

# **ATM Network Performance Report**

June 2018



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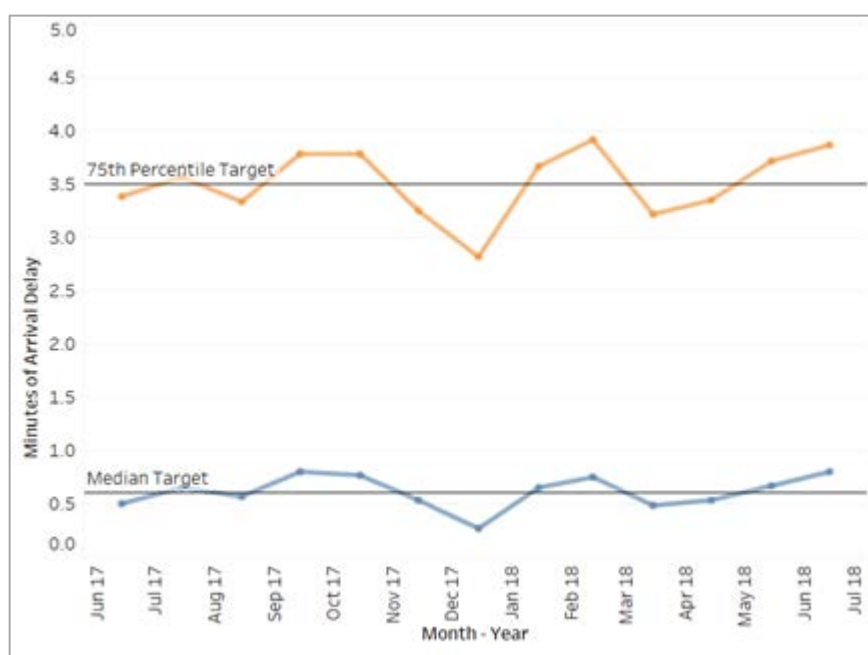
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# Summary

## Overview

### Annual performance

This month marks the end of the 2017-18 reporting cycle. The arrival airborne delay result across the year met the 2017-18 targets (median airborne delay of 0.6 minutes and 75<sup>th</sup> percentile airborne delay 3.5 minutes). **Figure 1** shows the arrival airborne delay for 2017-18 by month.



**Figure 1:** Airborne delay (median and 75<sup>th</sup> percentile) by month for 2017-18 with corresponding targets.

There was an increase of 5.3% in the number of international traffic movements at our largest airports and the total number of traffic movements across the network was steady. The primary focus during 2017-18 was on utilising post-operational analytics to work with airlines and airports to identify improvement opportunities. Our long term focus continues to be on building our suite of network management tools through the introduction of Airport Collaborative Decision Making (A-CDM) and Long Range Air Traffic Flow Management.

### June events

In June, the Air Traffic Network experienced a number of significant weather events. The three largest delay events experienced so far in 2018 occurred this month. The most disruptive event was due to intense fog for an extended period at Brisbane Airport on 29 June. The event led to significant delays and a severe disruption across the east coast network. A review was conducted to assess the impact and identify improvements for responding to future network-wide events. A summary is provided on the next page and the full report is included at **Appendix A**.

**Post Operations Performance Report Summary***East Coast Network Disruption– 29 June 2018*

During the morning of 29 June 2018, Brisbane Airport was affected by heavy fog that resulted in no successful landings until 2340Z. As a direct result, morning arrivals experienced large airborne delays with many in excess of 40 minutes. The event also resulted in diversions and cancellations and subsequently disruption across the entire network for the whole day. In the afternoon of the same day, operations at Sydney were also impacted by a failure with the Melbourne Flight Data Processor (ML FDP).

With the benefit of post-operational analysis, improvements were identified that would assist recovery after network-wide events in the future. These include:

- Giving consideration to runway configuration changes requirements when setting arrival acceptance rates.
- Increased crew awareness of Gold Coast-Brisbane En Route Supplement Australia (ERSA) requirements.
- Earlier consideration of network-wide factors and propagation of delay following significant disruption at a single airport.

The increased capability offered by A-CDM and LR ATFM may have some positive impact in similar events in the future. However additional technology and digital workspace capability (e.g. portal) may be required to improve information sharing and to support collaboration.

June also included several scheduled alterations to the application of the Air Traffic Flow Management Program (ATFM). On 16 June and 23 June, no ATFM program was in place due to the relocation of internet gateways supporting key IT infrastructure at Airservices premises in Canberra. On both occasions operations ran smoothly due to low demand and favourable weather conditions. A Post Operations Performance Report was conducted to assess the impact on operations on 16 June. The full report is included at **Appendix A**.

The application of the ATFM program for Perth was also amended in June. Commencing 18 June, the program will be run only when certain demand-capacity thresholds are forecast. This practice was already in place for weekends and has been extended to week days. On days where capacity constraints are not likely, aircraft operators will have the flexibility to adjust their schedule to meet their own operational and business needs without the burden of complying with a Ground Delay Program (GDP). This delivers a more agile approach to network management and is strongly supported by industry. This initiative has reduced workload and coordination impacts for industry and Airservices. Since implementation, there have been two days where GDPs have been required and for there has been no increase in Airborne Delay on the days where a GDP has not been in place.

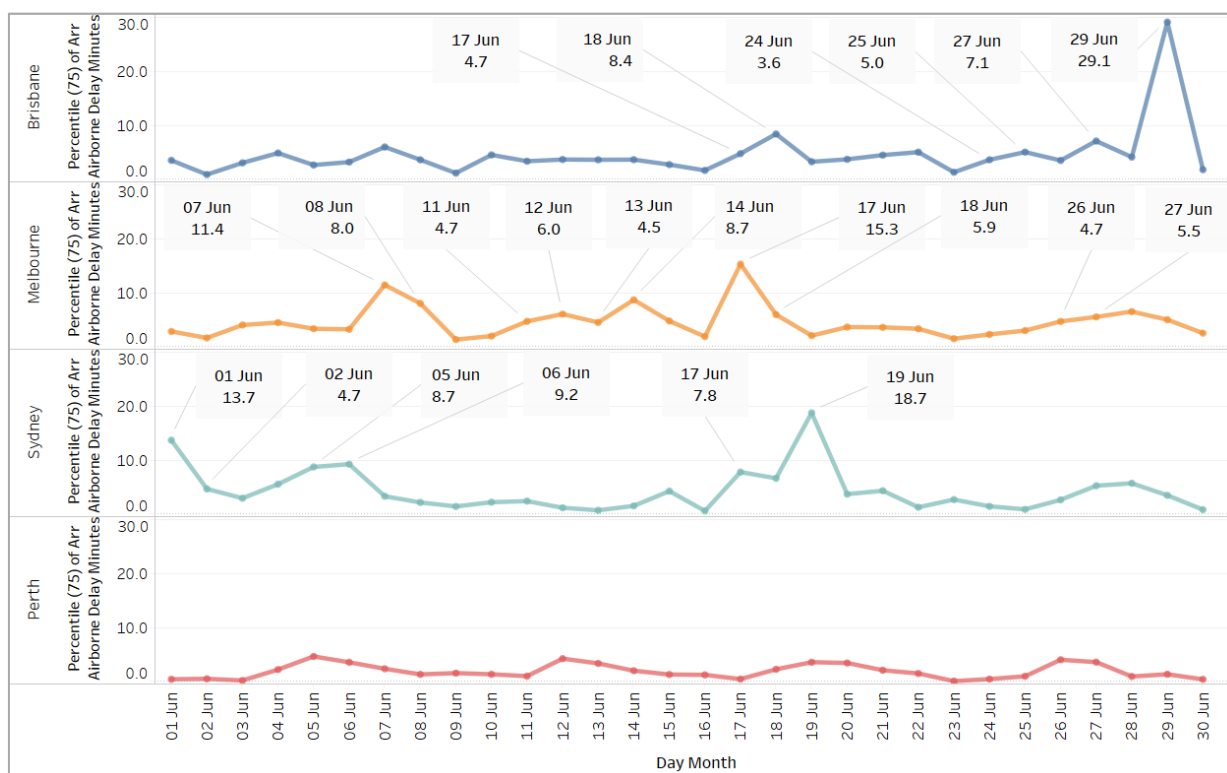
Separately, operations at Perth Airport were amended in June following a serious runway incursion on 28 April 2018. Following an initial evaluation, the J2 taxiway which was a factor in the incident is not in use. ATFM rates have been lowered to reflect reduced runway throughput.

## June performance

The month of June saw an increase (of 0.3 minutes) in the 75<sup>th</sup> percentile of airborne delay with respect to May. The combined 75<sup>th</sup> percentile performance for airborne delay across the four major airports (Sydney, Melbourne, Brisbane and Perth) was **3.7** minutes, and the median was **0.7** minutes. These monthly performance figures were an increase compared to the same period last year (i.e. an increase of 0.4 minutes delay for the 75<sup>th</sup> percentile and 0.2 minutes in the median), and were above the KPI targets of 3.5 minutes and 0.6 minutes for the 75<sup>th</sup> percentile and median, respectively.

