ATM Network Performance Report

August 2018

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Summary

This report focusses on the performance of the Air Traffic Network in August 2018. The combined 75th percentile performance during August for airborne delay across the four major airports (Sydney, Melbourne, Brisbane and Perth) was **3.4** minutes, and the median was **0.6** minutes. These results represent a slight decrease (0.1 minutes for both metrics) compared to the same period last year, and are in line with the KPI targets of 3.4 minutes for the 75th percentile and 0.6 minutes for the median.

There were a total of 16 notable events during August, 12 fewer than in July. August also had the fewest number of delay events for 2018 so far. Details of the notable events for August are shown in **Figure 1** and summarised in **Table 1.** Seven of these notable events resulted in a prolonged and moderately elevated airborne delay for the entire day (i.e. 75th percentile greater than seven minutes across the entire day). Nine events resulted in a shorter and more intense period of elevated airborne delay (i.e. two or more consecutive hours where the 75th percentile was over 10 minutes). Single runway operations at Sydney or Melbourne were a major cause of prolonged airborne delays at these airports. **Box 1** provides a further description of the impacts of single runway operations.

August saw a reduction in the number of delay events at Brisbane related to the concentration of demand from late non-compliant flights. There was only one such event in August compared to six that were experienced in July. This corresponded with a 28% decrease in the number of flights departing later than planned and arriving during the Brisbane evening peak (from 124 in July to 89 in August). Further information on this improved performance is detailed in the Brisbane section below.

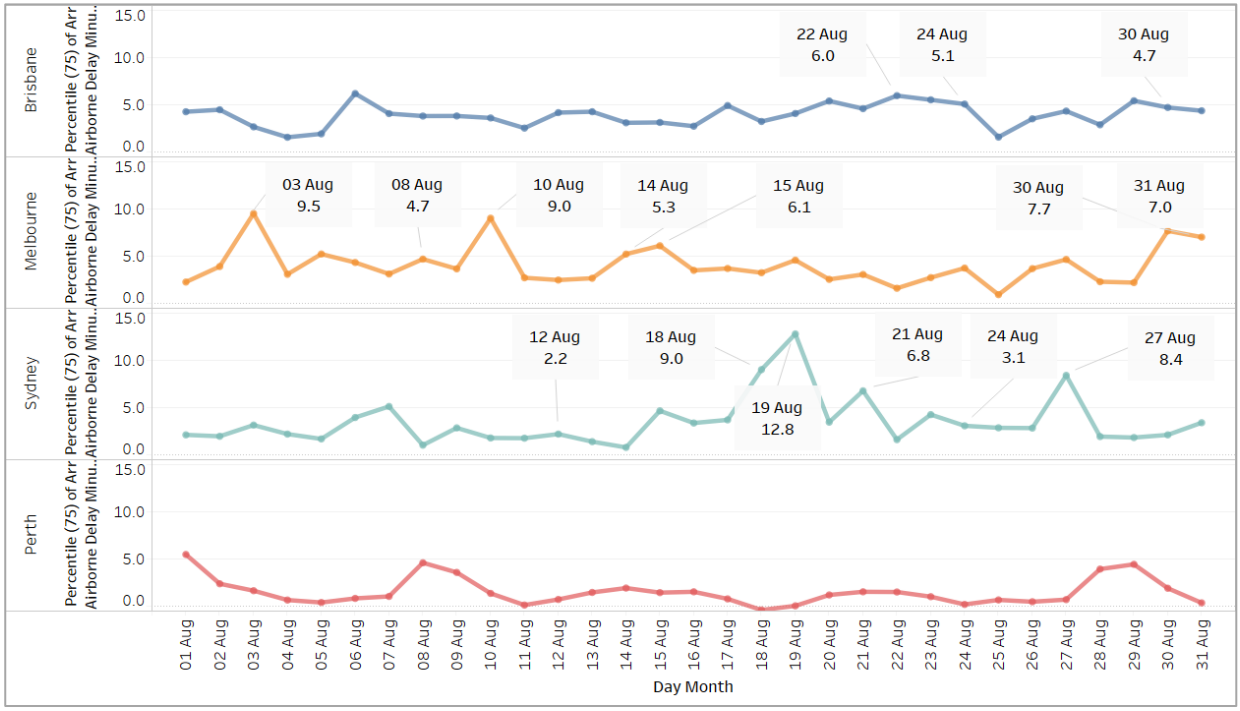

Figure 1: Notable delay impact events during August 2018

Numbers underneath the dates indicate the extent of the 75th percentile of airborne delay in minutes across the day.

