



**Australian Government**

**Australian Transport Safety Bureau**

# Flight below minimum altitude involving Boeing 737-800, PK-LDK

19 km south of Canberra Airport, Australian Capital Territory on 14 June 2024



**ATSB Transport Safety Report**  
Aviation Occurrence Investigation  
AO-2024-035  
Preliminary – 4 September 2024

**Cover photo:** Tony Haynes

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#### **Addendum**

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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 the evening of 13 June 2024, a Batik Air Boeing 737-800, registered PK-LDK, departed Denpasar International Airport, Indonesia for the inaugural passenger transport flight of a new service to Canberra, Australian Capital Territory. The captain was acting as pilot flying, and the first officer was acting as pilot monitoring.<sup>1</sup> A second captain was also on board, acting as a relief crewmember, occupying the flight deck jump seat located behind the flight crew during the arrival and approach.

As the aircraft climbed to the cruising level of flight level 350,<sup>2</sup> the crew input forecast winds, which included strong tailwinds, into the aircraft's flight management computer. The crew noted that the estimated time of arrival into Canberra was prior to 0600 local time on 14 June, when Canberra Tower and Approach air traffic control began providing services for the day (see the section titled *Canberra Tower and Approach*). The crew elected to continue to Canberra without any en route delays and prepared for an arrival without those air traffic control services, using the Canberra Airport common traffic advisory frequency (CTAF).

As the aircraft descended towards Canberra in darkness, the flight was cleared by air traffic control (ATC) to track via the waypoint AVBEG direct to Canberra Airport and to descend to FL120. During the descent, the flight crew prepared to conduct the AVBEG 5A standard arrival route (STAR) but did not make a request to track via the STAR to the Melbourne Centre air traffic controller managing the airspace.

At 0541 local time, as the aircraft approached AVBEG, ATC cleared the crew to leave controlled airspace descending. The aircraft crossed AVBEG while descending below FL205 and commenced tracking via the AVBEG 5A STAR. The Melbourne Centre air traffic controller identified that the Batik flight was deviating from the cleared track (direct to Canberra) and noted that the aircraft was descending toward a restricted area (Figure 1).

The controller did not query the flight crew's deviation, but asked the crew if they were going to remain clear of the restricted area. The crew advised the controller that they were tracking via the AVBEG 5A STAR (see the section titled *AVBEG 5A standard arrival route and restricted areas*). The controller acknowledged the tracking advice and instructed the crew to maintain 10,000 ft above mean sea level (AMSL) to remain above the restricted area. After receiving this instruction, the flight crew became uncertain as to whether the aircraft would be operating within, or outside of, controlled airspace during the STAR and approach.

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<sup>1</sup> Pilot flying (PF) and Pilot monitoring (PM): procedurally assigned roles with specifically assigned duties at specific stages of a flight. The PF does most of the flying, except in defined circumstances such as planning for descent, approach and landing. The PM carries out support duties and monitors the PF's actions and the aircraft's flight path.

<sup>2</sup> Flight level: at altitudes above 10,000 ft in Australia, an aircraft's height above mean sea level is referred to as a flight level (FL). FL 350 equates to 35,000 ft.

Figure 1: Overview of the descent



Source: Google Earth, recorded flight data, Airservices Australia and ATSB

The crew levelled the aircraft at 10,000 ft AMSL with the autopilot engaged and the aircraft passed over the restricted airspace. As was required by ATC procedures, the controller waited until the aircraft was observed to be more than 2.5 NM past the restricted area before instructing the crew to continue the descent to leave controlled airspace. The crew responded by advising that they would descend and continue tracking via the STAR. At about this time, the crew noted that the aircraft was about 1,300 ft above the desired descent profile for the arrival.

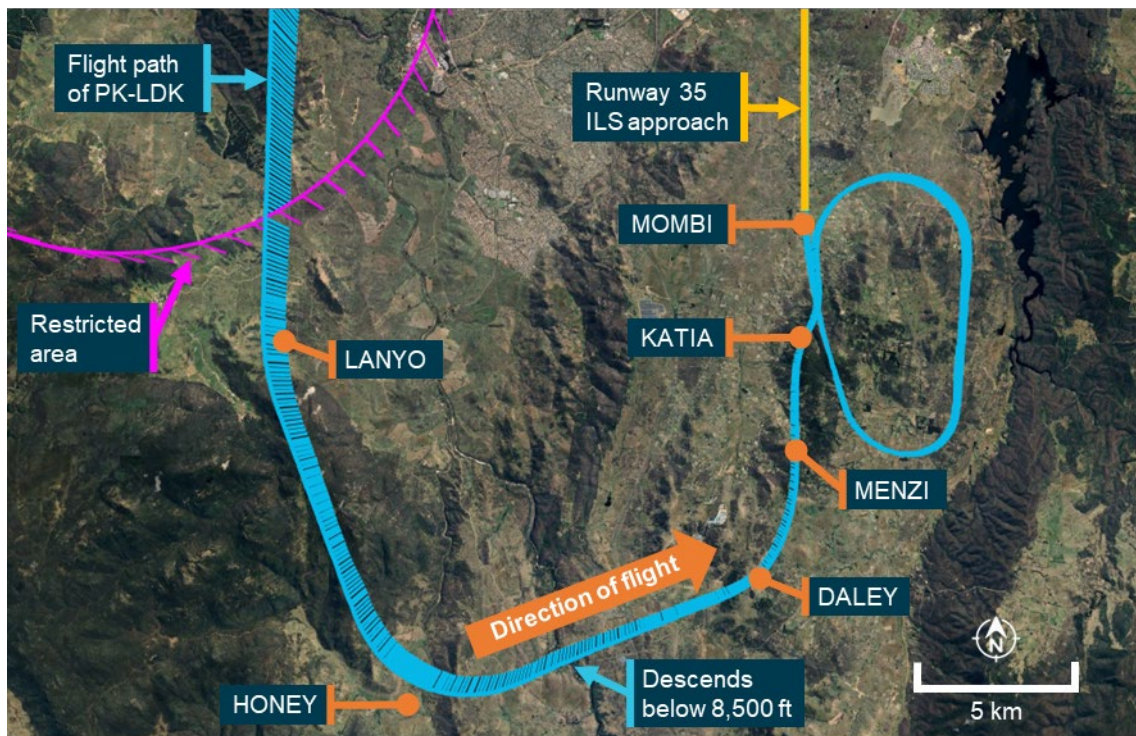
At 0551, the crew requested ATC clearance to conduct the instrument landing system (ILS) approach to runway 35 at Canberra. The controller responded by advising that the Canberra control tower was closed and that CTAF procedures applied for that airspace. At 0551:38, the aircraft descended below 8,500 ft AMSL, outside controlled airspace (class G).