There were 22 notable events during June. These are summarised in **Table 1** and depicted in **Figure 2**.

Twelve of these notable events resulted in a prolonged and moderately elevated airborne delay for the entire day (i.e. 75<sup>th</sup> percentile greater than 7 minutes across the entire day). Ten events resulted in a shorter and more intense period of elevated airborne delay (i.e. 2 or more consecutive hours where the 75<sup>th</sup> percentile was over 10 minutes).



**Figure 2: Notable delay impact events during June 2018.**

Numbers underneath the dates indicate the extent of the 75<sup>th</sup> percentile of airborne delay in minutes. Asterisk symbols in the labels (\*) indicate that a Post Operational Performance Review (POPR) is available for that event. The reviews are included in Appendix A.

| Location  | Day     | Local Time    | Delay<br>(minutes – 75 <sup>th</sup> percentile) | Event Descriptions   |
|-----------|---------|---------------|--|--|
| Sydney    | 01 June | 06-09 & 18-19 | 13.7   | Stronger than forecast cross winds led to a Level 2 GDP Revision with rates reduced. Excess demand in the evening peak period.   |
|           | 02 June | 06-07         | 4.7  | Low rates for expected cross winds and risk of showers combined with off-schedule international arrivals.  |
|           | 05 June | 19-20         | 8.7  | Heavy showers and low visibility in the afternoon and evening led to a Level 2 GDP Revision with rates reduced.  |
|           | 06 June | 08-09 & 17-18 | 9.2  | Thunderstorms impacted operations throughout the day. Lightning strikes in the afternoon led to a Level 3 GDP Revision.  |
|           | 17 June | 15-18         | 7.8  | Late non-compliant aircraft concentrated demand during a period with low capacity due to cross winds.  |
|           | 19 June | 06-11 & 18-21 | 18.7   | Storms and lightning impacted arrivals throughout the day. International heavy aircraft required arrivals on runway 16R in the early morning, limiting arrival rate for that period. No approaches made for 30 minutes in the early evening.   |
| Melbourne | 07 June | 08-09 & 17-21 | 11.4   | Low rates due to strong cross winds all day resulted in excess demand during peak periods.   |
|           | 08 June | 08-10 & 19-20 | 8.0  | Stronger than forecast cross winds, emergency medical arrival, returned aircraft and missed approach due to a bird-strike led to a Level 3 GDP Revision. Arrival rate in evening reduced by 12 per hour due to wind conditions combined with concentration of demand from late aircraft. |
|           | 11 June | 18-20         | 4.7  | Low rates due to cross winds and strong wind aloft resulted in excess demand evening peak period.  |
|           | 12 June | 07-08         | 6.0  | Rates reduced from 24 for 20 in the morning due to low cloud and winds aloft.  |
|           | 13 June | 11-12         | 4.5  | Exempt and late non-compliant aircraft concentrated late morning demand.   |
|           | 14 June | 08-09 & 18-20 | 8.7  | Low rates due to winds aloft resulted in excess demand evening peak period.  |
|           | 17 June | 11-12 & 15-20 | 15.3   | Low rates due to winds aloft all day combined with missed approaches in the late morning and excess demand in the evening peak period.   |
|           | 18 June | 09-10         | 5.9  | Worse than forecast winds and low cloud led to reduced rates and excess demand in the morning.   |
|           | 26 June | 08-10         | 4.7  | Low rates due to fog resulted in excess demand during morning peak period.   |
|           | 27 June | 08-10         | 5.5  | Rates reduced due to fog and low cloud combined with late international arrivals in the morning peak period.   |

|          |          |       |      |  |
|----------|----------|-------|------|--|
| Brisbane | 17 June  | 18-19 | 4.7  | Exempt, early and late non-compliant aircraft concentrated demand leading into a peak period. Actions underway to address this trend are detailed below.                         |
|          | 18 June  | 18-20 | 8.4  |  |
|          | 24 June  | 18-19 | 3.6  |  |
|          | 25 June  | 18-19 | 5.0  |  |
|          | 27 June  | 18-19 | 7.1  |  |
|          | 29 June* | 06-14 | 29.1 | Heavy fog in the morning prevented landings until 0924. Level 3 GDP Revision. Subsequent delays were experienced until early afternoon. Impact on operations across the network. |

**Table 1:** Notable event descriptions.

Asterisk symbols in the labels (\*) indicate that a Post Operational Performance Review (POPR) is available for that event. The reviews are included in Appendix A.

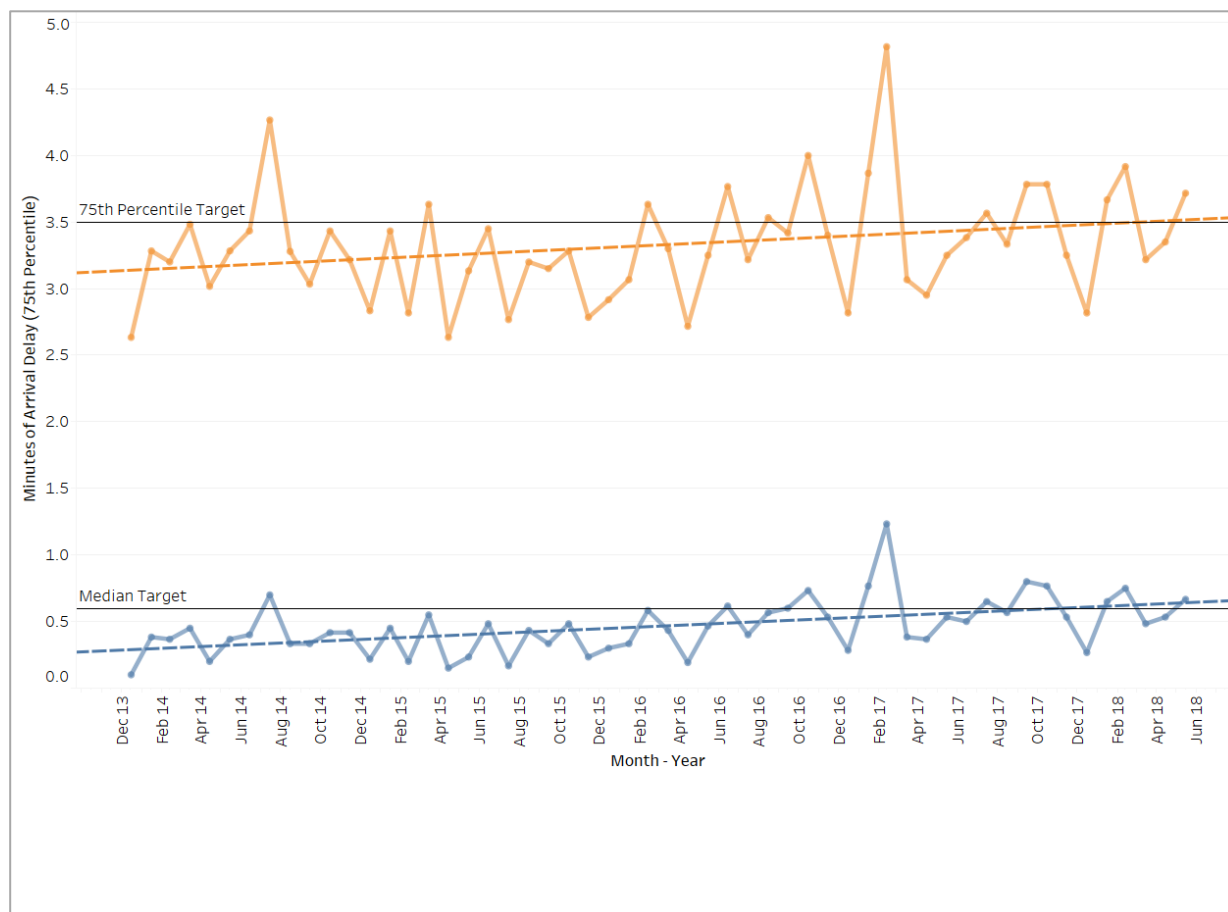
A weekly compliance report for industry is currently under development to further investigate delay events associated with late and early non-compliance. The report will target periods identified as regularly being impacted by non-compliance such as Brisbane from 1800 to 1900 which was associated with five notable events this month. The report will examine the link between non-compliance and poor network performance, and the potential gains for all operators associated with improved compliance.

Two Post Operational Analysis Reviews were conducted this month, for network wide events on Saturday 16 June and Friday 29 June. These reviews can be found in **Appendix A**.

## Network Wide Performance

### Airborne delay

The combined median and 75<sup>th</sup> percentile airborne delay at the four major airports is indicated below. **Figure 3** indicates that the long-term trend is upwards.

