Australian Government

Australian Transport Safety Bureau

ATSB TRANSPORT SAFETY INVESTIGATION REPORT

Aviation Occurrence Report – 200504338

Final

Breakdown of Separation

Brisbane Airport, Qld – 31 August 2005

VH-VQD

Boeing Company 717–200

VH-UUA

Fairchild Industries Inc SA227–DC

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Acknowledgements

Extract from Airservices Australia Brisbane Aerodrome Chart

Extract from Airservices Australia PC-replay radar replay

Extract of Brisbane Airport area from Google Earth

Abstract

On 31 August 2005, the crew of a Fairchild Industries Inc SA227–DC (Metro) aircraft had been issued a clearance for a visual approach to runway 14 at Brisbane Airport. At about the same time, the crew of a Boeing Company 717–200 (717) aircraft had been issued a take-off clearance from runway 01. The crew of the Metro commenced a go-around from runway 14 at about the same time the 717 became airborne from runway 01. The 717 crossed about 625 m in front of, and 580 ft above, the Metro. There was a breakdown of separation.

The Metro's descent to Brisbane had been restricted by another aircraft, which placed it above the normal descent profile. The crew of the Metro subsequently continued an approach that was unlikely to be conducted successfully. The aerodrome controller misjudged the position of the Metro, which resulted in the incorrect application of separation standards. This also meant that the controller did not give adequate consideration to the likelihood of a go-around by the crew of the Metro.

After the Metro crew commenced the go-around, the controller was unable to visually separate the aircraft. The controller had not provided traffic information to the crew of either aircraft, nor was he required to do so. The controller attempted to make the Metro crew aware of the 717, but did not provide the information in the form of a safety alert as required by the Manual of Air Traffic Services.

Without prior knowledge of the 717, the crew of the Metro found it difficult to identify the correct aircraft, as the 717 was initially below their level and masked by background lighting.

As a result of previous occurrences, the ATSB had previously issued a safety recommendation to Airservices Australia in October 2006 in relation to the provision of relevant traffic information, to enhance pilot situational awareness.

THE AUSTRALIAN TRANSPORT SAFETY BUREAU

The Australian Transport Safety Bureau (ATSB) is an operationally independent multi-modal Bureau within the Australian Government Department of Transport and Regional Services. ATSB investigations are independent of regulatory, operator or other external bodies.

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. Accordingly, the ATSB also conducts investigations and studies of the transport system to identify underlying factors and trends that have the potential to adversely affect safety.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and, where applicable, relevant international agreements. The object of a safety investigation is to determine the circumstances in order to prevent other similar events. The results of these determinations form the basis for safety action, including recommendations where necessary. As with equivalent overseas organisations, the ATSB has no power to implement its recommendations.

It is not the object of an investigation to determine blame or liability. However, it should be recognised that an investigation report must include factual material of sufficient weight to support the analysis and findings. That material will at times contain information reflecting on the performance of individuals and organisations, and how their actions may have contributed to the outcomes of the matter under investigation. 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.

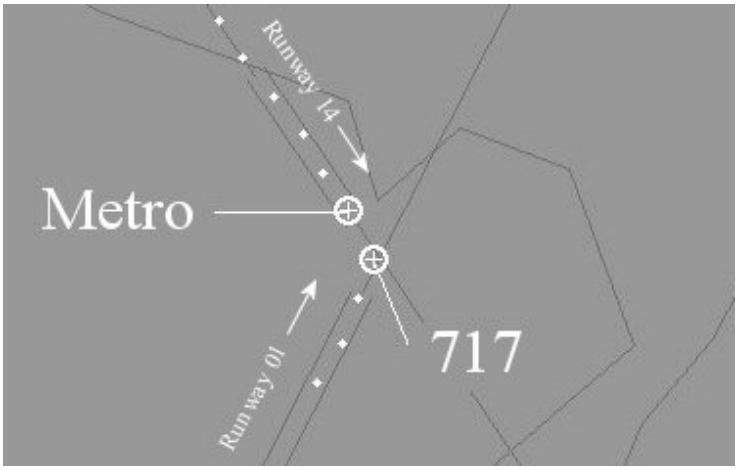
Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. While the Bureau issues recommendations to regulatory authorities, industry, or other agencies in order to address safety issues, its preference is for organisations to make safety enhancements during the course of an investigation. The Bureau prefers to report positive safety action in its final reports rather than making formal recommendations. Recommendations may be issued in conjunction with ATSB reports or independently. A safety issue may lead to a number of similar recommendations, each issued to a different agency.

