# ATM Network Performance Report

December 2019

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# Summary

## December Performance

Network Performance in December 2019 was affected by instances (fifteen days) of lower capacity operations at Sydney in response to meteorological conditions, which resulted in the highest monthly airborne delay over the last 4 years. Smoke haze from bushfires regularly impacted operations in Sydney this month. The combined 75th percentile performance during December for airborne delay across the four major airports (Sydney, Melbourne, Brisbane and Perth) was **4.6** minutes, and the median airborne delay across these airports was **1.1** minutes. These results did not meet the 2019/2020 KPI targets of 3.3 minutes and 0.6 minutes respectively. The median and 75th percentile have increased compared to the same period last year.

The main contributing factors to elevated airborne delay in December include:

- worse than (or different to) forecast conditions,
- thunderstorm activity in Brisbane and Melbourne,
- smoke haze in Sydney, and
- concentrated demand during peak, or low capacity, periods.

Completion of taxiway works at Melbourne airport is expected in early February 2020. During this time, close monitoring of the airborne delay is being undertaken to ensure appropriate controls are in place to regulate delays. This includes offering revisions to the Ground Delay Program (GDP) through a Collaborative Decision Making (CDM) process with our airline customers. The result of this CDM process can be a greater tolerance for airborne delay by airlines in favour of decreased gate holding, which explains some of the observed increase in airborne delay. Taxiway F was opened and works were suspended from 21st December 2019 to 13th January 2020 to accommodate increased demand and reduce disruption during the holiday period.

The following terms are used to categorise delay events in this report:

1. **Significant event**: prolonged and moderately elevated airborne delay for the entire day (i.e. 75th percentile greater than 7 minutes across the entire day).In contrast to previous months, not all of these events are included under each of the airport sections. Only those categorised under the "distinctive event" terminology are included.
2. **Notable event**: shorter and more intense periods of elevated airborne delay (i.e. two or more consecutive hours where the 75th percentile was over 10 minutes). These are considered so comparisons to previous months can be made, and counts are included in the Arrival Airborne Delay KPI commentary. In contrast to previous months, not all of these events are included under each of the airport sections. Only those categorised under the "distinctive event" terminology are included.
3. **Distinctive event:** noteworthy disruption, generally that was not planned or forecast. Identification of distinctive events is through a qualitative and quantitative assessment during the Daily Post Operational Review call. These events may include a subset of the significant and notable events.

There were thirty six significant and/or notable events in December, three more than in November (seventeen in Sydney, thirteen in Melbourne, and six in Brisbane). Twenty two of these events were 'significant', due to prolonged and moderately elevated airborne delay for the entire day; these events are labelled in **Figure** 1.

There were also nineteen distinctive events in December and these are summarised under each of the airport sections below. There were nine distinctive events in Sydney, five in Melbourne, four in Brisbane, and one in Perth.

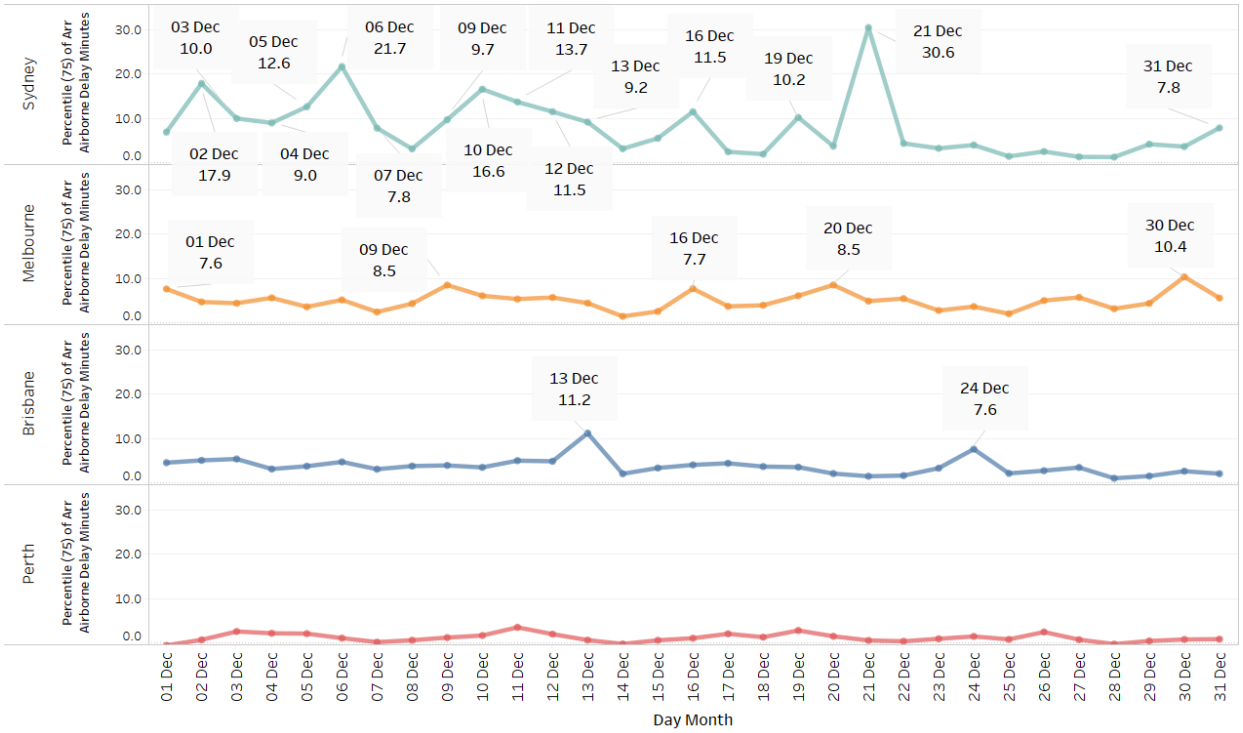


**Figure 1:** Significant events during December 2019. The marked events indicate the extent of the 75th percentile of airborne delay in minutes across each day.

# Network Wide Performance

## Airborne delay

The 24-month combined median and 75th percentile airborne delay at the four major airports is indicated in **Figure 2**. The trends are upward for both measures.

