastern tip of Hamilton Island' was satisfactory for traffic management purposes. However, the Tiger Moth pilot's unfamiliarity with the area and his understanding of the previous clearance differed from that of the ADC because the latter had not confirmed the correct readback of the clearance limit from the pilot. The result was that the pilot continued to track north of Hamilton Island and came in close proximity to the runway 14 final approach path.

The ADC's instruction to the pilot of the Tiger Moth to remain in the Turtle Bay area would have provided a lateral separation standard between the two aircraft. Had the ADC pursued and received an acknowledgement from the pilot of that amended clearance, it is likely that the occurrence would have been prevented.

Compliance with air traffic control clearances and instructions is particularly important in a procedural environment, where controllers rely on the integrity of the information provided by pilots to ensure the safe, orderly and expeditious flow of air traffic. Air traffic controllers must ensure that clearances and instructions are specific enough to reduce the likelihood of misinterpretation by a pilot, particularly in a non-radar environment, where surveillance opportunities to ensure compliance are limited.

The ADC's efforts to impose clearance limits on the tracking of the Tiger Moth were an indication that he considered that the aircraft might be in proximity to the A320 at some stage. If that was not the case, then there would have been no need to impose the clearance limits on the pilot of the Tiger Moth. In those circumstances, traffic information was required to be provided to the crew of the A320 on the Tiger Moth, and to the pilot of the Tiger Moth on the A320, in accordance with the MATS. The provision of traffic information would have improved the situational awareness for both the pilot and the crew. Enhanced situational awareness for pilots is particularly important when aircraft may be in proximity and when a separation standard does not exist.

In addition, the static and other interference to the radio broadcasts between the Tiger Moth pilot and the ADC impeded the ability of the pilot of the Tiger Moth to hear and understand the ADC's instructions. There was the potential for those difficulties, in conjunction with the Tiger Moth pilot's lack of familiarisation with the Whitsunday Islands area, to have combined and have adversely affected his situational awareness.

SAFETY ACTIONS

Airservices Australia

On the afternoon after the occurrence, the pilot of the Tiger Moth met with the Hamilton Island aerodrome controller. The aerodrome controller provided the pilot with a briefing on operations in the Hamilton Island control zone.

Tiger Moth pilot

The pilot replaced the headset and microphone in the aircraft. The Hamilton Island aerodrome controller reported that there has been some improvement in the quality of radio broadcasts from the Tiger Moth since that time.