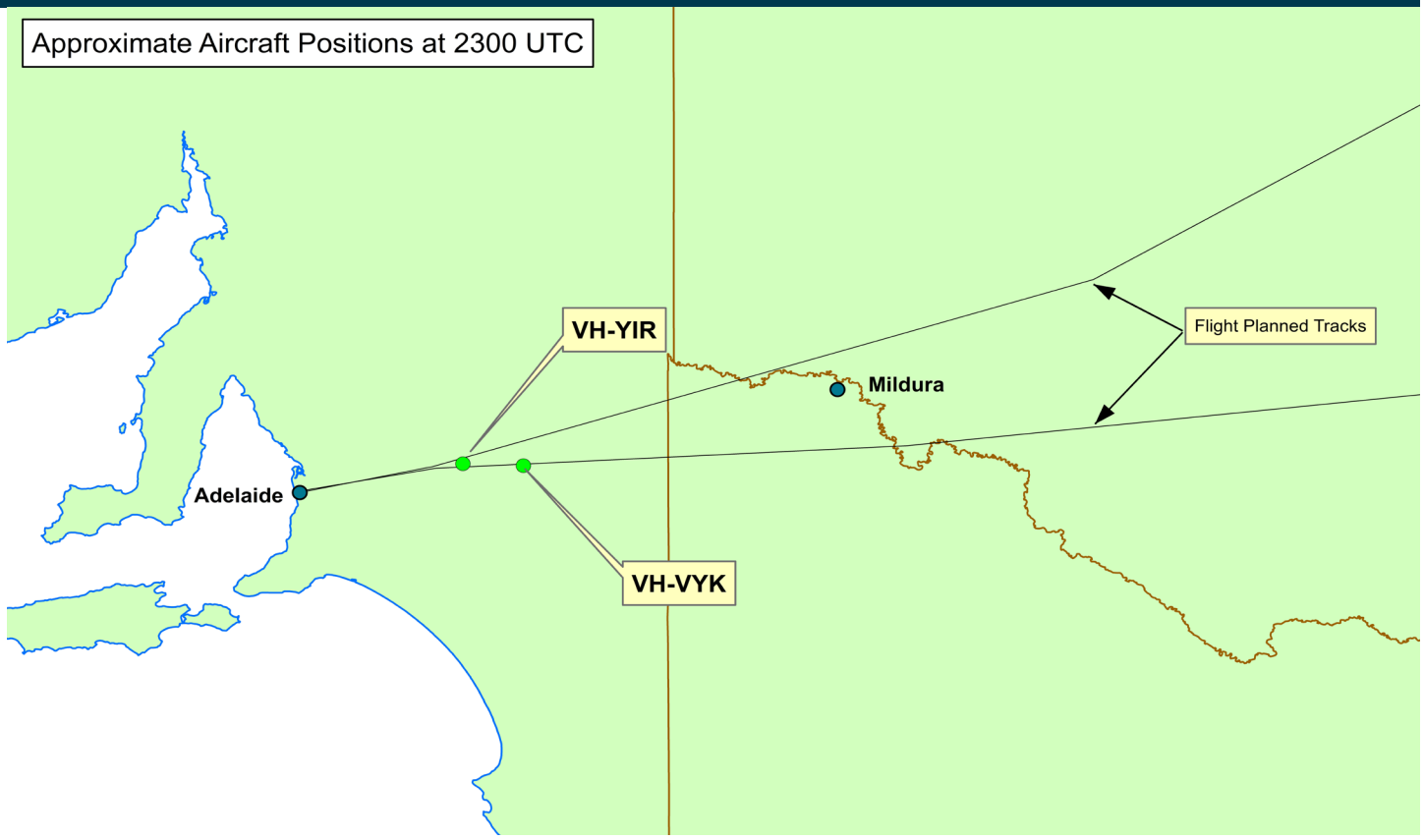
Australian Government
Australian Transport Safety Bureau

Weather related operational event involving Boeing 737s VH-YIR and VH-VYK

Mildura Airport, Victoria | 18 June 2013



Investigation

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Preliminary – 18 July 2013

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Addendum

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The occurrences

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.

History of the flights

On the morning of 18 June 2013, a Boeing Company 737 (B737) aircraft, registered VH-YIR (YIR) and operated by Virgin Australia, was conducting a scheduled passenger service from Brisbane, Queensland to Adelaide, South Australia. On board were 6 crew members and 85 passengers. The aircraft was being flown by the pilot in command (PIC) with a first officer (FO) who was performing the duties of pilot monitoring.

On the same morning, another B737 aircraft, registered VH-VYK (VYK) and operated by Qantas Airways Limited, was conducting a scheduled passenger service from Sydney, New South Wales, to Adelaide. On board were 6 crew and 146 passengers. The aircraft was being flown by the PIC with an FO who was performing the duties of pilot monitoring.

VH-YIR flight planning

As part of their pre-flight routine, and after accessing the relevant weather forecasts and reports via the National Aeronautical Information Processing System, both flight crew members assessed the weather conditions for the flight on the night prior and again once they awoke on the morning of the flight. Their assessment was that conditions were fine and there was no adverse weather expected either en route or at the destination.

The crew was provided with a flight briefing package by their company that was generated at 1913 Coordinated Universal Time[1] and included the flight and fuel plan, weather forecasts for a number of airports, NOTAMs[2] and the expected loading of the aircraft. The ramp fuel indicated on the flight plan and reported as carried by the crew was sufficient to meet the minimum operating requirement[3] for the flight. On the basis of the forecasts available to the crew in this briefing, they assessed the forecast conditions for the flight and landing as being fine and determined that an alternate aerodrome for Adelaide was not required. According to the fuel plan, upon arrival at Adelaide the aircraft was planned to have approximately 2,500 kg of fuel remaining in the tanks, which equated to the planned fuel reserves plus an additional 30 minutes of fuel.

The flight briefing package indicated that the aircraft was capable of conducting an automatic landing[4] and the crew reported that they were trained and current on auto-land procedures.

The aircraft departed Brisbane for Adelaide at 2038.

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1 Local time in Brisbane and Sydney was Coordinated Universal Time (UTC) + 10 hours, and in Adelaide UTC + 9:30. Due to Adelaide being in a different time zone to most of the flight and the respective departure airports, the times in this report are expressed in UTC for consistency and ease of understanding.

2 A Notice To Airmen advises personnel concerned with flight operations of information concerning the establishment, condition or change in any aeronautical facility, service, procedure, or hazard, the timely knowledge of which is essential to safe flight.

3 Minimum operating fuel was defined as including flight fuel from departure to destination, a variable fuel reserve of 10 per cent of the flight fuel, a fixed fuel reserve equal to 30 minutes of flight time, any fuel required due to forecast weather en route, planned air traffic control routing or traffic holding at the destination, any fuel required for flight to an alternate aerodrome (if required), and any fuel required due weather or traffic at that alternate aerodrome. It also included an amount for taxi.

4 An automatic landing is a landing that is conducted in conditions where there are no visual cues available during landing to assist the pilots. It uses a number of automatic flight control systems on board the aircraft, along with specific procedures, and is combined with a ground-based instrument landing system and runway environment that results in a precisely repeatable approach and landing on a runway.