As the aircraft was higher than the desired flightpath, the captain decided to conduct a holding pattern at the approach waypoint of MOMBI to reduce altitude and the first officer requested ATC clearance to hold at MOMBI. The controller responded by providing traffic information for the MOMBI holding pattern. The crew then again requested clearance for the ILS approach and the

controller responded by advising that clearance was not required and that the crew must broadcast their intentions on the Canberra CTAF.

At 0553:10, the aircraft passed the arrival waypoint MENZI (Figure 2) while descending below 6,720 ft AMSL and soon after made another request to hold at MOMBI. The controller provided traffic information for the hold and requested that the crew make a right-hand orbit to remain clear of the restricted airspace, now to the west of the aircraft.

**Figure 2: Overview of arrival**



Source: Google Earth, recorded flight data, Airservices Australia and ATSB

As the aircraft approached MOMBI, the captain entered 5,400 ft AMSL (the approach’s minimum safe altitude before intercepting the ILS glideslope) into the autopilot mode control panel (MCP) and at 0554:15, the aircraft descended below the minimum holding altitude of 5,600 ft AMSL (see the section titled *Instrument landing system approach*) before levelling at 5,400 ft AMSL.

The captain then used the heading select function to make a right turn to a heading of 170°<sup>3</sup> and the aircraft commenced turning prior to crossing MOMBI. At 0554:30, the aircraft passed MOMBI at a speed of 172 kt (2 kt above the maximum speed for the 5,600 ft AMSL minimum holding altitude).

The captain then asked the first officer to enter a holding pattern into the aircraft’s flight management system (FMS) at MOMBI. As the aircraft had already passed MOMBI, the waypoint had dropped off the FMS track and the first officer was required to manually re-enter the waypoint into the FMS planned track. As the turn continued, the speed reduced below 170 kt, the captain selected 4,700 ft AMSL (the crew’s intended MOMBI crossing altitude) on the autopilot MCP and the aircraft commenced descending to that altitude. During this time, the Melbourne Centre controller did not identify that the aircraft was operating below the minimum holding altitude of 5,600 ft AMSL.

The aircraft turned to a heading of 170° and continued descending until levelling at 4,700 ft AMSL at 0555:59. As the aircraft tracked south, the incoming Canberra Approach air traffic controller

<sup>3</sup> All headings used in the report are magnetic.

prepared to take control of the Approach airspace (see the section titled *Canberra airspace*) and commenced a handover with the Melbourne Centre controller.

