Australian Government
Australian Transport Safety Bureau

Navigation event involving Saab Aircraft Co. 340B, VH-TRX

11 km SW of Williamtown (Newcastle Airport), New South Wales | 8 November 2012

Investigation

ATSB Transport Safety Report
Aviation Occurrence Investigation
AO-2012-153
Final – 13 March 2015

Cover photo: George Canciani

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, Australian Capital Territory 2601
Telephone: 1800 020 616, from overseas +61 2 6257 4150 (24 hours)
Accident and incident notification: 1800 011 034 (24 hours)
Facsimile: 02 6247 3117, from overseas +61 2 6247 3117
Email: atsbinfo@atsb.gov.au
Internet: www.atsb.gov.au

Addendum

Page	Change	Date
5	*Context - Crew details – Captain* section amended	13 March 2015

Safety summary

What happened

VH-TRX

Source: Andrei Bezmylov

On the evening of 8 November 2012, the crew of a Regional Express Saab Aircraft Co. 340B, registered VH-TRX, were conducting a scheduled passenger flight from Sydney to Williamtown (Newcastle Airport), New South Wales, under the instrument flight rules.

After the crew reported on descent to Williamtown, the aircraft was cleared by the approach controller for a visual approach via a right base to runway 12. At 10 NM (19 km) south of Williamtown, the crew transferred to the aerodrome controller. Instead of tracking toward Williamtown as anticipated, the controller observed the aircraft manoeuvring at a greater distance than usual from the runway and advised the crew of their position. The crew then requested radar guidance and were directed toward the airport.

The crew visually identified runway 12 and landed the aircraft about 14 minutes before last light. After landing the crew advised the controller that they were unfamiliar with locating the airport at night.

What the ATSB found

The ATSB found that, in the low light conditions, the captain misidentified a coal loading and storage facility, 6 NM (11 km) south-west of Williamtown, as the airport environment.

What's been done as a result

Following an internal investigation, Regional Express alerted its crews to the possible misidentification of features in the Williamtown area and reminded them of the importance of using navigation equipment to verify their position. In addition, crews were advised that visual approaches were no longer to be conducted at Williamtown during normal operations and additional material on situation awareness and assertiveness skills was also incorporated into existing human factors and non-technical skills training.

The Williamtown air traffic control unit reminded its controllers of the need to provide assertive safety alert instructions, including the provision of minimum sector altitudes and prompt position information to aircraft that deviated from a cleared route, or whose observed position differed from that reported.

Safety message

This occurrence highlights the possibility of crews misidentifying ground features for the airport environment during visual approaches, especially in conditions of poor light. To avoid misleading visual cues during visual approaches, crews should confirm that they have correctly identified and are tracking to the intended destination by crosschecking with the aircraft's navigation equipment.

Contents

The occurrence

On the evening of 8 November 2012, the crew of a Regional Express Saab Aircraft Co. 340B, registered VH-TRX (TRX), was conducting a scheduled passenger flight from Sydney to Williamtown (Newcastle Airport), New South Wales, under the instrument flight rules (IFR).[1] The first officer (FO) was designated as the pilot flying.

At about 1928 Eastern Daylight-saving Time,[2] after the crew reported 'visual'[3] to air traffic control while on descent, the Williamtown approach controller cleared the crew of TRX for a visual approach[4] via a right base to runway 12 and instructed them to contact the Williamtown aerodrome controller (tower) when 10 NM (19 km) from the airport. [5] Although about 20 minutes before last light, the crew reported that conditions at the time were darker than usual because of cloud cover to the west.

At about 1929, the crew contacted the tower controller. The approach controller continued to monitor the aircraft on the air situation display (radar) after its transfer to the tower controller. The aircraft was observed on radar by both controllers to turn left after passing Nobby's Head and track along the Hunter River on descent (Figure 1).

The captain reported observing buildings, believed to be associated with the airport environment at Williamtown and provided the FO with tracking guidance for the visual approach. The captain later reported misidentifying these buildings and lights, which were associated with a coal loading and storage facility about 6 NM (11 km) south-west of the airport, as the airport environment.

At about 1930, when 7 NM (13 km) south-west of Williamtown, the crew commenced a left turn onto an apparent downwind leg for runway 12. The aircraft was levelled off at the circuit height of 1,500 ft.

The tower controller, with the aid of binoculars, saw the aircraft manoeuvring at a greater distance than usual from the runway. The captain reported having previously experienced difficulties with sighting the runway when approaching from the south, and had intended to conduct a wider than normal base leg to assist with locating the runway.

