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# Operational non-compliance, VH-VNC 15 km south of Avalon Airport, Victoria 30 June 2011

## Abstract

At 2302 Eastern Standard Time on 30 June 2011, an Airbus A320 aircraft, registered VH-VNC and operated by Tiger Airways, conducted a missed approach procedure after an unsuccessful approach to land on runway 18 at Avalon Airport, Victoria. The flight crew contacted air traffic control (ATC) and was directed to climb to 3,000 ft and, after further discussion, to position as required to return to Avalon for a landing on runway 36. During that re-positioning, the flight crew left the assigned altitude without clearance and descended to 1,600 ft, which was below the minimum safe altitude for that area of 2,000 ft. The aircraft landed on runway 36.

The investigation is continuing.

## FACTUAL INFORMATION

*The information contained in this preliminary report is derived from the initial investigation of the occurrence. Readers are cautioned that there is the possibility that new evidence may become available that alters the circumstances as depicted in the report.*

## Sequence of events

On the evening of 30 June 2011, an Airbus A320 aircraft, registered VH-VNC and operated by Tiger Airways, was conducting a flight from Sydney, New South Wales to Avalon Airport (Avalon), Victoria. The captain was operating the aircraft as the pilot

flying (PF) while the first officer (FO) was the pilot monitoring (PM).<sup>1</sup>

Before descent, the flight crew obtained the latest METAR<sup>2</sup> information for Avalon from an AERIS<sup>3</sup> station, which indicated clear conditions at Avalon, but with a downwind component of up to 7 kts for a landing on runway 18 at Avalon. The flight crew prepared for an instrument landing system (ILS)<sup>4</sup> approach and landing on runway 18, with the expectation that, if the downwind component was greater than the aircraft's 10 kts maximum tailwind for landing, a missed approach would be initiated with a return for landing on runway 36 at Avalon. At 2256:10,<sup>5</sup> Melbourne Approach (ML-APP) cleared the aircraft to leave controlled airspace on the ILS approach to runway 18.

1 PF and PM are 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.

2 An aviation routine weather report that uses aeronautical meteorological code.

3 Automatic En Route Information Service, a very high frequency (VHF) automated weather service that provided METAR information for specific airfields.

4 A standard ground aid to landing, comprising two radio guidance beams: the localizer, for direction in the horizontal plane; and the glideslope, for vertical plane direction, usually at an inclination of 3°.

5 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.

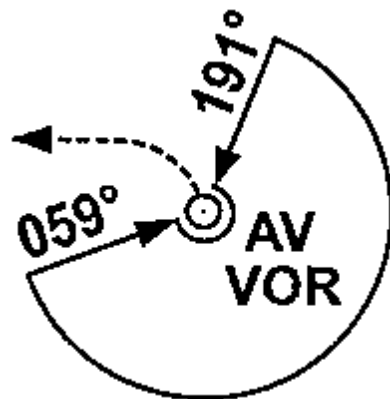
The flight crew conducted a missed approach from the ILS approach to runway 18 due to the tailwind being in excess of the maximum permitted for landing.

The flight crew immediately contacted ML-APP and was instructed to climb to 3,000 ft above mean sea level (AMSL). After further radio communications, the aircraft was cleared to position as required for a landing to runway 36 (that is, a landing from the reciprocal direction on Avalon's single runway).

During the approach to runway 36, the aircraft left its assigned altitude of 3,000 ft without an airways clearance and, while positioning for the final approach to runway 36, descended to 1,600 ft. That was below the minimum safe altitude (MSA)<sup>6</sup> for that part of the approach.

Avalon Airport has ground-based navigation aids including distance measuring equipment (DME)<sup>7</sup> and a very high frequency omnidirectional radio range (VOR)<sup>8</sup>. They are located close together and near the runway. For an aircraft inbound to the VOR on a track of between 191° and 059° clockwise (Figure 1), and between 6 NM (11 km) and 9 NM (17 km) from the DME, the minimum safe altitude is 2,000 ft.

**Figure 1: The relevant sector for determination of the minimum safe altitude**



6 Minimum safe altitude is specified to allow adequate vertical clearance from terrain and buildings.

7 DME here means ground-based transponder station. A signal from an aircraft to the ground station is used to calculate its distance from the ground station.