VH-VYK flight planning

The crew of VYK were provided with a flight briefing package by their company approximately 1 hour before departure that included the flight and fuel plan, weather forecasts for a number of airports, NOTAMs and the expected loading of the aircraft. The fuel uplift indicated on the flight plan and the total fuel load reported as carried by the crew was sufficient to meet the minimum operating requirements for the flight. According to the flight plan, upon arrival at Adelaide the aircraft was planned to have approximately 2,800 kg of fuel remaining in the tanks, which equated to the planned fuel reserves plus an additional 45 minutes of fuel.

The flight crew assessed the weather information that was provided to them in the briefing and determined that there was no adverse weather expected either en route or at Adelaide. On the basis of the forecasts available to the crew at briefing, they assessed the forecast conditions as being fine at Adelaide and that an alternate airport was therefore not required. The PIC reported that, as part of his pre-flight preparation, on arrival at the aircraft he checked the actual weather conditions at Adelaide and determined that they had not changed from those forecast.

There was no indication on the flight plan of the aircraft's auto-land status; however, the flight crew reported their being trained and current to use an auto-land procedure.

The aircraft departed Sydney for Adelaide at 2127.

En route

VH-YIR

The crew of YIR reported that they were not advised of any changing weather conditions at Adelaide until just prior to top of descent (approximately 330 km from Adelaide). Nor had they heard any discussion between air traffic services (ATS) and other aircraft about the weather conditions at Adelaide.

VH-VYK

At 2148, the crew of VYK was advised by their company via the aircraft communications and automatic reporting system (ACARS) that the forecast on which they had planned the flight had been amended and that Adelaide now required provision for an alternate airport, due to a period of probable fog between 2100 and 2400. There was an approximate 45-minute delay in providing this information to the crew due to the operator's sterile cockpit procedure,[5] during which unnecessary ACARS messages were not transmitted to the aircraft.

Once the amended forecast was received by the crew of VYK, they requested weather forecasts and reports for a number of other airports. On receipt of that information, they decided to continue towards Adelaide until approximately 80 NM (148 km) east of reporting point MAXEM, or about 520 km from Adelaide. Their expected time of arrival (ETA) at that position was 2220. The crew decided that if the weather indicated that they could not continue to Adelaide from that point, they would return to Sydney.

At approximately 2215, the crew of VYK obtained a forecast of the weather and a report of the conditions at Adelaide via ACARS. The forecast had not changed from the amended forecast that was provided to the crew earlier. The weather report indicated that the visibility had reduced to 2,000 m in fog and to 500 m to the north in fog, and that from 2300 the visibility was forecast to improve to greater than 10 km. On the basis of this weather information and taking into consideration the fuel on board, which would have allowed the aircraft to (if necessary) hold for 45 minutes after the estimated arrival time of 2320, the crew elected to continue to Adelaide.

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[5] The sterile cockpit rule was introduced to minimise unnecessary distractions during critical phases of flight. The operator maintained a sterile cockpit from push back until established above 10,000 ft above mean sea level (AMSL) on climb.

Weather forecasts and reports

The main weather-related events relevant to the en route phases of each flight are listed at Appendix A. The published weather forecasts and weather reports at the time of each of those events are also highlighted.

Notification of fog at Adelaide and diversions

VH-YIR

The crew of YIR were routinely transferred from one ATS sector to another as they flew across New South Wales. Shortly before reaching top of descent, they were transferred to a new ATS sector and the air traffic controller asked the crew if they were aware of the 'fog at Adelaide'. The crew reported that they were not and immediately commenced obtaining additional weather information for a number of alternate airports, including Mildura. The weather report received for Mildura indicated visibility at Mildura was in excess of 10 km, with a broken[6] cloud layer at 3,900 ft. Based on this weather information, the crew decided that they were able to continue to a point approximately 90 km from Adelaide, from where they would divert to Mildura if the weather had not improved at Adelaide. Their planning indicated that they would have about 30 minutes of fuel in addition to their reserve fuel overhead Mildura if they diverted at their planned diversion point. This equated to 2,000 kg of fuel. The crew were also cleared by air traffic control (ATC) to contact Adelaide Tower as required to obtain an appreciation of the actual weather conditions affecting Adelaide. Following the indication of the Adelaide weather in that radio call, the crew elected to divert to Mildura and obtained an ATC clearance to do so.

VH-VYK

When the crew of VYK were transferred to Adelaide approach control they were advised that a third B737 aircraft had conducted an approach to Adelaide and been unable to land because of low visibility due to fog and was diverting to Melbourne, Victoria. In response, the crew of VYK entered a holding pattern at a position 85 km from Adelaide and reviewed the weather information that they had received earlier. In addition, the crew requested an actual weather report for Royal Australian Air Force Base Edinburgh, 28 km north of Adelaide Airport. This report indicated that they could not land at Edinburgh due to the presence of fog.

A report of the actual weather conditions at Mildura that was also requested by the crew indicated a visibility in excess of 10 km, with a broken cloud layer at 3,900 ft. On the basis of that weather report the crew decided to divert to Mildura. The crew reported planning to have approximately 2,900 kg of fuel on arrival at Mildura.

VH-YIR arrival at Mildura

Positioning for the approach

The crew of YIR proceeded to Mildura. Based on the latest weather report received for Mildura, they decided and made preparations to carry out a Distance Measuring Equipment[7] arrival until below the reported cloud level, before making a visual approach to runway 27. They also loaded the runway 27 area navigation global navigation satellite system (RNAV(GNSS))[8] instrument approach into the aircraft's flight management system in the event that the weather conditions made an instrument approach necessary.

The crew briefed the cabin crew in relation to the fog at Adelaide and decision to divert to Mildura. They continued the flight towards Mildura and commenced a descent in accordance with their plan.

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6 Cloud cover is normally reported using expressions that denote the extent of the cover. Broken indicates that more than half to almost all the sky was covered, while Overcast means all the sky was covered.

7 Distance Measuring Equipment (DME) is a ground-based transponder station. A signal from an aircraft to the ground station is used to calculate its distance from the ground station.

8 Formally known as a global positioning system/non-precision approach (GPS/NPA), a RNAV (GNSS) approach provides pilots with lateral guidance only, based on a number of waypoints.

The aircraft left controlled airspace en route to Mildura and, on first contact with the sector controller with responsibility for that airspace, the crew were provided with the expected traffic at Mildura for their ETA of 2332. This included: a Saab 340 aircraft that was expected to arrive 2 minutes prior to YIR; a De Havilland DHC-8 aircraft, arriving 2 minutes after YIR's ETA and another Saab 340 aircraft arriving 6 minutes later; and VYK with an ETA of 2342.

As they descended through about 10,000 ft in visual conditions, it became obvious to the crew of YIR that the weather conditions were not as reported and that there appeared to be fog at Mildura and low cloud in the area. An indication of the actual weather at Mildura was not possible from the automated weather information service (AWIS)[9] at the airport as it was unavailable. This unavailability was published via NOTAM. The crew were anticipating a low fuel warning at approximately 2,000 kg fuel remaining, and decided to action the relevant checklist.