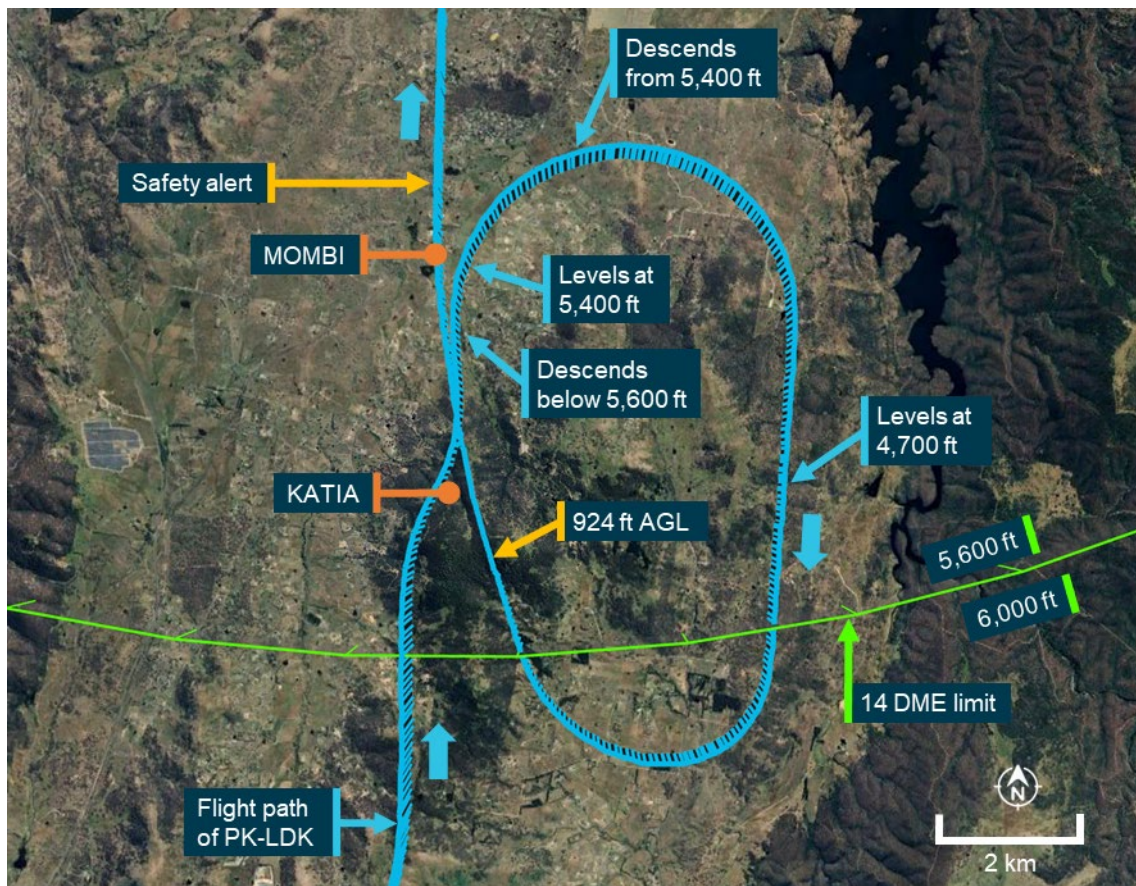
The aircraft continued south and at 0556:25, proceeded beyond the 14 distance measuring equipment (DME) limit for the 5,600 ft AMSL minimum holding altitude. At or before that DME limit, an inbound turn back to MOMBI needed to be commenced, or the minimum holding altitude increased to 6,000 ft AMSL. By that time, the first officer had completed re-entering MOMBI into the FMS and the captain then used the lateral navigation autopilot mode to commence a right turn toward the waypoint.

As the aircraft was turning back toward MOMBI, at 0556:58, the incoming Canberra Approach controller completed their handover with the Melbourne Centre controller and took over the airspace and the Melbourne Centre radio frequency that the aircraft was using (this frequency then became a Canberra Approach frequency).

At the same time, the Canberra Tower air traffic controller preparing to commence the tower service observed that the aircraft was operating below the minimum holding altitude and made multiple unsuccessful attempts to contact the crew on the Canberra CTAF frequency. As the Canberra Tower controller did not have a direct means of communication with the Melbourne Centre controller, the Tower controller contacted a Melbourne Approach controller to relay their concerns to the Melbourne Centre controller.

The aircraft continued turning toward MOMBI (Figure 3) and as it crossed over the eastern slopes of Mount Campbell at 0557:46, the recorded radio height reduced to a minimum of 924 ft above ground level. At 0558:21, the aircraft rejoined the ILS approach.

**Figure 3: Overview of MOMBI hold**



Source: Google Earth, recorded flight data, Airservices Australia and ATSB

The Melbourne Approach controller contacted the Melbourne Centre controller to relay the Tower controller's concerns about the aircraft's altitude and the Melbourne Centre controller responded by advising that the airspace was now being controlled by Canberra Approach.

At about the same time, the Canberra Approach controller also identified that the aircraft was operating below the minimum altitude. The controller contacted the crew to provide a safety alert and asked the crew if they were 'visual'. The crew responded advising that they were 'visual with the runway' and continued the approach. The aircraft landed at 0602 without further incident.

## Context

### ***Pilot details***

The captain was an instructor pilot with Batik Air and held an Indonesian air transport pilot licence (aeroplane) and the required medical certificates and operational ratings to undertake the flight. The captain had a total flying experience of 10,508 hours of which 7,772 were on the Boeing 737 aircraft type. In the previous 90 days, they had flown 164 hours, all in the Boeing 737.

The first officer held an Indonesian commercial pilot licence (aeroplane) and the required medical certificates and operational ratings to undertake the flight. The first officer had a total flying experience of 6,843 hours of which 6,688 were on the Boeing 737 aircraft type. In the previous 90 days, they had flown 159 hours, all in the Boeing 737.

The relief captain held an Indonesian air transport pilot licence (aeroplane) and the required medical certificates and operational ratings to undertake the flight. The relief captain had a total flying experience of 11,295 hours of which 11,018 were on the Boeing 737 aircraft type. In the previous 90 days, they had flown 191 hours, all in the Boeing 737.

From 1998 to 2010, the captain was a pilot in the Indonesian military and, in that role, had conducted operations in uncontrolled airspace. In 2010, the captain commenced employment with Batik Air's parent company Lion Air and moved to Batik Air in 2013. From 2010, the captain had not undertaken any flights within uncontrolled airspace. The first officer and relief captain reported having no experience operating in uncontrolled airspace. All crewmembers had previously operated flights to Australian destinations.