The ATSB does not have the resources to carry out a full cost-benefit analysis of each safety recommendation. The cost of a recommendation must be balanced against its benefits to safety, and transport safety involves the whole community. Such analysis is a matter for the body to which the recommendation is addressed (for example, the relevant regulatory authority in aviation, marine or rail in consultation with the industry).

FACTUAL INFORMATION

At 1835 Eastern Standard Time[1] on 31 August 2005, a Fairchild Industries Inc SA227–DC (Metro) aircraft, registered VH-UUA, departed Oakey, Qld, on a scheduled passenger service to Brisbane, Qld. At 1855, a Boeing Company 717–200 (717) aircraft, registered VH-VQD, taxied at Brisbane Airport on a scheduled passenger service to Avalon, Vic. At 1900, the Brisbane approach controller issued a clearance to the crew of the Metro for a visual approach to runway 14. At 1901, the Brisbane aerodrome controller issued a take-off clearance from runway 01 to the crew of the 717. At 1901:49, the crew of the Metro commenced a go-around from runway 14, at about the same time as the 717 became airborne. At 1902:03 (figure 1), the 717 crossed about 625 m in front of, and 580 ft above, the Metro. There was a breakdown of separation.

Figure 1: Extract from Airservices Australia radar replay at 1902:03



Sequence of events

The Metro's descent to the airport had been initially restricted due to an aircraft on a crossing track in the approach controller's airspace. That delay for descent placed the Metro above the normal descent profile.

At 1858, the aerodrome controller instructed the crew of the 717 to enter and line up on runway 01 behind a landing aircraft. At that time there was an approaching Boeing Company 737 (737) aircraft on final approach to runway 01.

When the Metro was about 10 NM from the airport, the approach controller provided the crew with a radar heading to a runway 14 right base position, and subsequently assigned them a visual approach. The crew were advised by the approach controller that the heading would establish them on final at about 4 NM. The approach controller had also asked the crew if they could make an approach from that position and they responded that they could.

1 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.

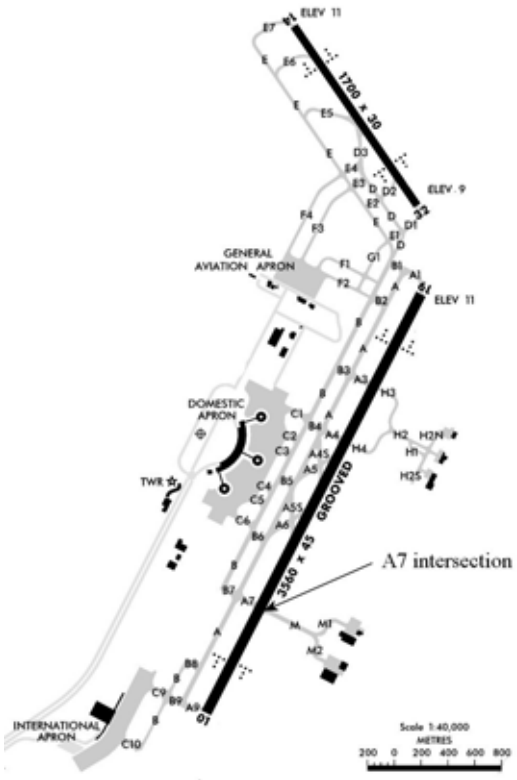
At about 1900, the 717 was lined up on runway 01 and the crew was awaiting a take-off clearance from the aerodrome controller.

At 1900:32, the approach controller instructed the crew of the Metro to transfer to the aerodrome controller's frequency and the crew acknowledged that transmission. Normal practice when notified to transfer radio frequencies is for a pilot to change to that frequency with minimal delay.

At 1900:55, the aerodrome controller issued a take-off clearance to the crew of the 717. At the same time, the Metro was about 2 NM from the runway 14 threshold at 2,100 ft, with a groundspeed of 200 kts, and the 737 was about 5 NM from the runway 01 threshold.