Location	Day	Local Time	Delay (minutes – 75th percentile)	Event Descriptions (*Contributing causes to increased delays*)
Sydney	12 August	10-11	2.2	Decreased capacity due to unplanned change to single runway operations, taxiway/gate congestion and staff unavailability.
	18 August	15-17	9.0	Concentration of demand due to late arrival of several compliant aircraft during a low capacity period (single runway operations).
	19 August	10-12 & 17-18	12.8	Decreased capacity due to short-notice staffing unavailability in late morning. Build-up of delay in early evening following an extended low capacity period (single runway operations).
	21 August	17-19	6.8	Concentration of demand due to exempt and late non-compliant flights during an extended period of low capacity (single runway operations).
	24 August	07-08	3.1	Concentration of demand due to off-schedule international arrivals during a peak period.
	27 August	06-09	8.4	Concentration of demand due to off-schedule international arrivals and late non-compliant flights during a peak period. Poor visibility extended longer than forecast. Tactical arrival rates lowered for staffing breaks to accommodate increased workload in this period.
Melbourne	03 August	08-10 & 17-18	9.5	Concentration of demand due to off-schedule international arrivals during morning peak period. Build-up of delay in early evening following an extended low capacity period (single runway operations) and two MEDEVAC flights during busy period.
	08 August	08-09	4.7	Concentration of demand due to off-schedule international arrivals, and early and late non-compliant flights.
	10 August	07-09 & 19-20	9.0	Concentration of demand in the morning and evening peak periods due to exempt and late-compliant aircraft combined with extended periods of low capacity (single runway operations).
	14 August	19-20	5.3	Concentration of demand due to late non-compliant flights during a peak period.
	15 August	08-09	6.1	

Melbourne	30 August	07-09 & 20-21	7.7	Concentration of demand during the morning peak due to off-schedule international arrivals and late-non compliant aircraft. Build-up of delay in early evening following an extended low capacity period (single runway operations).
	31 August	08-10	7.0	Concentration of demand due to off-schedule international arrivals during a peak period.
Brisbane	22 August	17-18	6.0	Concentration of demand due to off-schedule international arrivals during a peak period.
	24 August	19-20	5.1	Concentration of demand due to late non-compliant flights during a peak period.
	30 August	20-21	4.7	Concentration of demand at the beginning of the 2000 local and 2100 local hours. Occurred during a low demand period so the increase in delay only impacted a small number of flights.

Table 1: Notable event descriptions

Single runway operations

Sydney and Melbourne are Australia's busiest airports and can experience over 550 and 350 arrivals per day, respectively. These large arrival numbers are accommodated through the operation of dual runways at each airport. However, airport capacity is significantly reduced on days where conditions require single runway operations.

During single runway operations the scheduled arrival demand is more likely to exceed the airport's actual arrival capacity. In these circumstances, airborne delay can build up despite the efforts or pre-tactical ATFM as there is no spare capacity to recover from concentrations in tactical demand or unplanned factors (such as MEDEVAC flights or missed approaches). This increase in airborne delay is consistent with the known limitations of pre-tactical ATFM programs in situations where scheduled demand exceeds capacity for a prolonged period of time.

The figure below shows how airborne delay (blue line) can increase during the period of single runway operations (indicated in yellow).

An analysis of Sydney airport showed that during extended periods of single runway operations, airborne delay was substantially higher than average. The airborne delay (75th percentile) on these days was 16 minutes across the day and 28 minutes during the peak hour.

Airborne delay was even higher on days where single runway operations included the evening peak period. The airborne delay (75th percentile) on these days was 23 minutes across the day and 40 minutes during the peak hour.

Airborne arrival delay (blue line) at Sydney during an extended period of single runway operations (runway 25A/25D marked in yellow).

Box 1: Single runway operations

Network Wide Performance

Airborne delay

The combined median and 75th percentile airborne delay at the four major airports is indicated in **Figure 2**. The 24-month trend is statistically flat and close to the target levels.