### ***Operator details***

Batik Air was a subsidiary of Lion Air and commenced operations in 2013 and operated to 2 Australian destinations: Perth, Western Australia, and Canberra. The airline operated 46 Airbus A320 series aircraft, 22 Boeing 737-800s and 1 Airbus A330-300. All of Batik Air's scheduled flights were undertaken in controlled airspace, with the exception of any early Canberra arrivals (before 0600) and potential diversions from Perth Airport to the operator nominated diversion destination of Kalgoorlie, which operated as a CTAF at all times.

### ***Light and meteorology***

The approach was conducted in night conditions. On the morning of 14 June 2024, first light<sup>4</sup> was at 0641, 39 minutes after the aircraft landed. The moon was below the horizon.

At 0554, when the aircraft descended below the minimum holding altitude, the Bureau of Meteorology (BoM) automatic weather station at Canberra Airport recorded the wind as 1 kt from 141° magnetic. The station recorded that there was no cloud cover, and visibility was greater than 10 km.

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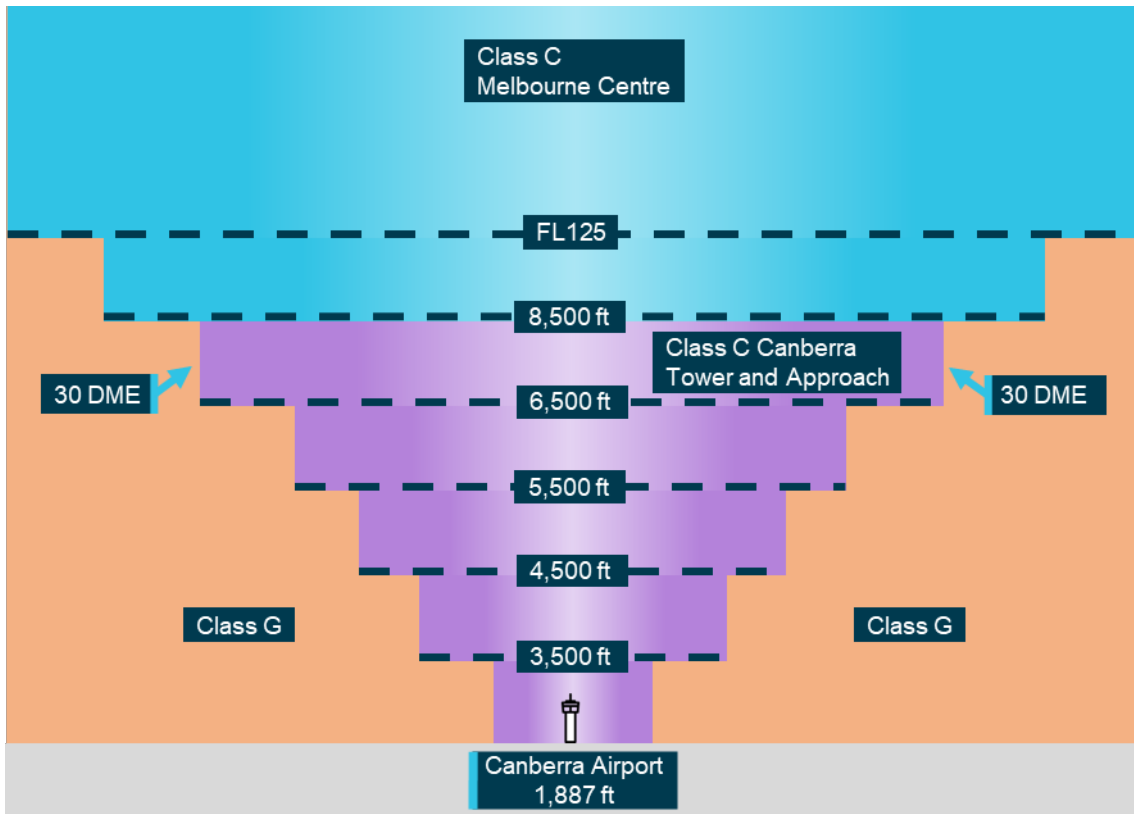
<sup>4</sup> First light: when the centre of the sun is at an angle of 6° below the horizon before sunrise. At this time the horizon is clearly defined but the brightest stars are still visible under clear atmospheric conditions.

## Canberra airspace

### Canberra Tower and Approach

On the day of the incident, the operating hours of Canberra Tower and Approach controlled airspace were 0600 to 2300. During these hours, Canberra Airport was within class C airspace, with airspace bases that increased as the airspace fanned out at increasing distances from the airport (Figure 4). The Canberra Tower and Approach air traffic control (ATC) services controlled the class C airspace within 30 DME of Canberra and below 8,500 ft above mean sea level (AMSL). Control services for the airspace above 8,500 ft AMSL were provided by a Melbourne Centre controller at all times during the flight's descent and approach.