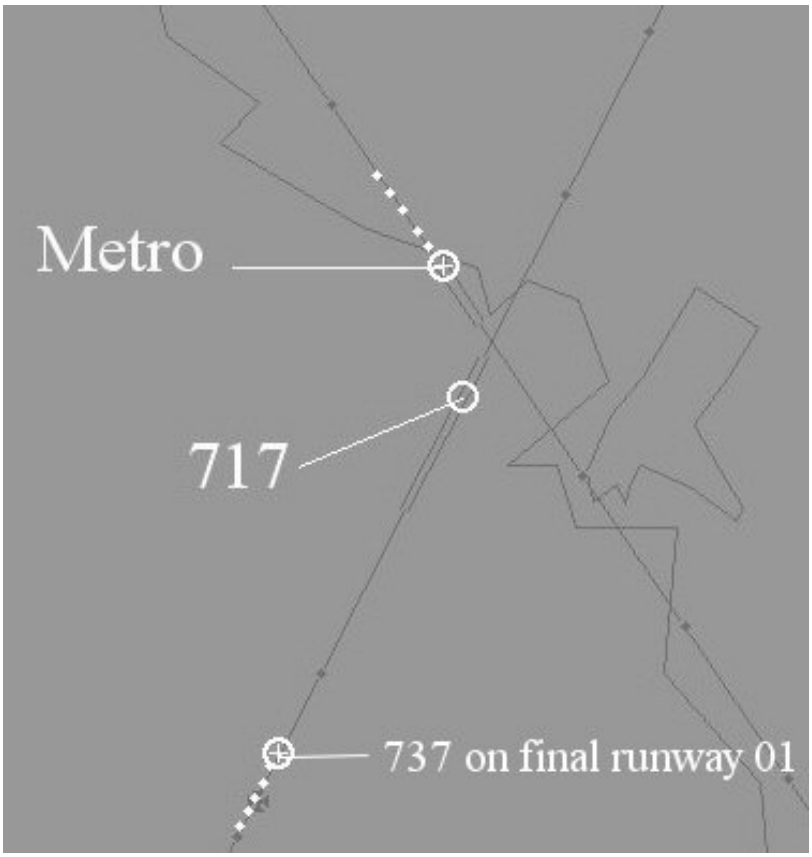
At 1901:04, the approach controller contacted the aerodrome controller and advised that the Metro was 'high on approach' and that he should 'watch him'. At about this time, the crew of the 717 commenced their take-off run from the intersection of taxiway Alpha 7 (A7) and runway 01 (figure 2). The 717 crew did not operationally require the full runway length for the departure.

Figure 2: Extract from Brisbane Aerodrome Chart



At 1901:49, the Metro crossed the threshold of runway 14 at about 500 ft and with a groundspeed of 190 kts. At about this time, the 717 was becoming airborne from runway 01 and the 737 was about 70 seconds from landing (figure 3). At that time, the aerodrome controller attempted to contact the crew of the Metro and they responded that they would not be able to complete the approach and landing, and that they were going around.

Figure 3: Extract from Airservices Australia radar replay at 1901:49



At 1901:54, the aerodrome controller asked the Metro crew if they had 'the jet in sight just airborne off [runway] zero one'. The crew later advised that they looked out and initially mistook this to be the 737 that was on final approach to runway 01. They subsequently sighted the 717 directly in front of their aircraft, about 30 to 50 ft higher, and climbing at a higher rate of climb than the Metro's rate of climb. The Metro crew believed the reason that the 717 aircraft was not initially sighted was due to it being below the level of the Metro and it being indiscernible from lights and buildings in the vicinity of the aerodrome.

At 1902:03, the 717 crossed the flight path of the Metro, 625 m in front of, and 580 ft above the Metro. While the vertical distance between the two aircraft continued to increase, the minimum lateral distance reduced to about 343 m.

Aerodrome information

Brisbane Airport had two runways, 01/19 and 14/32. Runway 01 was 3,560 m long, bearing 016 degrees magnetic and runway 14 was 1,700 m long, bearing 135 degrees magnetic. The runways did not physically cross, but were in the shape of an open 'V', with 666 m between the thresholds of runways 19 and 32. The extended centrelines of the runways intersected 387.5 m north of the threshold of runway 19, a distance from the control tower of about 2,700 m.