As they approached the airport, it became even clearer that the weather was worse than reported and they heard the crew of the Saab 340 aircraft report conducting a missed approach and diverting to Broken Hill.

The crew elected to discontinue the visual approach, and activated the RNAV(GNSS) approach previously loaded into the flight management system. They decided to commence the approach from waypoint MIAEC, which was located to the south-east of the airport. At the same time, they heard the crew of one of the DHC-8 aircraft report that they were tracking to a waypoint located to the east of the airport to commence the RNAV(GNSS) approach. The crew of YIR reported that, in response, they turned to the right slightly to increase the distance between themselves and that aircraft and that they were in visual flight conditions at that time, above the low cloud and fog.

As the crew turned and tracked to MIAEC to commence the approach, they reported hearing the crew of VYK also tracking direct to MIAEC and asking the crew of YIR for their intentions. The crew of YIR advised that they were commencing an approach via MIAEC. The crew of VYK replied that they were also commencing the approach and that fuel was an issue. The crew of YIR reviewed their fuel status and, assessing the intent of the radio transmission from the crew of VYK as meaning that they had less fuel than YIR, elected to fly to the north of MIAEC and allow the crew of VYK to conduct their approach first. They visually sighted VYK and reported that they were well clear, continuing to monitor VYK's position via their aircraft's traffic collision and avoidance system (TCAS).

The crew of YIR also decided that if VYK conducted the approach first, the crew of that aircraft would then be able to give them an appreciation of the weather and actual cloud base at Mildura. A DHC-8 aircraft reported going around and diverting due to fog as the crew of YIR monitored the progress of VYK on TCAS and discussed their own approach.

The crew of VYK conducted the RNAV runway 27 approach and landed (see the following section titled *VH-VYK arrival at Mildura* for further information). Following that landing the crew of VYK advised the crew of YIR that they had become visual approximately 150 ft below the minimum descent altitude[10] and that visibility was around 3,000 m.

Conduct of the approach and landing

The crew of YIR decided to conduct an initial approach to assess where the approach would place them in relation to the runway environment. They also indicated that taking this approach would increase the time before landing and, as the time was approaching 2400 (1000 local time), the temperature on the ground would be increasing, possibly leading to an improvement in the fog conditions. They reported contacting ATS to advise them of the actual weather conditions encountered and their intentions, and to nominate an operations normal time[11]. ATS asked the

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[9] The aerodrome weather information service (AWIS) provides actual weather conditions, via telephone or radio broadcast, from Bureau of Meteorology automatic weather stations.

[10] The minimum descent altitude for the runway 27 RNAV(GNSS) approach is 660 ft AMSL. This equates to 493 ft above the ground.

[11] A time nominated by either ATS or flight crew by which two-way radio contact will be made, indicating that operations are normal. This procedure allows for the continuation of a search and rescue watch on the aircraft.

aircraft for its revised fuel status and alternate and were advised that there was no alternate, that they would be landing at Mildura due insufficient fuel to divert. When asked by ATS if they wished to declare a fuel emergency, the crew replied that they would be doing so in the next 10 minutes. ATS replied by asking if they wished to have a local standby[12] called for their arrival at Mildura. The crew replied in the affirmative.

Prior to commencing the approach, the crew of YIR contacted the crew of VYK and asked them to provide the QNH[13], the actual weather conditions and to see if the runway lights were illuminated. The crew of VYK provided the information as requested.

At approximately 2358, the crew of YIR commenced their first approach, deciding that if they obtained visual reference with the runway, they would land and that if they were not visual they would conduct a missed approach. The crew of YIR had planned to descend to a minimum of 300 ft[14], and configured the aircraft early for the final approach. They reported entering the fog layer at about 800 ft. The PIC concentrated on flying the aircraft, while the FO provided support and assessed the aircraft's position visually over the ground. The FO indicated that visibility to the front of the aircraft was virtually non-existent, so he elected to look down from the right cockpit side-window to assess their position. He recalled sighting the threshold as the PIC called going around. The FO provided support to the PIC and during the go around sighted the crossing runway.

As the aircraft climbed out, the crew became visual above the fog at approximately 800 ft and conducted a right circuit. They discussed the first approach and assessed that the RNAV (GNSS) approach would place them over the physical runway environment successfully. Due to their fuel state, they were required to land from the next approach, regardless of conditions.

The crew briefed the cabin crew of their plan and that they would be given an emergency landing call during the approach and should review their actions and prepare the cabin accordingly. The cabin crew asked when they should commence their actions and the crew indicated that there would be a public address (PA) announcement during the final approach. The crew also indicated that the touchdown would be firm and that they had about 4 minutes before landing.

As the crew reconfigured the aircraft for the second approach, they decided to raise the height of their seats to improve the downward visibility ahead of the aircraft. The PIC also reported assessing the wind velocity from the navigation display during the base leg and from that assessed where the runway was likely to be in relation to the cockpit windows during the landing. The FO decided that it would be best to allow the PIC to concentrate on flying the aircraft and that he would make the PA broadcast to the cabin for the PIC. He recalled making the appropriate radio calls and hearing the second DHC-8 aircraft holding overhead Mildura at 10,000 ft.

The flight crew commenced the final approach and the FO made the 'BRACE BRACE BRACE' PA announcement as the aircraft passed 600 ft. The cabin crew immediately called for passengers to keep their heads down.

The FO then looked outside and down to obtain visual reference with the ground and saw the same visual features as he had on the first approach. He assessed the aircraft was over the runway and reported hearing the PIC disconnect the autopilot. The crew could not determine where they were in relation to the length of the runway and flew the aircraft onto the ground. The crew recalled hearing an enhanced ground proximity warning system (EGPWS) sink rate warning and that the touchdown was 'firm'. The crew obtained slightly better visual cues as the aircraft rolled out on the runway and conducted the normal after touchdown and rollout procedures. As the aircraft was turned off the runway, the FO made a PA to the cabin advising that they had landed and that the emergency procedures were no longer applicable.

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12 A local standby is the deployment of emergency services to an airfield to await the arrival of an aircraft.

13 Altimeter barometric pressure subscale setting to provide altimeter indication of height above mean seal level in that area.

14 The elevation of Mildura is 167 ft. A minimum of 300 ft would place the aircraft approximately 150 ft above ground level.

The crew taxied to the parking area and shut down the aircraft at 0018. The recorded total fuel remaining in the fuel tanks on shut down was 535 kg.

VH-VYK arrival at Mildura

Prior to their landing at Mildura, crew of VYK heard the crew of YIR indicating that they were discontinuing the visual approach and that they were conducting the RNAV(GNSS) approach to runway 27. The crew of VYK were already tracking to the commencement of that approach so they broadcast their intentions and asked the crew of YIR for their intentions. They also indicated that they had limited fuel remaining. The reply from the crew of YIR indicated that they were going to let VYK conduct the approach first, so the crew of VYK proceeded on that basis. The crew of VYK were also aware of the other aircraft in the vicinity.