**Figure 4: Canberra airspace when tower and approach were operating**

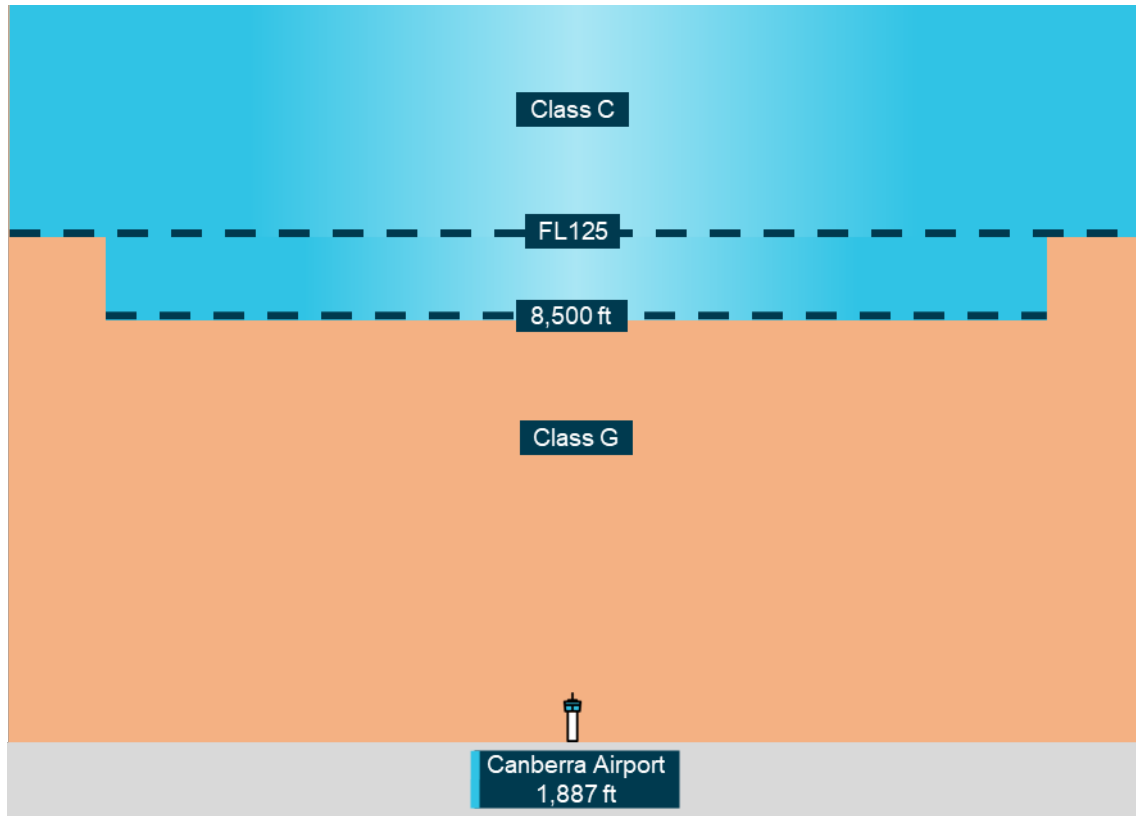


All altitudes and elevations are above mean sea level.  
Source: ATSB

Outside of the Canberra Tower and Approach operating hours, the base of the Class C airspace was 8,500 ft AMSL. Below this was class G, non-controlled airspace (Figure 5). Within class G airspace, aircraft crews could manoeuvre as required to position for an approach and were responsible for maintaining adequate terrain clearance. ATC was unable to issue STARs or approach clearances for the class G airspace.



**Figure 5: Canberra airspace when tower and approach were not operating**



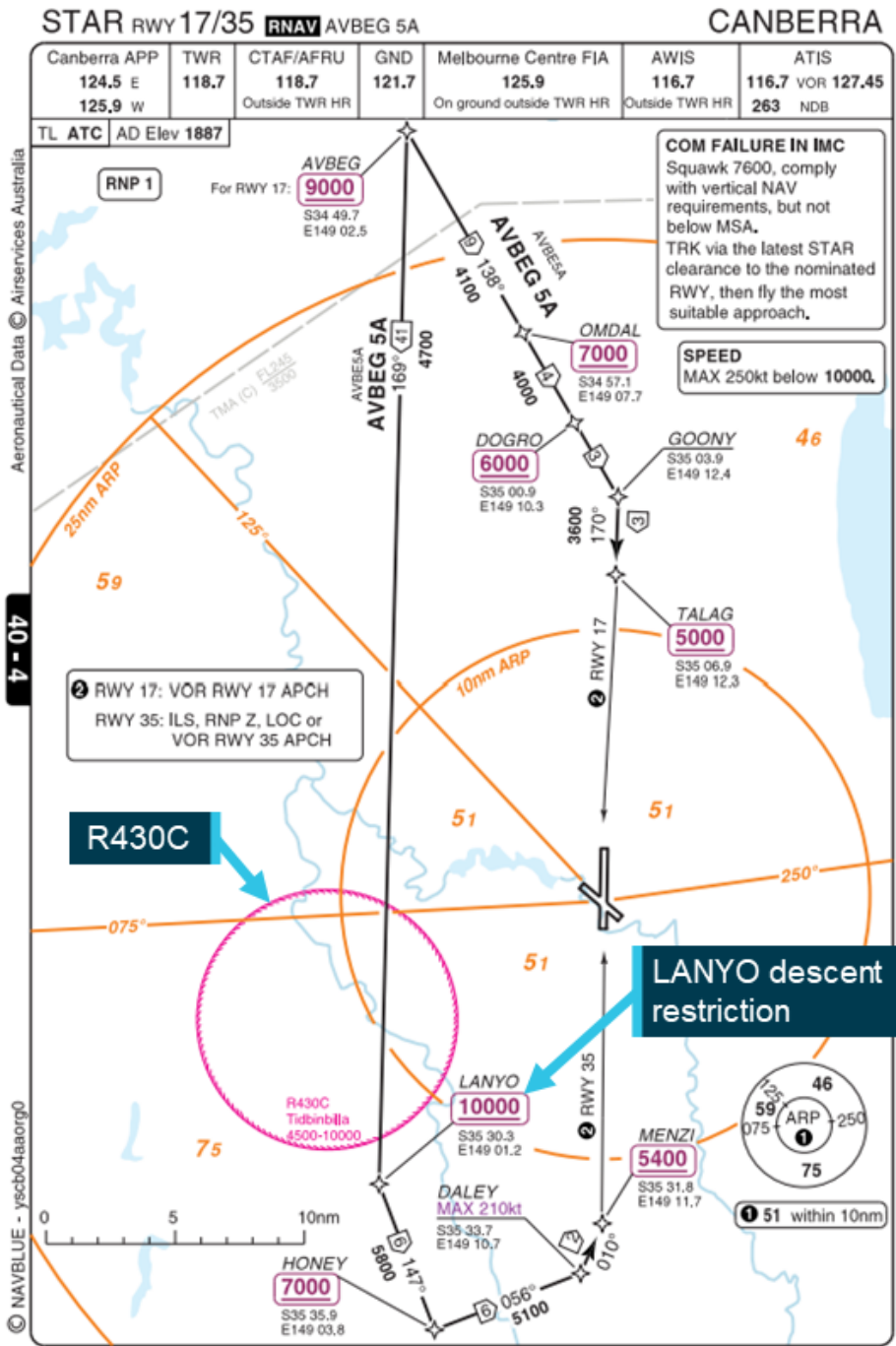
All altitudes and elevations are above mean sea level.  
Source: ATSB