Converging runway operations

Converging runway operations (CROP) procedures at Brisbane Airport were developed by Airservices Australia to enhance the capacity of the airport. This allowed for simultaneous approaches, or arrivals and departures, for certain runway configurations in visual conditions. A safety case had been completed and hazards and safety requirements had been identified. Procedures had been published for controller and pilot reference.

In the circumstances of an arrival to runway 14 and a departure from runway 01, while the two runways did not physically cross, they were considered to be intersecting runways for the application of separation standards. The aerodrome controller was required to apply the runway separation standards for intersecting runways, contained in the Manual of Air Traffic Services (MATS). The Brisbane Tower local instructions reiterated the local application of the MATS standard and stated:

> For a runway 14 arrival and runway 01 departure;
>
> The landing aircraft shall NOT be permitted to cross the runway threshold until the preceding departing aircraft has crossed the intersection of the runway centrelines.
>
> The departing aircraft shall NOT be permitted to commence take-off until the arriving aircraft has landed.

Local instructions also stated that the aerodrome controller must apply visual separation inside 5 NM for this runway configuration. Before the aerodrome controller could apply visual separation, two-way communications were required to be established between the pilot of an arriving aircraft and the aerodrome controller.

The approach controller did not instruct the crew of the Metro to transfer to the tower frequency until the aircraft was about 3.5 NM from the aerodrome. The approach controller did not advise the tower controller that the Metro would be transferring at other than the normal transfer point of 5 NM. The aerodrome controller did not contact the crew of the Metro until that aircraft was approaching the threshold of runway 14 (figure 3).

The first recorded transmission on the aerodrome control frequency from the crew of the Metro was in response to the transmission from the aerodrome controller, 73 seconds after the transfer instruction. It was not determined if the Metro crew were monitoring the tower frequency during this period.

The aerodrome controller later reported that he considered that it takes approximately 60 seconds from the time a take-off clearance is issued, or brakes released, until a 717 type aircraft departing from the taxiway A7 intersection would pass the intersection of the extended runway centrelines. Similarly, he believed that a Metro type aircraft would need to be at least 60 seconds flying time away, or about 3 NM from the threshold of runway 14, with a groundspeed of about 130 to 140 kts to comply with the intersecting runway standard.

Recorded information later showed that when the aerodrome controller issued the take-off clearance to the crew of the 717:

- the Metro was about 2 NM from the threshold of runway 14 and with a groundspeed of about 200 kts, and

- there was a 12 second delay between when the crew of the 717 received the take-off clearance and when that aircraft commenced its take-off run.

There was no evidence of any radio equipment problems for either of the controllers, or the crews of the Metro and the 717.

Meteorological information

The routine aerodrome weather report for Brisbane issued at 1900 recorded the wind as 360 degrees T at 7 kts, with no cloud below 5,000 ft and visibility greater than 10 km. The automatic terminal information service was recorded at 1825. This nominated converging runway operations, with runways 01 and 14 for arriving aircraft and runway 01 for departing aircraft. The wind was recorded as 020 degrees at 8 kts with a downwind maximum of 5 kts for runway 14. Visibility was recorded as greater than 10 km with cloud few[2] at 3,500 ft.

The observed meteorological conditions met all the specified requirements for the application of visual separation and converging runway operations. The downwind maximum of 5 kts on runway 14 was the maximum allowable for the nomination of the runway 14 for arrivals.

It was a dark, moonless night, with the end of civil twilight[3] at 1757. For a landing on runway 14, the environmental background lighting included the runway lighting for runway 01/19, aerodrome aircraft maintenance facility lights, lights from Port of Brisbane facilities, and lighting and gas flares from fuel refinery facilities located adjacent to the Brisbane River (figure 4).

2 Few = 1 to 2 oktas of cloud, where an okta is a unit of sky area equal to one-eighth of total sky visible to the celestial horizon.

3 The end of civil twilight is the time, in the absence of moonlight, artificial lighting or adverse atmospheric conditions, the illumination is such that large objects may be seen but no detail is discernible.