As they approached the airport from the south-west, the crew of VYK reported that there appeared to be low stratus cloud in the area, and that fog was on the ground to the north of the airport. As they continued towards waypoint MIAEC, they heard the crew of an aircraft conduct a missed approach, which they took as an indication that the conditions at Mildura were deteriorating rapidly. They configured the aircraft early for the approach and planned to descend as far as 200 ft below the minimum descent altitude if required.

The crew recalled that as they flew the approach, breaks started to appear in the cloud at about 100 ft above the published minimum altitude for the instrument approach. However, they could not see the runway environment at this time. The crew continued the descent and reported that between 100 and 150 ft below the published minimum altitude, they obtained visual reference with the runway and landed the aircraft. The crew conducted the normal landing and rollout procedures and the PIC reported that, as the aircraft exited the runway, he noticed that the fuel remaining was 2,100 kg.

The crew taxied the aircraft to the parking area and shut the aircraft down. The PIC reported that after he had shut the aircraft down, he looked towards the landing threshold for runway 27 but could not see it at all. The distance between the reported parking area of VYK and the threshold was approximately 700 m.

Air traffic services

Both aircraft were operating scheduled regular public transport services and were required to be in contact with ATS at all stages of the flights. In this respect, both crews reported no problems with radio communications between the aircraft and ATS. The crews also indicated that both aircraft were passed between numerous ATS sectors without any problems with their radio communications.

Continuing investigation

The investigation is continuing and will examine the:

- provision of information to flight crews from ATS
- ATS policies and procedures affecting the flights
- provision by the operators of information to the respective flight crews
- the basis for the sequencing of the aircraft landings at Mildura
- Bureau of Meteorology meteorological services and products as they applied to these flights
- accuracy of aviation meteorological products in Australia.

The final report is anticipated for release to the public by June 2014. Should any critical safety issues emerge during the intervening period, the ATSB will immediately bring those issues to the attention of the relevant authorities or organisations and publish them as required.

Appendix A - Weather forecasts and reports while the aircraft were en route

The weather-related events and published weather forecasts and reports tabulated below do not indicate whether the applicable weather information was passed to the aircraft; rather, they indicate particular times when weather information was issued by the Bureau of Meteorology or Airservices Australia.

A diagram is provided to show the approximate position of each aircraft in relation to the departure airports and Adelaide and Mildura at appropriate times.

All times are in UTC.

Time: 1925 - YIR crew at flight briefing	
Adelaide TAF[15]	TAF YPAD 171703Z 1718/1824 VRB05KT 9999 FEW030 SCT045 FM181000 VRB05KT CAVOK RMK T 06 06 11 14 Q 1018 1018 1020 1020
Adelaide METAR[16]	METAR YPAD 171900Z 07004KT 9999 FEW022 05/04 Q1018 RMK RF00.0/000.0 TTF: NOSIG
Mildura TAF	TAF AMD YMIA 171758Z 1718/1812 24005KT 9999 SCT030 BKN060 BECMG 1718/1720 21006KT 9999 SCT006 SCT030 BECMG 1800/1802 18010KT 9999 SCT030 SCT050 BECMG 1807/1809 16008KT 9999 SCT040 TEMPO 1719/1724 BKN006 RMK T 06 05 07 13 Q 1016 1018 1020 1019
Mildura METAR	METAR YMIA 171900Z AUTO 29005KT 9999 SCT048 06/05 Q1017 RMK RF00.0/000.0

Time: 2000 – VYK crew at flight briefing	
Adelaide TAF	TAF YPAD 171703Z 1718/1824 VRB05KT 9999 FEW030 SCT045 FM181000 VRB05KT CAVOK RMK T 06 06 11 14 Q 1018 1018 1020 1020
Adelaide METAR	METAR YPAD 172000Z 06004KT 9999 FEW022 05/04 Q1019 RMK RF00.0/000.0 TTF: NOSIG
Mildura TAF	TAF AMD YMIA 171758Z 1718/1812 24005KT 9999 SCT030 BKN060 BECMG 1718/1720 21006KT 9999 SCT006 SCT030 BECMG 1800/1802 18010KT 9999 SCT030 SCT050 BECMG 1807/1809 16008KT 9999 SCT040 TEMPO 1719/1724 BKN006 RMK T 06 05 07 13 Q 1016 1018 1020 1019
Mildura METAR	METAR YMIA 172000Z 26003KT 9999 FEW042 06/05 Q1017 RMK RF00.0/000.2

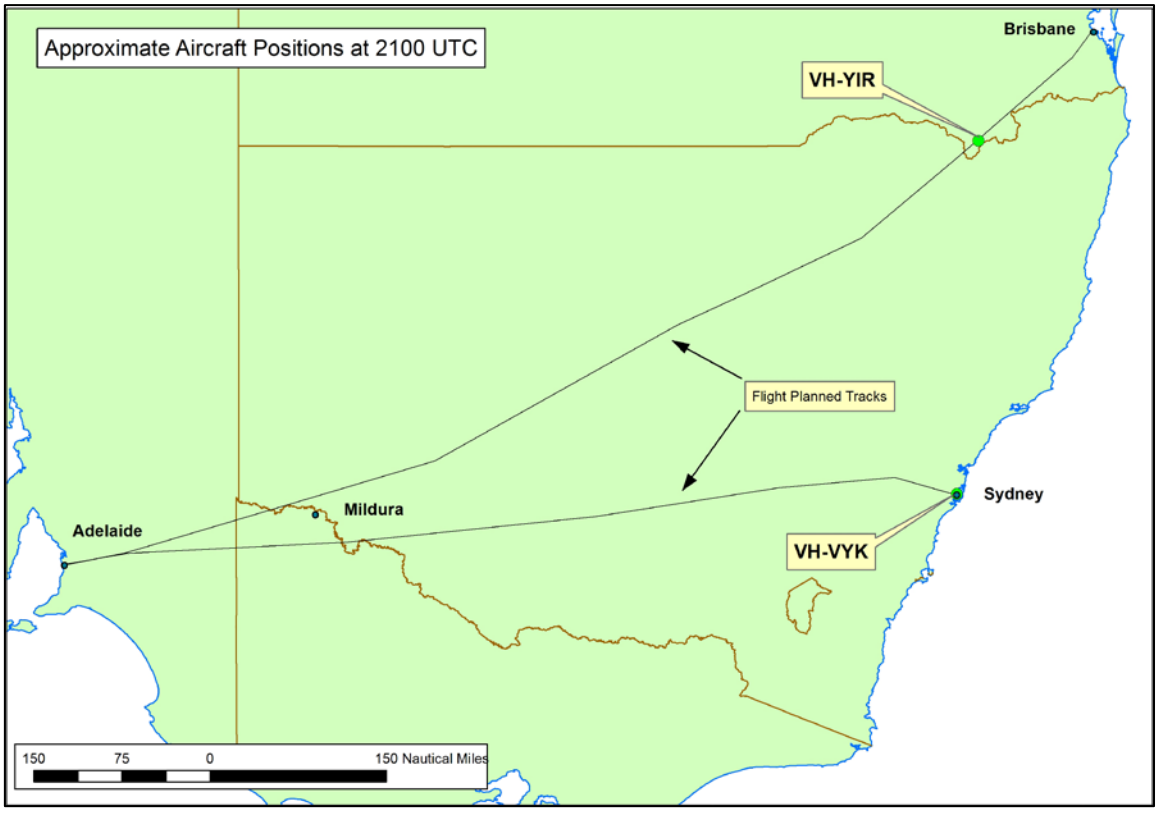
[15] Aerodrome Forecasts (TAF) are a statement of meteorological conditions expected for a specific period of time, in the airspace within a radius of 5 NM (9 km) of the aerodrome. A TAF is used by the flight crew to determine the need to plan for an alternate aerodrome, based on weather conditions forecast.