When the tower was not operating, Canberra Airport operated using a common traffic advisory frequency (CTAF). When operating using a CTAF, pilots make positional radio broadcasts to coordinate self-separation with other traffic.

***AVBEG 5A standard arrival route and restricted areas***

South-west of Canberra Airport, restricted areas of airspace (R430 A-C) encompassed the Canberra Deep Space Communications Complex at Tidbinbilla. The uppermost of these restricted areas (R430C) had a radius of 10 NM and a ceiling of 10,000 ft AMSL. The AVBEG 5A STAR (Figure 6) passed over this restricted area and had a 10,000 ft AMSL descent restriction at the waypoint LANYO which prevented aircraft descending via the STAR from entering that area.

Figure 6: AVBEG 5A standard arrival route



Source: Batik Air and Navblue, annotated by the ATSB

### Instrument landing system approach

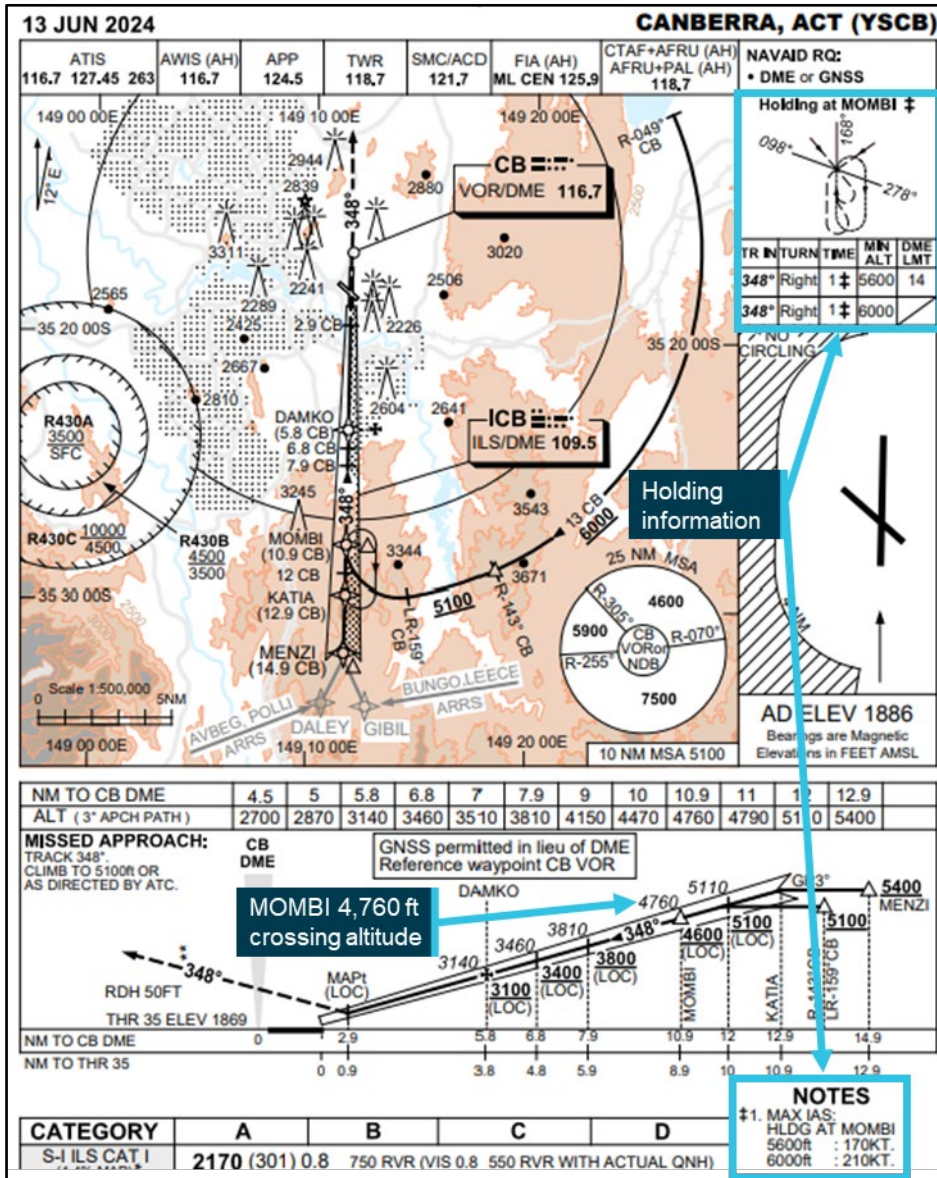
An instrument landing system (ILS) is an instrument approach procedure that provides lateral (localiser) and vertical (glideslope) position information using angular deviation signals from the localiser antennas (located past the upwind end of the runway) and the glideslope antennas (located approximately 1,000 ft from the runway threshold).