The captain guided the FO in the approach as the FO was less familiar with operations into Williamtown and suggested when to commence a right turn onto base. The FO reported not being confident that he was observing the runway at Williamtown and also recalled seeing the distance measuring equipment (DME)[6] showing the aircraft to be about 6 NM (11 km) from the airport at that time. The FO reported mentioning the distance to the captain who responded that they were conducting a wider base leg. The FO believed this was a wider than normal position, but remembered the captain mentioning the conduct of a wider base leg. As the captain was more familiar with the approach, the FO elected not to advise him of the DME distance or his

---

1 Instrument flight rules permit an aircraft to operate in instrument meteorological conditions (IMC), which have much lower weather minimums than visual flight rules. 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.

2 Eastern Daylight-saving Time (EDT) was Coordinated Universal Time (UTC) + 11 hours.

3 'Visual' is the term used by a pilot to indicate acceptance of responsibility to see and avoid obstacles while operating below the minimum vectoring altitude, or minimum sector altitude/lowest safe altitude (Aeronautical Information Publication Australia (AIP) GENERAL (GEN) 2.2 - DEFINITIONS AND ABBREVIATIONS, Section 1 - *DEFINITIONS*).

4 AIP En Route (ENR) 1.1 – GENERAL RULES, paragraph 12.8.1 *Visual Approach, ATC Authorisation* stated that air traffic control may authorise a visual approach for an IFR flight, by day, when '…the pilot has established and can continue flight to the aerodrome with continuous visual reference to the ground or water…'.

5 The approach and tower controllers were in the tower cabin, but at separate work stations. The approach controller was the more experienced controller, but did not have a tower rating.

6 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.

uncertainty over the aircraft's position. Furthermore, the FO reported that when about 7 NM (13 km) from the airport on a previous flight to Williamtown, he had been prompted by the captain of that flight to manoeuvre the aircraft to join the circuit earlier than expected.

At about 1931, the approach controller became concerned about the aircraft's position and prompted the tower controller to question the crew about their intentions. In reply to the controller's query if they were still visual, the crew responded that they had just 'lost' the runway and were continuing the right turn.

Data from the aircraft's flight data recorder showed that the aircraft commenced a shallow descent from 1,500 ft on a westerly heading and then turned right. During the turn, the crew commenced configuring the aircraft for landing.

After turning right onto a base leg, the FO was unable to resolve his confusion about the aircraft's position and handed control to the captain. The captain reported that after taking control, they could not see the runway, but had formed a strong belief that they were in the airport environment. Being unable to discern the runway, the captain thought that they may have overshot the runway centre-line. The FO reported that after handing over control to the captain, he became aware that the aircraft was not positioned as intended, having observed the lighting and width of the coal loading and storage facility and noted their distance from the airport was greater than expected.

At about 1932, the tower controller offered to increase the intensity of the runway approach lighting.[7] The controllers reported realising that the crew had probably lost situation awareness and, at the approach controller's suggestion, the tower controller advised the crew that they were 6 NM (11 km) south-west of the airport tracking to the east. Recorded radar surveillance data also showed the aircraft tracking in a south-easterly direction toward the coal facility. When told they were not at the airport, the captain immediately requested radar vectors[8] to resolve the uncertainty. As the tower controller was not qualified to provide radar vectors, a heading of left 020° was suggested.[9] At about the same time, the crew turned onto a southerly heading and descended to 680 ft.

While the aircraft was tracking south, heading toward the boundary of controlled airspace, the approach controller advised the tower controller to instruct the crew of TRX to initiate a climb and pass traffic advice to the crew about another aircraft 5 NM (9 km) ahead and outside controlled airspace. The tower controller advised the crew to climb, but did not issue a safety alert[10] or a clearance as that would have necessitated a coordinated handover to the approach controller and a radio frequency change. Instead, the controllers elected to keep TRX on the tower frequency and under tower control as visual meteorological conditions[11] existed and both controllers could see the aircraft.

Information from the flight data recorder showed that the aircraft climbed to about 900 ft. The captain reported that engine power was increased but they did not commence a go-around or reconfigure the aircraft.

The approach controller reported suggesting that the tower controller advise the crew to turn north in order to locate the airport. The captain complied and adopted a northerly heading before requesting further guidance as they could still not see the runway. The tower controller turned the

---

7 A pattern of lights extending along the projected centre-line of the runway toward approaching aircraft to provide visual indication of runway location, alignment and distances.

8 A radar vector is a heading provided by a qualified controller to an identified aircraft with reference to the location on a radar display.