[16] Routine aerodrome weather report issued at fixed times, hourly or half-hourly.

Time: 2038 – YIR departs Brisbane	
Adelaide TAF	No change from previous
Adelaide METAR	METAR YPAD 172030Z 08005KT 9999 FEW022 05/05 Q1019 RMK RF00.0/000.0 TTF: NOSIG
Mildura TAF	No change from previous
Mildura METAR	METAR YMIA 172030Z 27003KT 9999 FEW038 05/05 Q1017 RMK RF00.0/000.2

Time: 2100 – YIR approaching top of climb, VYK pushing back for departure at Sydney (Figure A1)	
Adelaide TAF	TAF AMD YPAD 172100Z 1721/1824 05005KT 9999 FEW025 FM180000 VRB05KT 9999 FEW030 SCT045 FM181000 VRB05KT CAVOK PROB30 1721/1724 0500 FG RMK T 05 10 14 15 Q 1019 1020 1020 1020
Adelaide METAR	METAR YPAD 172100Z 05004KT 9999 FEW022 05/05 Q1019 RMK RF00.0/000.0 TTF: NOSIG
Mildura TAF	No change from previous
Mildura METAR	METAR YMIA 172100Z 28005KT 9999 FEW042 05/05 Q1018 RMK RF00.0/000.2

Figure A1: Approximate aircraft positions at 2100



Time: 2111 – YIR in cruise, VYK on initial climb from Sydney

Adelaide SPECI[17]	SPECI YPAD 172111Z 06005KT 9999 MIFG FEW022 SCT058 05/05 Q1020 RMK RF00.0/000.0 TTF: NOSIG

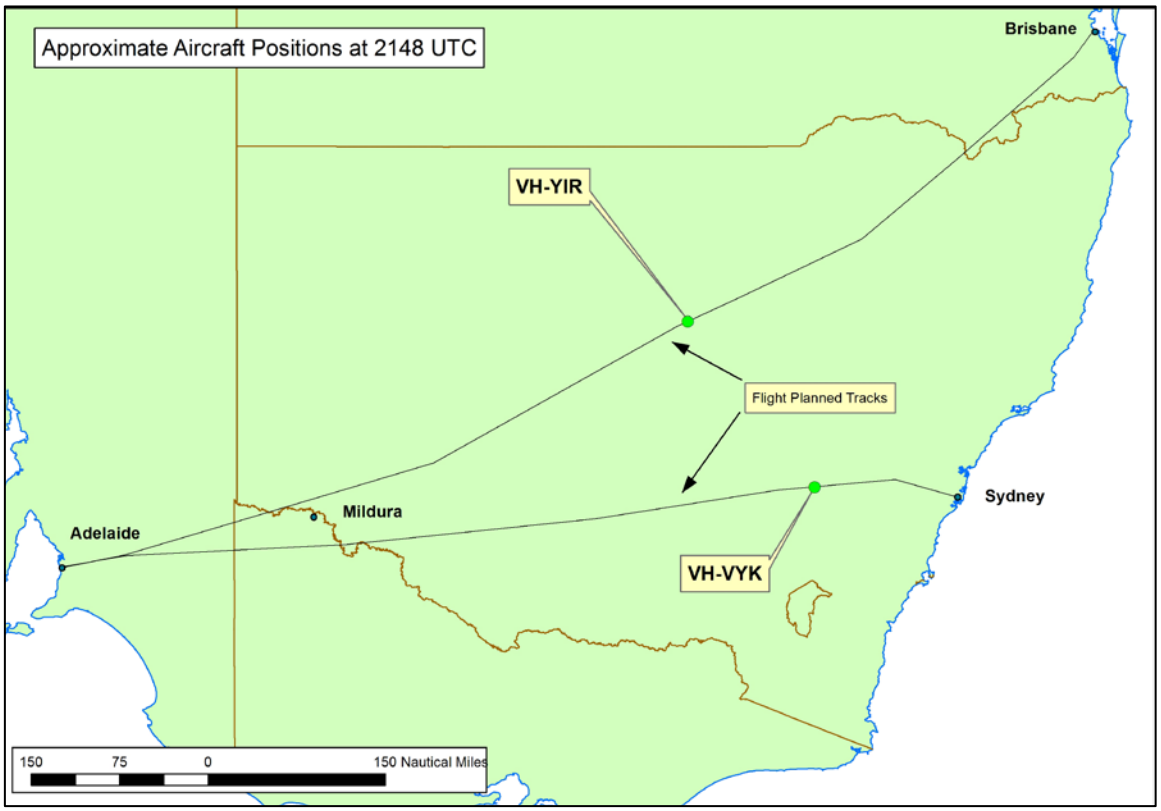
Time:2130 – YIR in cruise, VYK in cruise

Adelaide SPECI	SPECI YPAD 172130Z 06004KT 9999 MIFG FEW022 05/04 Q1020 RMK RF00.0/000.0 TTF: NOSIG
Mildura METAR	METAR YMIA 172130Z 27004KT 9999 FEW040 05/05 Q1018 RMK RF00.0/000.2

Time: 2148 – YIR in cruise, VYK in cruise (Figure A2)

Amended TAF for Adelaide issued at 2100 passed to the crew of VYK via ACARS.