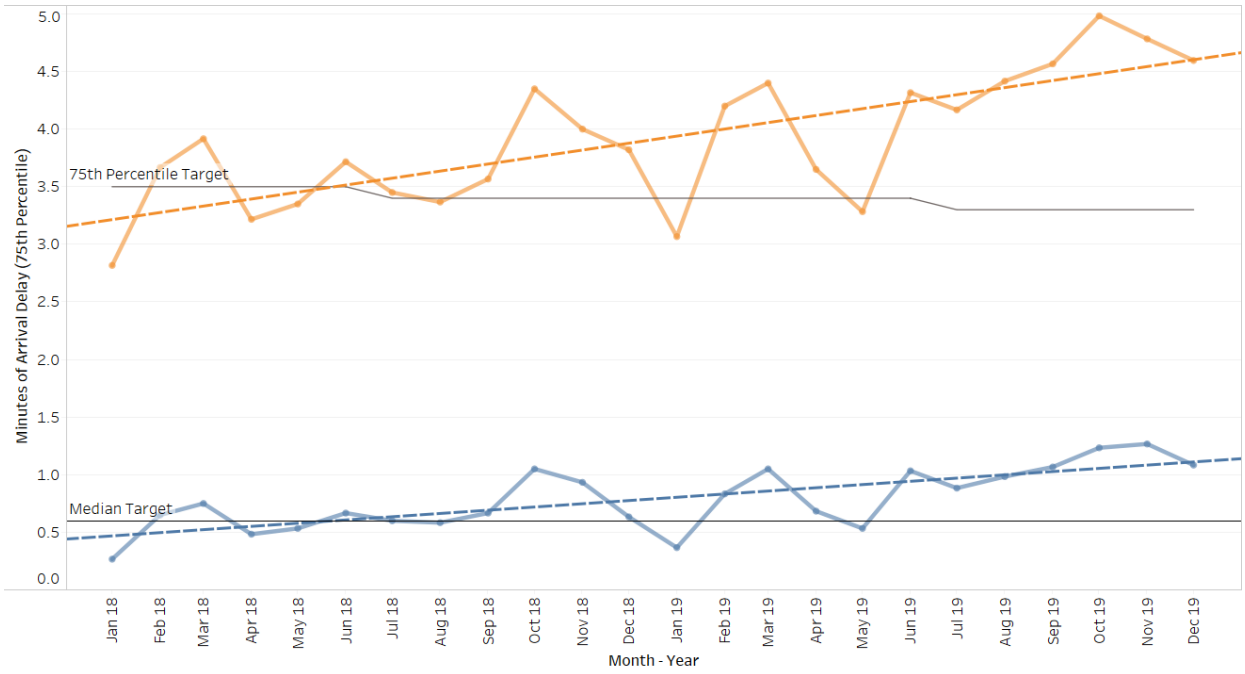


**Figure 2:** 24-month trend for airborne delay

The long term (48-month) trends of the 75th percentile airborne delay for each of the four major airports are depicted in **Figure 3.** The trends for Sydney and Melbourne are upwards. More detailed analysis for each airport is presented later in this report.

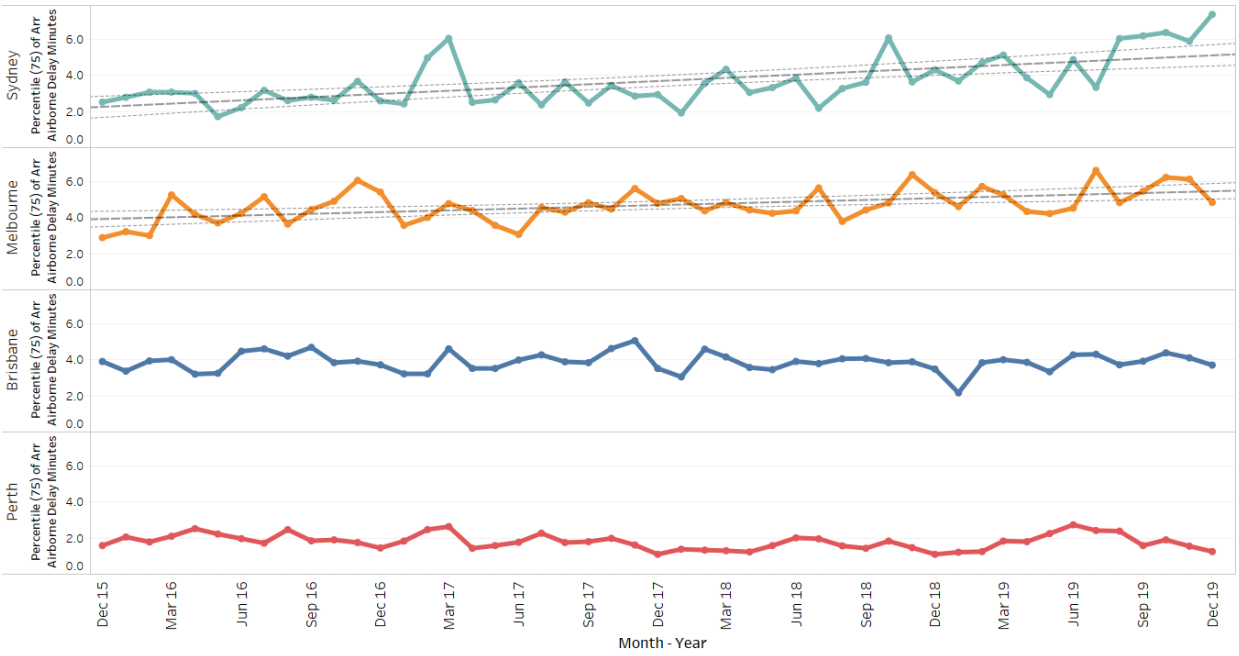


**Figure 3:** 48-month trend for airborne delay (75th percentile) by airport

# Runway configuration

The runway configuration usage for each airport is shown in **Figure 4**. It shows the current month, the same month from the preceding year for comparison purposes, and the preceding 3 months.