8 A VOR emits a signal that can be received by appropriately-equipped aircraft and represented as the aircraft's bearing (called a 'radial') to or from the beacon.

The aircraft's track into Avalon, the missed approach and the re-positioning for the approach and landing onto runway 36 is at Appendix A. Appendix B is an integrated list of the flight crew's actions, the changes in aircraft configuration, and the radio communications from the commencement of the approach to runway 18, until the aircraft landed on runway 36.

## Personnel information

The captain held an Air Transport Pilot (Aeroplane) Licence (ATPL(A)) and had accrued about 15,500 hours total flying experience, of which approximately 10,000 hours were in command and about 1,000 hours were on the aircraft type.

The first officer held an ATPL(A) licence and, at the time of the occurrence, had accrued about 7,500 hours total flying experience and had about 380 hours on the aircraft type.

## Meteorological information

Avalon had an automated weather station that produced METAR reports. The METAR for 2300 reported a wind of 030° at 8 kts, visibility of greater than 10 km and broken<sup>9</sup> cloud with a base of 12,500 ft.

## Communications

The communications between the flight crew and ML-APP are at Appendix B.

## Flight recorders

The aircraft was fitted with a flight data recorder and a cockpit voice recorder. Elements of the recorded information are presented in Appendices A and B.

## Additional information

### Airspace

Aeronautical Information Publication (AIP) ENROUTE (ENR) 1.4 identified the air traffic services (ATS) airspace classification system used within Australia. The sections of that classification system that were relevant to the occurrence flight stated that:

9 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.

- controlled airspace was airspace for which air traffic services were provided for instrument flight rules (IFR) flights in accordance with the airspace classification
- controlled airspace was a generic term that covered a number of ATS airspace classes, including Classes D and E airspace
- in Class D airspace, IFR flights are provided with an air traffic control (ATC) service, are separated from other IFR flights, and receive traffic information about visual flight rules (VFR) flights
- in Class E airspace, IFR flights are provided with an ATC service, are separated from other IFR flights, and receive traffic information on VFR flights as far as is possible
- in Classes D and E airspace, IFR aircraft are subject to ATC clearance.

AIP ENR 1.4 identified Class G airspace as non-controlled airspace, in which IFR aircraft are not subject to an ATC clearance but are required to maintain two-way radio communications with ATC.

The AIP En Route Supplement Australia (ERSA) entry for Avalon was amended on 2 June 2011<sup>10</sup>. That entry stated that:

Avalon controlled airspace shall, outside of the tower operating hours, be classified as Class E airspace from 700 ft within the lateral boundary of the control zone (CTR) to the upper level 2,500 ft and, within the Class E steps, from 1,500 ft to an upper level of 4,500 ft. From the surface to 700 ft within the lateral boundary of the CTR, the airspace was classified as Class G.

The published tower operating hours were between 0700 and 2000.

The Australia Terminal Area Chart (TAC) for the Melbourne airspace (TAC-3), dated 2 June 2011, depicted the Avalon airspace as that which operated during the tower's hours of operation.<sup>11</sup> The Avalon CTR was identified as Class D airspace from the surface to 2,500 ft, with Avalon Class E airspace contiguous and above the Class D

airspace. The Class E vertical limits were depicted as being 2,500 ft to 4,500 ft. A note adjacent to the Avalon airspace directed the reader to the ERSA for activation times of the Class E airspace.

#### *Visual approach criteria*

The criteria under which ATC may authorise a visual approach for an IFR flight were identified in AIP ENR 1.1 paragraph 12.8. Paragraph 12.8.1 allowed for a visual approach provided that:

- the pilot has established that flight can continue with continual visual reference to the ground or water; and
- visibility along the flight path was not less than 5,000 m; and
- the aircraft was within 30 NM (56 km) of the aerodrome.