Figure A2: Approximate aircraft positions at 2148



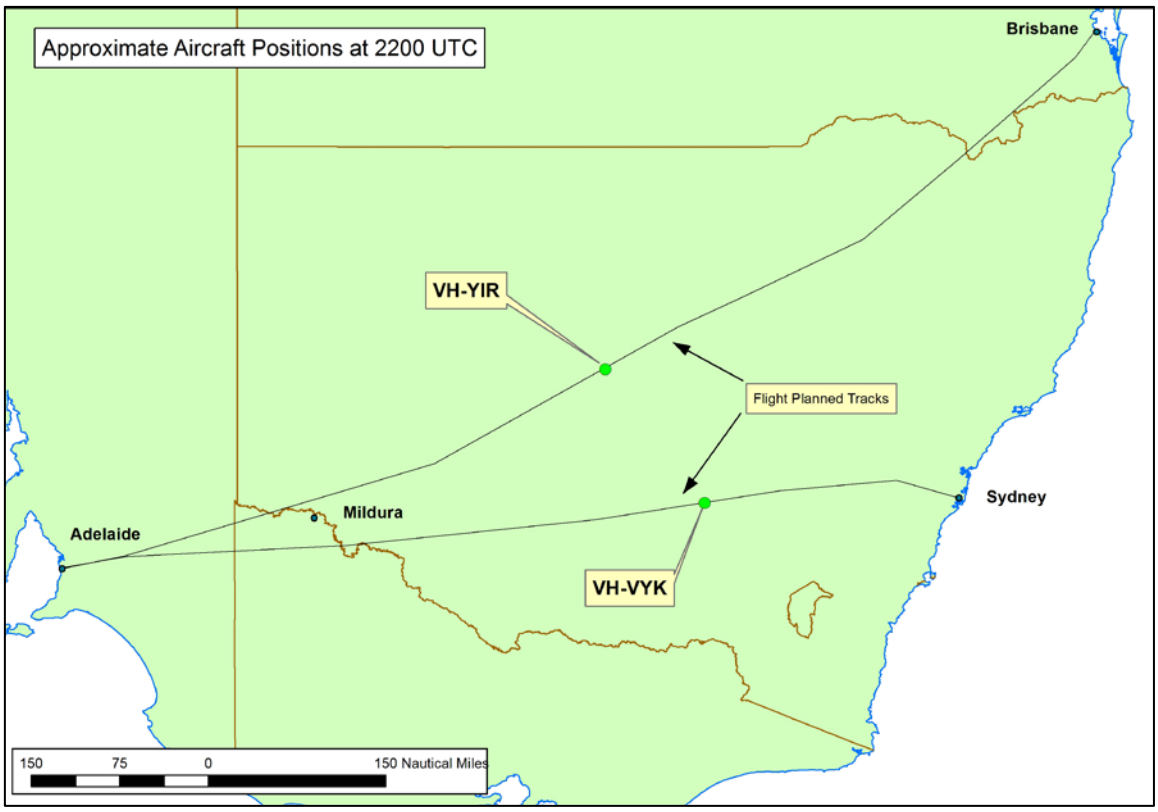
Time: 2200 – YIR in cruise, VYK in cruise (Figure A3)

Adelaide SPECI	SPECI YPAD 172200Z 01006KT 1000NW 9999 PRFG MIFG FEW022 05/05 Q1020 RMK RF00.0/000.0 TTF: FM2200 01005KT 0500 FG FM2300 05005KT 9999 FEW025

[17] Special Reports (SPECI) are aerodrome weather reports that are issued whenever weather conditions fluctuate about or are below specified criteria. These specified criteria relate to broken or overcast cloud conditions below specific heights or visibility less than specific distances. These heights and distances are specific to each location and require the provision of an alternate aerodrome. Special weather reports will also be issued when there are specified wind changes, hazardous weather events occur at aerodromes, when wind shear is reported, when the temperature changes significantly, the air pressure changes significantly or any incidence of any other phenomena likely to be significant to the operation of an aircraft.

Mildura METAR	METAR YMIA 172200Z 28005KT 9999 SCT034 05/04 Q1019 RMK RF00.0/000.2

Figure A3: Approximate aircraft positions at 2200



Time:2204 – YIR in cruise, VYK in cruise

Adelaide ATIS[18]	ATIS YPAD W 172204 APCH EXP INST APCH RWY 23 *[19] OPR INFO HIAL ON. LOW VIS PROCS WND 360/5, MAX DW 5 KTS. * VIS 700M IN FOG CLD FEW015 TMP 5. QNH 1020

Time: 2205 – YIR in cruise, VYK in cruise

Adelaide SPECI	SPECI YPAD 172205Z 01006KT 0500N 2000 FG FEW022 04/04 Q1020 RMK RF00.0/000.0 TTF: FM2205 01005KT 0500 FG FM2300 05005KT 9999 FEW025
Mildura METAR	No change from previous

Time: 2215 – YIR in cruise, VYK approaching diversion point

Adelaide	SPECI YPAD 172215Z 02006KT 0250N 0500 FG BKN001 04/04 Q1020

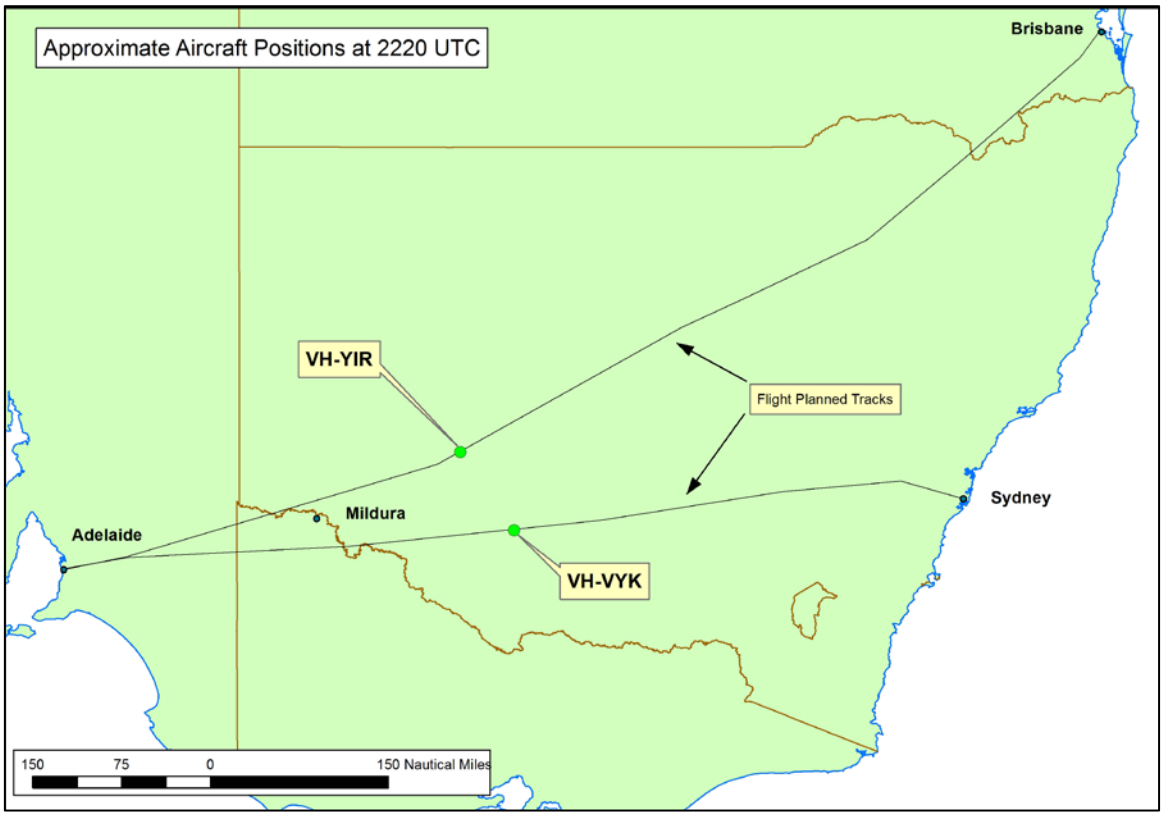
[18] An automated pre-recorded transmission indicating the prevailing weather conditions at the aerodrome and other relevant operational information for arriving and departing aircraft.