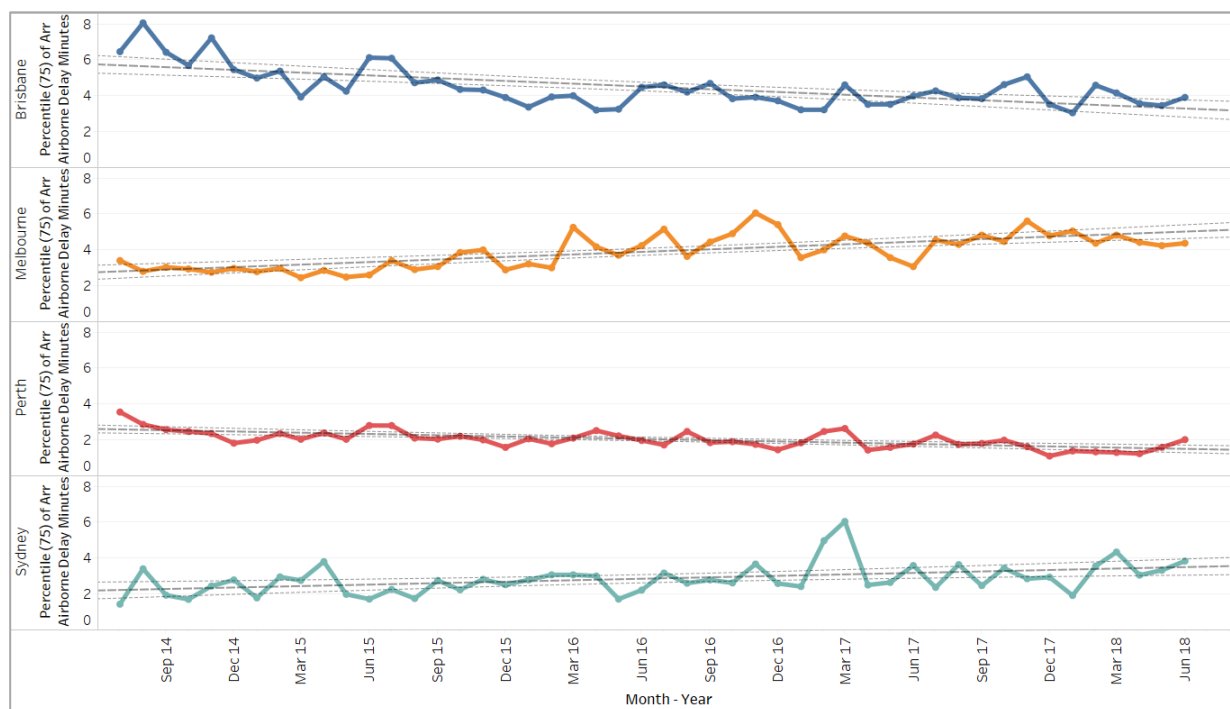


**Figure 3:** Long-term airborne delay (median and 75<sup>th</sup> percentile) for January 2014 to June 2018 with corresponding targets.

The individual long-term trends of the 75<sup>th</sup> percentile airborne delay for each of the four major airports are depicted in **Figure 4**. For each curve, the long-term trend is represented by the thick dashed line; and the thin dashed lines provide an indication of the confidence of the trend.

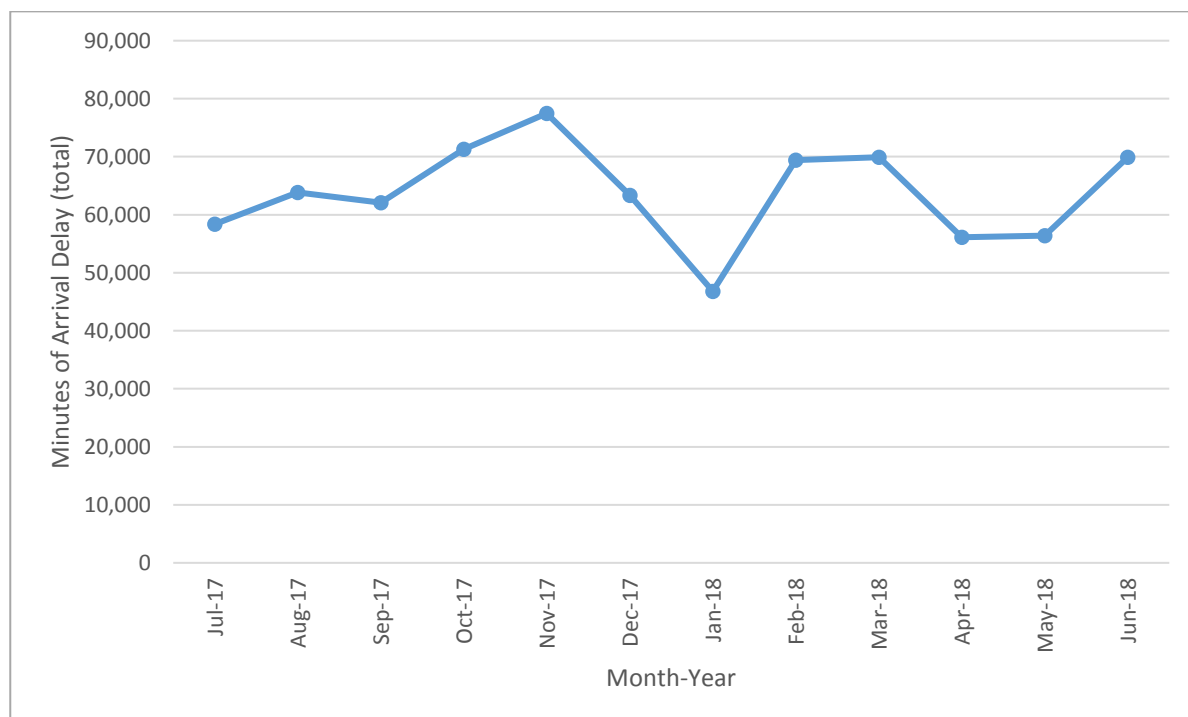
The long-term trends for Sydney and Melbourne are upwards. More detailed analysis for each airport is presented later in this report.





**Figure 4:** Long-term airborne delay 75th percentile by airport  
(July 2014 to June 2018)

**Figure 5** shows the total minutes of arrival airborne delay by month combined for Sydney, Melbourne, Brisbane and Perth. Figures are adjusted for the number of days in the month. June was the third highest month of adjusted total delay in the 2017-18 period.



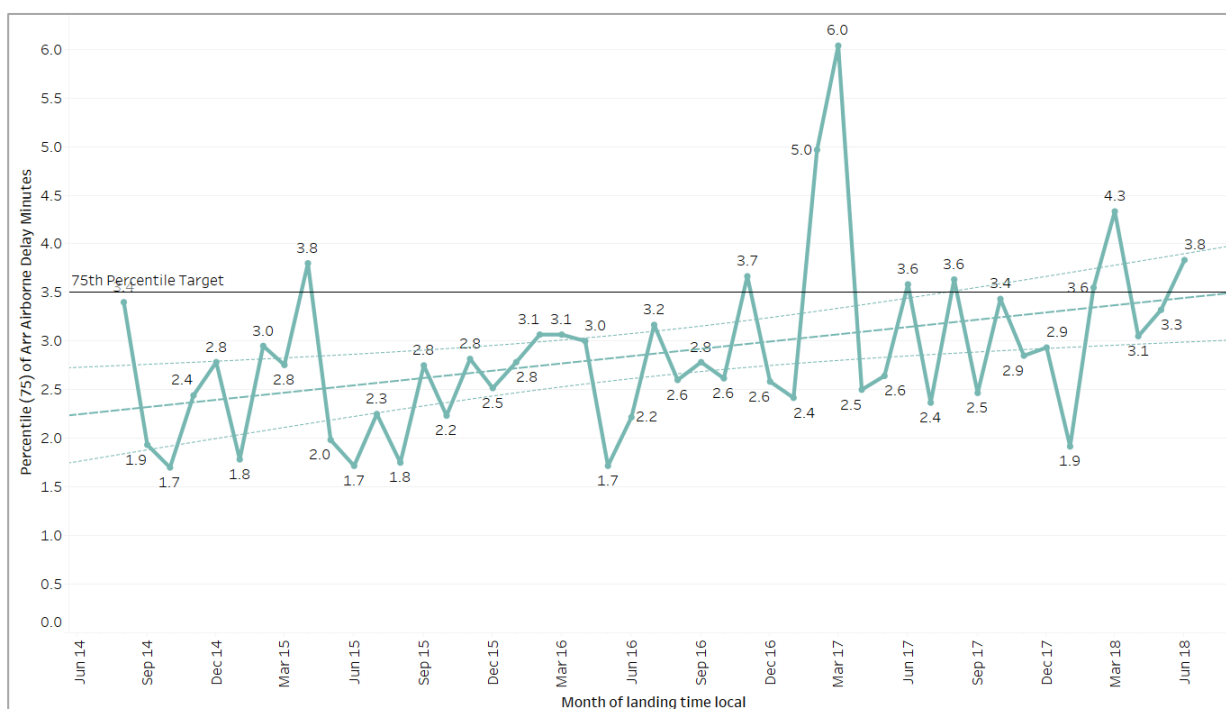
**Figure 5:** Total of arrival airborne delay by month for Sydney, Melbourne, Brisbane and Perth Airports (July 2017 to June 2018).  
Figures are adjusted to represent a 30 day period for all months.

