ATM Network Performance Report

January 2019

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Summary

This report focusses on the performance of the Air Traffic Network in January 2019. The combined 75th percentile performance during January for airborne delay across the four major airports (Sydney, Melbourne, Brisbane and Perth) was **3.1** minutes. The median airborne delay across these airports was **0.4** minutes. These results met the KPI targets despite an increase compared to the same period last year.

The airborne delay outcomes for January were the lowest observed in FY 2019. This was a result of the relatively low number (22) of notable events during January. There were no notable events in Brisbane or Perth, corresponding with relatively favourable weather conditions at these locations.

While the overall number of notable events in January was low, there were a number of highly-disruptive events in Sydney and Melbourne. This includes three events where airborne arrival delay for the day was over 20 minutes (75th percentile). These events were primarily related to thunderstorm activities and short-notice staff absences.

The performance for the FY 2019 year to date is above the targets for the median (0.7 minutes) and 75th percentile (3.7 minutes). Compared to the same period in FY 2018 there has been an increase in the median (from 0.6 minutes) and the 75th percentile (from 3.4 minutes).

There were 22 notable events in January which are summarised under each of the airport sections below**.** Twelve 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). These events are labelled in **Figure** 1. Ten 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) or had other significant impacts such as cancelled flights.

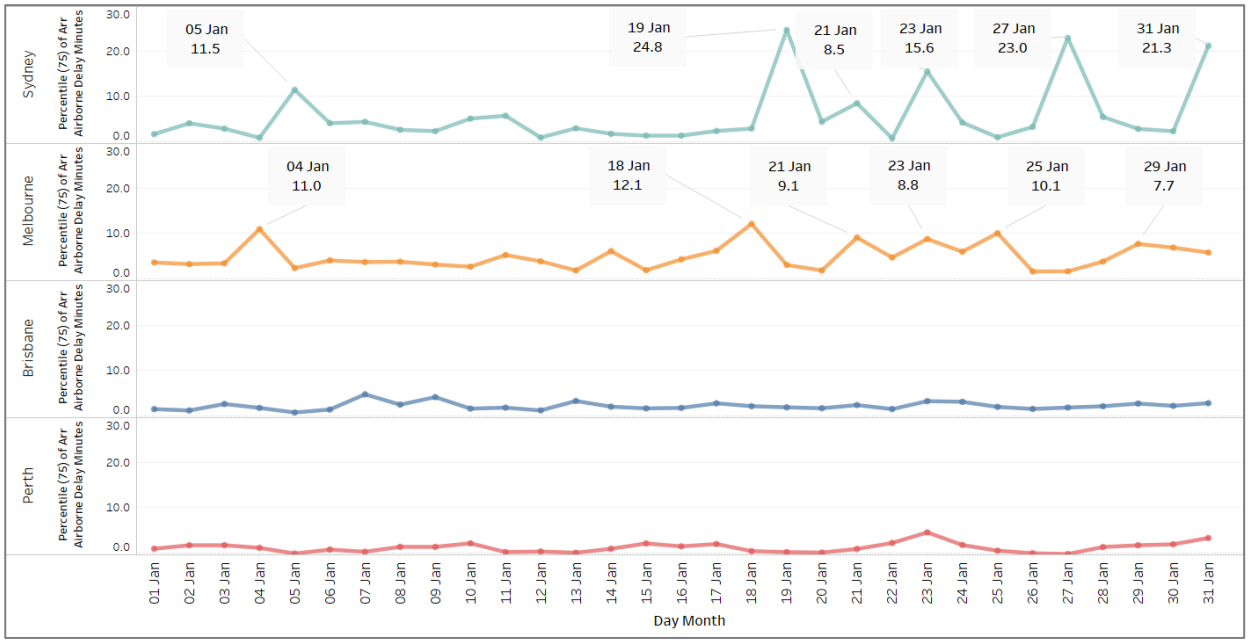


Figure 1: Notable prolonged delay impact events during January 2019

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

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.