Figure 4: Sources of external lighting SE of Brisbane Airport

Separation standards

The approach controller was responsible for the sequencing and separation of aircraft in the airspace surrounding Brisbane Airport. The aerodrome controller was responsible for the application of runway separation standards and the application of visual separation.

The MATS stated that visual separation 'shall be achieved by the use of visual procedures or by assigning visual separation responsibility to a pilot'. The MATS did not specify any minimum distance requirement for the application of visual separation, but stated:

> When aircraft are operating visually as aerodrome traffic … Air Traffic Control shall issue clearances designed to maintain separation; and/or sequencing instructions and/or relevant traffic information.
>
> The pilot will position the aircraft in such a manner that, while complying with Air Traffic Control instructions, they maintain separation from other aircraft.

The aerodrome controller reported that when the Metro was approaching the runway, he had recognised the aircraft was 'pretty high' and had attempted to contact the Metro crew to pass traffic information on the departing 717. The situation changed when the crew of the Metro notified that they were going around and the aerodrome controller asked the crew if they had the 'jet in sight'. At that time, there was about 9 seconds before the 717 crossed in front of the Metro.

Recorded information later showed that, in response to this sighting request, the Metro crew provided a short response that was partly muffled. The aerodrome controller then attempted to contact the Metro crew a second time. The Metro crew later reported that they had heard the first transmission from the controller, but had

initially identified the wrong aircraft due to the background lighting clutter. They reported that while they were responding to the first transmission they saw the 717.

The MATS advised that when visual separation responsibility is assigned to a pilot:

> Correct identification by a pilot of the aircraft from which separation must be maintained is essential.
>
> The controller should consider the following limitations to a pilot's ability to comply with a control instruction that required visual contact with another aircraft: (a) the field of vision from the cockpit (b) the contrast of aircraft with the background against which it will appear.
>
> The controller shall issue an alternative instruction to provide separation if there is any doubt of the pilot's ability to keep the other aircraft in sight or maintain separation.

The aerodrome controller did not correctly apply the runway separation standards for CROP as required by local instructions. Also, the aerodrome controller did not, assign separation responsibility to the crew of the Metro during the go-around.

Traffic information and Safety Alerts

The provision of traffic information was not mandatory and the MATS did not provide guidance to controllers on the circumstances under which the provision of relevant traffic information would be appropriate.

The requirement to provide traffic information was changed from 'mandatory (and)' to 'optional (and/or)' by Airservices Australia in April 2003. On 1 September 2005, Airservices Australia amended the MATS to completely remove the previously amended section 4.5.2.3 relating to the provision of aerodrome traffic information, with the concurrence of the Civil Aviation Safety Authority (CASA), to remove ambiguity over separation responsibilities in the aerodrome traffic zone.

On 16 September 2005, the Civil Aviation Safety Regulation Part 172 Manual of Standards was amended, after agreement between CASA and Airservices Australia, to state:

> When aircraft are operating visually as aerodrome traffic ATC must issue 1 or more of the following:
>
> (a) clearances designed to maintain separation
>
> (b) sequencing instructions
>
> (c) relevant traffic information

The issue of the provision of traffic information was subject of an Australian Transport Safety Bureau (ATSB) safety recommendation in June 2004[4] and a

4 ATSB occurrence investigation report 200205540 and associated safety recommendation R20040063 available at www.atsb.gov.au.

further recommendation in October 2006[5] (see also Safety Action section of this report).

The converging runway operations safety case had identified that certain runway configurations did require the provision of relevant traffic information to mitigate the hazards. Where traffic information was required, the AIP and MATS specified:

> Air Traffic Control will provide relevant traffic information to aerodrome traffic to enable pilots, while complying with Air Traffic Control instructions, to maintain separation from other aircraft.
>
> Relevant traffic information shall be passed in sufficient time and detail to enable the pilot to identify and maintain separation from the other aircraft.

The hazard identified for a runway 14 go-around with a runway 01 departure was considered to be have been adequately managed with the separation between airborne aircraft provided by the aerodrome controller. This was in conjunction with additional safety requirements such as two-way communication, runway separation standards and suitable meteorological conditions. The provision of traffic information was not mandated in this configuration.