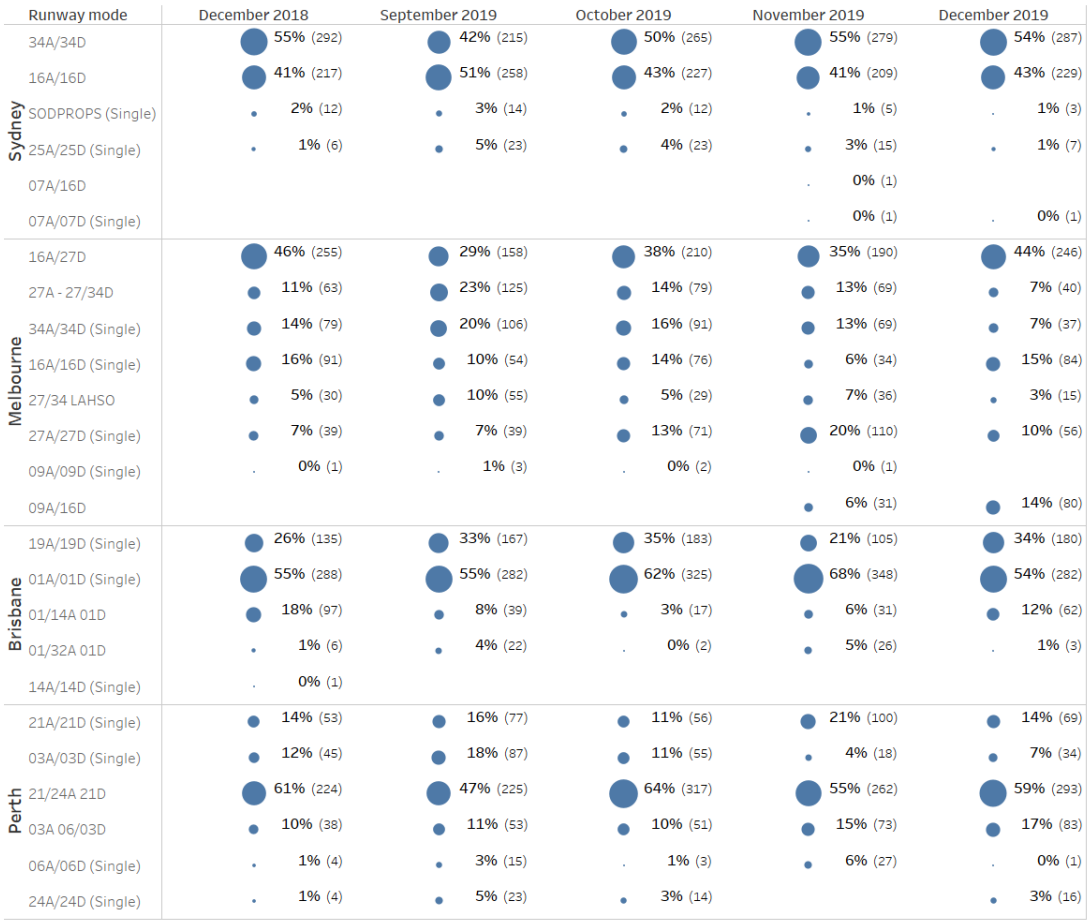


**Figure 4:** December runway configuration usage (percentage of total and hours in brackets) by airport (Sydney 06-22L, Melbourne 06-23L, Brisbane 06-22L and Perth 06-21L). Single runway configurations indicated in parentheses. Note: Sydney runway mode selection takes into account the Long Term Operating Plan to manage aircraft noise.

In Sydney the use of parallel 34 runway operations decreased by 2% compared to the same month last year (287 hours compared to 292 hours in December 2018). Additionally, the use of parallel 16 operations increased by 6% (229 hours compared to 217 hours in December 2018). The overall single runway usage (runway 07/25 and SODPROPS) decreased by 7 hours compared to the same month last year.

In Melbourne the availability of Land and Hold Short Operations (LAHSO) decreased by 50% compared to the same month last year (15 hours compared to 30 hours in December 2018). Single runway usage decreased by 16% (177 hours compared to 210 hours in December 2018). The use of Runway 34 for arrivals (single runway 34 and LAHSO operations) decreased by 50% (to 52 hours) compared to November (105 hours).

Brisbane had single runway operations for 88% of the time in December 2018 and 80% of the time in December 2019. Single runway 01 operations decreased by 2% compared to the same month last year (282 hours compared to 288 hours in December 2018). Single runway 19 operations increased by 33% (180 hours compared to 135 in December 2018). The use of two

runways for arrivals in Brisbane decreased by 37% compared to the same month last year (65 hours compared to 103 hours in December 2018). In December 2018 and 2019 the more common configuration was runways 01 and 14 for arrival, with Runway 01 for departure.

Perth was required to use single runway operations for 24% of the time in December 2019. Single runway operations are 13% higher compared to the same month last year (120 hours compared to 106 hours in December 2018). Changes to reporting at Perth now capture weekend operating configurations. This is creating an artefact change to year-on-year differences (December 2018 had 368 hours, compared to December 2019 having 496 hours of recorded runway usage). Typically weekends at Perth have low traffic volumes which favour single runway configurations.

## Traffic levels and composition changes

**Figure 5** shows traffic levels and composition changes since the beginning of 2017. Overall during 2019 Brisbane (1.8%) and Perth (4.5%) have experienced year on year domestic growth while other indicators and locations have experienced smaller changes.

Comparing overall traffic levels in December 2019 to December 2018, Sydney (-1.3%) has decreased, while Melbourne (0.9%), Brisbane (1.7%) and Perth (4.0%) have increased. Traffic growth at Brisbane and Perth are similar to most other months in 2019. International traffic numbers have decreased in Sydney (-2.9%), but they are increasing at Melbourne (1.2%), Brisbane (1.1%) and Perth (4.5%). This is the second straight month in which international traffic grew at Perth, after the remainder of the calendar year saw a decline.

In Sydney the domestic traffic comparison between months in 2018 and 2019 fluctuates; and December 2019 is slightly down on December 2018. The general increase of international traffic in 2018 has levelled off in 2019. Traffic in Melbourne for 2019 is fairly steady compared to the previous year, with the strong growth of international traffic in 2018 no longer seen. In 2018 Brisbane traffic generally showed a decrease compared to the same month in the previous year, but with growth in international traffic. For 2019 traffic is increasing, driven by domestic traffic, as international growth has slowed. Perth traffic levels were relatively stable in 2018, while 2019 has shown overall growth driven by domestic traffic (with a drop in the international component).

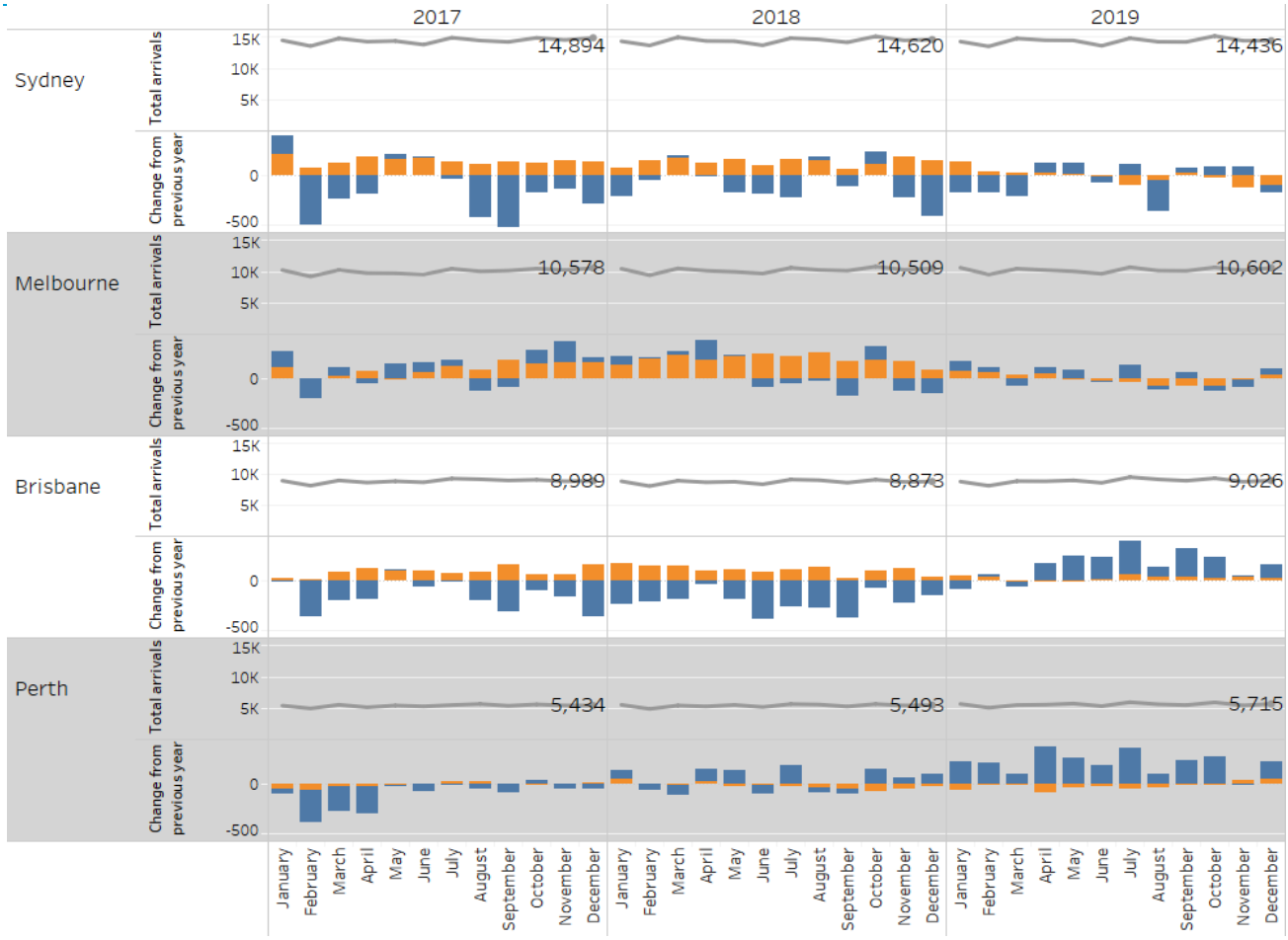


**Figure 5:** Traffic levels and composition change since January 2017. Grey lines show overall traffic numbers (annotated figures compare current month to same month one and two years earlier). Coloured bars show change in traffic compared to the same month the previous year for domestic (blue) and international (orange) flights.