# Sydney

## Airborne delay

The 75<sup>th</sup> percentile performance figures for airborne delay at Sydney are indicated in **Figure 6**.

June performance met the target for median airborne delay (0.4 minutes) but did not meet the target for the 75<sup>th</sup> percentile of airborne delay (3.8 minutes). Compared to the same month last year these results were a decrease in the median airborne delay (from 0.5 minutes) and an increase in the 75<sup>th</sup> percentile (from 3.6 minutes). The long-term trend for airborne delay at Sydney is upwards.



**Figure 6:** Sydney airborne delay 75<sup>th</sup> percentile

The GDP Revisions conducted for Sydney in June are detailed in **Table 2**. There were a total of 10 Revisions.

| Revision Type | Number in June | Dates                                       |
|---------------|----------------|---|
| Level 1       | 3              | 07 June, 19 June, 28 June                   |
| Level 2       | 5              | 01 June, 05 June, 07 June, 28 June, 29 June |
| Level 3       | 2              | 06 June, 19 June                            |

**Table 2:** GDP Revisions for Sydney in June.

## Notable events

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

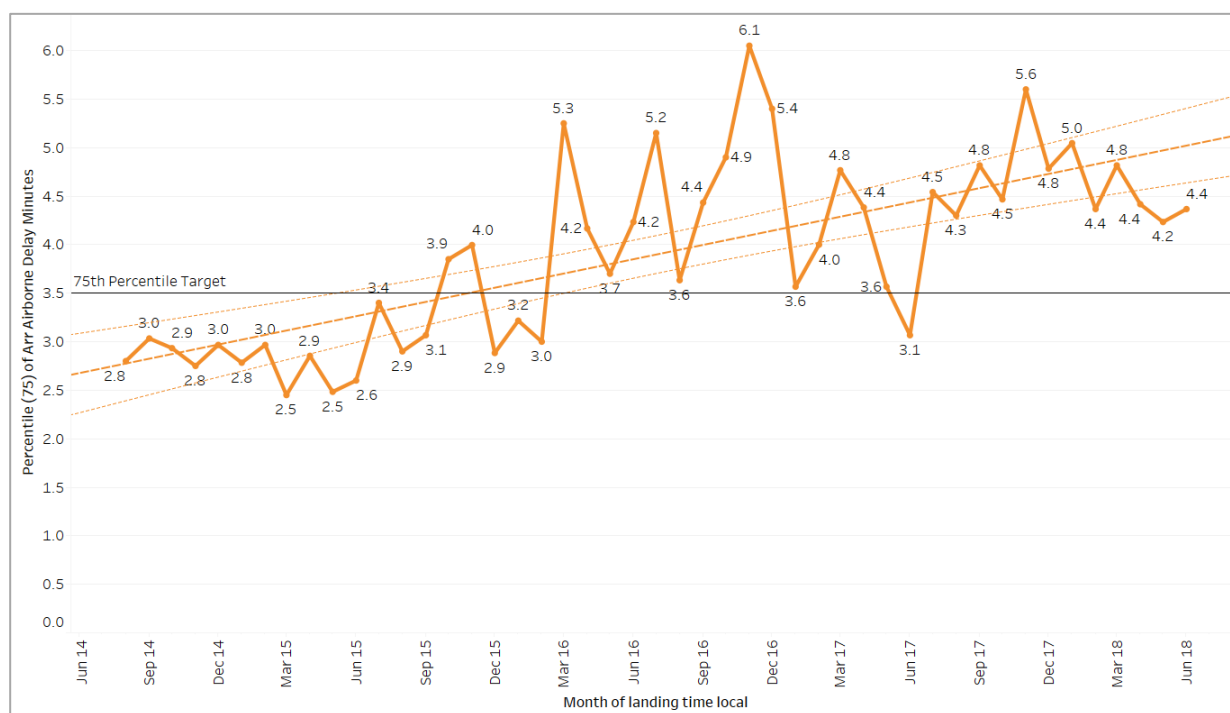
- 01 June (0600-0900 & 1800-2000 Local) – Delay 13.7 minutes
  - Stronger than forecast crosswinds led to increased airborne delay during the morning peak period.
  - A Level 2 GDP Revision was conducted with rates reduced from 42 to 38 for 0700-0800 and then 32 for the rest of the morning. The lower rates limited the ability to recover from the increased delay until after the peak period.
  - Excess demand during the evening peak led to increased airborne delay in this period.
- 02 June (0600-0700 Local) – Delay 4.7 minutes
  - Low rates were planned for the morning period due to forecast cross winds and risk of showers.
  - Off-schedule international arrivals concentrated demand in this period of low rates.
- 05 June (1900-2000 Local) – Delay 8.7 minutes
  - Heavy showers and low visibility impacted operations in the afternoon including some missed approaches.
  - A Level 2 GDP Revision was conducted with rates reduced from 38 to 34 for one hour then 35 for five hours. Airborne delay built up during this period of reduced capacity.
- 06 June (0800-0900 & 1700-1800 Local) – Delay 9.2 minutes
  - Thunderstorms impacted operations throughout the day.
  - Lightning strikes associated with thunderstorms in the afternoon led to a period of no approaches.
  - A Level 3 GDP Revision was implemented in the late afternoon with rates reduced from 35 to 30 for two hours then 34 for the rest of the day.
- 17 June (1500-1800 Local) – Delay 7.8 minutes
  - Low rates were planned for the afternoon period due to forecast cross winds.
  - Late non-compliant aircraft concentrated demand during this period of low capacity and resulted in increased airborne delay.
  - A Level 1 GDP Revision was conducted to increase rates when the winds abated.
- 19 June (0600-0900 & 1800-2100 Local) – Delay 18.7 minutes
  - Storms and lightning impacted arrivals throughout the day.
  - International heavy aircraft required arrivals on runway 16R in the early morning. This concentrated the demand on this runway and limited the overall arrival rate for that period.
  - There were no approaches made for 30 minutes in the early evening. A Level 3 GDP Revision was implemented during this period with rates reduced by three to four arrivals per hour for the rest of the day.

# Melbourne

## Airborne delay

The 75<sup>th</sup> percentile performance figures for airborne delay at Melbourne are indicated in **Figure 7**.

June performance (1.1 minutes median and 4.4 minutes 75th percentile) did not meet the targets and delay increased with respect to the same period last year (0.5 minutes median and 3.1 minutes 75th percentile). The long-term trend for airborne delay at Melbourne is upwards but is showing signs that the upward trend may have flat-lined.



**Figure 7:** Melbourne airborne delay 75<sup>th</sup> percentile

The GDP Revisions conducted for Melbourne in June are detailed in **Table 3**. There were a total of 8 Revisions.

| Revision Type | Number in June | Dates  |
|---------------|----------------|--|
| Level 1       | 6              | 06 June, 12 June, 17 June, 19 June, 27 June, 29 June |
| Level 2       | 1              | 28 June  |
| Level 3       | 1              | 08 June  |

**Table 3:** GDP Revisions for Melbourne in June.

## Notable events

The following commentary describes the most significant airborne delay events during June in Melbourne:

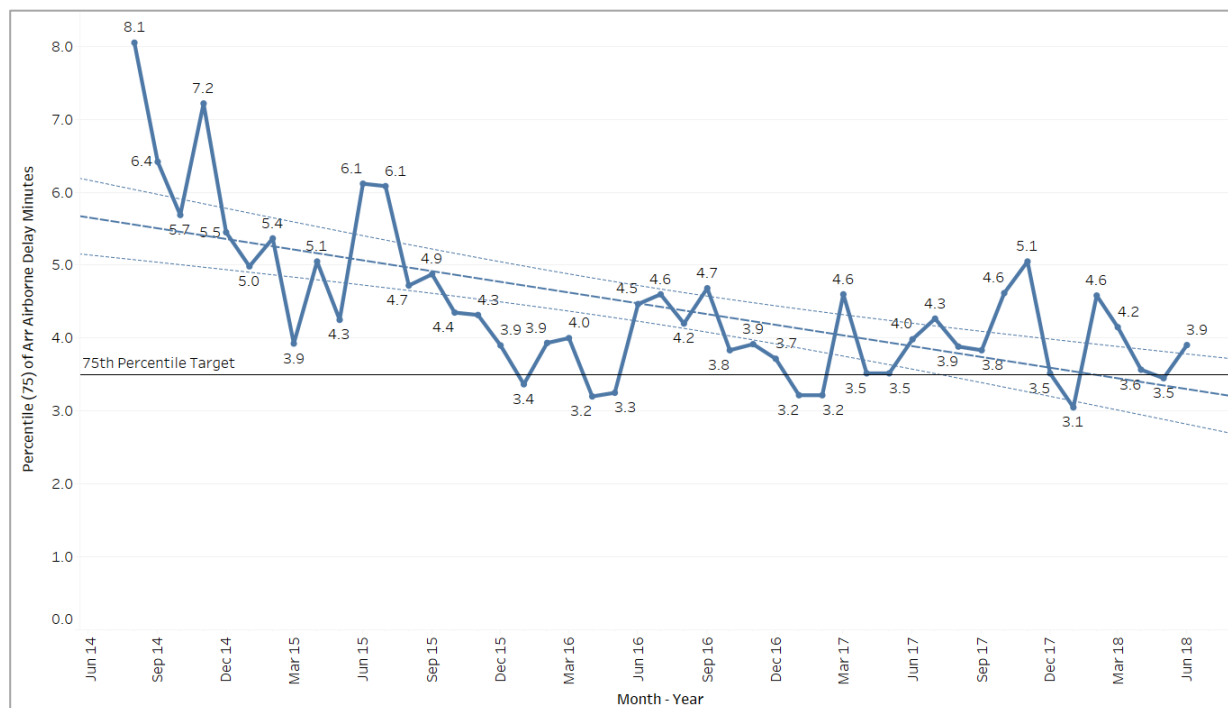
- 07 June (0800-0900 & 1700-2100 Local) – Delay 11.4 minutes
  - Low rates were planned for the throughout the day due to forecast cross winds.
  - Excess demand during the peak periods led to increased airborne delay.
- 08 June (0800-1000 & 1900-2000 Local) – Delay 8.0 minutes
  - Morning operations were impacted by multiple events including stronger than forecast cross winds, an emergency medical arrival, a returned aircraft, and a missed approach due to a bird strike.
  - A Level 3 GDP Revision was conducted during the morning peak period with rates reduced from 23 to 22 for the rest of the morning.
  - Arrival rate in evening reduced by 12 per hour due to wind conditions. This combined with a concentration of demand from late aircraft and led to increased airborne delay.
- 11 June (1800-2000 Local) – Delay 4.7 minutes
  - Low rates were planned for throughout the day due to forecast cross winds and strong winds aloft.
  - Excess demand during the evening peak period led to increased airborne delay.
- 12 June (0700-0800 Local) – Delay 6.0 minutes
  - A Level 1 GDP Revision was conducted in the morning due to lower than forecast cloud and winds aloft. Rate were reduced from 24 to 20 throughout the morning.
  - Excess demand during the morning peak period led to increased airborne delay.
- 13 June (1100-1200) – Delay 4.5 minutes
  - Exempt and late non-compliant aircraft concentrated demand in the late morning.
- 14 June (0800-0900 Local) – Delay 8.7 minutes
  - Low rates were planned for throughout the day due to forecast strong winds aloft.
  - Excess demand during the morning peak period led to increased airborne delay.
- 17 June (1100-1200 & 1500-2000 Local) – Delay 15.3 minutes
  - Low rates were planned throughout the day due to forecast strong winds.
  - Low rates combined with missed approaches in the morning period which led to increased airborne delay.
  - Excess demand during the afternoon and evening led to increased airborne delay.
- 18 June (0900-1000 Local) – Delay 5.9 minutes
  - Rates were reduced by three arrivals per hour during the morning peak period due to worse than forecast winds and low cloud.
  - Excess demand during the morning peak period led to increased airborne delay.
- 26 June (0900-1000 Local) – Delay 4.7 minutes
  - Low rates were planned for the early morning due to forecast low cloud and chance of fog.
  - Excess demand during the morning peak period led to increased airborne delay.
- 27 June (0900-1000 Local) – Delay 5.5 minutes
  - Low rates during the morning due to low cloud.
  - Excess demand during the morning peak period led to increased airborne delay.

# Brisbane

## Airborne delay

The 75<sup>th</sup> percentile performance figures for airborne delay at Brisbane are indicated in **Figure 8**.

June performance met the target for 75<sup>th</sup> percentile of airborne delay (3.5 minutes) but did not meet the target for the median of airborne delay (1.1 minutes). Compared to the same month last year these results were a decrease in the median (from 1.2 minutes) and 75<sup>th</sup> percentile (from 4.0 minutes). The long-term trend for airborne delay at Brisbane is downwards.



**Figure 8:** Brisbane airborne delay 75<sup>th</sup> percentile

The GDP Revisions conducted for Brisbane in June are detailed in **Table 4**. There were a total of 5 Revisions.

| Revision Type | Number in June | Dates            |
|---------------|----------------|------------------|
| Level 1       | 2              | 22 June, 29 June |
| Level 2       | 2              | 29 June (x2)     |
| Level 3       | 1              | 29 June          |

**Table 4:** GDP Revisions for Brisbane in June.

## Notable events

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

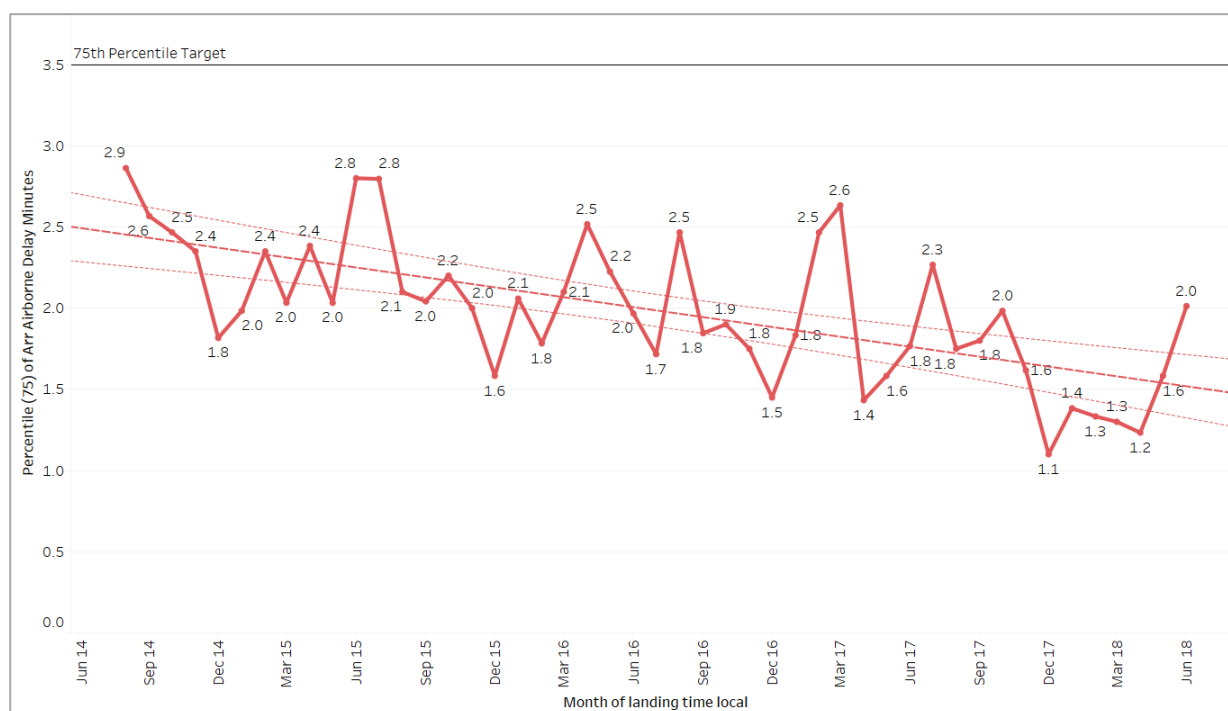
- 17 June (1800-1900 Local) – Delay 4.7 minutes
  - Exempt, early and late non-compliant aircraft concentrated demand leading into a peak period.
- 18 June (1800-2000 Local) – Delay 8.4 minutes
  - Exempt, early and late non-compliant aircraft concentrated demand leading into a peak period.
- 24 June (1800-1900 Local) – Delay 3.6 minutes
  - Exempt, early and late non-compliant aircraft concentrated demand leading into a peak period.
- 25 June (1800-1900 Local) – Delay 5.0 minutes
  - Exempt aircraft concentrated demand leading into a peak period.
- 27 June (1800-1900 Local) – Delay 7.1 minutes
  - Exempt, early and late non-compliant aircraft concentrated demand leading into a peak period.
- 29 June (0600-1400 Local) – Delay 29.1 minutes
  - Heavy fog in the morning prevented landings until 0924 Local.
  - Level 3 GDP Revision was implemented with no aircraft bound for Brisbane departing from 0800-0900 Local.
  - Subsequent delays were experienced until early afternoon.
  - Impact on operations across the network.
  - A Post Operations Performance Report was conducted to assess the network impact and response. The full report is included at **Appendix A**.

## Perth

### Airborne delay

The 75<sup>th</sup> percentile performance figures for airborne delay at Perth are indicated in **Figure 9**.