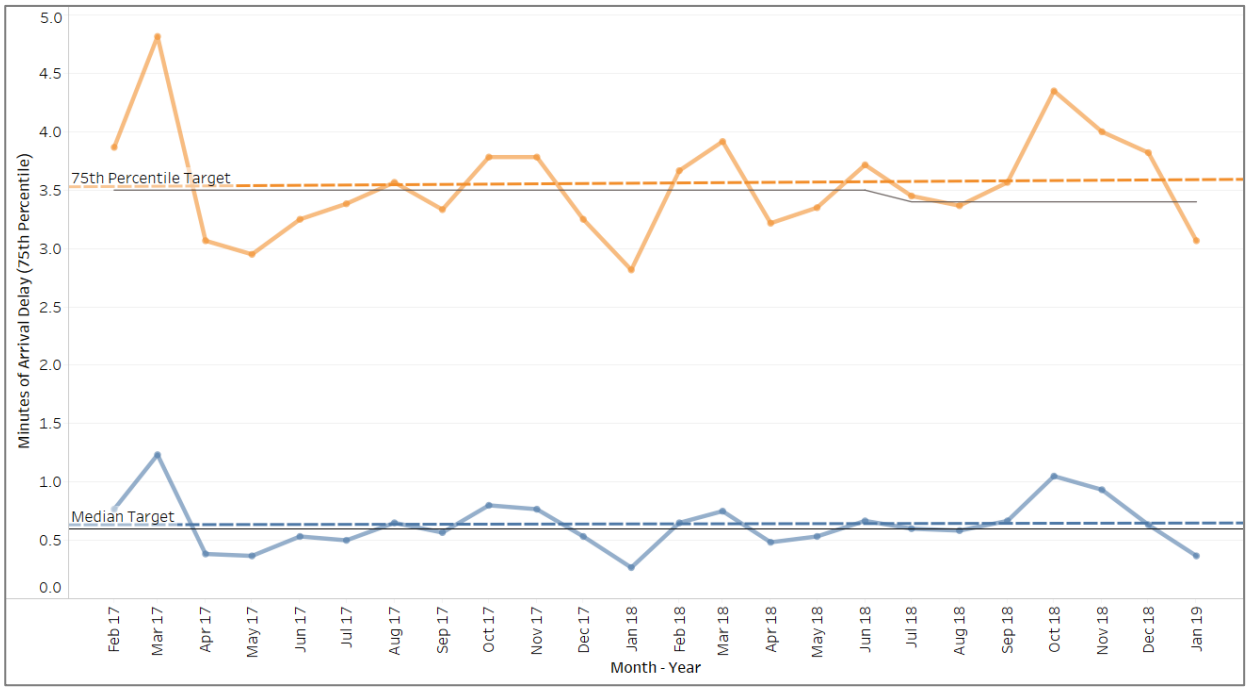


Figure 2: 24-month trend for airborne delay

The 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.