# Demand and capacity

**Figure 6** shows estimates of the number of hours each month where scheduled demand is significantly above capacity (hours where demand is three or more flights higher than the METCDM rate) for each of the four major airports. The 24-month trend for excess demand is upward in Sydney and Perth. **Figure 7** shows the day of week and local hour of day when demand exceeded capacity most often. The displayed hours are 07, 08, 09, 10, 16, 17, 18 and 19. Sydney shows excess demand in each of these hours (predominately 07, 08 and 17), Melbourne is more noticeable in 07 and 17, and Brisbane in 07, 16, 18 and 19.

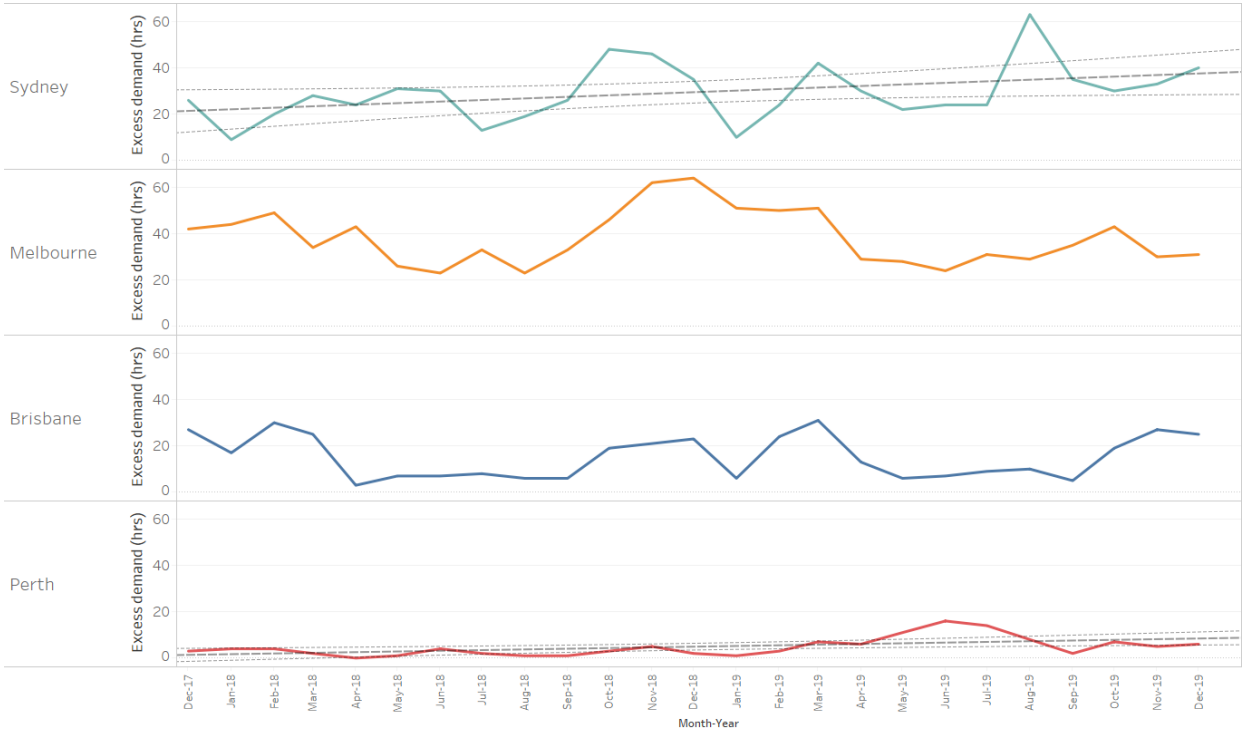


**Figure 6:** Excess demand estimates. Solid lines indicate the number of hours where estimated demand exceeds the METCDM rate for that hour by three or more flights. Dashed and dotted lines for Sydney and Perth indicate upward trends. Demand is estimated using Harmony Base Estimated Landing Time.