June performance (-0.2 minutes median and 2.0 minutes 75<sup>th</sup> percentile) met the targets. Median delay was unchanged and the 75<sup>th</sup> percentile increased from 1.8 minutes with respect to the same period last year. The long-term trend for airborne delay at Perth is downwards.



**Figure 9:** Perth airborne delay 75<sup>th</sup> percentile

### Notable events

There were no notable events during June in Perth.



# Appendix A



## Post Operational Performance Review

*Sydney, Melbourne and Brisbane Airports - 16th June 2018*

### Event Description

On the 16<sup>th</sup> of June 2018 there were no ground delay programs executed due to the relocation of the internet gateways supporting key infrastructure and systems including the METRON system (used to run the ground delay programs). Advanced notice was provided to relevant parties to ensure adequate planning and analysis took place before proceeding with the plan. An internal Airservices teleconference was held the evening prior to provide the opportunity to address any concerns that may arise.

This review was initiated to focus on the outcome of not running a GDP across the network and the effectiveness of communications and process used during the event. There were no significant issues raised during the Daily Network Performance Review meeting to address.

### Analysis and findings

The weather conditions across all ports were good and consistent with predictions. This permitted close to maximum tactical rates and facilitated a day with low delays across the network. The maximum arrival delay experienced by any aircraft was 15 minutes. The following airport sections contain the tactical rates used and the throughput by hour, as well as the 75th percentile of airborne arrival delay by hour (sourced from ODAS).

#### Sydney

The MET CDM predicted (ATFM) arrival rates of 50 for the entire day. There was a chance of crosswinds up to 25 knots. However, this was considered a low probability so maximum rates were expected. Figure 1 shows that close to the maximum arrival (maximum tactical rate is 48) rate was experienced throughout the day.

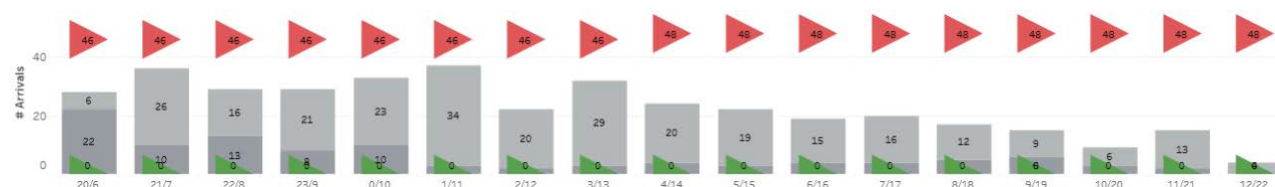


Figure 1 –Arrivals by hour, tactical and pre-tactical rates for 16th June 2018 by hour (UTC/local) at Sydney. Domestic arrivals in light grey, internationals in dark grey. Pre-tactical rates shown by green triangles, tactical rates shown by red triangles.

Figure 2 shows there was low delay throughout the day. The morning delay peak was investigated and shown to be predominantly related to a sequence of Heavy arrivals all landing on the longer runway (34L) as shown below in Figure 3.

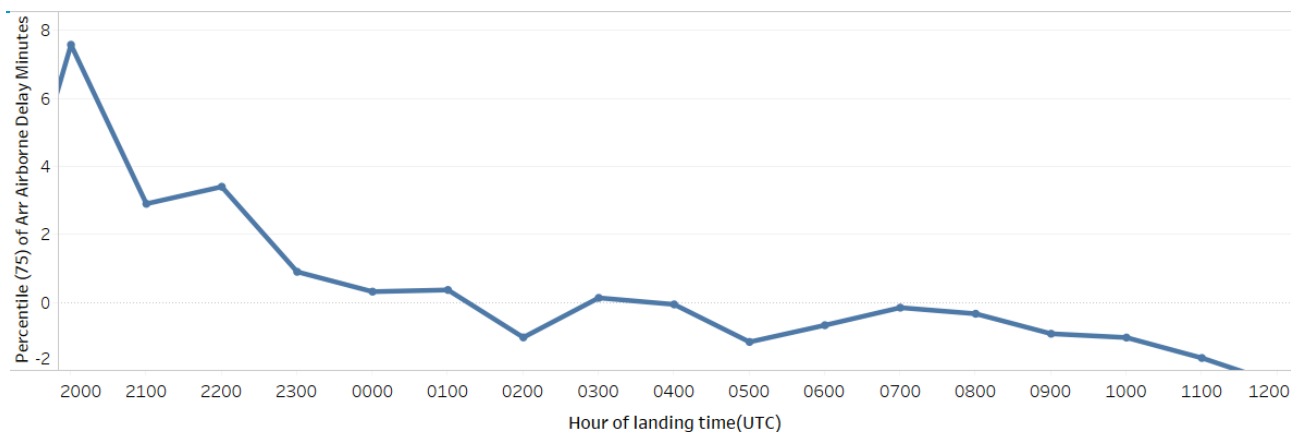


Figure 2 – 75<sup>th</sup> percentile of airborne arrival delay (source ODAS) for Sydney on 16<sup>th</sup> June 2018

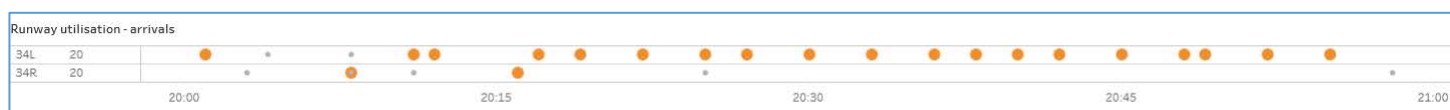


Figure 3 Runway utilisation for the 2000 hour at Sydney. Orange dots indicate heavy wake turbulence category aircraft and medium category are marked by smaller grey dots

## Melbourne

The predicted meteorological conditions indicated an arrival rate of 24 all day (with a possibility of LAHSO during the morning). The conditions on the day permitted LAHSO for a brief period (1 hour) with an increased arrival rate to 40 as shown in Figure 4.



Figure 4 - Arrivals by hour, tactical and pre-tactical rates for 16th June 2018 by hour (UTC/local) at Melbourne. Domestic arrivals in light grey, internationals in dark grey. Pre-tactical rates shown in green, tactical rates shown in red.

Figure 5 shows the arrival delay for Melbourne and there are low levels of arrival delay throughout the day.

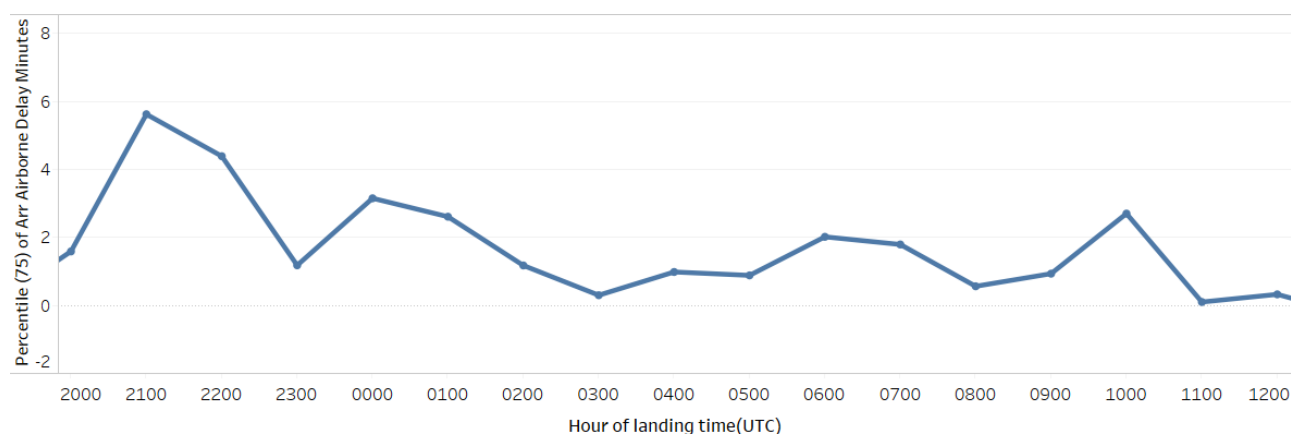


Figure 5 - 75<sup>th</sup> percentile of airborne arrival delay (source ODAS) for Melbourne on 16<sup>th</sup> June 2018

## Brisbane

The predicted conditions meteorological conditions were fine and dry with an expected arrival rate of 24 all day. Figure 6 shows the rates were consistent with the forecast, achieving a rate of 25 all day. The 0200 hour was the highest throughput hour and still maintained low levels of delay (see Figure 7).



Figure 6 - Arrivals by hour, tactical and pre-tactical rates for 16th June 2018 by hour (UTC/local) at Brisbane. Domestic arrivals in light grey, international arrivals in dark grey. Pre-tactical rates shown in green, tactical rates shown in red.