9 The Manual of Air Traffic Services paragraph 12.9.1.5 *Direction, suggested heading or tracking* permits a tower controller to provide a direction, suggested heading or tracking information as an advisory aid to navigation.

10 See the section titled *Safety alert*.

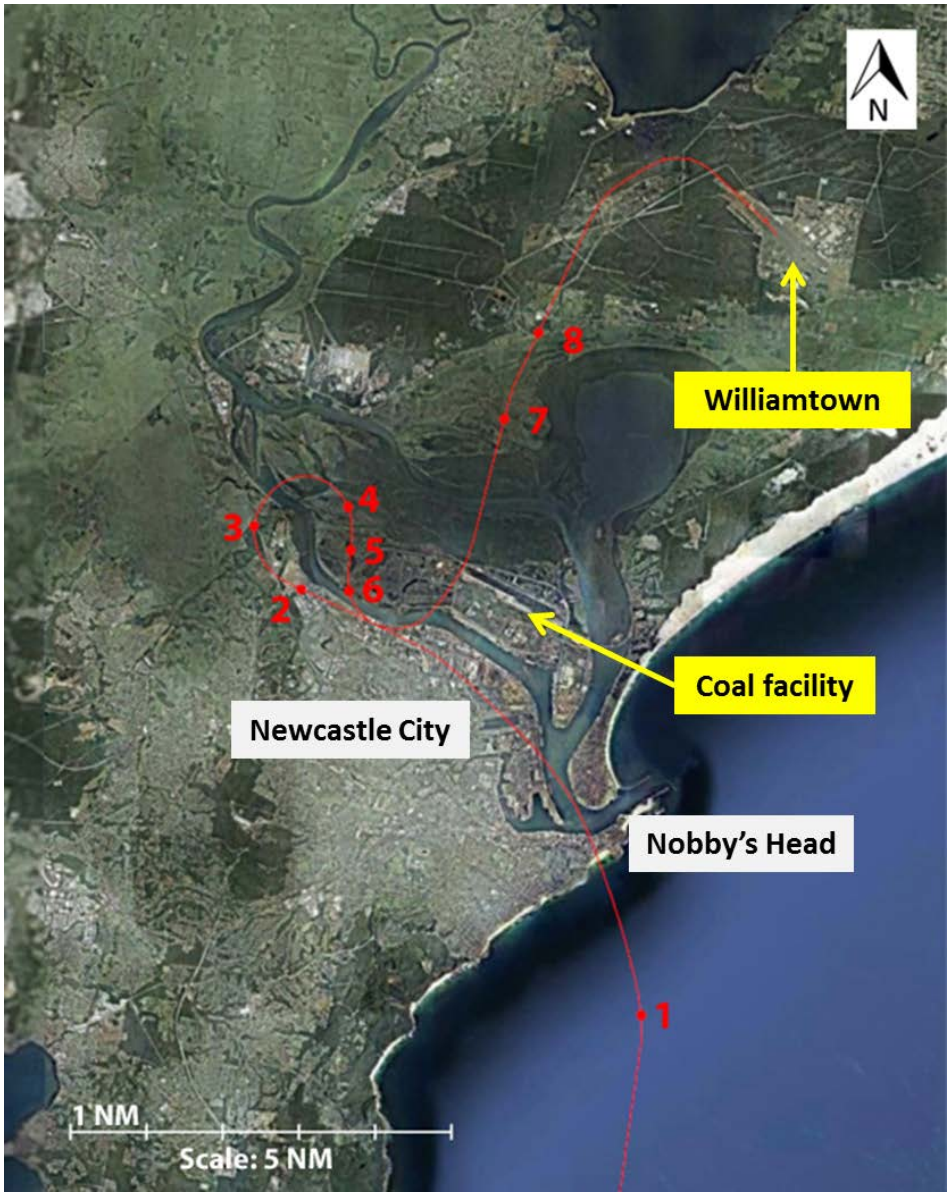
11 Visual Meteorological Conditions comprise the required visibility and vertical and horizontal distances from cloud for flight under the visual flight rules (VFR)—that is, conditions in which pilots have sufficient visibility to fly the aircraft maintaining visual separation from terrain and other aircraft.

runway lighting to stage 6 (full brightness) and continued to provide position information until satisfied that the crew had sighted runway 12.

At about 1935, after further guidance, the captain identified the runway and approach lights and positioned the aircraft for a landing on runway 12. The aircraft landed at about 1937, 14 minutes before last light.[12] After landing, the crew advised the aerodrome controller that they were unfamiliar with locating the airport 'at night'.