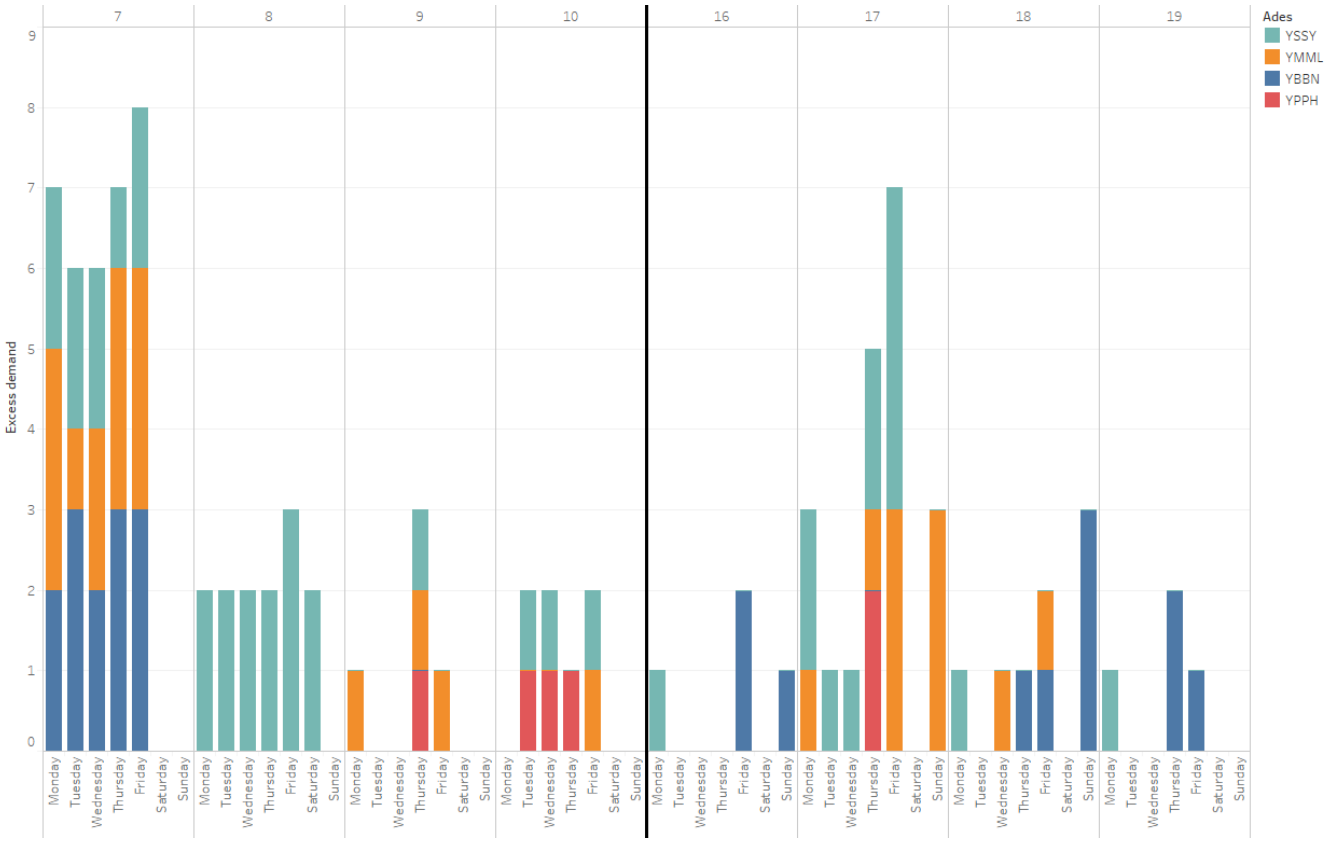


**Figure 7:** Excess demand estimates by day of the week (bottom axis) and local hour of day (top axis) when scheduled demand is most likely to exceed capacity in December. The count is incremented for a bar when the estimated demand exceeds the METCDM rate for that hour and day of week by three or more flights. Demand is estimated using Harmony Base Estimated Landing Time. Colours on the stacked bars are indicated by airport in the legend (ICAO airport codes – YSSY: Sydney, YMML: Melbourne, YBBN: Brisbane, YPPH: Perth).
*Note: There are five of each Sundays, Mondays and Tuesdays during the month, with all other days of the week occurring four times.*

# Sydney

## Airborne delay

The 75th percentile performance figures for airborne delay at Sydney are indicated in **Figure 8.** December performance for the median (2.0 minutes) and the 75th percentile (7.4 minutes) did not meet the targets (0.6 minutes and 3.3 minutes respectively). Compared to the same month last year, there was an increase in the airborne delay median performance (from 0.5 minutes) and in the 75th percentile performance (from 4.3 minutes).

The long-term (48-month) and 24-month trends for airborne delay at Sydney are upwards.

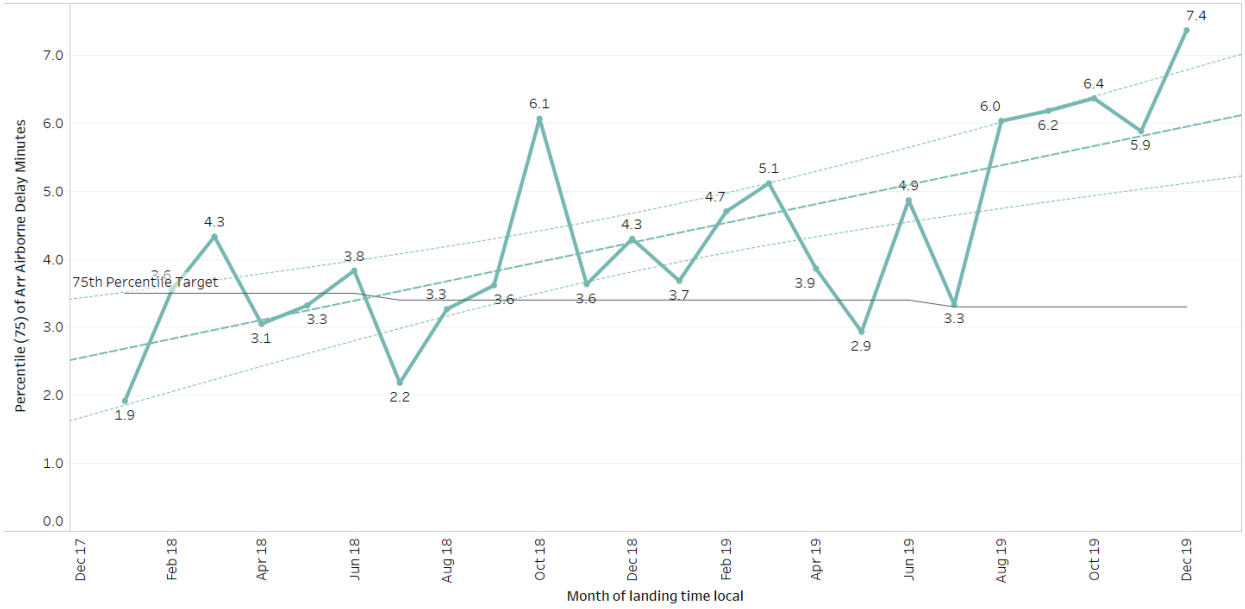


**Figure 8:** Sydney airborne delay 75th percentile (last 24 months)

## Distinctive events

**Table 1** describes the distinctive events during December in Sydney.

| Day | Event Category | Delay (minutes – 75th percentile) | Event Descriptions (*Contributing causes to increased delays*) |
|---|---|---|---|
| 2 December | Significant | 17.9 | Morning: Rates reduced tactically due to smoke haze.<br>Afternoon: Extended period of single runway operations with reduced visibility due to smoke haze. Level 1 revision at 1645 local to reduce rates.<br>Concentration of demand due to off-schedule internationals and non-compliant flights in both periods. |
| 3 December | Significant | 10.0 | Afternoon: Rates reduced tactically due to smoke haze (requiring full ILS). Concentration of demand due to off-schedule internationals and non-compliant flights. |
| 6 December | Significant | 21.7 | Afternoon: Rates reduced tactically, with multiple go-arounds due to windshear. Runway change earlier than forecast, with smoke haze and low cloud. Concentration of demand due to off-schedule internationals and non-compliant flights. |
| 10 December | Significant | 16.6 | Morning/Afternoon: Rates reduced tactically due to smoke haze with Concentration of demand due to off-schedule internationals and non-compliant flights. |

| | | | |
|---|---|---|---|
| 11 December | Significant | 13.7 | Morning: Rates reduced tactically due to smoke haze.<br>Afternoon: Reduced visibility due to smoke haze.<br>Concentration of demand due to off-schedule internationals and non-compliant flights in both periods. |
| 19 December | Significant | 10.2 | Afternoon: Rates reduced tactically due to smoke haze and strong winds. Concentration of demand due to off-schedule internationals and non-compliant flights. |
| 21 December | Significant | 30.6 | Morning: Rates reduced tactically due to smoke haze.<br>Afternoon: Strong southerly wind change caused runway change to 16 earlier than forecast with associated windshear resulting in only 4 landings in 50 minutes. A ground stop was put in place at 1745 local, a search and rescue operation prevented the use of runway 16L for 50 minutes.<br>Concentration of demand due to off-schedule internationals and non-compliant flights in both periods. |
| 26 December | Notable | 2.5 | Afternoon: Unplanned change to single runway (due to strong cross winds) operations for an hour significantly reduced the arrival rate. |
| 31 December | Significant | 7.8 | Afternoon: Rates reduced tactically due to windshear and strong winds (also resulting in go-arounds), and the use of Runway 16R only due to New Year's Eve fireworks. Some smoke haze and low cloud reduced rates. Concentration of demand due to off-schedule internationals and non-compliant flights. A medical evacuation flight also impacted operations. |

**Table 1:** Distinctive event descriptions for Sydney.

## CTOT variations

This section of the report focusses on variations from CTOT at Sydney from 0600-2300 local, as non-compliance is evident at almost any time of day at some point during the month. **Table 2** provides the flights within this period that departed either early or late with respect to their CTOTs (-5 to +15 minutes). Flights that appear at least twice early or five times late have been included. This facilitates collaboration to identify patterns and causes of delay.

