



**Australian Government**

**Australian Transport Safety Bureau**

# Flight below the minimum safe altitude involving Beechcraft Baron 95-B55, VH-CBG

5 km north-east of Parafield Airport, South Australia, on 13 May 2021

**ATSB Transport Safety Report**

Aviation Occurrence Investigation (Short)

AO-2021-021

Final – 22 October 2021

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

#### Publishing information

**Published by:** Australian Transport Safety Bureau  
**Postal address:** PO Box 967, Civic Square ACT 2608  
**Office:** 62 Northbourne Avenue Canberra, ACT 2601  
**Telephone:** 1800 020 616, from overseas +61 2 6257 2463  
Accident and incident notification: 1800 011 034 (24 hours)  
**Email:** [atsbinfo@atsb.gov.au](mailto:atsbinfo@atsb.gov.au)  
**Website:** [www.atsb.gov.au](http://www.atsb.gov.au)

© Commonwealth of Australia 2021



#### Ownership of intellectual property rights in this publication

Unless otherwise noted, copyright (and any other intellectual property rights, if any) in this publication is owned by the Commonwealth of Australia.

#### Creative Commons licence

With the exception of the Coat of Arms, ATSB logo, and photos and graphics in which a third party holds copyright, this publication is licensed under a Creative Commons Attribution 3.0 Australia licence.

Creative Commons Attribution 3.0 Australia Licence is a standard form licence agreement that allows you to copy, distribute, transmit and adapt this publication provided that you attribute the work.

The ATSB's preference is that you attribute this publication (and any material sourced from it) using the following wording: *Source:* Australian Transport Safety Bureau

Copyright in material obtained from other agencies, private individuals or organisations, belongs to those agencies, individuals or organisations. Where you want to use their material you will need to contact them directly.

#### Addendum

Page	Change	Date

# Safety summary

## What happened

On the evening of 13 May 2021, a Hartwig Air Beechcraft Baron 95-B55 aircraft, registered VH-CBG, departed Ceduna Airport, South Australia (SA), for a charter flight under the instrument flight rules (IFR) to Parafield Airport, SA, with the pilot and one passenger on-board. During the flight, the autopilot system did not function as the pilot expected.

At 1851, the aircraft was cleared for a night visual approach and descended towards Parafield Airport. At the time, the pilot's focus was on the autopilot, resulting in the pilot losing sight of the runway and inadvertently overflying the airport towards an area of rising terrain at an altitude well below the minimum safe altitude. The pilot maintained this altitude and continued the approach while looking for the runway. Despite the night conditions, there was enough light for the airport tower controller to see the aircraft and the hill-line to the east, so its terrain clearance did not raise concerns.

At 1855, the aircraft re-entered the Parafield control area and was cleared for a visual approach to the runway, landing shortly thereafter.

## What the ATSB found

The ATSB found that during the night visual approach under the IFR, the pilot lost situational awareness, probably as a result of distraction due to a perceived autopilot system issue. The approach was then continued at an altitude below the minimum safe altitude, removing obstacle clearance assurance.

## What has been done as a result

The operator's pilot training program has been updated to include a threat and error management course.

Airservices Australia advised that Parafield Airport tower controllers will be provided with a briefing paper about the incident and incorporate any learning opportunities and safety messaging from the ATSB investigation. The briefing will include information on the circling area, descent below the minimum safe altitude during visual approaches, go-arounds, and the 'safety alert' procedure. This procedure is intended to warn pilots that their aircraft is in unsafe proximity to terrain, obstruction, active restricted/prohibited areas, or other aircraft.

## Safety message

Handling of approaches is one of the ATSB's [SafetyWatch](#) priorities. Due to the reduced visibility at night, a night approach requires even greater pilot awareness. Unless there is a problem affecting flight safety, pilots should remain focussed on monitoring aircraft and approach parameters, which provides assurance that an approach can be safely completed. If a visual approach cannot be completed, pilots must inform air traffic control so assistance can be provided.

If the criteria for the safe continuation of an approach are not met, for example losing sight of the runway, pilots must initiate a go-around and attain a safe altitude to reduce the risk of colliding with obstacles or terrain.

# The investigation

Decisions regarding whether to conduct an investigation, and the scope of an investigation, are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, a limited-scope investigation was conducted in order to produce a short investigation report, and allow for greater industry awareness of findings that affect safety and potential learning opportunities.