[12] Last light is the time when the centre of the sun is at an angle of 6° below the horizon following sunset. At this time large objects are not definable but may be seen and the brightest stars are visible under clear atmospheric conditions. Last light can also be referred to as the end of evening civil twilight.

Figure 1: Flight path of VH-TRX[13]



Source: Google earth, modified by ATSB.

KEY

1.	1929:12	10 NM (19 km) south of Williamtown.
2.	1931:21	TRX descends from 1,500 ft.
3.	1931:45	Tower controller asks the crew of TRX if they were still visual.
4.	1932:30	Tower controller advises the crew that they were 6 NM (11 km) south-west of Williamtown; the crew requested radar assistance.
5.	1932:42	TRX at 680 ft. (Initial heading guidance from the tower controller at 1932:45).
6.	1932:55	Tower controller advises the crew to climb the aircraft.
7.	1934:30	Crew requests further guidance from the tower controller (TRX was about 800 ft at this time).
8.	1934:54	Crew advises that they have runway 12 in sight.

[13] The aircraft's flight path was derived from the aircraft's flight data recorder (FDR) and correlated with Department of Defence surveillance radar data. The resulting consolidated flight path was used to show the aircraft's position at key times.

Context

Crew details

Captain

The captain held an Air Transport Pilot (Aeroplane) Licence that was issued on 25 January 1995 and had a total flying experience of 12,386 hours, of which 7,549 were on the Saab 340 aircraft. The captain had a valid Class 1 Medical Certificate, which required wearing distance vision correction and having vision correction available for reading while exercising the privileges of the licence. The captain reported that, at the time of the incident, distance vision-correcting contact lenses were being worn.

The captain last flew into Williamtown the day prior to the occurrence and during the past year had flown there on 34 occasions, five of which were at night. The captain reported previously having trouble identifying the runway at Williamtown when approaching from the south.

The captain's roster showed that the 2 days before the occurrence were rostered days off (RDO), but the captain reported agreeing to operate an overnight return service over both days. The captain initially rejected the duty, but when phoned again by operations staff and informed that the service would be cancelled, the captain agreed, believing that he was fit for duty. The 4 days prior to those RDOs were spent off duty, due to illness. The captain described this illness as being intermittent, resulting in some discomfort. The illness was medically treated.

On the day of the occurrence, the captain was rostered for, and flew two flights, the first a return flight from Sydney to Bathurst and the second the scheduled service to Newcastle Airport. The captain later reported that he may not have been fully fit for duty and that, in hindsight, the illness may have affected his performance on the Newcastle Airport flight.

First officer

The first officer (FO) held a Commercial Pilot (Aeroplane) Licence that was issued on 11 January 2012 and had a total flying experience of 411 hours, of which 224 hours were on the Saab 340 aircraft. The FO held a valid Class 1 Medical Certificate with no restrictions.

The FO had flown into Williamtown on two previous occasions, the most recent on 28 September 2012. All were during daylight.

The FO, who was on an RDO on the day of the incident, reported being contacted mid-morning and asked to fly that afternoon. The FO commenced duty about midday and had flown two sectors with the captain before the occurrence flight. The FO had flown the previous 3 days, including one overnight stop during the previous duty period, and confirmed that he was fit for duty.

Crew resource management

The operator's training and checking records showed that the captain and FO received the operator's initial and refresher training in human factors and non-technical skills. Both were current in all respects.

Air traffic services information

Personnel information

The approach controller had 8 years experience in air traffic control (ATC) and had operated as a controller at Williamtown since 2009, initially as a surface movement controller and for the last 18 months as an approach controller. The controller did not hold a current tower rating, but had completed In-flight Emergency Response (IFER) training.

The tower controller attended the Royal Australian Air Force School of Air Traffic Control in 2011 and had operated as a controller at Williamtown since the start of 2012. The tower controller had held a tower rating for about 6 months, but had not completed IFER training, which was reported as normally being completed within 18 months of a controller being qualified, and was not radar qualified.

At the time of the occurrence, both controllers had been on duty for about 5 hours. Each reported being fit for duty that day.

In-flight Emergency Response

The In-flight Emergency Response checklist, of which Airservices Australia and the Department of Defence (DoD) are joint approving authorities, provided guidance on the critical actions by ATC in a range of abnormal aviation situations. This included when a pilot was uncertain of their position, which compelled ATC to assist a pilot to resume normal operations and land the aircraft safely. Among other items, the IFER checklist included information on the type of emergency phase to declare in specific situations.

The approach controller reported that, while supporting the tower controller in providing assistance to the crew, they accessed the IFER checklist and had considered declaring an emergency. However, by the time the navigation error had been corrected, the aircraft was on approach to land on runway 12 and the need to declare an emergency had passed.