The CTOT against the ATOT (actual take off time) measure is used as a proxy until the COBT (calculated off blocks time) against AOBT (actual off blocks time) can be routinely reported on.

| CTOT Variation | ACID | ADEP | Local - ALDT HOUR | |
|---|---|---|---|---|
| Early | RXA853 | YBHI | 9 | 4 |
| | PE721 | YTRE | 6 | 3 |
| | QLK161 | YPMQ | 7 | 3 |
| | RXA161 | YORG | 7 | 3 |
| | RXA311 | YGFN | 9 | 3 |
| | JST722 | Hobart | 19 | 2 |
| | PE823 | YCBA | 15 | 2 |
| | QLK161D | YPMQ | 8 | 2 |
| | QLK181 | YMOR | 10 | 2 |
| | QLK230D | Wagga | 18 | 2 |
| | RXA167 | YORG | 10 | 2 |
| | RXA464 | YNAR | 12 | 2 |
| | RXA472 | Griffith | 18 | 2 |
| | RXA917 | Griffith | 13 | 2 |
| | VOZ500 | Gold Coast | 8 | 2 |
| Late | TGG252 | Melbourne | 17 | 7 |
| | JST514 | Melbourne | 17 | 6 |
| | VOZ841 | Melbourne | 13 | 6 |
| | QFA434 | Melbourne | 14 | 5 |
| | QFA464 | Melbourne | 21 | 5 |
| | QFA517 | Brisbane | 12 | 5 |
| | TGG228 | Melbourne | 12 | 5 |
| | VOZ827 | Melbourne | 10 | 5 |
| | VOZ883 | Melbourne | 20 | 5 |

**Table 2:** CTOT variation for Sydney arrivals 0600-2300 local – December 2019. Number of occasions that each flight departed early or late with respect to its CTOT (-5 to +15 minutes). Flights that appear at least twice early or five times late have been included.

# Melbourne

## Airborne delay

The 75th percentile performance figures for airborne delay at Melbourne are indicated in **Figure 9.** December performance for the median (1.4 minutes) and the 75th percentile (4.8 minutes) did not meet the targets. Compared to the same month last year, there was a decrease in the airborne delay median performance (1.5 minutes), and in the 75th percentile performance (from 5.4 minutes)

The long-term (48-month) and 24-month trends for airborne delay at Melbourne are upwards.

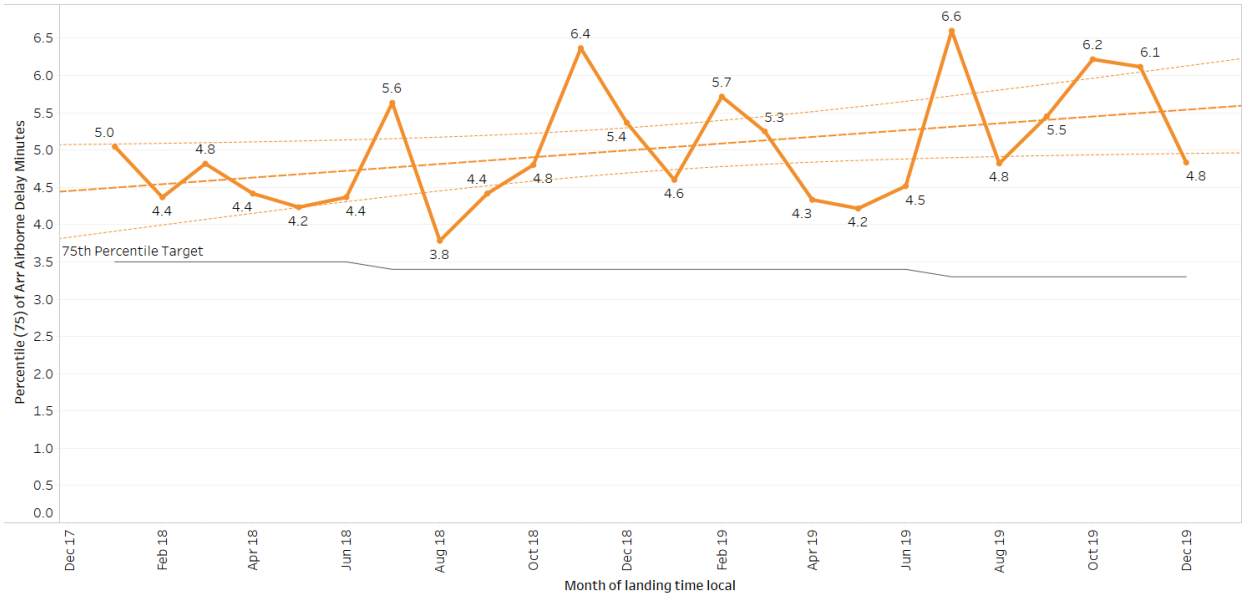


**Figure 9:** Melbourne airborne delay 75th percentile (last 24 months)

## Distinctive events

**Table 3** describes the distinctive events during December in Melbourne.

Any events marked with an asterisk (*) in the table indicates that the arrival rate reduction required for the Rapid Exit Taxiway F works was a contributing factor to the delay event. Collaborative decision making with our airline customers about the impact of these works on network performance has resulted in an increased tolerance for Airborne Delay for arrivals into Melbourne rather taking higher levels of ground holding. The works are anticipated to be completed in early February 2020 with a break taking place over the Christmas period to avoid disruption during the busy holiday period. Co-ordination group meetings with airlines and airports resulted in the decision to monitor the situation each month to determine if any further controlling actions are required to manage delay.

| **Day** | **Event Category** | **Delay** (minutes – 75th percentile) | **Event Descriptions** (*Contributing causes to increased delays*) |
|---|---|---|---|
| 1 December | Significant | 7.6 * | Afternoon: Weather diversions and showers in the terminal area. |
| 9 December | Significant | 8.5 * | Morning: Concentration of demand due to off-schedule internationals and non-compliant flights during period with strong winds, wind gusts and turbulence. |
| 20 December | Significant | 8.5 | Afternoon: Concentration of demand due to non-compliant flights with strong winds. |
| 27 December | Notable | 5.7 | Afternoon: Concentration of demand due to off-schedule internationals and non-compliant flights. |
| 30 December | Significant | 10.4 | Afternoon: Thunderstorm activity (rates slightly reduced tactically). No arrivals for half an hour coinciding with a runway change. Concentration of demand due to off-schedule internationals and non-compliant flights. |

**Table 3:** Distinctive event descriptions for Melbourne.

# CTOT variations

This section of the report focusses on variations from CTOT at Melbourne from 0600-2300 local, as non-compliance is evident at almost any time of day at some point during the month. **Table 4** provides the flights within this period that departed either early or late with respect to their CTOTs (-5 to +15 minutes). Flights that appear at least twice early or five times late have been included. This facilitates collaboration to identify patterns and causes of delay.