The MATS provided directions for controllers on the provision of Safety Alerts:

> A Safety Alert shall be issued to an aircraft when a controller is aware the aircraft is in a situation which is considered to place it in unsafe proximity to terrain, obstructions or other aircraft. The controller must remain vigilant for the development of such situations and issue a Safety Alert when the situation is recognised.
>
> The issuance of a Safety Alert is a first priority.
>
> When a controller is aware that an aircraft is in unsafe proximity to another aircraft, a Safety Alert shall be issued as follows:
>
> "(Call sign) TRAFFIC ALERT (position of traffic if time permits), [SUGGEST] TURN LEFT / RIGHT (specific heading, if appropriate), and / or [SUGGEST] CLIMB / DESCEND (specific altitude if appropriate), IMMEDIATELY".

Tower environment

The approach and aerodrome controllers were correctly rated, endorsed and satisfied recency requirements. The workload of each position was reported as being both moderately complex and moderately busy.

The aerodrome controller had extensive experience in the provision of aerodrome control services. He had completed all required training, including refresher training for visual separation, runway separation standards and converging runway operations. He reported that he was well rested and did not consider himself to be fatigued. He also reported that there were no significant distractions and all the required equipment and facilities were operational.

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5 ATSB occurrence investigation report 200501921 and associated safety recommendation R20060018 available at www.atsb.gov.au.

The aerodrome controller confirmed that he was separating aircraft by visual observations from the tower. He reported that he had seen the Metro on approach before the 717 was cleared for takeoff, although he had not perceived that the Metro was high on approach until alerted by the approach controller. He stated that he had seen other aircraft make successful landings from similar steep approaches in the past, but 'had in the back of his mind he may need to do something'.

A tower radar display was available for aerodrome controller situational awareness, with both altitude and groundspeed displayed. The controller recalled observing the Metro on the radar display around the time it was being radar vectored clear of the crossing traffic and thinking that the aircraft was possibly going to be processed for runway 01 instead of runway 14. He reported that he changed the flight progress strip from runway 14 to runway 01, and at some later time changed it back to runway 14. He did not recall making any reference to the radar display when the Metro was on final approach.

The controller reported that while he had observed go-arounds from runway 14 in the past, he had never previously been required to separate a runway 14 go-around with a departure from runway 01, or other close arriving traffic.

Flight crew of the Metro

The pilot in command (PIC) of the Metro reported having over 6,000 flying hours, with about 2,000 hours on that aircraft type and 500 hours in command. The copilot reported having about 600 flying hours, with about 400 hours on the Metro.

The crew signed on at Brisbane Airport at about 0600 and they flew 3 sectors to Thargomindah, Qld. After about a 4 hour rest period, they flew another 4 sectors on the return trip to Brisbane. The PIC reported that he had not eaten prior to signing on, but did consume a light company supplied breakfast. Food and drink consumption during the day was limited because of the flight times and workload. There had been an opportunity to eat, drink and rest during the time on the ground at Thargomindah.

The Metro aircraft was not equipped with an autopilot. On the sector to Brisbane, the copilot was the pilot flying (PF). The PIC, as the pilot not flying (PNF), was responsible for other duties, including the radio transmissions. They reported that the weather was fine apart from some light turbulence on approach and that it was a 'pitch black' night.

The PIC recalled their descent to Brisbane being restricted by another aircraft, which placed them high on approach. When the approach controller asked if they could make the approach, he looked out to see other approaching traffic for runway 14 a few miles away.[6] He informed the copilot and then the approach controller, that they could make the approach.

The copilot later stated that he had not done many steep approaches in a Metro before and had done none at night. He had also only flown into Brisbane about 10 times previously. He accepted the advice of the PIC that the approach was possible. When it became evident that a safe landing was not assured, due to the aircraft's

6 Recorded data later showed that this aircraft was about 14 NM from the runway 14 threshold at the time.

speed and altitude, the crew decided to go around. This was about the time their aircraft was approaching the runway 14 threshold.

The PIC commented that it had been a long flying day and that they had wanted to 'get the aircraft in'. He acknowledged that he accepted an approach that perhaps he would not have accepted in other circumstances.

Both pilots agreed that they were probably about 1,000 ft higher on approach than normal and the copilot later reported that he perceived that they were further from the runway than they really were. The PIC reported that the visibility from the Metro cockpit was not good, other than for straight ahead. This was due to the small side windows which are often partly opaque or obscured by condensation.