Paragraph 12.8.5 detailed the minimum altitude requirements during the conduct of a visual approach by an IFR flight at night, including that:

- altitude was to be maintained not less than the appropriate step of the DME/global positioning system (GPS) arrival procedure, or 500 ft above the lower limit of the control area, whichever was higher; or
- if receiving an ATS surveillance service, the aircraft was to operate not below the last assigned altitude;

until the aircraft was:

- within the prescribed circling area for the category of the aircraft or higher category, and the aerodrome was in sight; or
- within 5 NM (9 km) of the aerodrome, aligned with the runway centreline and established not below 'on slope' on the precision approach path indicator (PAPI).<sup>12</sup>

## **Further investigation**

The investigation is continuing and will include the:

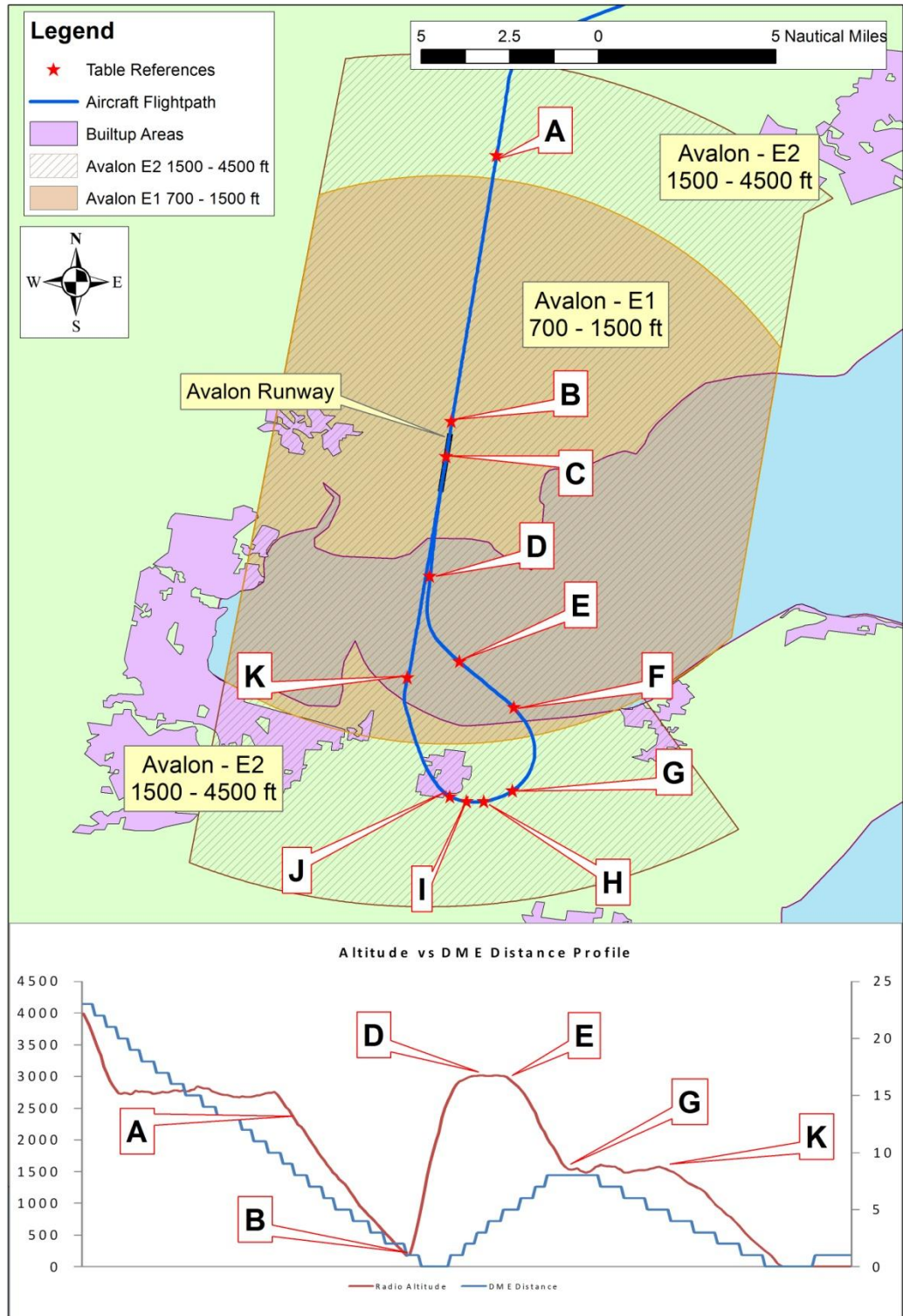
- analysis of recorded flight and air traffic control data
- examination of the operator's procedures.