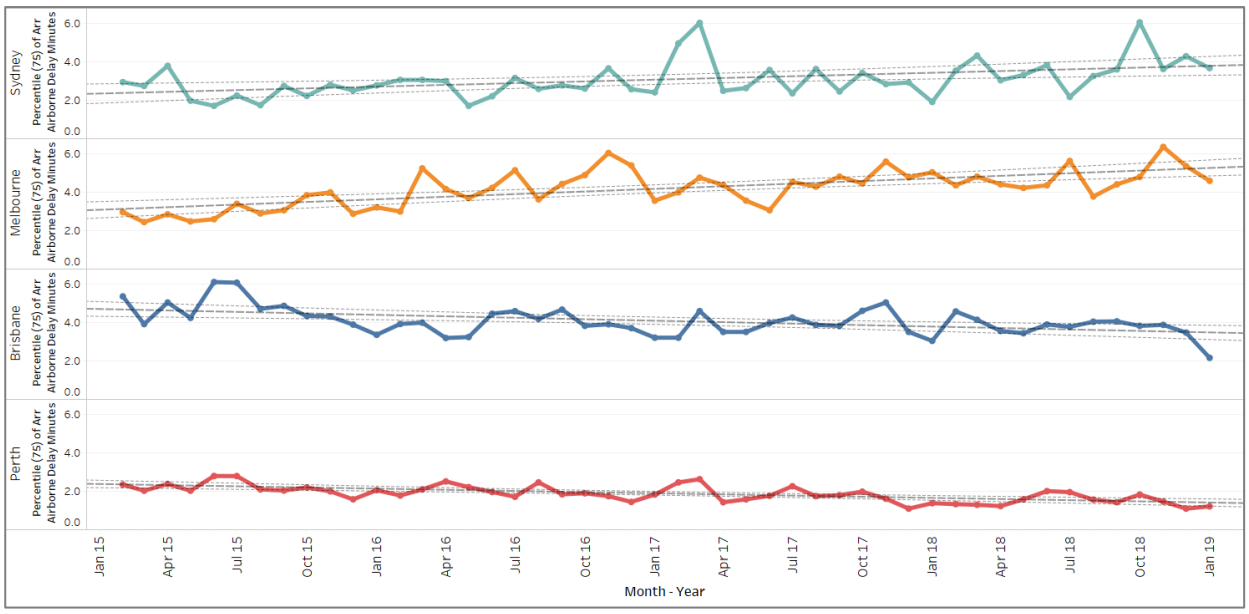


Figure 3: 48-month trend for airborne delay (75th percentile) by airport

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. January was the fourth lowest month of adjusted total delay in 2018-19. There is no statistically significant trend.