Both crew members reported that they were not aware of the 717 until being told of the traffic by the aerodrome controller in the go-around. They had no recollection of any transmissions to the 717, including the issuing of the take-off clearance.

The PIC reported that after informing the aerodrome controller they were going around, the controller asked if they had 'the jet in sight just airborne off 01'. He stated that he looked to the right and sighted the aircraft on approach to runway 01. As he was completing his radio transmission to the controller stating that they had the traffic sighted, the crew then sighted the 717 ahead at about the same altitude and at a close distance.

The PIC believed that he misidentified the conflicting aircraft due to the numerous lights to the south-east of the aerodrome, some of which are very bright. The copilot also commented that while the runway lighting was adequate, it could get a bit disorienting at times due to the surrounding lights. He stated that he felt sighting another aircraft from above, amongst the lights, was impossible.

The Metro was not equipped with a traffic alert and collision avoidance system (TCAS)[7], nor was it required by regulations.

Flight crew of the 717

Both pilots of the 717 were experienced on the aircraft type and with operations at Brisbane Airport. The PIC, who was also the PF, reported that they were not aware of the Metro until becoming airborne from runway 01. At about that time, the aircraft's TCAS showed traffic about 400 ft higher and 2 NM west of the 717, and provided a traffic advisory (TA). The PIC heard the transmission from the Metro crew stating they were going around and he then saw the Metro. The crew increased the climb rate slightly, to ensure that they would pass above the other aircraft. At 1902:07, as the 717 passed 1,100 ft on climb, the traffic advisory changed to a resolution advisory (RA)[8], to 'monitor vertical speed'. No further action was required by the crew. The crew had not been provided with traffic information or a safety alert about the Metro from the aerodrome controller.

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7 TCAS is an independent onboard collision avoidance system. It is designed as a backup to the ATC system and the 'see and avoid' concept.

8 Resolution Advisories are inhibited below 1,100 ft for climbing aircraft.

ANALYSIS

The Metro crew continued on an approach that, due to the aircraft's higher than normal speed and altitude, together with the relative inexperience of the pilot flying, was unlikely to be conducted successfully. The pilot in command accepted an approach that in other circumstances he might not have. It was likely that he was influenced by the operational pressure of another approaching aircraft and the desire to land after a long flying day. Restricted cockpit visibility, together with the dark night and unusual profile, probably contributed to the crew's perception that the Metro was further from the runway than it actually was.

The aerodrome controller did not recognise that the Metro aircraft was high and too fast on approach until advised by the approach controller. The aerodrome controller subsequently did not apply the runway separation standards for CROP as required by local instructions, due to his misjudgement of the relative position and speed of the Metro. He also did not give adequate consideration to the likelihood of a go-around until after a take-off clearance had been issued to the 717 crew. While the controller believed that the Metro met the criteria that he used to assess whether aircraft would remain separated, the replay of the recorded data showed that at the time, the Metro did not meet either the distance or speed criteria he normally used. The aerodrome controller was probably influenced by the fact that he had instructed the 717 to line up on runway 01, with another aircraft approaching to land. This placed additional pressure on the controller to issue a take-off clearance to the crew of the 717 to ensure a vacant runway for the landing of the 737.

In order for the aerodrome controller to meet visual separation requirements, two-way communications were required to be established by 5 NM. The need for the approach controller to maintain the Metro on frequency resulted in a late frequency transfer instruction to the Metro crew. The Metro crew did not report promptly on the aerodrome controller's frequency, nor did that controller initially attempt to contact them. It could not be determined if the Metro crew were monitoring the tower frequency during the interim period. However, the crew did not recollect hearing any transmissions from the 717 crew. Consequently, they were unaware of the 717. The lack of a report on the aerodrome control frequency by the crew of the Metro may have also reduced the situational awareness of the crew of the 717.

Once the crew of the Metro reported that they had commenced a go-around, there was limited time for the aerodrome controller to consider and implement an alternate separation method. Thus, there was no alternative to the safety case hazard mitigator of the controller 'providing separation'. In that situation, the controller was required to issue a safety alert to the crews.