Safety alert

ATC is required to issue a safety alert when they become aware that an aircraft is in a situation that will place it in unsafe proximity to terrain, obstructions or other aircraft. The issue of further safety alerts may be discontinued if the pilot advises that action is being taken to resolve the situation.[14] When issuing a safety alert, the broadcast is prefixed with the phrase 'safety alert', followed by the appropriate circumstance, such as terrain alert or low altitude warning.[15]

Airport information

The airport was surrounded by mainly open farmland and was situated 8 NM (15 km) to the north-east of Newcastle City. The primary function of the airport and infrastructure at Williamtown was as a military base, Royal Australian Air Force Base Williamtown. The DoD facilitated use of the airport by a number of civil operators, and the civil terminal was known as Newcastle Airport. The DoD was responsible for the provision of ATC services to both military and civil operators.

The single runway at Williamtown, runway 12/30, was aligned south-east to north-west and was 2,438 m in length (Figure 2). The military base and associated infrastructure was situated on the north-east side of the runway, with a smaller civilian apron and terminal on the south-west side. There was an operational requirement for right circuits to runway 12.

There were a number of radio navigation aids at Williamtown capable of providing track guidance for suitably-equipped aircraft. These included an ultra high frequency tactical air navigation (TACAN)[16] system, from which international distance measuring equipment (DME)-equipped aircraft could obtain distance information, and a medium-frequency, non-directional (radio) beacon

---

[14] Manual of Standards Part 172 – Air Traffic Services, Version 1.6 (June 2011), CHAPTER 11: INFORMATION PROVIDED TO PILOTS, subsection 11.1.2 *Safety Alerts.*

[15] Aeronautical Information Publication Australia (AIP) GENERAL (GEN) 3.4 – COMMUNICATION SERVICES, paragraph 5.1 *Traffic Alert and Collision Avoidance System (TCAS), Safety Alerts and Avoiding Action;* effective from 23 August 2012.

[16] TACAN is a military, ultra-high frequency navaid, which provides a continuous indication of bearing and distance, in nautical miles, to the selected station.

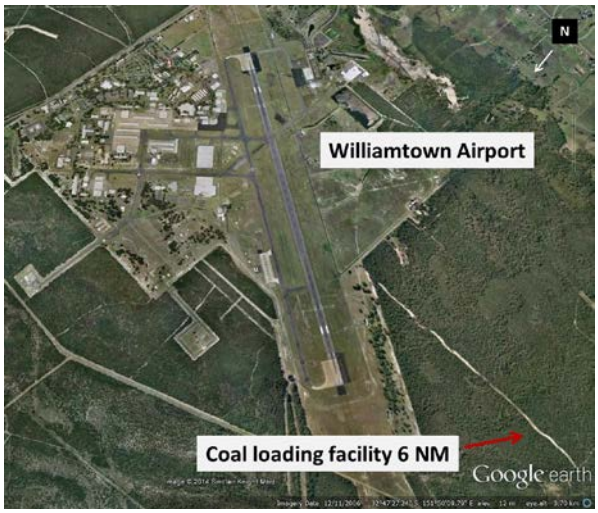
(NDB).[17] These ground-based radio navigation aids were serviceable at the time of the occurrence. Additionally, an instrument landing system (ILS)[18] was aligned to runway 12 and area navigation global navigation satellite system (RNAV (GNSS)) non-precision instrument approaches were published for runway 12/30.

The airport lighting consisted of 6-stage intensity, runway and approach lighting. There was no aerodrome beacon,[19] nor was one required by regulation.

Kooragang Island coal facility

The Kooragang Island coal loading and storage facility was located about 6 NM (11 km) south-west of Williamtown, between the northern and southern branches of the Hunter River and just north of the city. The facility comprised of long lines of coal aligned in a south-south-westerly direction and associated infrastructure (Figure 3), including numerous buildings and lighting, which was similar to that found in an airport environment.

Figure 2: Williamtown (Newcastle Airport)



Source: Google earth, modified by ATSB.

Figure 3: Coal facility

Source: ATSB

Visual approach procedures

The Regional Express procedures for visual approaches were in accordance with the Aeronautical Information Publication Australia (AIP) and the Jeppesen Airway Manual. Those procedures specified that a visual approach by day could be conducted from 30 NM (56 km) from the destination provided that continuous visual contact with the ground was maintained and visibility along the flight path was not less than 5,000 m. The tracking requirements for a visual approach by day specified that the aircraft maintain the track progressively authorised by ATC until within 5 NM (9 km) of the airport.