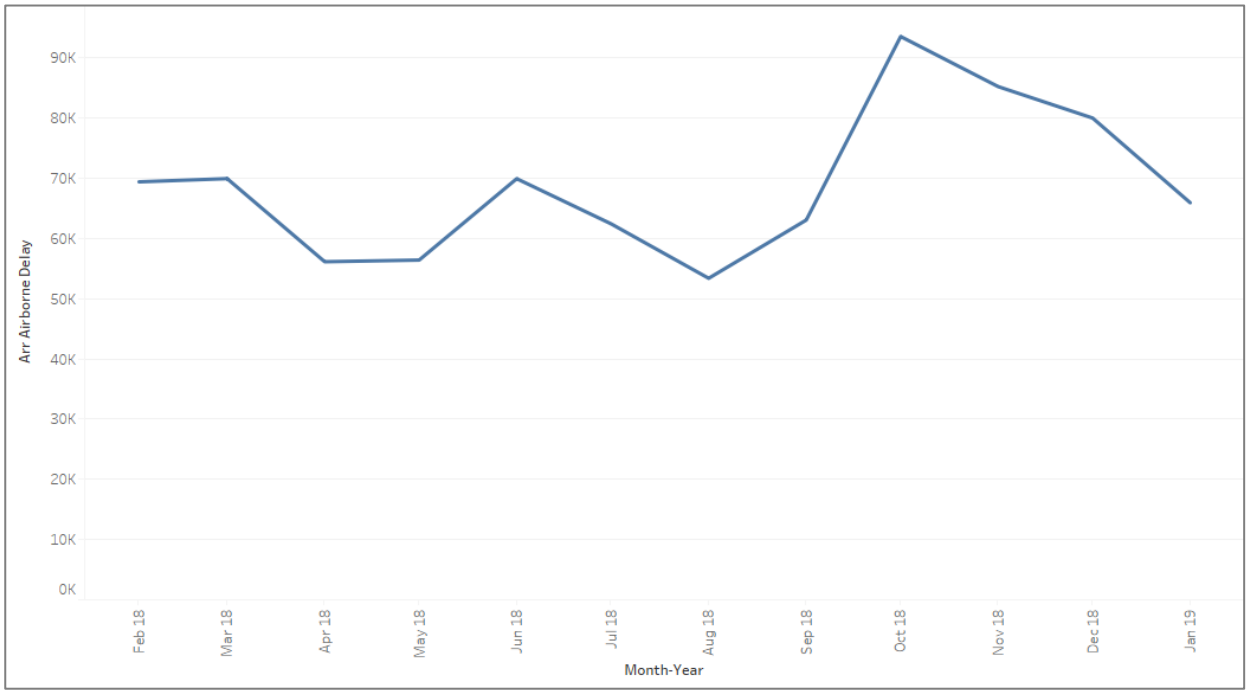
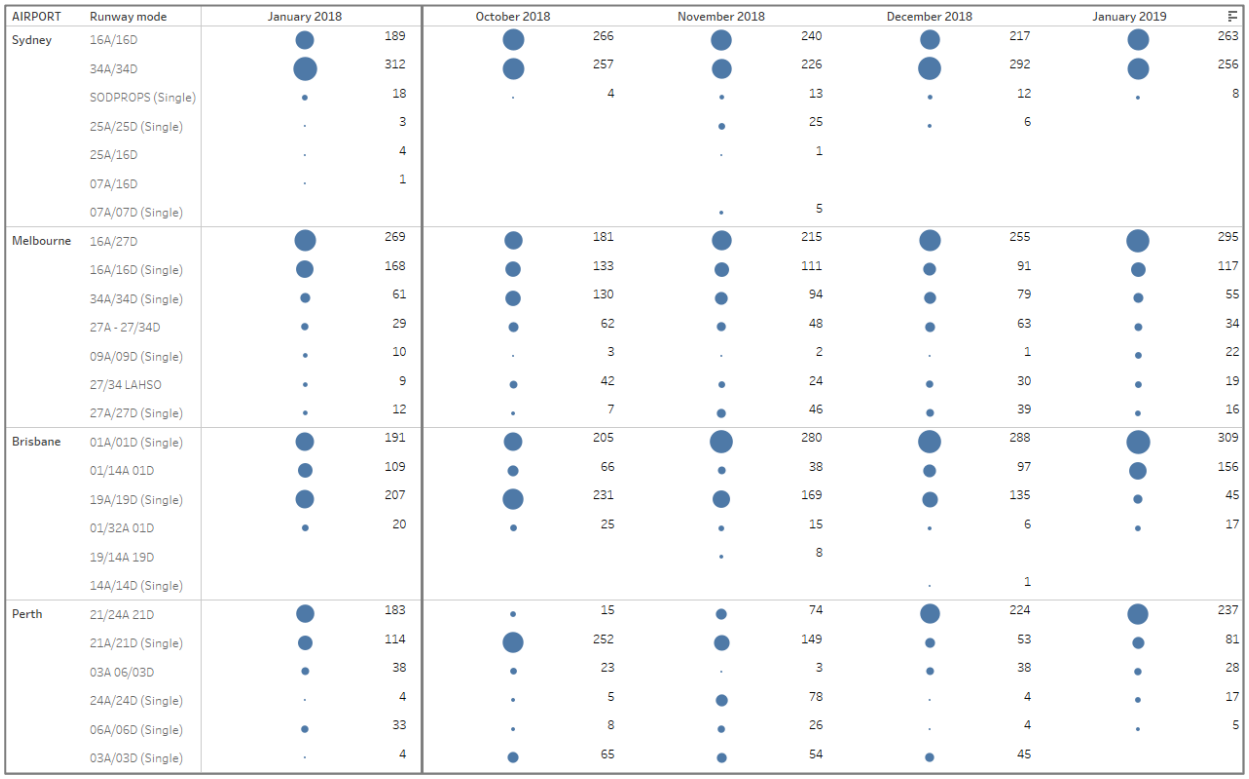


Figure 4: Total amount of airborne delay by month for Sydney, Melbourne, Brisbane and Perth Airports.

The runway configuration usage for each airport is shown in **Figure 5**. Compared to the same month last year, the number of hours of single runway operations in January decreased at all four airports.