## The occurrence

On 13 May 2021, at 1700 Central Standard Time,<sup>1</sup> a Hartwig Air Beechcraft Baron 95-B55 aircraft, registered VH-CBG (Figure 1), departed Ceduna Airport, South Australia (SA), for a charter flight under the instrument flight rules (IFR)<sup>2</sup> to Parafield Airport, SA, with the pilot and one passenger on-board.

**Figure 1: VH-CBG**



Source: Andrew Lesty

During the flight, the pilot noted that when the autopilot was engaged, the aircraft was ‘snaking left to right’ but felt that, overall, its tracking was not greatly affected (the aircraft’s slight left and right lateral motion during the flight was evident in the aircraft’s tracking data). The pilot had also observed the same behaviour on an earlier flight that day.

At 1841, the aircraft was located about 22 NM from the waypoint<sup>3</sup> PORTA (Figure 2). At that time, Adelaide Approach air traffic control (ATC) instructed the pilot to turn left, and 4 minutes later, turn

<sup>1</sup> Central Standard Time (CST): Coordinate Universal Time (UTC) + 9.5 hours.

<sup>2</sup> Instrument flight rules (IFR): a set of regulations that permit the pilot to operate an aircraft in instrument meteorological conditions (IMC), which have much lower weather minimums than visual flight rules (VFR). Procedures and training are significantly more complex as a pilot must demonstrate competency in IMC conditions while controlling the aircraft solely by reference to instruments. IFR-capable aircraft have greater equipment and maintenance requirements.

<sup>3</sup> Waypoint: A defined position of latitude and longitude coordinates, primarily used for navigation.

right to separate the aircraft from other traffic. The pilot switched the autopilot from navigation (NAV) to heading (HDG)<sup>4</sup> mode and complied with the instructions.

At 1847, the pilot was instructed to resume navigation to PORTA. The pilot recalled switching the autopilot back to NAV mode to track toward PORTA, but the aircraft continued along the previously assigned heading, about 20° to the left of the track to PORTA. Shortly after, ATC requested the pilot to confirm tracking, and after the pilot acknowledged, the aircraft gradually turned right over the next minute until 1849, when it tracked toward PORTA.

**Figure 2: Aircraft track from 1838 to 1901**



Source: Google Earth, annotated by ATSB

At 1850, the aircraft was travelling south-east, descending over PORTA at a ground speed of 165 kt (the forecast wind was 20 kt from the south-west) and the autopilot initiated a turn towards the Parafield Airport non-directional beacon (NDB). The aircraft did not turn as quickly as the pilot anticipated, so the autopilot was disconnected, and the pilot completed the turn manually before re-engaging the autopilot.

One minute later, the pilot contacted the Parafield Airport Tower controller and was instructed to descend to 1,500 ft once established in the circling area for runway 21R (see the section titled *Circling area*), and report 'visual'<sup>5</sup> (it was dark at the time). At the same time, two other aircraft were conducting circuits<sup>6</sup> on runway 21R. The pilot selected the autopilot NAV mode to track to the Parafield NDB and reported 'visual'.

Eighty seconds later, the aircraft descended below 1,700 ft above mean sea level (AMSL) at a ground speed of 180 kt with a 20 kt tailwind. The controller then instructed the pilot to join the right downwind leg of the circuit for the runway. After the pilot acknowledged the instruction, the aircraft continued toward the airport before commencing a slight left turn onto a heading of 022° magnetic, consistent with a downwind heading, but almost directly overhead the runway (Figure 3).

<sup>4</sup> In NAV mode, the autopilot system follows the lateral path commanded by the GPS. When HDG mode is selected, the autopilot steers the aircraft according to a heading manually selected by the pilot.

<sup>5</sup> A request to the pilot to confirm the criteria for visual conditions are met so a visual approach clearance could be authorised by air traffic control (see section 1.1 of the [Aeronautical Information Publication \(AIP\) En Route](#)).

<sup>6</sup> Circuit: a specified pattern flown by aircraft when taking off or landing while maintaining visual contact with the airfield. Typically rectangular in shape and include pattern legs; upwind, crosswind, downwind, base and final.



The aircraft passed over the control tower, in line with the upwind leg of the circuit for the reciprocal runway (03L) and descended to about 1,330 ft. At the same time, another aircraft was at 700 ft and turning onto the final leg of the circuit for runway 21R, so the tower controller instructed the pilot of CBG to maintain 1,500 ft. At this time, the pilot believed (incorrectly) that the aircraft was positioned on the downwind leg for runway 21R. Seventeen seconds later, the controller instructed the pilot to make a right turn with the intention of repositioning the aircraft to join final for runway 21R via a teardrop turn.