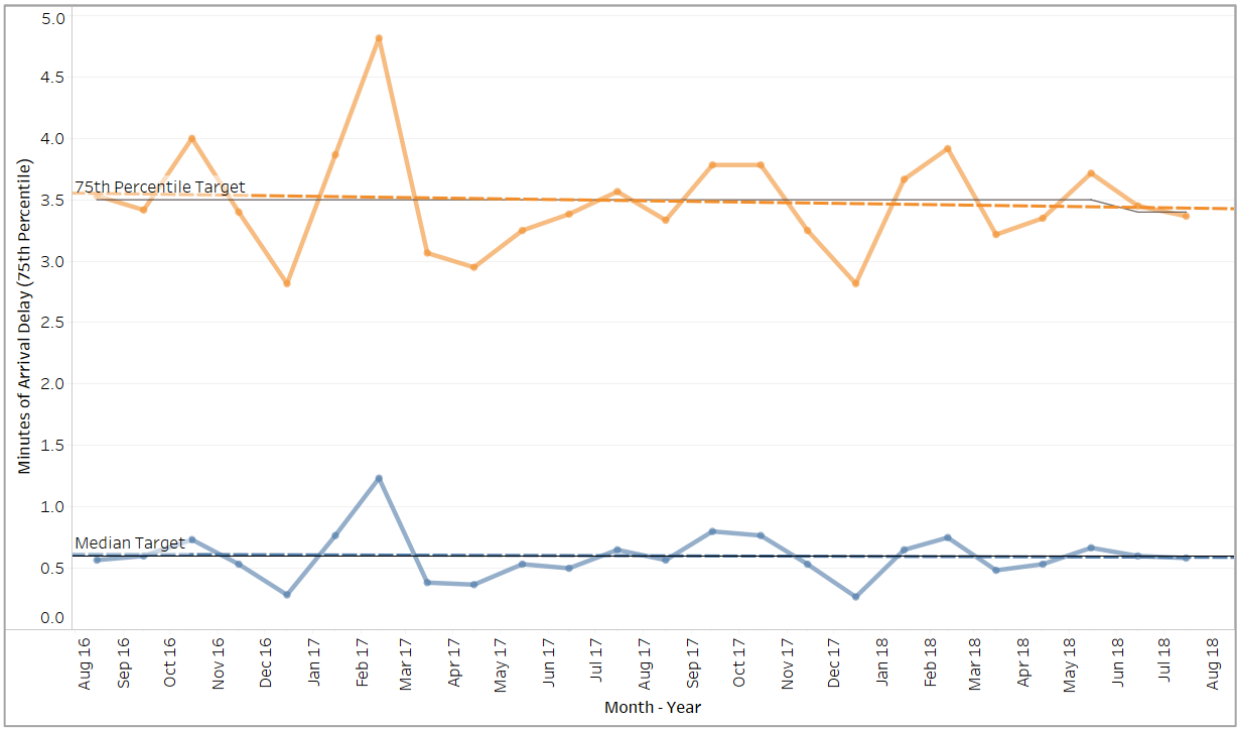

Figure 2: 24-month trend for airborne delay

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

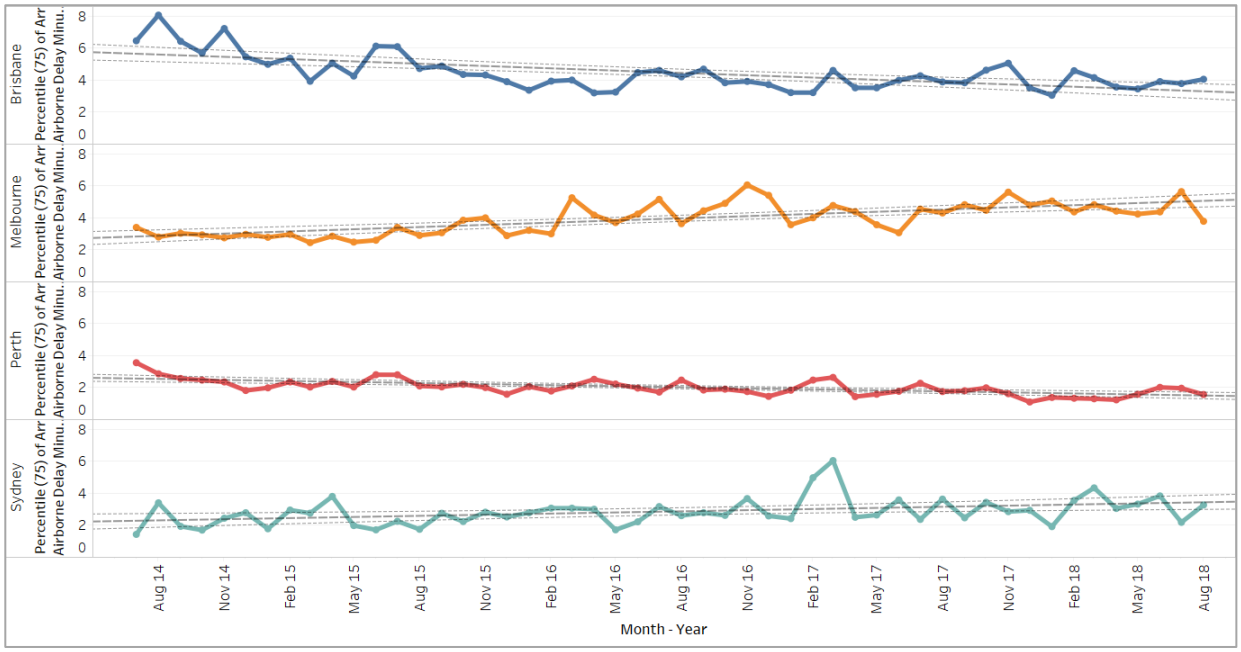

Figure 3: Long-term airborne delay (75th percentile) by airport

The monthly total minutes of airborne delay for Sydney, Melbourne, Brisbane and Perth combined is depicted in **Figure 4**. Figures are adjusted for the number of days in the month. August was the fifth lowest month of adjusted total delay in the September 2017 to August 2018 period. There is no significant trend.

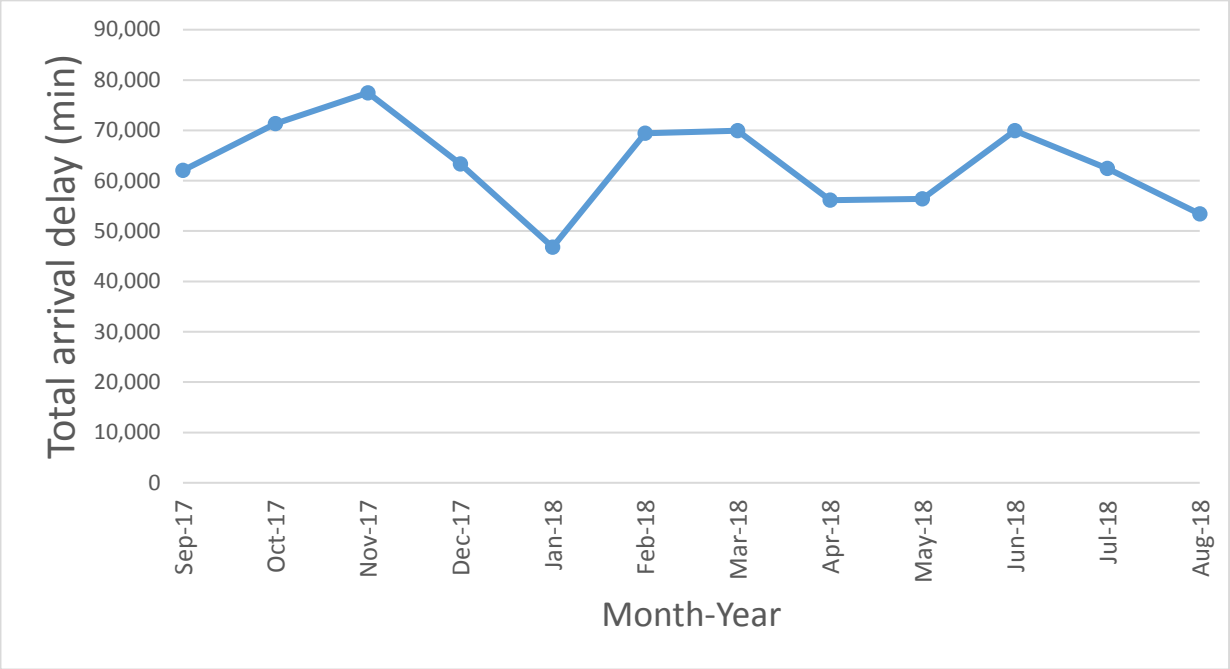

Figure 4: Total amount of airborne delay by month for Sydney, Melbourne, Brisbane and Perth Airports.

Sydney

Airborne delay

The 75th percentile performance figures for airborne delay at Sydney are indicated in **Figure 5.** August performance (0.3 minutes median and 3.3 minutes 75th percentile) met the targets. Compared to the same month last year, there was a decrease in the airborne delay median (from 0.5 minutes) and 75th percentile (from 3.6 minutes) performance. The long-term trend for airborne delay at Sydney is upwards. However, the 24-month trend is flat.

Figure 5: Sydney airborne delay 75th percentile (last 24 months)

Notable events

The following commentary describes the notable airborne delay events during August in Sydney:

- 12 August (1000-1100 local) – Delay 2.2 minutes
  - Decreased capacity due to:
    - Unplanned change to single runway operations from 0900-1300 local.
    - Staff unavailability.
    - Taxiway and gate congestion which increased controller workload.
  - Tactical rates were reduced by 11-13 arrivals per hour (from 34 planned) between 0900-1300 local.
- 18 August (1500-1700 local) – Delay 9.0 minutes
  - Concentration of demand due to the late arrival of several compliant aircraft at the beginning of a period of single runway operations.
  - The low capacity during single runway operations did not enable these additional arrivals to be absorbed which resulted in increased airborne delay.