The operator's *SAAB Flight Crew Operating Manual* (FCOM) contained a schematic diagram of the standard circuit for the Saab 340 and showed the downwind leg at a distance of 1.7 NM (3 km) from the runway.

---

17 A non-directional (radio) beacon (NDB) is a radio transmitter at a known location, used as a navigational aid. The signal transmitted does not include inherent directional information.

18 A standard ground aid to landing, comprising two directional radio transmitters: the localizer, which provides direction in the horizontal plane; and the glideslope, for vertical plane direction, usually at an inclination of 3°. Distance measuring equipment or marker beacons along the approach provide distance information.

19 An aeronautical ground light visible from all directions, either continuously or intermittently, that can assist in the location of an aerodrome from the air.

The operator specified the items to be covered in an approach and go-around briefing, which was to be conducted prior to the top of descent. Its function was to ensure mutual understanding and effective cooperation between crew members while manoeuvring in compliance with ATC clearances and instructions. At the completion of the briefing there should be a common expectation of how the aircraft is to be flown and positioned.

The crew reported that the FO conducted the approach briefing for the visual approach during the descent. Although the captain could not recall the exact words, he indicated that the briefing given for the visual approach followed the standard wording.

Weather conditions

The automatic terminal information service[20] current at the time reported conditions at Williamtown as CAVOK[21] with a wind from the north-east at 15 kt and a temperature of 24 °C.

The crew reported that, although it was daylight, cloud cover to the west resulted in darker conditions than usual at that time of the evening. Last light for Williamtown on 8 November 2012 was 1951.

Previous occurrences

While this occurrence was related to the misidentification of the airport environment, previous occurrences have highlighted how ground features can be misidentified as the airport environment or a runway.

Australian occurrences

A review of the ATSB's occurrence database identified a number of occurrences where ground features have been misidentified as the airport environment or a runway, including:

- In September 2000, as the crew of a Boeing 737 aircraft were conducting an instrument approach to runway 05 at Adelaide Airport, South Australia in conditions of poor visibility. The crew identified lights consistent with runway 05 and discontinued the instrument approach, descended and tracked toward the lights. As they approached the lights, the crew realised they were not aligned with the runway and conducted a missed approach, later landing on runway 05 without further incident. During the approach, the crew had misaligned the aircraft with the Anzac Highway, which is located about 2.6 km south-east of runway 05 and runs approximately parallel to the runway centre-line. This September 2000 investigation also highlighted a similar event in Perth in June 1988, which involved the crew of an Airbus A300 aircraft misidentifying ground lighting for runway 03.
- In October 2000, when the crew of a Boeing 777 were conducting a visual approach to runway 01 at Brisbane Airport, Queensland. In this case, ATC identified that the aircraft appeared to be aligned with something other than the correct runway, possibly the southern aircraft parking area, which was part of the decommissioned runway 04 or a nearby road. The crew conducted a go-around and landed without further incident.
- In May 2003, when the crew of a Boeing 717 were conducting a night instrument approach to Mackay Airport, Queensland. ATC observed the aircraft diverging to the right of the extended runway centre-line while on final approach to runway 14. Analysis of the flight data recorder showed it was likely the aircraft was aligned to Broadsound Road, which is located about 2.5 km west of the runway and runs in a southerly direction. A similar event occurred in May

---

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

[21] Ceiling and visibility OK, meaning that the visibility, cloud and present weather are better than prescribed conditions. For an aerodrome weather report, those conditions are visibility 10 km or more, no significant cloud below 5,000 ft or cumulonimbus cloud and no other significant weather within 9 km of the aerodrome.

1989 and involved the crew of a Boeing 737 aircraft also misidentifying Broadsound Road for runway 14. That aircraft descended to 170 ft above ground level before the crew became aware of the error and conducted a missed approach.

International occurrences

A search of international investigation agencies databases identified an event in August 2007 involving a McDonnell Douglas MD-83 on a flight from Lisbon, Portugal to Dublin Airport, Ireland. During a non-precision approach at night to runway 34 the aircraft deviated left of the approach course at approximately 9 km from touchdown. This deviation was due to the flight crew mis-identifying the lights of a hotel as those of the runway approach lighting system. The aircraft descended below the minimum descent altitude prior to the crew executing a go-around and landing without further incident.

A review of the National Aeronautics and Space Administration's Aviation Safety Reporting System (ASRS) found one instance of a flight crew lining up on what they thought was a runway but was actually a road 7 km away.