<sup>10</sup> That amendment contained no variations from the previous version that were significant for the investigation.

<sup>11</sup> The airspace depicted in Appendix A was in operation at the time of the occurrence.

<sup>12</sup> An approach lighting system that aids the pilot to identify the correct glidepath to the runway.

APPENDIX A: AIRCRAFT TRACK AND DESCENT PROFILE WITH AIRSPACE DIMENSIONS<sup>13</sup>



13 The labels 'A' through 'K' correspond with a number of entries in the transcript of events and radio communications (Appendix B).

APPENDIX B: TRANSCRIPT OF EVENTS AND RADIO COMMUNICATIONS<sup>14</sup>

Event Identifier <sup>15</sup>	Time	Crew Activities/Events	Radio Call From	Radio Call To	Call	Response
A	22:56:10		ML-APP	Go Cat 6207 <sup>16</sup>	Cleared to leave controlled airspace tracking via the 18 ILS approach, no reported IFR traffic.	Cleared to leave controlled airspace on the 18 ILS Avalon, Go Cat 6207.
	22:57:04		Go Cat 6207	CTAF <sup>17</sup> Broadcast	Go Cat 6207, A320, is currently 15nm NE inbound for the ILS runway 18.	
	22:58:06		ML-APP		Go Cat 6207, the wind is now showing 030/7, cleared to close this frequency. Confirming there is no reported IFR traffic, report on the ground clear of the runway on 133.55 to cancel SAR.	Report on the ground clear of the runway on this frequency, Go Cat 6207.
	22:58:36		Go Cat 6207	CTAF Broadcast	Traffic Avalon, Go Cat 6207, Airbus A320 is now establishing on the ILS at 10 miles.	
	22:59:22	2500 automated radio altitude (RA) <sup>18</sup> call.				

14 The transcription is an incomplete representation of all of the events and actions recorded with respect to the occurrence flight.

15 With reference to the track labels in Appendix A.

16 Radio callsign for the occurrence aircraft.

17 Common Traffic Advisory Frequency.

18 Altitude determined by radar altimeter.

Event Identifier <sup>15</sup>	Time	Crew Activities/Events	Radio Call From	Radio Call To	Call	Response
B	23:00:37	Aircraft configured for landing <sup>19</sup> as it passed 1,350 ft RA. The Flight Control Unit <sup>20</sup> (FCU) was set to 128 kts and 2,500 ft for the go-around.				
	23:00:51	Landing checks completed.				
	23:02:03	Go-around initiated.				
C	23:02:05	Aircraft reconfiguration commenced, flap selected to Flap 2, landing gear selected up.				
	23:02:26		Go Cat 6207	ML-APP	Melbourne Control, Go Cat 6207, going around, climbing runway heading to 2,500.	Go Cat 6207, still identified, climb to 3,000.
	23:02:31	As the aircraft passed 1,000 ft RA, FCU target airspeed set to 189 KIAS.				
	23:02:31		Go Cat 6207	ML-APP	3,000, Go Cat 6207.	
	23:02:40		ML-APP	Go Cat 6207	Go Cat 6207, when able advise intentions.	
	23:02:42	Command for 'flap 1'.				
	23:02:53	Flap selected to 1.				
	23:03:05	Captain identified intent to 'go selected speed and leave flap at manoeuvre'.				

19 The landing configuration was landing gear down and locked and flaps set to Full.

20 The FCU is located on the glareshield in front of the flight crew and allows the crew to make short-term inputs into the Flight Management Guidance System (FMGS). The FMGS provided aircraft navigation, lateral and vertical guidance and aircraft performance functions along a pre-planned route that has been previously entered into the system by the flight crew.