[19] The addition of an asterisk to an ATIS message highlights the information that has changed from the previous ATIS.

SPECI	RMK RF00.0/000.0 TTF: FM2300 05005KT 9999 FEW025
Mildura METAR	No change from previous

The aircraft's position at 2220 is shown in Figure A4.

Figure A4: Approximate aircraft positions at 2220



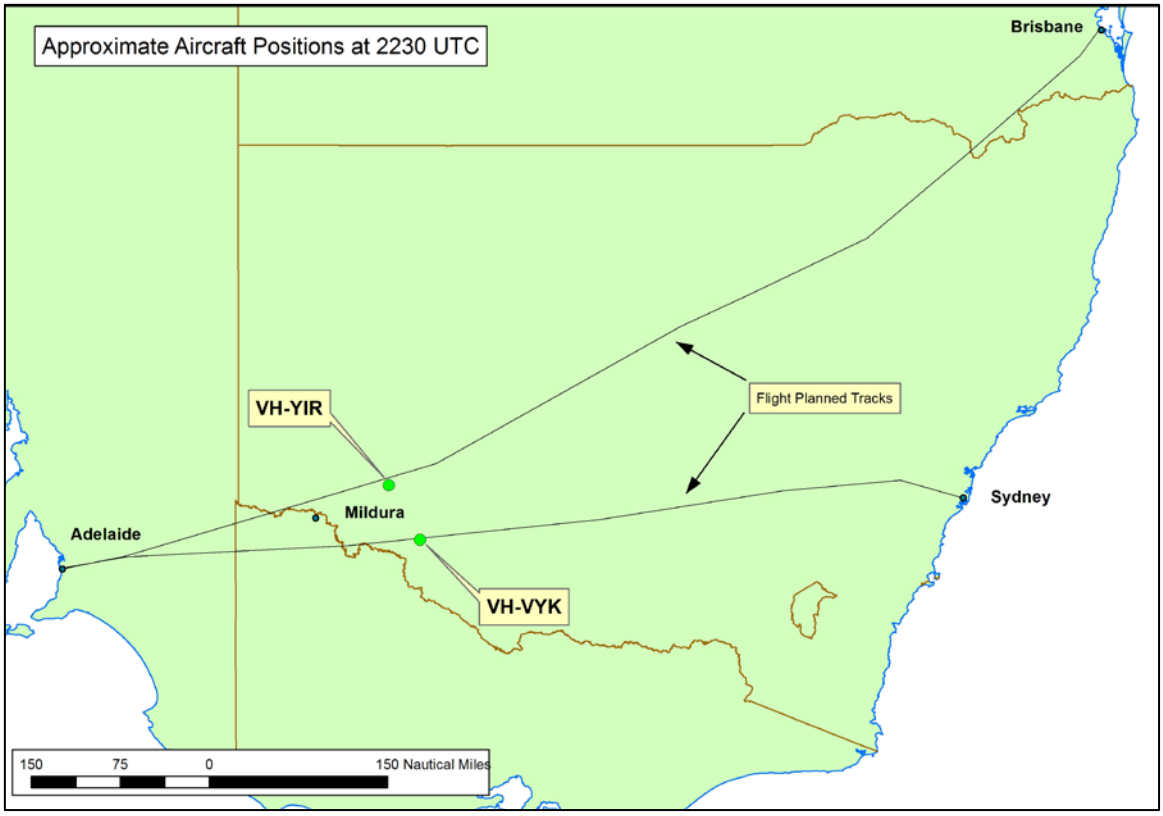
Time: 2230 – YIR in cruise, VYK in cruise

Adelaide SPECI	SPECI YPAD 172230Z 04005KT 0150 FG BKN001 06/05 Q1020 RMK RF00.0/000.0 TTF: FM2300 05005KT 9999 FEW025
Mildura METAR	METAR YMIA 172230Z 27004KT 9999 BKN034 06/05 Q1019 RMK RF00.0/000.2

Time:2230 – YIR in cruise, VYK in cruise (Figure A5)

Adelaide ATIS	ATIS YPAD X 172230 APCH EXP INST APCH RWY 23 OPR INFO HIAL ON. LOW VIS PROCS WND 360/5, MAX DW 5 KTS. * VIS 500M IN FOG CLD FEW015 * TMP 6. QNH 1020

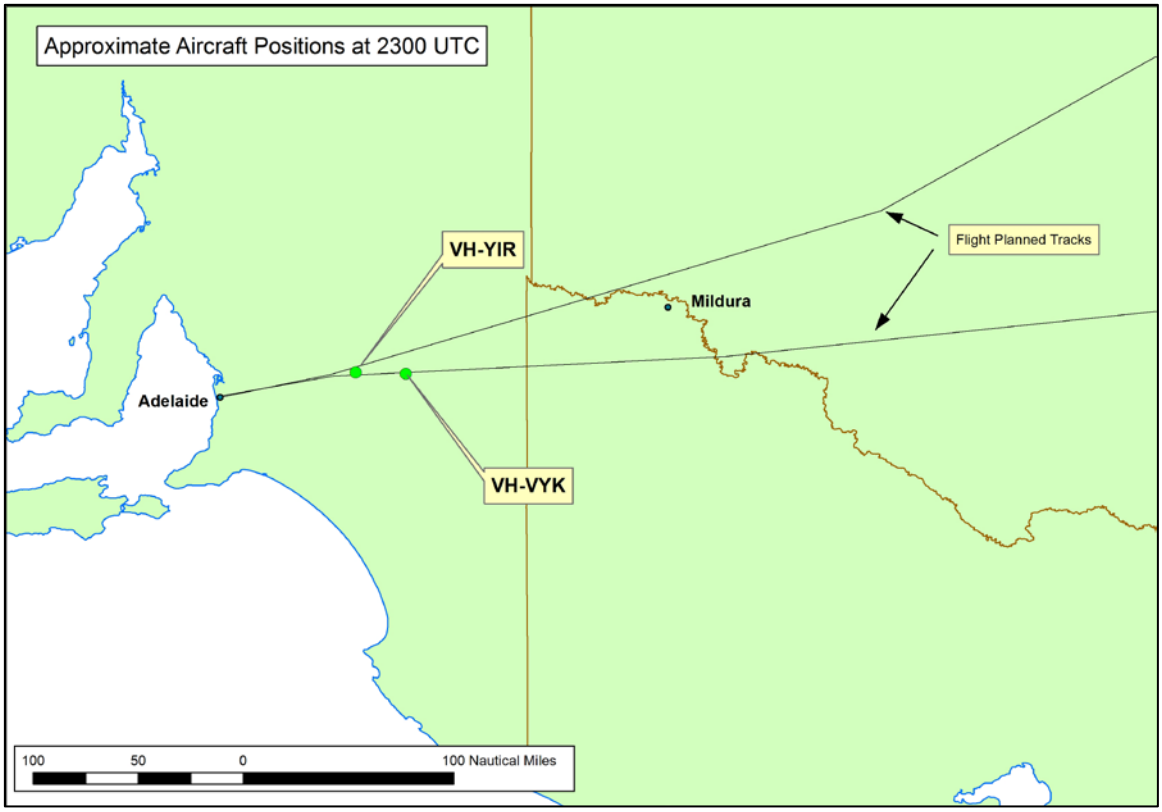
Figure A5: Approximate aircraft positions at 2230