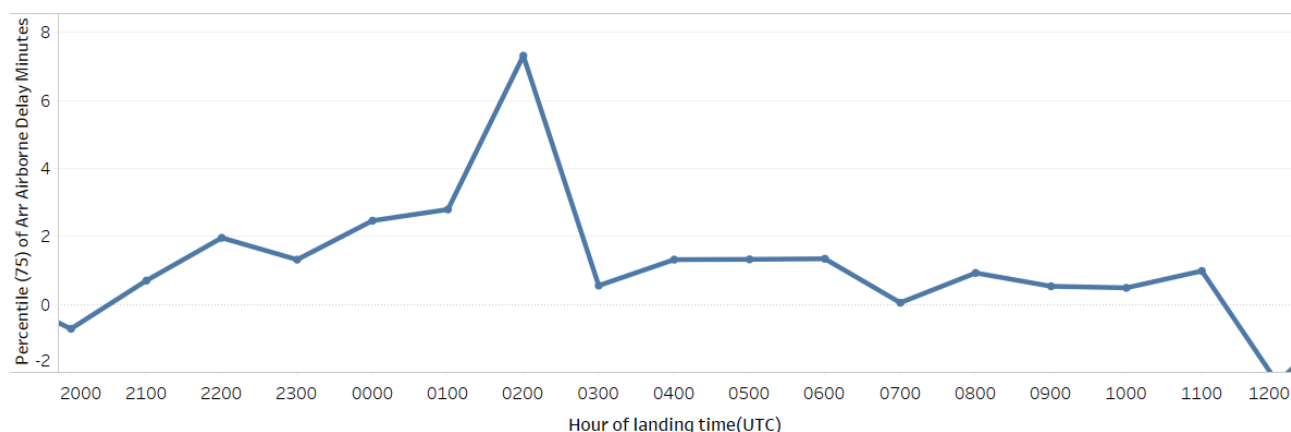


Figure 7 - 75th percentile of airborne arrival delay (source ODAS) for Brisbane on 16th June 2018

## Communications and process

### External

There were several communications promulgated externally via e-mail, NOTAM and Whispir. These included NOTAMS relating to the GDPs not running and also an increase in the anticipated arrival delays. The airlines provided positive feedback, and everyone within their organisations had a good awareness and understanding of the event and its implications.

### Internal

Internally the communications were via NOTAM, Group Circular and via email through the ATM service managers. One query from an Operational Unit was received on the day regarding no COBTs which has since been followed up.

### NOTAMS

NOTAMS were issued for Brisbane and Sydney related to increased airborne traffic delays. Brisbane issued (0810) a NOTAM for an expected 20 minutes delay from 2000 to 1000. This was 5 minutes above the published ERSA advice. The NOTAM was cancelled at 0356 (1356 local).

The Sydney traffic delay NOTAM (issued at 0823) advised up to 30 minutes delay from 2100 to 0200. This was 10 minutes above the published ERSA advice. The NOTAM was cancelled at 2339.

## Summary

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The management of not running GDPs on Saturday the 16<sup>th</sup> June 2018 went well. Co-ordination and communication was well executed and airline customers provided positive feedback on these aspects.

The network ran well with low delays. This was facilitated by all airports operating near maximum capacity (as forecast) and substantially above demand.

Increased delay advisory NOTAMS were issued to mitigate anticipated demand spikes based on the GDP modelling undertaken the night prior.

**For further information please contact Network Performance and Analysis @  
[OPS\\_ANALYSIS\\_ADMIN@AirservicesAustralia.com](mailto:OPS_ANALYSIS_ADMIN@AirservicesAustralia.com)**

## Post Operational Performance Review

*Sydney, Melbourne and Brisbane Airports - 29 June 2018*

### Event Description

During the morning hours of 29 June 2018, Brisbane Airport was affected by heavy fog that resulted in no successful landings until 2340Z. As a direct result, morning arrivals experienced large airborne delays with many in excess of 40 minutes.

The event also resulted in diversions and cancellations and subsequently disruption across the entire network for the whole day. In the afternoon of the same day, operations at Sydney were also impacted by a failure with the Melbourne Flight Data Processor (ML FDP).

This review outlines the sequence of events and explores issues raised by the various ATM functions and the Airlines on areas that can be improved.

### Analysis

On 29 June 2018 all three major east coast airports experienced increase airborne delays:

- At **Brisbane airport** the formation of fog in the morning resulted in no arrivals until 2340Z and consequently a built-up of airborne delay. During 00Z the 75<sup>th</sup> percentile reached 74 minutes. From 04Z the delay stayed below 10 minutes on average.
- At **Sydney airport** reduced visibility and low cloud base in the early morning resulted in reduced capacity and average airborne delay of 10 minutes from 20-22Z. Diversions from YBBN put additional strain on the demand. In the afternoon an equipment failure of the ML FDP during 07Z resulted in no processing of new aircrafts outside the TMA and led to delays during 08Z.
- At **Melbourne airport** the pre-tactical AAR (airport acceptance rate) was set to the VMC rate (24) for all hours post-22Z. This resulted in demand close to capacity and required significant ground delay with averages up to 22 min. during 08Z. During the two evening hours (07-08Z), conditions better than forecasted allowed for LAHSO and a tactical rate of 36. This resulted in 4 tactical releases that allowed some relief for the built-up of ground delay.

Table 1 shows an overview of the timeline for the entire day for Brisbane (red), Sydney (blue) and Melbourne (green) airports to successively investigate the cause of these delays.

For **Brisbane**, the schedule of events was as following:

- The initial MetCDM meeting on the evening of the previous day took the 30% probability of fog and 500 meter visibility from the TAF into account by using the ILS rate minus 3 (18) for 20-00Z.
- Around 16Z fog began forming around the aerodrome with visibility reduced to an average of 350 meters. A level 1 revision at 1715z was issued to lower the rate to the fog rate (12) until 23Z. At this stage, NCC MET expected the fog to gradually lift around 22-23Z.
- When operations at YBBN commenced during the 20Z hour, the heavy fog resulted in conditions below CAT I and prevented any inbound aircraft from landing. A level 3 revision at 2100Z issued a ground stop. A number of international and domestic aircraft were diverted to the Gold Coast, Melbourne, Sydney and Coffs Harbour airports.
- During 23Z the fog started to lift. MXD157 successfully landed at 2324Z followed by VOZ100 at 2347Z, both on runway 19. A level 2 revision was issued at 2353Z that set an AAR of 26 from 00Z on. When Brisbane ATC asked for the level 2 revision at 2349Z, METCDM had not been finalised yet. Thus an AAR of 26 with CROPS configuration was set for 0000-0730Z. However, METCDM advised to use CROPS with runways 01/14 only from 0300Z till 0730Z. First the aircrafts currently holding had to be landed and there would be no window of opportunity to change the runway 19 to 01/14 until 03Z. From 0348Z CROPS was used with a tactical rate of 28.

- Another level 2 revision was issued at 0230Z to realign the arrival slots due to the increasing airborne holding and under delivery to the ATFM plan since 2350Z.

Pre-tactical  Tactical (maestro)   
Rate: 26/32

|         | Brisbane  | RATE  | Sydney   | RATE  | Melbourne  | RATE  |
|---------|---|-------|--|---|--|-------|
| 17z/03L | L1 GDP BN @1715Z<br>Reduced rates 2000-2300z due to fog   | -     | -  | -   | -  | -     |
| 18z/04L | -   | -     | L1 GDP SY @ 1800Z,<br>standard 04L revision, no changes  | -   | -  | -     |
| 19z/05L | -   | -     | L2 GDP SY @ 1915Z, rate 26 for 20z due to LVP/fog at SY  | -   | -  | -     |
| 20z/06L | Ground stop due to fog, diversions to YBCG,YMML,YSSY,YCFS | 0/0   | 26/32  | 22/24   |  |       |
| 21z/07L | L3 GDP BN @ 2100Z<br>Ground stop                          | 6/0   | 40/32  | 22/24   |  |       |
| 22z/08L | Ground stop   | 6/0   | maestro rate increase from 32 to 48; leads to reduction in delay   | 40/48   | 22/24  |       |
| 23z/09L | L2 GDP BN @2353Z,<br>first arrival at 2324z.              | 12/12 | 40/48  | 24/24   |  |       |
| 00z/10L | (RWY19 arrivals)  | 26/21 | 50/48  | 24/24   |  |       |
| 01z/11L |   | 26/24 | 50/48  | 24/24   |  |       |
| 02z/12L | L2 GDP BN @ 0230Z<br>Realignment of slots                 | 26/25 | 50/48  | 24/24   |  |       |
| 03z/13L |   | 26/27 | 50/48  | L1 GDP ML @ 0330Z<br>(unchanged rates, COBTs realigned) | 24/24  |       |
| 04z/14L | CROPS   | 26/28 | 50/48  | 24/24   |  |       |
| 05z/15L | CROPS   | 26/28 | 50/48  | 24/24   |  |       |
| 06z/16L | CROPS   | 26/28 | 50/48  | 24/24   |  |       |
| 07z/17L |   | 25/25 | 0717-0735Z<br>Significant technical fault, no FDP-access. No departures and no entry into TMA for new arrivals | 50/48   | Unforecast LAHSO operation during 07-09Z allowed tactical releases | 24/36 |
| 08z/18L |   | 24/24 | 50/48  | 24/36   |  |       |
| 09z/19L |   | 24/24 | 50/48  | 24/24   |  |       |

Table 1: Timeline during the day for Brisbane (red), Sydney (blue), and Melbourne (green). The RATE (xx/yy) refers to the pre-tactical / tactical rate.