Event Identifier <sup>15</sup>	Time	Crew Activities/Events	Radio Call From	Radio Call To	Call	Response
	23:03:10	First Officer (FO) asked if the Captain would like him to talk to the passengers.				
	23:03:10		ML-APP	Go Cat 6207	Go Cat 6207, what would you like to do now.	
	23:03:11	Captain identified intention to make a teardrop to FO, takes radio while FO makes PA.				
	23:03:20		Go Cat 6207	ML-APP	Approach Go Cat 6207, we had a bit of a downwind there on the landing, are we okay to make a teardrop for landing left turn out but a right turn back to land?	Go Cat 6207, affirm, so come back visual or by the VOR?
D	23:03:31	Aircraft levels off at 3,000 ft.				
	23:03:39		Go Cat 6207	ML-APP	No no, we are visual, we are happy just to make a left hand teardrop to turn back into a right hand pattern.	Go Cat 6207, that's approved.
	23:03:47				Thank you.	
	23:03:48	Captain states his intention to the FO. Confirms FO is happy with his intentions. Captain called for After Take-off Checks.				
	23:03:54		ML-APP	Go Cat 6207	Go Cat 6207, report turning inbound for descent.	Go Cat 6207, Wilco.
E	23:04:15	Open descent selected, target 1,600 ft. Aircraft commenced descent.				

Event Identifier <sup>15</sup>	Time	Crew Activities/Events	Radio Call From	Radio Call To	Call	Response
F	23:04:17	After Take-off Checks completed.				
	23:04:20	FO begins to insert runway 36 data into the Multifunction Control and Display Unit (MCDU). <sup>21</sup>				
	23:04:38	Captain commanded 'activate the route'.				
	23:04:45	Captain called to 'activate the approach'. This was followed by discussion about cleaning up the approach.				
	23:04:50	Aircraft passing 2,600 ft.	ML-APP	Go Cat 6207	Go Cat 6207, Confirm you will be maintaining 3,000 until back on final?	Go Cat 6207, we are leaving 3,000 now for the teardrop turn right base for runway 36.
	23:04:56		ML-APP	Go Cat 6207	Go Cat 6207, understood, established on the PAPI or circling area make visual approach for runway 36 the wind still trending about 030/8 kts.	Go Cat 6206 Roger.
	23:05:15	Captain directed the FO to ignore the MCDU, he will track visually, instructed the FO to monitor the approach.				
	23:05:19	Captain directed 'activate the approach'.				
	23:05:22	Captain identified approaching the target altitude, calls to make sure that FO is monitoring the aircraft, calls				

21 The MCDU is the interface that the flight crew uses to insert flight planning details into the aircraft's flight management guidance computers and that displays various flight information.

Event Identifier <sup>15</sup>	Time	Crew Activities/Events	Radio Call From	Radio Call To	Call	Response
		'1,600 ft'.				
	23:05:29	Discussion concerning the position of the aircraft relative to the runway. The FO visually confirming the runway is sighted at 23:05:29.				
G	23:05:37	Aircraft levels of at 1,600 ft.				
	23:05:42	Captain commanded 'flap 2'.				
H	23:05:47	Flap 2 selected. Commencement of aircraft being reconfigured for the landing.				
I	23:05:54		ML-APP	Go Cat 6207	Go Cat 6207, are you happy with the terrain there, you are showing one thousand six hundred?	Yeh, Go Cat, affirm, we are visual.
J	23:05:55	Captain declared 'Runway's in sight'.				
	23:05:57		ML-APP	Go Cat 6207	Go Cat 6207, okay thanks.	
	23:06:11	Landing gear selected down.				
	23:06:22		ML-APP	Go Cat 6207	Go Cat 6207, clear to close this frequency, confirm there is no reported IFR traffic and on the ground clear of the runway contact me 133.55 to cancel SAR.	Go Cat, will contact you on the ground clear of the runway.
K	23:07:48	Aircraft commenced descent on final approach.				
	23:08:27	Landing checks reported complete.				
	23:08:43		Go Cat	CTAF Broadcast	All stations Avalon, Go Cat 6207 is now on final for runway 36	
	23:09:02	Automated 1,000 ft RA call.				

Event Identifier <sup>15</sup>	Time	Crew Activities/Events	Radio Call From	Radio Call To	Call	Response
	23:10:41	The aircraft touched down on runway 36. Wind on touchdown was 7 kt headwind.				