Time: 2300 – YIR on descent to Adelaide, VYK on descent to Adelaide (Figure A6)

Adelaide SPECI	SPECI YPAD 172300Z 04006KT 0150 FG BKN000 06/06 Q1021 RMK RF00.0/000.0 TTF: FM2330 05005KT 9999 FEW025
Mildura METAR	METAR YMIA 172300Z 23004KT 9999 BKN039 07/06 Q1019 RMK RF00.0/000.2

Figure A6: Approximate aircraft positions at 2300



Time: 2302 – YIR on descent, VYK on descent	
Adelaide TAF	TAF YPAD 172302Z 1800/1906 VRB05KT 9999 FEW030 SCT045 FM181000 VRB05KT CAVOK FM190000 04008KT CAVOK RMK T 11 14 15 11 Q 1020 1020 1020 1021
Mildura TAF	TAF YMIA 172302Z 1800/1812 20008KT 9999 SCT030 SCT050 RMK T 08 12 13 10 Q 1020 1019 1019 1020

Time: 2318 – YIR diverting to Mildura, VYK diverting to Mildura	
Mildura SPECI	SPECI YMIA 172318Z 22004KT 9999 BKN002 SCT041 08/06 Q1019 RMK RF00.0/000.0

Time: 2328 – YIR on descent to Mildura, VYK on descent to Mildura	
Mildura SPECI	SPECI YMIA 172328Z 21006KT 5000 BR BKN002 07/07 Q1019 RMK RF00.0/000.0

Time: 2330 – YIR approaching Mildura, VYK approaching Mildura	
Adelaide SPECI	SPECI YPAD 172330Z 04005KT 0150 FG BKN000 07/07 Q1021 RMK RF00.0/000.0 TTF: FM2400 05005KT 9999 FEW025
Mildura SPECI	SPECI YMIA 172330Z 21006KT 3300 BR BKN002 07/07 Q1019 RMK RF00.0/000.0

Time:2332 – YIR overhead Mildura, VYK approaching Mildura	
Mildura SPECI	SPECI YMIA 172332Z 20007KT 2100 BR BKN002 07/07 Q1019 RMK RF00.0/000.0

Time: 2348 – YIR overhead Mildura, VYK on approach to runway 27 at Mildura	
Mildura SPECI	SPECI YMIA 172348Z 19007KT 0900 FG OVC001 07/07 Q1019 RMK RF00.0/000.0

Time: 2352 – YIR overhead Mildura, VYK landed Mildura	
Mildura TAF	TAF AMD YMIA 172352Z 1800/1812 20007KT 3000 BR SCT003 BKN040 BECMG 1800/1801 19006KT 9999 SCT030 SCT050 PROB30 1800/1802 0500 FG BKN002 RMK T 07 11 13 10 Q 1019 1019 1019 1020

Time:2353 – YIR overhead Mildura	
Adelaide TAF	TAF AMD YPAD 172353Z 1800/1906 02004KT 0500 FG FM180100 VRB05KT 9999 FEW030 SCT045 FM181000 VRB05KT CAVOK FM190000 04008KT CAVOK RMK T 11 14 15 11 Q 1020 1020 1020 1021

Time: 2356 – YIR overhead Mildura	
Mildura SPECI	SPECI YMIA 172356Z 21007KT 0400 FG OVC001 07/07 Q1020 RMK RF00.0/000.0

Time: 0000 – YIR overhead Mildura	
Adelaide SPECI	SPECI YPAD 180000Z 01005KT 0150 FG BKN000 08/07 Q1021 RMK RF00.0/000.0 TTF: FM0100 05005KT 9999 FEW025
Mildura SPECI	SPECI YMIA 180000Z 20006KT 0300 FG OVC001 07/07 Q1020 RMK RF00.0/000.0

Time:0011 – YIR on final approach to runway 27 Mildura	
Mildura SPECI	SPECI YMIA 180011Z 20006KT 0200 FG OVC001 07/07 Q1020 RMK RF00.0/000.0

Time: 0014 – YIR lands Mildura

General details

Occurrence details

Date and time:	18 June 2013 – 1010 EST	
Occurrence category:	Serious incident	
Primary occurrence type:	Weather related operational event	
Location:	Mildura Airport, Victoria	
	Latitude: S 34° 51.08'	Longitude: E 139° 26.12'

Aircraft details

Manufacturer and model:	Boeing Company B737-8FE	
Registration:	VH-YIR	
Operator:	Virgin Australia	
Serial number:	39925	
Type of operation:	High Capacity Scheduled Regular Public Transport	
Persons on board:	Crew – 6	Passengers – 85
Injuries:	Crew – 0	Passengers - 0
Damage:	None	

Manufacturer and model:	Boeing Company B737-838	
Registration:	VH-VYK	
Operator:	Qantas Airways Limited	
Serial number:	34183	
Type of operation:	High Capacity Scheduled Regular Public Transport	
Persons on board:	Crew – 6	Passengers – 146
Injuries:	Crew – 0	Passengers – 0
Damage:	None	

Australian Transport Safety Bureau

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The ATSB is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: 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 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.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

Purpose of safety investigations

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the factors related to the transport safety matter being investigated.

It is not a function of the ATSB to apportion blame or determine 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.

Developing safety action

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. The ATSB prefers to encourage the relevant organisation(s) to initiate proactive safety action that addresses safety issues. Nevertheless, the ATSB may use its power to make a formal safety recommendation either during or at the end of an investigation, depending on the level of risk associated with a safety issue and the extent of corrective action undertaken by the relevant organisation.

When safety recommendations are issued, they focus on clearly describing the safety issue of concern, rather than providing instructions or opinions on a preferred method of corrective action. As with equivalent overseas organisations, the ATSB has no power to enforce the implementation of its recommendations. It is a matter for the body to which an ATSB recommendation is directed to assess the costs and benefits of any particular means of addressing a safety issue.

When the ATSB issues a safety recommendation to a person, organisation or agency, they must provide a written response within 90 days. That response must indicate whether they accept the recommendation, any reasons for not accepting part or all of the recommendation, and details of any proposed safety action to give effect to the recommendation.

The ATSB can also issue safety advisory notices suggesting that an organisation or an industry sector consider a safety issue and take action where it believes it appropriate. There is no requirement for a formal response to an advisory notice, although the ATSB will publish any response it receives.

Australian Transport Safety Bureau

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Email atsbinfo@atsb.gov.au

Investigation

ATSB Transport Safety Report
Mode Occurrence Investigation

Weather related operational event involving Boeing 737s VH-YIR and VH-VYK, Mildura Airport, Victoria on 18 June 2013

AO-2013-100
Preliminary – 18 July 2013