The CTOT against the ATOT (actual take off time) measure is used as a proxy until the COBT (calculated off blocks time) against AOBT (actual off blocks time) can be routinely reported on.

| CTOT Variation | ACID | ADEP | Local - ALDT HOUR | |
|---|---|---|---|---|
| Early | QLK58D | Devonport | 18 | 4 |
| | RXA3752 | Mount Gambier | 8 | 3 |
| | JST734 | Launceston | 12 | 2 |
| | JST742 | Launceston | 18 | 2 |
| | QFA623 | Brisbane | 17 | 2 |
| | QLK50D | Devonport | 7 | 2 |
| | QLK77D | Mildura | 7 | 2 |
| | QLK280D | Launceston | 7 | 2 |
| | QLK286D | Launceston | 18 | 2 |
| | VOZ726 | Gold Coast | 9 | 2 |
| | VOZ742 | Gold Coast | 18 | 2 |
| | VOZ1036 | YBSU | 16 | 2 |
| Late | VOZ318 | Brisbane | 12 | 12 |
| | VOZ742 | Gold Coast | 17 | 9 |
| | VOZ1034 | YBSU | 15 | 9 |
| | JST477 | Williamtown | 16 | 8 |
| | JST521 | Sydney | 19 | 8 |
| | JST563 | Brisbane | 12 | 8 |
| | QFA423 | Sydney | 11 | 8 |
| | QFA419 | Sydney | 10 | 7 |
| | QFA427 | Sydney | 12 | 7 |
| | QFA467 | Sydney | 21 | 7 |
| | QFA839 | Darwin | 17 | 7 |
| | VOZ878 | Sydney | 20 | 7 |
| | JST515 | Sydney | 15 | 6 |
| | QFA439 | Sydney | 15 | 6 |
| | QFA443 | Sydney | 16 | 6 |
| | QFA449 | Sydney | 18 | 6 |
| | QFA463 | Sydney | 20 | 6 |
| | QFA465 | Sydney | 21 | 6 |
| | QFA613 | Brisbane | 12 | 6 |
| | QFA617 | Brisbane | 14 | 6 |
| | QFA881 | Gold Coast | 15 | 6 |
| | VOZ834 | Sydney | 12 | 6 |
| | VOZ838 | Sydney | 13 | 6 |

| | | | | |
|---|---|---|---|---|
| JST437 | Gold Coast | 15 | ■ | 5 |
| JST471 | Williamtown | 20 | ■ | 5 |
| JST513 | Sydney | 14 | ■ | 5 |
| JST519 | Sydney | 20 | ■ | 5 |
| JST710 | Hobart | 18 | ■ | 5 |
| JST777 | Adelaide | 21 | ■ | 5 |
| QFA411 | Sydney | 9 | ■ | 5 |
| QFA429 | Sydney | 13 | ■ | 5 |
| RXA3493 | Merimbula | 18 | ■ | 5 |
| TGG239 | Sydney | 13 | ■ | 5 |
| TGG565 | Gold Coast | 17 | ■ | 5 |
| VOZ322 | Brisbane | 13 | ■ | 5 |
| VOZ332 | Brisbane | 17 | ■ | 5 |
| VOZ738 | Gold Coast | 15 | ■ | 5 |
| VOZ846 | Sydney | 15 | ■ | 5 |
| VOZ850 | Sydney | 16 | ■ | 5 |
| VOZ858 | Sydney | 17 | ■ | 5 |
| VOZ862 | Sydney | 18 | ■ | 5 |
| VOZ870 | Sydney | 19 | ■ | 5 |

**Table 4:** CTOT variation for Melbourne arrivals 0600-2300 local – December 2019. Number of occasions that each flight departed early or late with respect to its CTOT (-5 to +15 minutes). Flights that appear at least twice early or five times late have been included.

# Brisbane

## Airborne delay

The 75th percentile performance figures for airborne delay at Brisbane are indicated in **Figure 10**. December performance did not meet the target for the median (0.9 minutes) or the 75th percentile (3.7 minutes). Compared to the same month last year, there was an increase in the airborne delay median performance (from 0.8 minutes) and the 75th percentile (from 3.5 minutes).

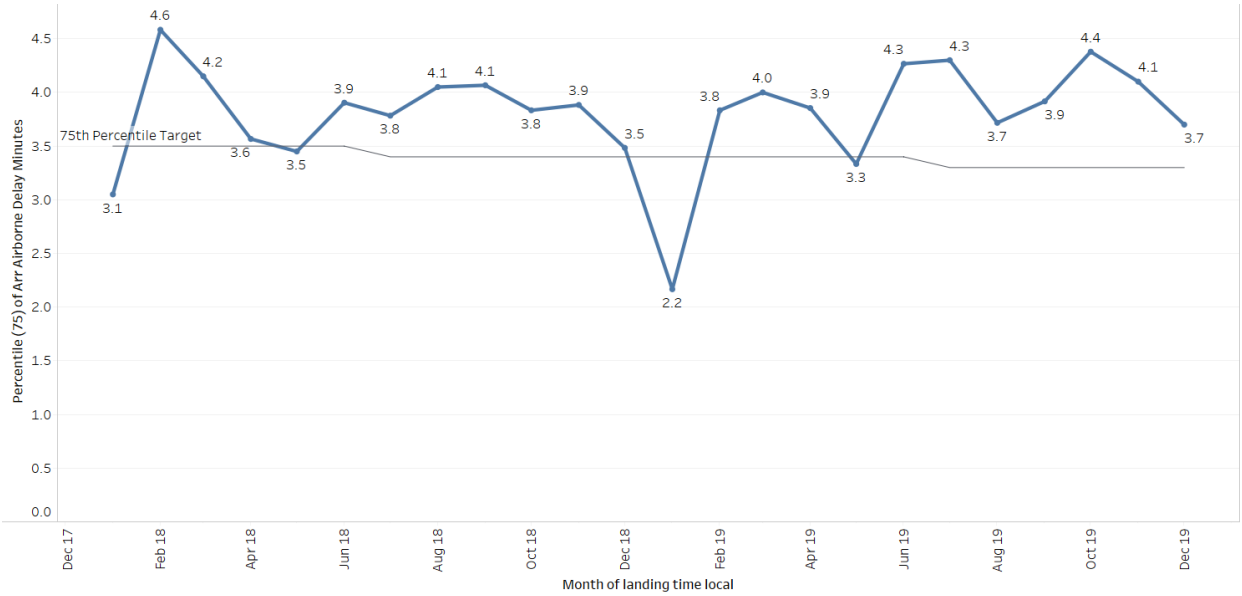


**Figure 10:** Brisbane airborne delay 75th percentile (last 24 months)

## Distinctive events

**Table 5** describes the distinctive events during December in Brisbane.

| Day | Event Category | Delay (minutes – 75th percentile) | Event Descriptions (*Contributing causes to increased delays*) |
|---|---|---|---|
| 1 December | Notable | 4.5 | Afternoon: Thunderstorm activity with no arrivals for half an hour. |
| 13 December | Significant | 11.2 | Morning: Low cloud<br>Afternoon: Thunderstorm activity with rates reduced tactically. At 1614 local a ground stop was put in place.<br>Concentration of demand due to off-schedule internationals and non-compliant flights in both periods. |
| 23 December | Notable | 3.3 | Afternoon: Low cloud led to single runway operations earlier than forecast. Emergency services flight impacted approach path for about 10 minutes. |
| 24 December | Significant | 7.6 | Afternoon: Thunderstorm activity with no arrivals for 45 minutes. |

**Table 5:** Distinctive event descriptions for Brisbane.

# CTOT variations

This section of the report focusses on variations from CTOT at Brisbane from 0600-2300 local , as non-compliance is evident at almost any time of day at some point during the month. **Table 6** provides the flights within this period that departed either early or late with respect to their CTOTs (-5 to +15 minutes). Flights that appear at least twice early or five times late have been included. This facilitates collaboration to identify patterns and causes of delay.