- 19 August (1000-1200 and 1700-1800 local) – Delay 12.8 minutes
  - Taxiway congestion and a short-notice staffing unavailability resulted in a Level 2 GDP Revision at 1031 local to reduce rates from 23 to 15 per hour until 1300 local.
  - Concentration of demand in the evening due to late non-compliant flights during an extended period of single runway operations.
  - The low capacity during single runway operations did not enable this concentration to be absorbed which resulted in increased airborne delay.
- 21 August (1700-1900 local) – Delay 6.8 minutes
  - Concentration of demand in the evening due to late non-compliant flights during an extended period of single runway operations.
  - The low capacity during single runway operations did not enable this concentration to be absorbed which resulted in increased airborne delay.
- 24 August (0700-0800 local) – Delay 3.1 minutes
  - Concentration of demand due to off-schedule international arrivals during a peak period.
- 27 August (0600-0900 local) – Delay 3.1 minutes
  - Concentration of demand due to off-schedule international arrivals and late-non compliant aircraft during the morning peak period.
  - Poor visibility in the morning extended longer than forecast. Additional staffing breaks were required to accommodate increased controller workload in this period. As a result the tactical arrival rate was lowered from 42 to 32 from 0900-1000 local.

Melbourne

Airborne delay

The 75th percentile performance figures for airborne delay at Melbourne are indicated in **Figure 6.** August performance (1.0 minute median and 3.8 minutes 75th percentile) did not meet the targets. Compared to the same month last year the median delay was steady and the 75th percentile decreased (from 4.3 minutes). The long-term trend for airborne delay at Melbourne is upwards. However, the 24-month trend is flat.

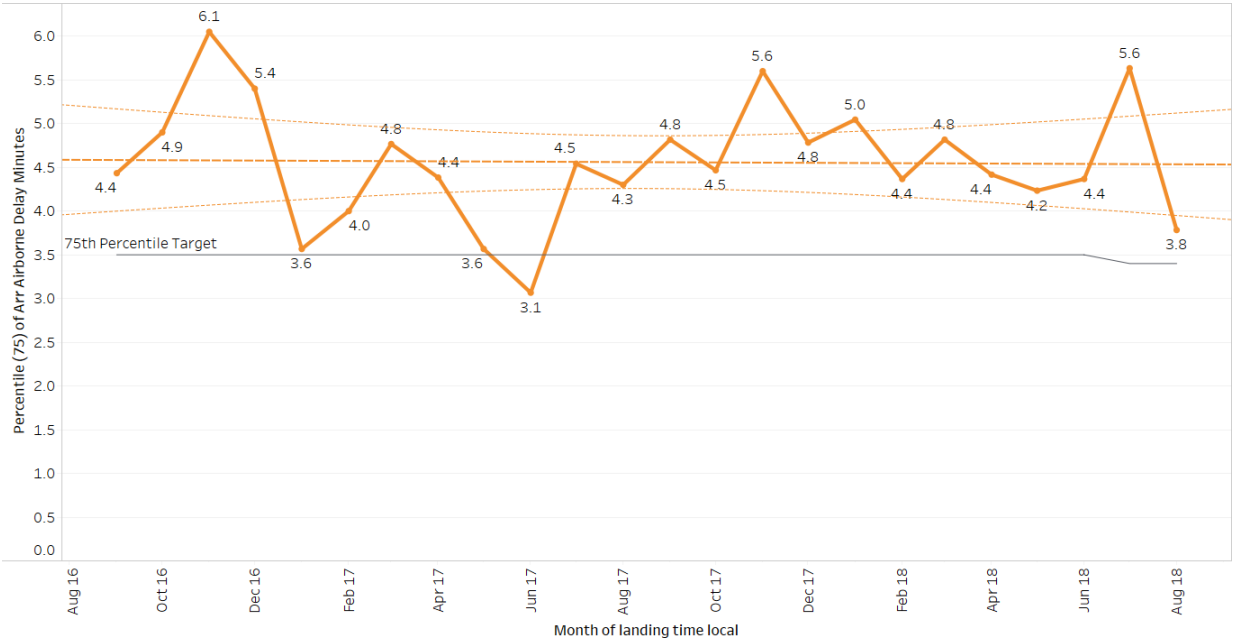

Figure 6: Melbourne airborne delay 75th percentile (last 24 months)

Notable events

The following commentary describes the most significant airborne delay events during August in Melbourne.