AIRPORT	Runway mode	January 2018	October 2018	November 2018	December 2018	January 2019
Sydney	16A/16D	189	266	240	217	263
	34A/34D	312	257	226	292	256
	SODPROPS (Single)	18	4	13	12	8
	25A/25D (Single)	3		25	6	
	25A/16D	4		1		
	07A/16D	1				
	07A/07D (Single)			5		
Melbourne	16A/27D	269	181	215	255	295
	16A/16D (Single)	168	133	111	91	117
	34A/34D (Single)	61	130	94	79	55
	27A - 27/34D	29	62	48	63	34
	09A/09D (Single)	10	3	2	1	22
	27/34 LAHSO	9	42	24	30	19
	27A/27D (Single)	12	7	46	39	16
Brisbane	01A/01D (Single)	191	205	280	288	309
	01/14A 01D	109	66	38	97	156
	19A/19D (Single)	207	231	169	135	45
	01/32A 01D	20	25	15	6	17
	19/14A 19D			8		
	14A/14D (Single)				1	
Perth	21/24A 21D	183	15	74	224	237
	21A/21D (Single)	114	252	149	53	81
	03A 06/03D	38	23	3	38	28
	24A/24D (Single)	4	5	78	4	17
	06A/06D (Single)	33	8	26	4	5
	03A/03D (Single)	4	65	54	45	

Figure 5: January runway configuration usage (hours) 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.

Sydney

Airborne delay

The 75th percentile performance figures for airborne delay at Sydney are indicated in **Figure 6.** January performance met the target for the median (0.5 minutes) and did not meet the target for the 75th percentile (3.7 minutes). Compared to the same month last year, there was an increase in the airborne delay median performance (from -0.2 minutes) and 75th percentile performance (from 1.9 minutes).

The long-term (48-month) trend for airborne delay at Sydney is upwards. However, the 24-month trend is flat.

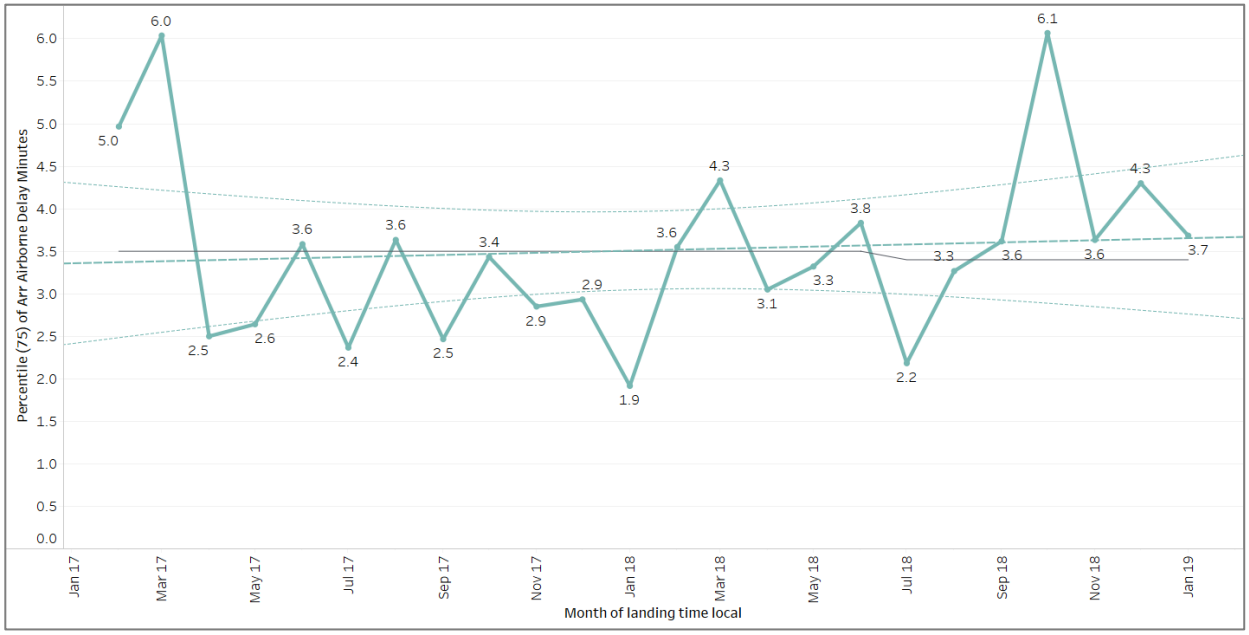


Figure 6: Sydney airborne delay 75th percentile (last 24 months)

Notable events

Table 1 describes the notable airborne delay and other events during January in Sydney.