At 1854, the pilot started a right turn, during which the aircraft proceeded outside both the circling area and Parafield control area (see the section titled *Airspace*) at an altitude of 1,400 ft and a groundspeed of 157 kt. During the right turn, the pilot could not see the runway and continued flying south-east at 1,400 ft while looking for it.

About 30 seconds later, the tower controller requested confirmation that the pilot was returning to the airport and informed them that the aircraft was in non-controlled airspace (see the section titled *Airspace*). Although it was dark, there was enough light for the controller to see the aircraft and the hill-line to the east, and therefore, they were not concerned about the aircraft's terrain clearance. The pilot maintained a stable aircraft attitude and altitude as they could see the artificial street lighting on the ground, had good visibility ahead and below the aircraft, and were generally familiar with Parafield Airport.

After the pilot confirmed the intention to return to Parafield, the aircraft continued tracking away from the airport and the controller then instructed the pilot to track direct to the airport, maintain 1,500 ft, and join the upwind leg of the circuit. At 1855, with the aircraft still travelling south away from the airport, the controller requested confirmation that the pilot could see the airport. The pilot acknowledged and turned the aircraft towards Parafield Airport.

**Figure 3: The approach**



Source: Google Earth, annotated by ATSB

At 1856, the tower controller cleared the aircraft for a visual approach. The aircraft joined the circuit via the crosswind circuit leg for runway 21R, with a subsequent downwind leg ground speed of 138 kt and altitude of 1,000 ft, before landing safely at 1901.

## Context

### Pilot

The pilot held a Commercial Pilot Licence (Aeroplane) with a total flying time of 1,185 hours, having flown 82 hours in the previous 90 days. The pilot's total time included 227 hours on the Beechcraft Baron 95-B55 aircraft and a total night flying time of 20 hours.

In discussing the incident, the pilot stated:

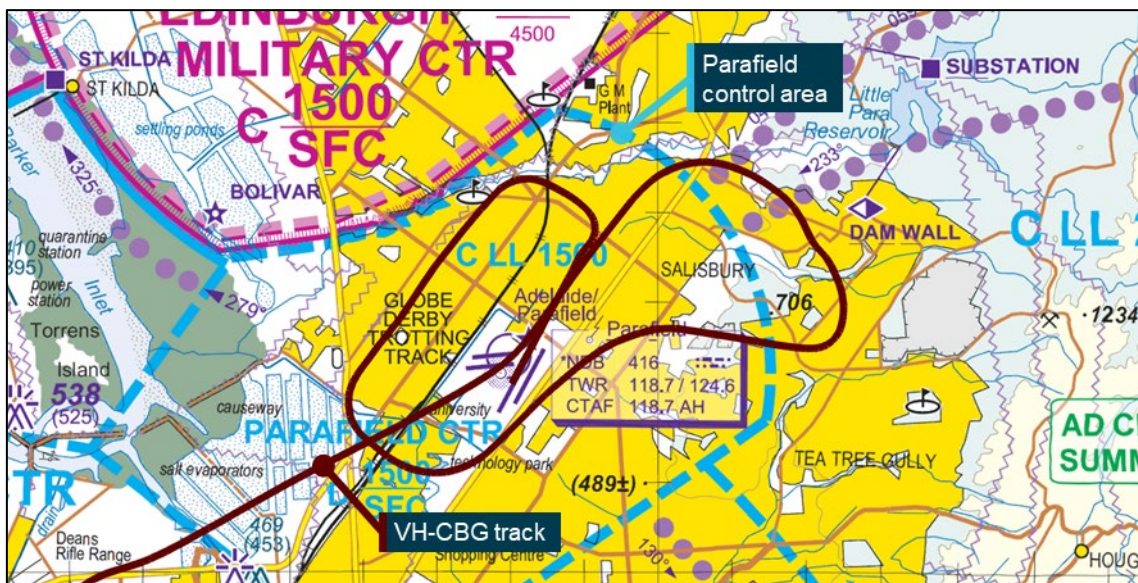
- The behaviour of the autopilot led them to lose confidence in its performance and partly focus on the autopilot during the approach (no defect with the autopilot system was identified after the flight).
- They felt they were 'slipping behind the aircraft' while inbound to Parafield from PORTA.
- When the aircraft flew over the control tower in line with the runway, they believed the aircraft was positioned on the downwind leg.
- They were not aware that the aircraft left the circling area and the control area.
- There was no interaction with the passenger seated in the rear of the aircraft during the approach.