- 03 August (0800-1000 & 1700-1800 local) – Delay 9.5 minutes
  - Concentration of demand due to off-schedule international arrivals during morning peak period.
  - Following an extended period of low capacity due to single runway operations, airborne delay built up in the early evening.
  - Airborne delay was also impact by two MEDEVAC flights in the busy evening period.
- 08 August (0800-0900) – Delay 4.7 minutes
  - Concentration of demand due to off-schedule international arrivals, and early and late non-compliant flights during morning peak period.
- 10 August (0700-0900 & 1900-2000 local) – Delay 9.0 minutes
  - Concentration of demand in the morning and evening peak periods due to late non-compliant flights during an extended period of single runway operations.
  - The low capacity during single runway operations did not enable this concentration to be absorbed which resulted in increased airborne delay.

- 14 August (1900-2000 local) – Delay 5.3 minutes
  - Concentration of demand due to late non-compliant flights during the morning peak period.
- 15 August (0800-0900 local) – Delay 6.1 minutes
  - Concentration of demand due to late non-compliant flights during the morning peak period.
- 30 August (0700-0900 & 2000-2100 local) – Delay 7.7 minutes
  - Concentration of demand during the morning peak due to off-schedule international arrivals and late non-compliant flights.
  - Following an extended period of low capacity due to single runway operations, airborne delay built up in the early evening.
- 31 August (0800-1000) – Delay 7.0 minutes
  - Concentration of demand due to late non-compliant flights during the morning peak period.

CTOT (Calculated take off time) variations

The morning peak (0700-1100 local) is in general the most constrained period of the day in Melbourne. Variations from CTOT during the early morning hours are the focus of this section due to regular concentration of demand leading to increases in delay.

The results depicted in Table 1 provide the flights within this period that departed either early or late with respect to their CTOTs (-5 to + 15 minutes) on more than one occasion. This facilitates collaboration to identify patterns and causes.

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	ADES	Local - ALDT HOUR	August 2018
Early	QLK77D	YMIA	Melbourne Arrivals	7	2
	RXA3469	YMER	Melbourne Arrivals	10	2
	RXA3752	YMTG	Melbourne Arrivals	7	2
	VOZ206	YPAD	Melbourne Arrivals	8	2
Late	VOZ824	Sydney Departures	Melbourne Arrivals	10	6
	QFA411	Sydney Departures	Melbourne Arrivals	9	4
	QFA415	Sydney Departures	Melbourne Arrivals	9	4
	VOZ314	Brisbane Departures	Melbourne Arrivals	10	4
	JST981	Perth Departures	Melbourne Arrivals	7	3
	QFA419	Sydney Departures	Melbourne Arrivals	10	3
	QFA461	Sydney Departures	Melbourne Arrivals	10	3
	TGG213	Sydney Departures	Melbourne Arrivals	8	3
	JST473	YWLM	Melbourne Arrivals	7	2
	JST475	YWLM	Melbourne Arrivals	9	2
	JST503	Sydney Departures	Melbourne Arrivals	8	2
	QFA401	Sydney Departures	Melbourne Arrivals	7	2
	QFA409	Sydney Departures	Melbourne Arrivals	8	2
	QFA795	YSCB	Melbourne Arrivals	7	2
	TGG500	YMHB	Melbourne Arrivals	10	2
	VOZ252	YSCB	Melbourne Arrivals	7	2
	VOZ800	Sydney Departures	Melbourne Arrivals	7	2
	VOZ812	Sydney Departures	Melbourne Arrivals	9	2
	VOZ1313	YMHB	Melbourne Arrivals	7	2
	VOZ1361	YMLT	Melbourne Arrivals	8	2

Table 3: CTOT variation for Melbourne arrivals 0700-1100 local –August 2018

Brisbane

Airborne delay

The 75th percentile performance figures for airborne delay at Brisbane are indicated in **Figure 7**. August performance (1.2 minutes median and 4.1 minutes 75th percentile) did not meet the targets. Compared to the same month last year there was an increase in the median (from 1.1 minutes) the 75th percentile (from 3.9 minutes) of airborne delay. The long-term trend for airborne delay at Brisbane is downwards. However, the 24-month trend is flat.