Day	Local Time	Delay (minutes – 75th percentile)	Event Descriptions (*Contributing causes to increased delays*)
05 January	15-22	11.5	Reduced capacity in afternoon and evening due to thunderstorms in the terminal manoeuvring area (TMA). Ground stop for flights to Sydney implemented at 1640L with a Level 2 GDP Revision conducted at 1817L (rates reduced).
08 January	20-21	2.6	Reduced capacity due to thunderstorm and runway change during evening peak period.
11 January	20-21	5.7	Reduced capacity due to thunderstorm during the evening peak period (tactical rates lowered).

18 January	09-22	2.8	Reduced capacity due to late-notice staff unavailability. Level 1 GDP Revision at 1100L with rates reduced. Numerous flight cancellations. Subsequent Level 1 GDP Revision at 0315L as additional staff became available (rates increased).
19 January	07-14	24.8	Reduced capacity due to late-notice staff unavailability. Harmony system outage prevented GDP Revision to lower planned rates. As a result demand for the morning exceeded tactical capacity.
21 January	09-11	8.5	Reduced capacity due to technical fault preventing use of Precision Runway Monitor. Tactical rates lowered.
23 January	08-09 & 17-20	15.6	Reduced capacity due to thunderstorms in the morning (tactical rates lowered). Concentration of demand due to late non-compliant flights and off-schedule internationals in late afternoon. Delay impacts compounded by emergency services operations.
27 January	17-22	23.0	Reduced capacity due to thunderstorms in the late afternoon (tactical rates lowered).
31 January	18-22	21.3	Reduced capacity due to strong winds resulting in numerous missed approaches (tactical rates lowered).

Table 1: Notable event descriptions for Sydney.

Melbourne

Airborne delay

The 75th percentile performance figures for airborne delay at Melbourne are indicated in **Figure 7.** January performance for the median (1.1 minutes) and the 75th percentile (4.6 minutes) did not meet the targets. Compared to the same month last year, there was a decrease in the airborne delay median performance (from 1.2 minutes) and 75th percentile performance (from 5.0 minutes).

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

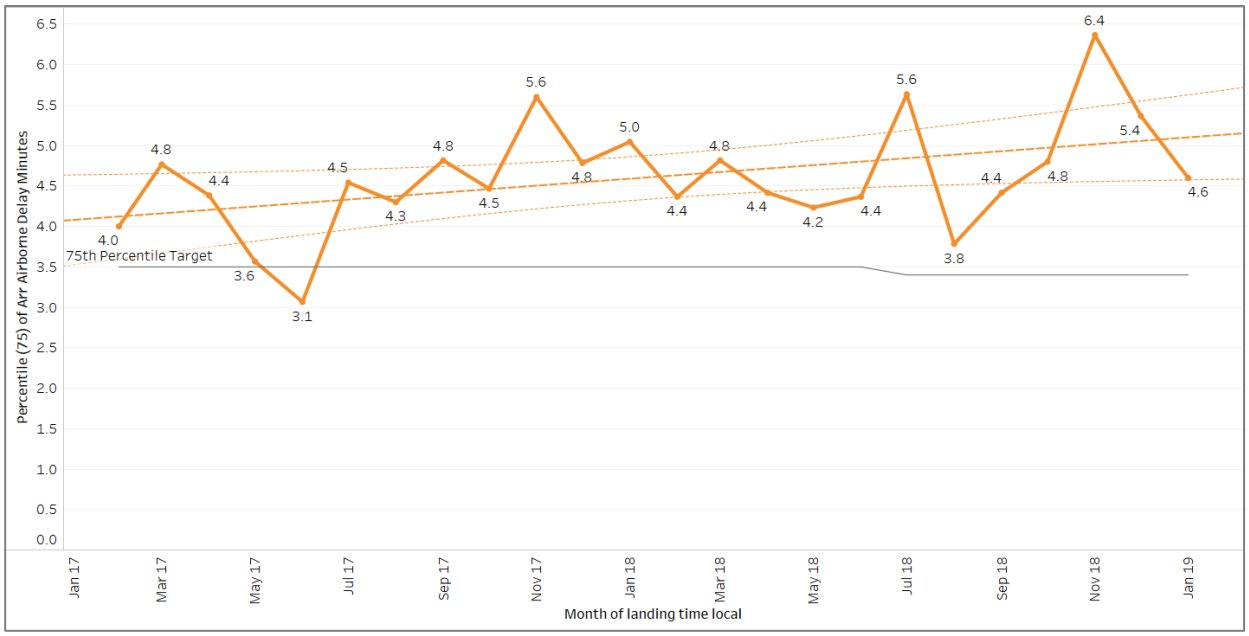


Figure 7: Melbourne airborne delay 75th percentile (last 24 months)

Notable events

Table 2 describes the notable airborne delay events during January in Melbourne.