At **Sydney**, the following events occurred:

- At 1800Z the standard 04L revision was issued to take updated international arrivals into account.
- At 1915Z, a level 2 revision was issued to reduce its arrival rate for 20Z from 40 to 26 because Sydney airport was in LVP and predicted to remain so till at least 21Z. Once the tower has commenced LVP it severely restricts arrival capacity regardless of the actual weather which may permit a greater arrival rate. After some negotiation with SY TWR the tactical rate was set at 32 during 21Z. An additional consideration was the prospect of some possible YBBN diversions.
- The airborne holding during the early morning period (20-22Z) was around 10 minutes on average due the reduced capacity as a result of the LVP. The transition from LVP was delayed due to extensive fog/mist on the northern perimeter of the aerodrome. The 34L/34R approaches had little significant cloud and the arrival rate was able to be increased. From 23Z the average airborne holding fell below the 3.5 min target.
- Between 0716 -0735Z a significant Eurocat failure isolated SY TCU and TWR from ML FDP (CIRRIS ATS-0161865). This resulted in no departures during that period. New arrivals were not able to enter the TMA thus these flights were hold at the TMA border with no single landing between 0741-0757Z. Consequently, flights arriving during the 08Z hour experienced elevated airborne holding, with an average delay of 12 min.

Relevant events at **Melbourne** were:

- At 0330Z a level 1 revision was issued to realign the COBTs as a consequence of the network disruption originating from the fog event at Brisbane.
- During the hours 07 and 08Z, the rate was increased from 24 to 36 as LAHSO became possible due to better conditions than forecasted. This allowed the tactical release of four flights (JST744, JST449, VOZ227, VOZ742).
- Despite the (unscheduled) use of LAHSO, the ground delay during the afternoon and evening (06-12Z) showed an average between 10 and 20 minutes.

| UTC                                 | 20    | 21          | 22           | 23            | 00            | 01     | 02     | 03     | 04     | 05     | 06     | 07     |
|-------------------------------------|-------|-------------|--------------|---------------|---------------|--------|--------|--------|--------|--------|--------|--------|
| MetCDM (previous day)               | 18    | 18          | 18           | 18            | 24            | 24     | 24     | 24     | 26     | 26     | 26     | 25     |
| Lvl1 1715z                          | 12    | 12          | 12           | 24            | 24            | 24     | 24     | 24     | 26     | 26     | 26     | 25     |
| Lvl3 2100z                          | 0     | 6           | 6            | 12            | 18            | 24     | 24     | 24     | 26     | 26     | 26     | 25     |
| Lvl2 2353z                          | -     | -           | -            | -             | 26            | 26     | 26     | 26     | 26     | 26     | 26     | 25     |
| Lvl2 0230z                          | -     | -           | -            | -             | -             | -      | -      | 26     | 26     | 26     | 26     | 25     |
| Maestro rate                        | 0     | 0           | 0            | 12            | 21            | 24     | 25     | 27     | 28     | 28     | 28     | 25     |
| Arrivals (achieved)                 | 0     | 0           | 0            | 2             | 19            | 23     | 23     | 29     | 19     | 20     | 23     | 24     |
| of these:                           |       |             |              |               |               |        |        |        |        |        |        |        |
| - exempt                            | -     | -           | -            | 2             | 6             | 2      | 1      | 0      | 1      | 1      | 2      | 3      |
| - early non-compliant               | -     | -           | -            | 0             | 4             | 6      | 1      | 2      | 2      | 2      | 4      | 2      |
| - late non-compliant                | -     | -           | -            | 0             | 1             | 0      | 4      | 6      | 2      | 4      | 6      | 6      |
| RVR (ATIS)                          | 400 m | 350 - 400 m | 650 - 1200 m | 1200 - 3000 m | 6 - 8 km      | >10 km | >10 km | >10 km | >10 km | >10 km | >10 km | >10 km |
| Ground visibility in meters (METAR) | 100 m | 100 - 150 m | 200 - 250m   | 600 - 5000m   | 9 km - >10 km | >10 km | >10 km | >10 km | >10 km | >10 km | >10 km | >10 km |
| Cloud base (METAR)                  | NSC   | NSC         | NSC          | 500 ft        | 900 - 1000 ft | FEW    | FEW    | FEW    | FEW    | FEW    | FEW    | FEW    |

Table 2: Full evolution of pre-tactical (green) and tactical arrival (red) rates at YBBN. Visibility as reported by ATIS is shown for reference as well (blue).

To illustrate the evolution of the pre-tactical rates at Brisbane airport prior and during the hours of operation, Table 2 shows the hourly pre-tactical rates for each revision (green), together with the tactical rates (red). Visibility and cloud base are also shown (blue).

In summary, the ground stop at Brisbane resulted in no arrivals during the first three hours of operations (20/21/22Z). Although the fog was initially forecasted to lift during 22Z, visibility and cloud base only improved towards the end of the 23Z hour. With runway 01 and 19 having a decision height (DH) of 208 ft and runway visual range (RVR) of 800 m, arrivals not resumed until during the 23Z hour, when conditions improved.

As a result the ground stop lasted nearly two hours longer than initially anticipated. From 00Z visibility had improved to 6-8 km and tactical rates of 18 to 26 were achieved. Visibility remained more than 10 km from 01Z for the remainder of the day.

The large number of early non-compliant aircraft, particular during 00 and 01Z, potentially also contributed to the slow ease of recovery from airborne holding.

## Communications

- A number of aircraft that had diverted to the Gold Coast did not phone the Brisbane Flow for a tactical slot as described in ERSA YBBN FAC 4.2b, “pilots of inbound flight to Brisbane with a duration of 45MIN or less must contact the Brisbane Flow Controller to validate their COBT and confirm a Flow tactical landing slot.” However, many aircraft that diverted to airports within 45 minutes flight time of YBBN and were then planning to depart back to Brisbane, did not comply with this requirement. This requirement would most likely be unfamiliar to those crews diverting as this is a flight leg not flown by medium category aircraft. This however did lead to additional workload for BN ATC.



- With hindsight, the rates for the L2 GDP revision at 2349Z were too high for the first three hours which resulted in oversubscription and contributed to the level 2 revision at 0230Z.
- The NCC responded late to requests from industry partners to rerun the Melbourne GDP to realign slots due network impacts. The NCC focus was on the Brisbane program until 0330Z when it had stabilised and the initiative had been discussed at an industry teleconference.
- After the ground stop was issued at 2000Z, airlines would have appreciated more communication before the level 3 revision at 2100Z.

### **System Limitations**

- For Sydney airport, the level 2 revision at 1855Z was not able to deliver the intended outcome. This was the result of a system limitation when dealing with pre-curfew flights. During 19Z, the hour before the curfew is lifted, only 3 specific flights are permitted to land (BAW15, QFA2, SIA221). However, demand with ETA < 20Z was 9 aircrafts and all these flights were not accounted for in the GDP revision.

### **Network view of event**

- NCC indicated that some flights did not receive a COBT after the revision at 2350Z as their ETA was in the past.
- The current procedures and tools available to the NCC provide a limited real-time view of how large scale disruptions are expected to propagate through the network. This is an area where Airport CDM (ACDM) is expected to lead to an improvement.

### **Summary**

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The events on 29 June 2018 led to a severe network disruption that started at Brisbane airport and subsequently impacted Sydney and Melbourne airport as well. The event can be summarised as:

- Pre-tactical processes were effectively applied prior to the commencement of peak-hour morning operations.
- With the benefit of post-operational analysis, once the fog cleared at YBBN and routine capacity became available, the recovery was not optimal. Specific items for improvement include:
  - When setting arrival acceptance rates to factor any runway configuration changes that may be required to achieve the rates;
  - Management of flights departing Gold Coast-Brisbane to understand and factor potentially counterproductive compliance requirements between the ATFM Program and the tactical requirements detailed in ERSA;
  - Increased awareness of flight crew of diversion flights of the Gold Coast-Brisbane ERSA requirements.
- Network-wide factors need to be considered earlier by the NCC following a significant disruption at a single airport and the propagation of delays through the network.

The increased capability offered by A-CDM and LR ATFM may have some positive impact in similar events in the future, however additional technology and digital workspace capability (e.g. portal) may be required to improve information sharing and to support collaboration.

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## Appendix B

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

#### Corporate Plan Description:

The median (and 75<sup>th</sup> 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 arrival demand/capacity balancing measures and arrival flight paths 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 June skew the average.

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

The last 25<sup>th</sup> percentile can typically contain arrival data from flights that were impacted by nonroutine 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.