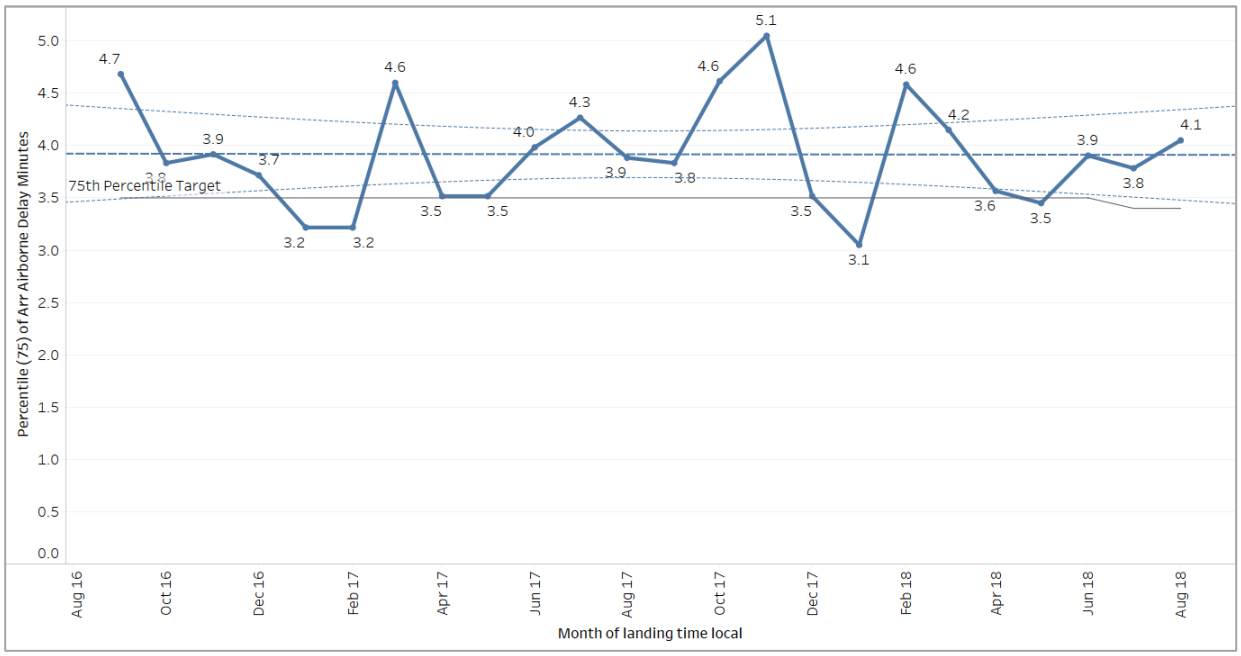

Figure 7: Brisbane airborne delay 75th percentile (last 24 months)

Notable events

The following commentary describes the most significant airborne delay events during August in Brisbane:

- 22 August (1700-1800 local) – Delay 6.0 minutes
  - Concentration of demand due to off-schedule international arrivals during a peak period.
- 24 August (1900-2000 local) – Delay 5.1 minutes
  - Concentration of demand due to late non-compliant flights during the evening peak period.
- 30 August (2000-2100 local) – Delay 4.7 minutes
  - Concentration of demand at the beginning of the 2000 local and 2100 local hours. Occurred during a low demand period so the increase in delay only impacted a small number of flights.

CTOT Variation

Variations from CTOT at Brisbane during the afternoon hours (1800-1900 local) are the focus of this section due to regular concentration of demand leading to increases in delay. Flights that appear at least twice have been included in the table below.

The results depicted in Table 1 provides the flights within this period that departed either early or late with respect to their CTOTs (-5 to + 15 minutes) on more than one occasion. This facilitates collaboration to identify patterns and causes.

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.

Change from July 2018

August saw a substantial improvement (decrease) in the number of flights with late CTOT variations arriving at Brisbane in the peak 1800 and 1900 local hours. There were 89 of these flights in August, down from 128 in July. In August there were 21 flights that departed late with respect to their CTOT two or more times. This was down from 27 in July.