Day	Local Time	Delay (minutes – 75th percentile)	Event Descriptions (*Contributing causes to increased delays*)
03 January	07-08	3.4	Concentration in demand due to off-schedule international flights during morning peak period.
04 January	16-21	11.0	Reduced capacity due to strong winds resulting in runway change and numerous missed approaches. Level 2 GDP Revision at 1739L due to increasing airborne delay (rates unchanged).
07 January	07-08	3.7	Reduced capacity in morning due to unfavourable wind conditions. Single runway operations commenced earlier than planned (tactical rates reduced).

08 January	07-08	3.7	Reduced capacity due to low cloud during morning peak period (tactical rates reduced).
11 January	18-19	5.2	Build-up of delay in afternoon following an extended low-capacity period (single runway operations).
17 January	14-16	6.2	Reduced capacity due to squall passing through TMA resulting in numerous missed approaches.
18 January	18-21	12.1	Reduced capacity due to low cloud and storms in the early evening (tactical rates lowered).
21 January	15-16	9.1	Concentration of demand due to late non-compliant flights during a period of low capacity (single runway operations).
22 January	07-08	4.7	Concentration in demand due to off-schedule international and late non-compliant flights during morning peak period.
23 January	10-11 & 18-20	8.8	Reduced capacity due to unfavourable wind conditions. Single runway operations continued for longer than planned (tactical rates reduced).
25 January	07-09 & 15-16	10.1	Concentration in demand due to off-schedule international flights during morning peak period. Reduced capacity due to strong winds resulting in numerous missed approaches during afternoon. Level 2 GDP Revision at 1522L (rates unchanged).
29 January	17-20	7.7	Reduced capacity due to strong winds resulting in numerous missed approaches.
30 January *	17-23	6.9	Reduced capacity due to thunderstorms in late afternoon resulted in four periods with few to no successful approaches. Level 3 GDP Revisions were conducted at 1800L (rates reduced) and 2110L (rates unchanged from first revision).

Table 2: Notable event descriptions for Melbourne.

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.

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.

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 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	QLK50D	Devonport	7	5
	JST730	Launceston	8	3
	QLK52D	Devonport	10	3
	QLK77D	Mildura	7	3
Late	QFA419	Sydney	10	7
	JST561	Brisbane	10	6
	QFA411	Sydney	9	6
	JST503	Sydney	8	5
	JST501	Sydney	7	4
	QFA415	Sydney	9	4
	VOZ816	Sydney	9	4
	QFA401	Sydney	7	3
	VOZ824	Sydney	10	3
	JST507	Sydney	10	2
	JST677	Darwin	7	2
	JST971	Perth	7	2
	QFA409	Sydney	8	2
	QFA413	Sydney	9	2
	VOZ800	Sydney	7	2
	VOZ812	Sydney	9	2
	VOZ820	Sydney	10	2

Table 3: CTOT variation for Melbourne arrivals 0700-1100 local – January 2019. Number of occasions that each flight departed early or late with respect to its CTOTs (-5 to +15 minutes).

Brisbane

Airborne delay

The 75th percentile performance figures for airborne delay at Brisbane are indicated in **Figure 8**. January performance (0.2 minutes median and 2.2 minutes 75th percentile) met the targets. Compared to the same month last year, there was a decrease in the airborne delay median performance (from 0.5 minutes) and 75th percentile performance (from 3.1 minutes).

The long-term (48-month) trend for airborne delay at Brisbane is downwards. However, the 24-month trend is flat.