The AVBEG 5A STAR connected with the Canberra runway 35 ILS Y approach at the initial approach fix waypoint MENZI. The minimum crossing height for MENZI was 5,400 ft AMSL. The

approach included a 3° glidepath to the runway which crossed the approach waypoint of MOMBI at 4,760 ft AMSL.

The approach included a right turn, 1 minute holding pattern at the approach waypoint MOMBI (Figure 7). The minimum holding altitude at MOMBI was 5,600 ft AMSL. To use that minimum altitude, the crew was required to adhere to a maximum speed of 170 kt and a 14 DME limit from the Canberra DME for commencing the inbound turn back to MOMBI. A higher minimum holding altitude of 6,000 ft AMSL could also be used which allowed for a higher maximum speed of 210 kt with no DME limit.

Figure 7: Canberra runway 35 instrument landing system approach



Source: Aircservices Australia, annotated by the ATSB

## ***Recorded data***

### ***Air traffic control***

Recorded air traffic control surveillance and communications audio data was provided by Airservices Australia. The recorded audio showed that:

- the crew did not request, and were not provided with, a clearance to track via the AVBEG 5A STAR
- no broadcasts were made by the crew on the Canberra CTAF
- no safety alert was provided by the Melbourne Centre controller.

### ***Quick access recorder***

The aircraft's quick access recorder data was provided by Batik Air. This data captured the aircraft's descent commencing from 10,000 ft AMSL at 0550:20, 2.3 NM after passing LANYO. It then continued descending past the waypoints of HONEY at 9,184 ft AMSL, DALEY at 8,608 ft and MENZI at 6,688 ft.

At 0554:15, while approaching MOMBI at a speed of 171 kt, the aircraft descended below 5,600 ft AMSL and 2 seconds later, 0.6 NM before crossing MOMBI, the aircraft commenced a right turn from the approach track into the holding pattern at a speed of 172 kt. At 0554:24, the aircraft levelled at 5,400 ft AMSL and 6 seconds later passed MOMBI at a speed of 169 kt while continuing the right turn.

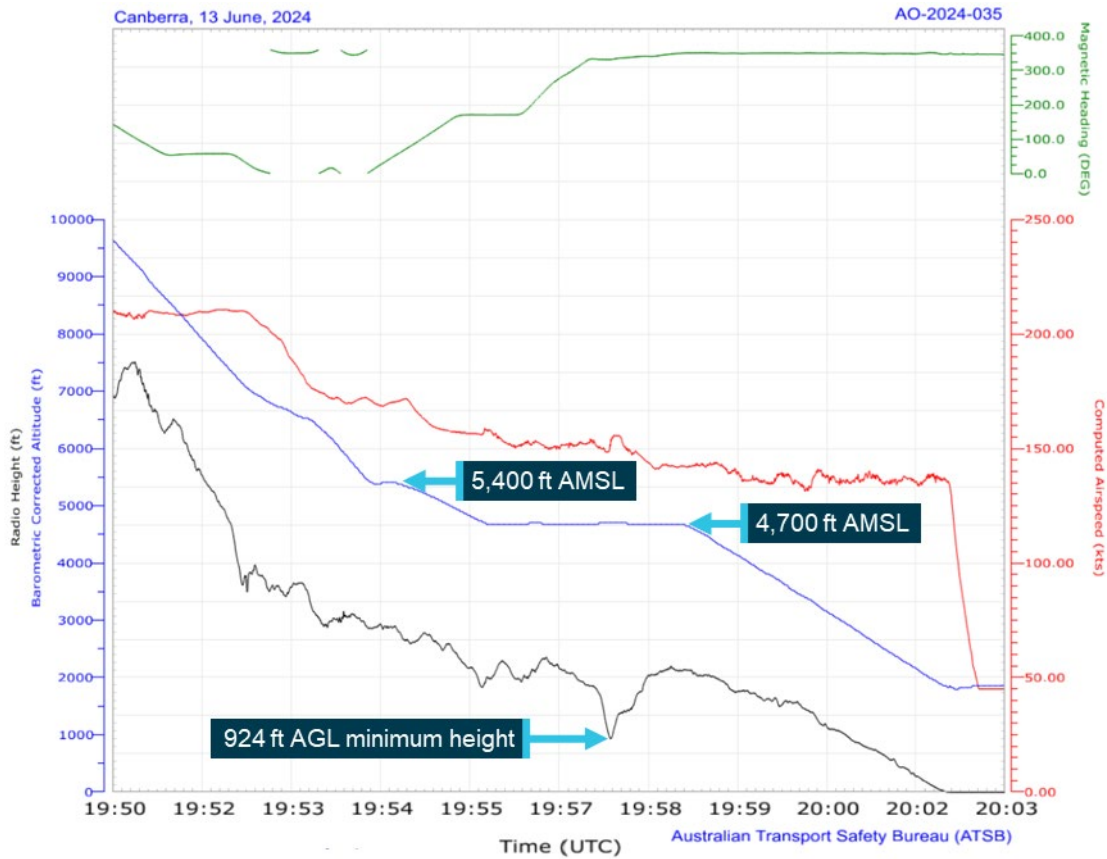
At 0554:51, the aircraft commenced descending from 5,400 ft AMSL and 4 seconds later, airspeed increased to 172 kt, before reducing to 170 kt, 4 seconds later. Speed remained at or below 170 kt for the remainder of the flight.