The provision of traffic information was not mandatory and the Manual of Air Traffic Services (MATS) did not provide guidance to controllers on the circumstances under which the provision of traffic information would be appropriate. However, when the tower controller recognised that the Metro was 'high' on the approach, the proactive and early provision of traffic information to the crew of that aircraft would have increased their situational awareness. Thus, they would likely have been better prepared for the subsequent situation that developed following the go-around. An increased level of situational awareness would have probably enabled the crew of the Metro to participate in the separation process as described in the Aeronautical Information Publication (AIP) and the MATS.

The controller's query to the crew about whether they had the jet in sight was ineffective in that it did not improve the crew's situational awareness. To rectify the lack of separation, the controller had either to assign separation responsibility to the crew of the Metro, or else provide a safety alert. Under the circumstances, the provision of a safety alert to the crew of the Metro was more likely to improve not only the situational awareness of that crew but also the situational awareness of the crew of the 717.

Without prior knowledge of the 717, the crew of the Metro found it difficult to identify the correct aircraft. The 717 was below their level and masked by a significant amount of background lighting to the south-east of the aerodrome. While the aircraft on approach would have been easily seen against the dark sky, the 717 would not have become clearly visible until it was on climb above the background lights and buildings.

The investigation could not establish whether any aspect of the occurrence sequence could be attributed to the effects of fatigue on the crew of the Metro. The duration of the flying day, high workload and crew performance were indicators that fatigue may have contributed to the occurrence.

SAFETY ACTION

Australian Transport Safety Bureau

Previous recommendation history

On 7 June 2004, the Australian Transport Safety Bureau (ATSB) issued the following recommendation to Airservices Australia:

R20040063

The Australian Transport Safety Bureau recommends that Airservices Australia review the Manual of Air Traffic Services (MATS) amendment decision that removed the mandatory requirement to provide traffic information to aerodrome traffic.

On 23 July 2004, the ATSB received the following response from Airservices Australia:

> This is agreed. A MATS amendment process has been initiated regarding the mandatory requirement to provide traffic information to aerodrome traffic. The current instruction is in contravention of the CASR Part 172 Manual of Standards (MOS) and is being rectified. This difference between the MATS and the Part 172 MOS was due to the MATS being amended and updated between the development and the implementation of the MOS.

The ATSB accepted the response and the recommendation remained on 'MONITOR' awaiting incorporation of the MATS amendment.

On 1 September 2005, Airservices Australia amended the MATS to completely remove the previously amended section 4.5.2.3 relating to the provision of aerodrome traffic information.

On 16 September 2005, the Civil Aviation Safety Regulation Part 172 Manual of Standards was amended, after agreement between CASA and Airservices Australia, to state:

> When aircraft are operating visually as aerodrome traffic ATC must issue 1 or more of the following:
>
> (a) clearances designed to maintain separation
>
> (b) sequencing instructions
>
> (c) relevant traffic information

On 15 September 2006, the ATSB classified the issue as 'CLOSED – NOT ACCEPTED'.

As a result of this, and other investigations, the Australian Transport Safety Bureau considers that pilot situational awareness can be limited by controller actions and as part of its investigation into a breakdown of separation at Hobart Airport (200501921), the Australian Transport Safety Bureau issued the following recommendation to Airservices Australia in October 2006:

R20060018

The Australian Transport Safety Bureau recommends that Airservices Australia review guidance material and training for aerodrome controllers relating to the provision of relevant traffic information, to enhance pilot situational awareness.

The ATSB has classified this recommendation as 'OPEN'

Airservices Australia

Airservices Australia has advised that a previously closed hazard, relating to Brisbane converging runway operations, was reviewed. This hazard related to the skill of air traffic controllers to provide separation in a go-around situation, due to their infrequent nature. Airservices Australia considered that existing measures such as controller training, licencing and familiarisation requirements adequately covered the situation and the hazard remains closed.

Airservices Australia has advised that a hazard classified as open, relating to Brisbane converging runway operations, was reviewed. This hazard related to an aircraft go-around from runway 14 with a departure from runway 01. Airservices Australia considered all controls within this hazard have been reviewed and met. The hazard remains classified as open.

Airservices Australia has advised that the opportunity to simulate go-around scenarios for aerodrome controllers will become available with the development of the Tower Visual Simulator in the medium term future. Use of this facility will assist both initial training and ongoing skills training aspects.