Another five recent events were reported where crews mistook another airport for the destination airport. In these instances, either the crew or ATC identified the mistake and the aircraft was subsequently landed at the intended destination. Crews reported the misidentification as the result of fatigue or distraction.

More recently, a further two incidents in the United States resulted in the aircraft actually landing at the wrong airport after their crews misidentified the destination airport during night visual approaches as follows:

- In November 2013, when the flight crew of a Boeing 747 freighter landed at a small municipal airport 13 km short of their destination, McConnell Air Force Base near Witchita, Kansas.
- In January 2014 when the flight crew of a Boeing 737 on a scheduled service to Branson, Missouri, landed at a small airport, about 10 km short of their destination.

Safety analysis

The navigation event involving Saab 340B, registered VH-TRX, occurred while the crew were positioning the aircraft for a visual approach to runway 12 at Williamtown (Newcastle Airport), New South Wales. This analysis examines the possible reasons why the captain misidentified the airport environment and why the first officer (FO) was not able to initially help the captain resolve the misidentification of the aircraft's position. It also considers the actions of the air traffic controllers in their attempt to resolve the crew's loss of situation awareness.

Crew

Misidentification of the airport environment

The initial visual approach was commenced to the Kooragang Island coal loading and storage facility, which the captain had incorrectly identified as the Williamtown (Newcastle Airport) environment. The captain described a brightly lit 'row of buildings' as a prime visual stimulus in believing that they were near the airport. The captain's belief that they were in the airport environment was made solely on these visual cues, to the exclusion of information from navigation aids and other visual cues. Furthermore, it was possible that the recent illness, including associated fatigue, affected the captain's performance during the incident, specifically reducing the attentional capacity to integrate the information from the other available sources and identify that the coal loading facility was not the airport. Although both crew stated that they were fit for duty when starting their shift, it is known that people can underestimate their level of fatigue (Battelle 1998), and the captain reported that in hindsight he considered that his ongoing discomfort due to illness played a part in his reduced attentional capacity and fatigue. Overall however, there was insufficient evidence available to determine the extent of the illness or fatigue at the time of the occurrence.

The phenomenon of pilots attempting to approach areas that have similar features to the destination airport environment or runway has occurred previously and is generally due to the features strongly resembling the airport environment or runway. Pilot's rely on these visual cues to confirm their understanding of their position and, unless they are alerted by air traffic control (ATC) or another crewmember, they often persist with the approach, believing they are aligned with the runway.

Crew actions

The FO displayed sound crew resource management skills in seeking to hand control to the captain when he became uncertain of the aircraft's position. However, the FO reported that, while he sighted the coal facility after handing over control, by not articulating their uncertainty about the aircraft's position, an opportunity was missed to alert the captain to the misidentification of the airport environment and associated navigational error. Earlier understanding by the crew of the aircraft's actual position would likely have precluded the descent to 680 ft.

When the captain requested radar vectors to runway 12, the tower controller provided a suggested heading of 020°. However, it was only following further suggested headings and advice on the position of the airport reference the aircraft that the crew visually acquired the runway. A missed approach and a climb to a circuit height of 1,500 ft after being alerted by ATC of the apparent navigational error would have afforded the crew a better chance of visually acquiring the runway sooner.

Air traffic control actions

The crew's loss of situation awareness did not become apparent to the controllers until the aircraft descended below an altitude expected for the aircraft's distance from the airport. Although both controllers were familiar with the visual approach profile flown by the operator's Saab 340 aircraft,

they did not question the crew until the aircraft was observed tracking in a westerly direction about 8 NM (15 km) south-west of the airport and descending through 1,300 ft. The aircraft was retained on the tower controller's airspace frequency as the crew had confirmed they were visual, the controller had the aircraft in sight, and in an effort to limit any crew distractions or increase in their workload.

When the crew advised that they were having difficulty sighting the runway, the tower controller informed them of their location reference the airport and advised them to climb. The preface of that transmission with the phrase 'safety alert – low altitude warning', and an instruction to climb to the 10 NM (19 km) minimum safe altitude of 2,100 ft, may have more promptly enhanced the crew's situation awareness and alerted them to the potential risk of being at low level in that area.

Environment

The flight was completed in daylight and although visibility was reported to have been good, the crew reported that lighting conditions were darker than usual at that time of the evening due to cloud cover in the western sky. Although the tower controller increased the intensity of the airport approach lighting in an attempt to assist the crew identify the runway, the aircraft's low altitude probably meant that the runway and approach lighting was not as readily apparent to them. Additionally, Williamtown did not, and was not required to have an aerodrome beacon to provide additional visual guidance in conditions of poor light and at night.