The ATSB collected information about the pilot's 72 hours of activity prior to the incident, including a statement from the pilot that they felt 'a little tired' during the approach to Parafield. However, a review of the evidence identified that it was unlikely that the pilot was experiencing a level of fatigue known to affect performance.

### Airspace

Parafield Airport is situated within Class D terminal airspace extending from the ground level up to an altitude of 1,500 ft. This airspace was controlled by an air traffic controller situated in the Parafield control tower. The airspace bordered both the Royal Australian Air Force Base Edinburgh airspace to the north and Adelaide Airport airspace to the south (Figure 4). The airspace east of Parafield Airport was non-controlled up to 2,500 ft, with Adelaide Airport Class C airspace above that altitude.

Figure 4: Parafield control area



Source: Airservices, annotated by ATSB



### **Night visual approach criteria**

Minimum altitude requirements during the conduct of a visual approach at night under the IFR is provided in section 1.1 of the [Aeronautical Information Publication \(AIP\) En Route](#):

En Route 1.1:

- Paragraph 2.11.3.7 Minimum Altitude Requirements

During the conduct of a visual approach, a pilot must descend as necessary to:

...b. by night:

- (1) For an IFR flight:

...Maintain an altitude not less than the route segment...MSA [minimum sector altitude]...until the aircraft is:

...within the prescribed circling area for the category of aircraft...and the aerodrome is in sight.

- Paragraph 2.11.3.9

...A pilot who is unable to continue a visual approach which has been authorised by ATC must immediately advise ATC.

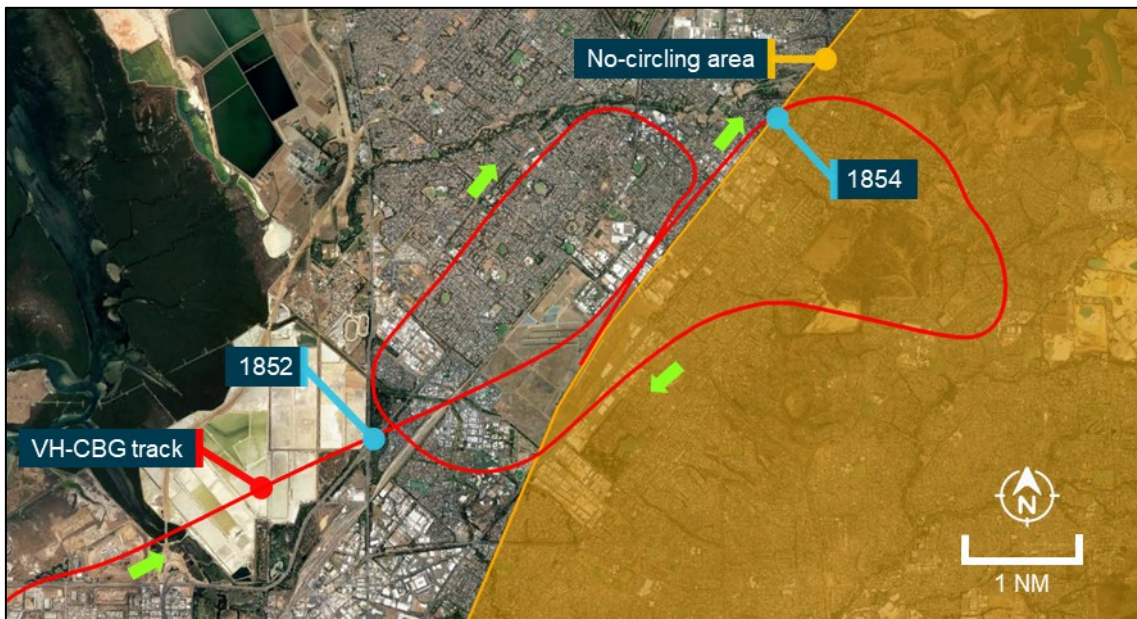
Within a 10 NM radius of Parafield Airport, the minimum sector altitude (MSA) was 3,800 ft AMSL, which provided a minimum terrain clearance of 1,000 ft above all objects.

### **Circling area**

The circling area is an area bounded by arcs drawn from the runway thresholds, with the radius of the arcs dependent on an aircraft's performance category (Category A to E). The performance categories are based on an aircraft's approach speed range. The Beechcraft Baron 95-B55 was a Category B aircraft with a circling area of 2.66 NM.

The Category B circling area provides obstacle clearance of not less than 300 ft at an altitude not below the appropriate minimum altitude for circling, which in this case was 1,580 ft. Circling was prohibited to the east of runway 21R at Parafield Airport due to relatively high terrain (Figure 5).