At 0555:44, the aircraft turned to and maintained a heading of 170° and 15 seconds later levelled at 4,700 ft AMSL (Figure 8). At 0556:25, the aircraft proceeded beyond 14 DME from Canberra DME before commencing the right turn toward MOMBI 4 seconds later. During this turn, the lowest recorded radio height was 924 ft above ground level (AGL). No ground proximity alerts were recorded.

The aircraft passed KATIA at 0557:53 at an altitude of 4,700 ft AMSL while tracking back toward MOMBI and rejoined the approach about 12 NM from the Canberra DME at 0558:19.

At 0558:48, the aircraft began descending from 4,700 ft along the runway 35 glidepath.

Figure 8: Recorded quick access data



All times are coordinated universal time (UTC). Local time was Australian Eastern Standard Time (EST), which was (UTC) +10 hours. Source: Quick access recorder from PK-LDK, annotated by the ATSB

## Safety actions

Following the occurrence, Batik Air implemented several safety actions:

- The Canberra Airport flight crew briefing document was revised to include more detailed information on Canberra air traffic control hours, common traffic advisory frequency (CTAF) procedures, holding requirements and guidance for adherence to lowest safe altitude requirements.
- Internal flight crew notices were also issued to highlight the importance of a comprehensive approach briefing, adherence to air traffic control instructions and altitude awareness. These notices also provided information on CTAF and traffic information by aircraft (TIBA) procedures and highlighted the additional risks and absent protections when operating in non-controlled airspace. Details of this incident were also disseminated to all flight crew and Batik Air conducted a special flight crew briefing with event details and lessons.
- Batik Air also adjusted the flight schedule for the Denpasar to Canberra flight (ID6015) to ensure that arrivals occur during Canberra Tower and Approach air traffic control operating hours.

## Further investigation

To date, the ATSB has:

- examined recorded flight and air traffic control data
- interviewed the flight crew and air traffic controller
- obtained Batik Air operational procedures and route implementation processes
- collected operational and airport information.

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

- recorded flight and air traffic control data
- Batik Air operational procedures and training
- Batik Air route implementation processes
- air traffic control procedures and training.

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.

The ATSB SafetyWatch highlights the broad safety concerns that come out of our investigation findings and from the occurrence data reported to us by industry. One of the safety concerns is [improving risk management associated with change](#).



# General details

## Occurrence details

Date and time:	14 June 2024 – 0554 Eastern Standard Time	
Occurrence class:	Serious incident	
Occurrence categories:	Flight below minimum altitude	
Location:	19 km south of Canberra Airport, New South Wales	
	Latitude: 35.4751° S	Longitude: 149.1966° E

## Aircraft details

Manufacturer and model:	THE BOEING COMPANY 737-8GP	
Registration:	PK-LDK	
Operator:	Batik Air	
Serial number:	39875	
Type of operation:	Part 129 Foreign air transport operators-Standard Part 121	
Activity:	Commercial air transport-Scheduled-International	
Departure:	Denpasar International Airport, Bali, Indonesia	
Destination:	Canberra, Australian Capital Territory	
Persons on board:	Crew – 6	Passengers – 33
Injuries:	Crew – None	Passengers – None
Aircraft damage:	None	

# Australian Transport Safety Bureau

## About the ATSB

The ATSB is an independent Commonwealth Government statutory agency. It is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers.

The ATSB's purpose is to improve the safety of, and public confidence in, aviation, rail and marine transport through:

- independent investigation of transport accidents and other safety occurrences
- safety data recording, analysis and research
- fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia, as well as participating in overseas investigations involving Australian-registered aircraft and ships. It 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. The ATSB does not investigate for the purpose of taking administrative, regulatory or criminal action.

## Terminology

An explanation of terminology used in ATSB investigation reports is available on the ATSB website. This includes terms such as occurrence, contributing factor, other factor that increased risk, and safety issue.