The CTOT against the ATOT (actual take off time) measure is used as a proxy until the COBT (calculated off blocks time) against AOBT (actual off blocks time) can be routinely reported on.

| CTOT Variation | ACID | ADEP | Local - ALDT HOUR | |
|---|---|---|---|---|
| Early | HT722 | Moranbah | 17 | 2 |
| | QLK349D | Rockhampton | 8 | 2 |
| | SKP738 | YCCA | 17 | 2 |
| | UJV | Maryborough | 19 | 2 |
| | VEU | YTNG | 15 | 2 |
| | VOZ2910 | Gladstone | 17 | 2 |
| Late | QFA512 | Sydney | 9 | 5 |
| | VOZ337 | Melbourne | 17 | 5 |

**Table 6:** CTOT variation for Brisbane arrivals 0600-2300 local – December 2019. Number of occasions that each flight departed early or late with respect to its CTOT (-5 to +15 minutes) Flights that appear at least twice early or five times late have been included.

# Perth

## Airborne delay

The 75th percentile performance figures for airborne delay at Perth are indicated in **Figure 11**. December performance for the median (-0.5 minutes) and the 75th percentile (1.3 minutes) met the targets. Compared to the same month last year, there was an increase in the airborne delay median performance (from -0.6 minutes) and an increase in 75th percentile performance (from 1.1 minutes).

The 24-month trend for airborne delay at Perth is upwards.

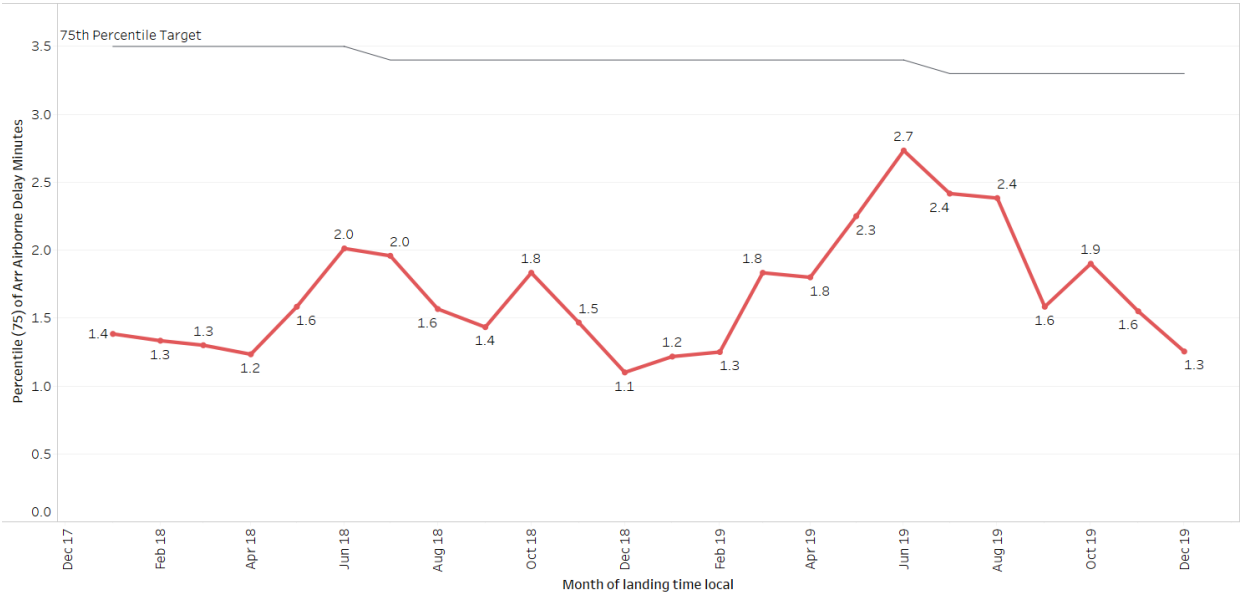


**Figure 11:** Perth airborne delay 75th percentile (last 24 months)

## Distinctive events

**Table 7** describes the distinctive events during December in Perth.

| Day | Event Category | Delay (minutes – 75th percentile) | Event Descriptions (*Contributing causes to increased delays*) |
|---|---|---|---|
| 11 December | - | 3.5 | Afternoon: Strong winds and turbulence. Concentration of demand due to non-compliant flights. |

**Table 7:** Distinctive event descriptions for Perth.

# Appendix A

## Corporate Plan Key Performance Indicator Profile: Arrival airborne delay

**Corporate Plan Description:**

The median (and 75th percentile) excess time incurred during the arrival airborne phase of flight in reference to the estimated time of arrival for high-volume operations. (High volume operating environments defined as Brisbane, Melbourne, Perth and Sydney).

**Corporate Plan Targets:**

| Year | 18/19 | 19/20 | 20/21 | 21/22 |
|---|---|---|---|---|
| 75% | 3.4 | 3.3 | 3.2 | 3.1 |
| Median | 0.6 | 0.6 | 0.6 | 0.6 |

**What is it:** Excess time incurred during the arrival phase of flight.

**What is measured:** It is measured by comparing the estimated flight time and actual flight time for the portion of the flight within 250 NM of the destination aerodrome.

**Why 250NM:** The 250NM threshold has been identified as the distance from the aerodrome at which tactical arrival demand/capacity balancing measures start taking effect. It is a true reflection of the tactical arrival management of the flight, and is not skewed by other non-related issues such as congestion at the departure aerodrome.

**Why measure Median rather than Average/Mean:** In some cases, the actual flight time within 250NM of the destination aerodrome will be less than the estimated flight time (e.g.: ATC has provide track shortening). In the dataset, this translates into a 'negative' value for that particular flight.

The Median shows the mid-point of the data set and allows us to demonstrate our impact on all flights, not just the ones that were delayed. Additionally, over short timeframes and small datasets (such as a daily report), Median measurement is more resilient to data errors and small groups of outliers which may skew the average.

**Why measure the 75th percentile:** This supplements the Median and is valuable to demonstrate how effectively we have managed the arrival of most of the fleet.

The last 25th percentile can typically contain arrival data from flights that were impacted by non-routine events, such as Medical priority traffic or aircraft in an emergency or diversion.

**How do we measure:**

Uses the high-fidelity Dalí aircraft trajectory model. For Sydney, some assumptions are built in to calculations as the actual flight path is unique for each flight (open STARs).