**Figure 5: Circling area**



Source: Google Earth, annotated by ATSB



## Safety analysis

The aircraft's track and its handling during the night approach was abnormal. This included a high inbound airspeed and incorrect downwind positioning. The pilot's statements and recorded aircraft tracking indicate a loss of situational awareness, which involves three stages:

- obtaining information
- understanding of what is going on around you
- identifying what is likely to happen next.

The loss of situational awareness was probably due to the perceived issue with the aircraft's autopilot system, which distracted the pilot from managing the approach.

As the approach progressed, the pilot's situational awareness became increasingly compromised, resulting in the aircraft being manoeuvred beyond both the circling area and the Parafield control area at an altitude significantly below the minimum sector altitude.

After turning onto what the pilot incorrectly believed was the circuit's base leg, the runway could not be visually identified, but the approach was continued while looking for the runway. Familiarity with the airport and a favourable assessment of the prevailing visibility conditions led the pilot to believe that the safest option was to remain within the proximity of the airport and maintain the aircraft's altitude.

However, the pilot had lost sight of the airport at night when the ability to visually identify obstacles was limited, so the safest option was to climb to the minimum safe altitude. Continuation of the night visual approach well below the minimum safe altitude removed obstacle clearance assurance and increased the terrain collision risk.

## Findings

ATSB investigation report findings focus on safety factors (that is, events and conditions that increase risk). Safety factors include 'contributing factors' and 'other factors that increased risk' (that is, factors that did not meet the definition of a contributing factor for this occurrence but were still considered important to include in the report for the purpose of increasing awareness and enhancing safety). In addition 'other findings' may be included to provide important information about topics other than safety factors.

These findings should not be read as apportioning blame or liability to any particular organisation or individual.

From the evidence available, the following finding is made with respect to the flight below minimum safe altitude involving Beechcraft Baron 95-B55, VH-CBG 5 km north of Parafield Airport, South Australia on 13 May 2021.

### **Contributing factor**

- During the night visual approach under the instrument flight rules the pilot lost situational awareness, probably as a result of distraction due to a perceived autopilot system issue. The approach was then continued at an altitude below the minimum safe altitude, removing obstacle clearance assurance.

## Safety actions

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following proactive safety action in response to this occurrence.

### **Safety action by Hartwig Air**

The operator advised the ATSB that the operator's pilot training program was being updated to include a threat and error management course.

### **Safety action by Airservices Australia**

Airservices Australia advised the ATSB that Parafield Airport tower controllers will be provided with a briefing paper about the incident and incorporate any learning opportunities and safety messaging from the ATSB investigation. The briefing will include information on the circling area, descent below the minimum safe altitude during visual approaches, go-arounds, and the 'safety alert' procedure.

This procedure states that unless a pilot has advised that action is being taken to resolve an unsafe situation, a tower controller can communicate a safety alert to an aircraft when the controller becomes aware that it is in a situation that places it in unsafe proximity to:

- terrain
- obstruction
- active restricted or prohibited areas
- other aircraft.

## **Sources and submissions**

### **Sources of information**

The sources of information during the investigation included the:

- operator
- pilot
- Airservices Australia
- Bureau of Meteorology

### **Submissions**

Under section 26 of the *Transport Safety Investigation Act 2003*, the ATSB may provide a draft report, on a confidential basis, to any person whom the ATSB considers appropriate. That section allows a person receiving a draft report to make submissions to the ATSB about the draft report.

A draft of this report was provided to the following directly involved parties:

- operator
- pilot
- controller
- Airservices Australia
- Civil Aviation Safety Authority.

The controller provided a submission, which was reviewed and, where considered appropriate, the text of the report was amended accordingly.

# General details

## Occurrence details

Date and time:	13 May 2021 – 1854 CST	
Occurrence class:	Serious incident	
Occurrence categories:	Operational non-compliance, Flight below minimum altitude	
Location:	5 km north-east of Parafield Airport, South Australia	
	Latitude: 34° 45.468' S	Longitude: 138° 40.400' E

## Aircraft details

Manufacturer and model:	Beech Aircraft Corp 95-B55	
Registration:	VH-CBG	
Operator:	Hartwig Air	
Serial number:	TC-1698	
Type of operation:	Charter-passenger	
Activity:	Commercial air transport - Non-scheduled - Passenger transport charters	
Departure:	Ceduna Airport, South Australia	
Destination:	Parafield Airport, South Australia	
Persons on board:	Crew – 1	Passengers – 1
Injuries:	Crew – nil	Passengers – nil
Aircraft damage:	None	