CTOT Variation	ACID	ADEP	ADES	Local - ALDT HOUR	August 2018
Early	JST833	YBPN	Brisbane Arrivals	19	3
	UJN	YMYB	Brisbane Arrivals	19	2
	YJL	YBWW	Brisbane Arrivals	19	2
Late	QFA626	Melbourne Departures	Brisbane Arrivals	18	11
	VOZ341	Melbourne Departures	Brisbane Arrivals	19	10
	QFA628	Melbourne Departures	Brisbane Arrivals	19	9
	VOZ337	Melbourne Departures	Brisbane Arrivals	18	7
	VOZ1225	YSCB	Brisbane Arrivals	19	7
	VOZ454	YPDN	Brisbane Arrivals	18	5
	JST486	YWLM	Brisbane Arrivals	19	3
	TGG532	Melbourne Departures	Brisbane Arrivals	18	3
	VOZ454	YPDN	Brisbane Arrivals	19	3
	VOZ965	Sydney Departures	Brisbane Arrivals	19	3
	JST484	YWLM	Brisbane Arrivals	18	2
	JST939	YBCS	Brisbane Arrivals	18	2
	QFA542	Sydney Departures	Brisbane Arrivals	19	2
	QFA544	Sydney Departures	Brisbane Arrivals	19	2
	QFA975	YBTL	Brisbane Arrivals	18	2
	QJE1598	YPAD	Brisbane Arrivals	18	2
				19	2
	QJE1757	YBCS	Brisbane Arrivals	19	2
	TGG314	YPAD	Brisbane Arrivals	19	2
	VOZ337	Melbourne Departures	Brisbane Arrivals	19	2
	VOZ378	YBTL	Brisbane Arrivals	18	2
	VOZ469	Perth Departures	Brisbane Arrivals	19	2
	VOZ957	Sydney Departures	Brisbane Arrivals	18	2
	VOZ973	Sydney Departures	Brisbane Arrivals	19	2

Table 4: CTOT variation for Brisbane arrivals 18-20 local August 2018

Perth

Airborne delay

The 75th percentile performance figures for airborne delay at Perth are indicated in **Figure 8**. August performance (-0.3 minutes median and 1.6 minutes 75th percentile) met the targets. Compared to the same month last year there was a decrease in the median (from -0.1 minutes) and 75th percentile (from 1.8 minutes) of airborne delay. The long-term and 24-month trend for airborne delay at Perth is downwards.

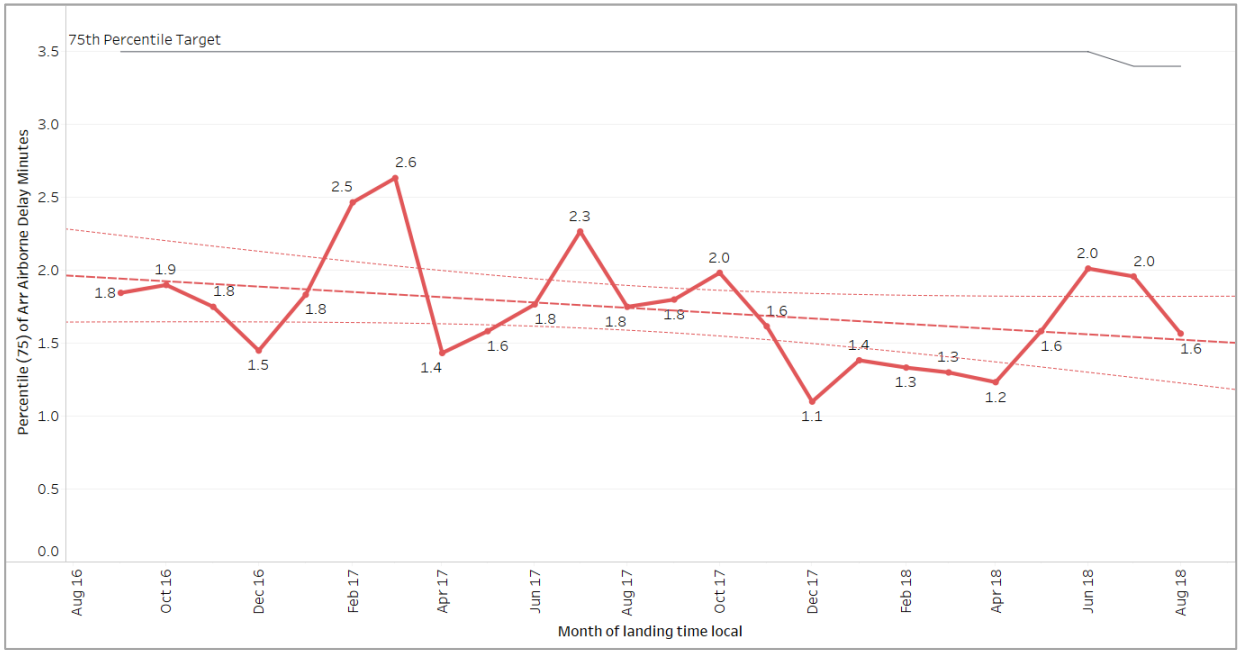

Figure 8: Perth airborne delay 75th percentile (last 24 months)

Notable events

There were no notable events at Perth during August 2018.

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	17/18	18/19	19/20	20/21	21/22
75%	3.5	3.4	3.3	3.2	3.1
Median	0.6	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 trajectory-based model. For Sydney, some assumptions are built in to calculations as the actual flight path is unique for each flight (open STARs).