Findings

From the evidence available, the following finding is made with respect to the navigation event involving Saab 340B, registered VH-TRX, which occurred near Williamtown (Newcastle Airport), New South Wales on 8 November 2012. The finding should not be read as apportioning blame or liability to any particular organisation or individual.

Contributing factors

- In the low light conditions and using the visual cues available, the captain incorrectly identified a coal loading and storage facility as the airport environment and manoeuvred the aircraft for an approach to that location.

Safety issues and actions

The ATSB did not identify any organisational or systemic issues that might adversely affect the future safety of aviation operations. However, the following proactive safety action was reported in response to this occurrence.

In-flight Emergency Response actions in the case of irregular aircraft operation

Proactive safety action taken by: Department of Defence air traffic control unit at Williamtown

Action number: AO-2012-153-NSA-045

The Department of Defence air traffic control unit at Williamtown advised that it had reviewed its requirements for the identification of irregular aircraft operation and the subsequent In-flight Emergency Response (IFER) actions. Controllers were made aware of the need to closely monitor their area of responsibility and provide assertive safety alert instructions, including provision of the relevant minimum sector altitude to the affected aircraft, and the prompt provision of position information to aircraft that have deviated from a cleared route, or whose observed position differs from that reported.

Operations to Williamtown (Newcastle Airport)

Proactive safety action taken by: Regional Express

Action number: AO-2012-153-NSA-046

Regional Express advised that it had added material to their human factor and non-technical skills training to emphasise the importance of situation awareness and assertiveness skills.

In addition, shortly after the occurrence, a notice to aircrew was issued that alerted crews to the possibility of misidentifying the Kooragang Island coal loading facility with Williamtown runway 12/30, and the importance of using navigation aids to verify their position when in the vicinity of Williamtown. The notice further stipulated that all approaches into Williamtown were to be via the published runway approach and that visual approaches were not to be conducted, regardless of the weather conditions. This information was incorporated into the company Route Manual for Williamtown and included a diagram showing the proximity of the coal loading facility to the airport. The Route Manual further stipulated that no visual approaches were to be authorised unless emergency or safety circumstances dictated.

General details

Occurrence details

Date and time:	8 November 2012 – 1931 EDT	
Occurrence category:	Incident	
Primary occurrence type:	Navigation event	
Location:	11 km south-west of Williamtown (Newcastle Airport), New South Wales	
	Latitude: 32° 52.63' S	Longitude: 151° 45.98' E

Aircraft details

Manufacturer and model:	Saab Aircraft Co. SF-340B	
Year of manufacture:	1992	
Registration:	VH-TRX	
Operator:	Regional Express	
Serial number:	340B-287	
Type of operation:	Air transport - low capacity	
Persons on board:	Crew – 3	Passengers – 2
Injuries:	Crew – 0	Passengers – 0
Damage:	None	

Sources and submissions

Sources of information

The sources of information during the investigation included the:

- crew of VH-TRX
- aerodrome (tower) and approach controllers
- Regional Express
- Department of Defence (DoD)
- Airservices Australia
- Civil Aviation Safety Authority.

References

Battelle Memorial Institute 1998, *An Overview of the scientific literature concerning fatigue, sleep, and the circadian cycle.* Report prepared for the Office of the Chief Scientific and Technical Advisor for Human Factors, US Federal Aviation Administration.

Submissions

Under Part 4, Division 2 (Investigation Reports), Section 26 of the *Transport Safety Investigation Act 2003* (the Act), the ATSB may provide a draft report, on a confidential basis, to any person whom the ATSB considers appropriate. Section 26 (1) (a) of the Act 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 crew of VH-TRX, Regional Express, the DoD, Airservices Australia and the Civil Aviation Safety Authority.

Submissions were received from the aircraft captain and first officer, the DoD and Regional Express. The submissions were reviewed and where considered appropriate, the text of the report was amended accordingly.

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 safety factors related to the transport safety matter being investigated. The terms the ATSB uses to refer to key safety and risk concepts are set out in the next section: Terminology Used in this Report.

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

Enquiries 1800 020 616
Notifications 1800 011 034
REPCON 1800 011 034
Web www.atsb. gov.au
Twitter @ATSBinfo
Email atsbinfo@atsb.gov.au

Investigation

ATSB Transport Safety Report
Aviation Occurrence Investigation

Navigation event involving Saab Aircraft Co. 340B, VH-TRX
11 km SW of Williamtown (Newcastle Airport), New South Wales
8 November 20123

AO-2012-153
Final – 13 March 2015