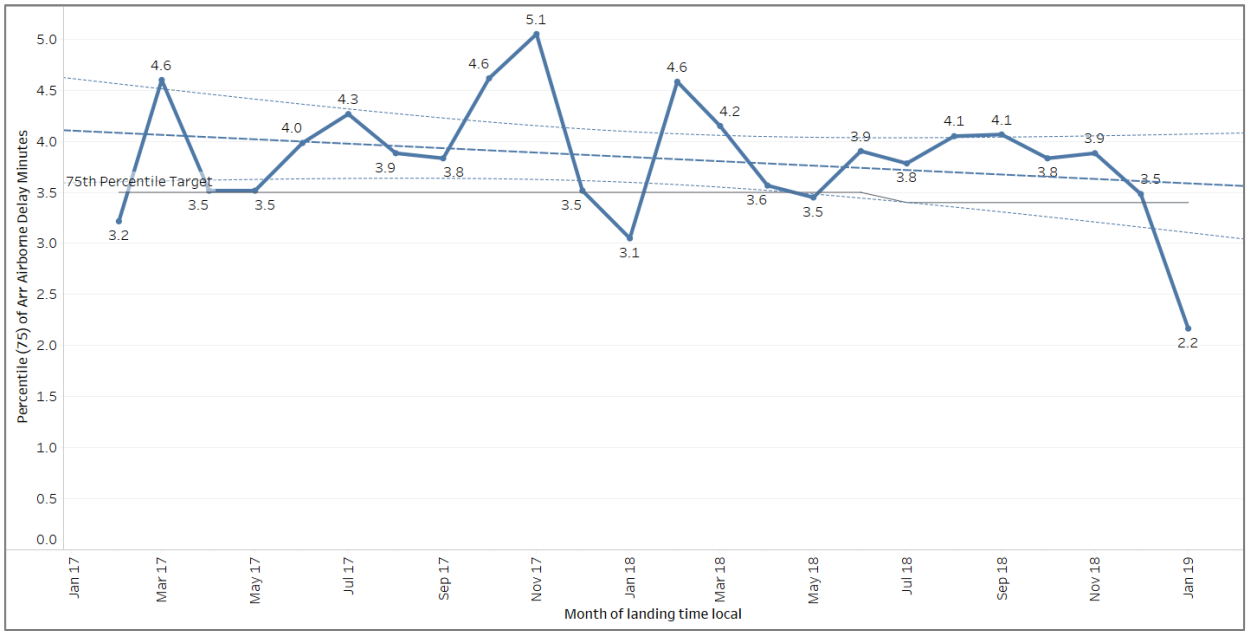


Figure 8: Brisbane airborne delay 75th percentile (last 24 months)

Notable events

There were no notable events in Brisbane in January.

CTOT variations

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.

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 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	JST833	YBPN	19	3
	QLK465D	Moranbah	18	3
	JST754	Launceston	19	2
	JST833	YBPN	18	2
	MEH	Maryborough	18	2
	QLK467D	Moranbah	18	2
	UJL	Maryborough	19	2
	UJS	Maryborough	19	2
Late	VOZ341	Melbourne	18	7
	JST486	Williamtown	18	5
	JST566	Melbourne	18	5
	QFA628	Melbourne	18	5
	VOZ454	Darwin	18	5
	JST818	Sydney	18	3
	QFA548	Sydney	19	3
	VOZ973	Sydney	18	3
	VOZ977	Sydney	19	3
	VOZ1225	Canberra	18	3
	JST566	Melbourne	19	2
	JST754	Launceston	19	2
	JST783	Adelaide	18	2
	JST820	Sydney	19	2
	QFA544	Sydney	18	2
	QFA546	Sydney	19	2
	QFA632	Melbourne	19	2
	QJE1598	Adelaide	18	2
	TGG314	Adelaide	19	2
	VOZ347	Melbourne	19	2
	VOZ469	Perth	19	2
	VOZ616	Mackay	18	2

Table 4: CTOT variation for Brisbane arrivals 1800-2000 local – January 2019. Number of occasions (minimum two) that each flight departed early or late with respect to its CTOT (-5 to +15 minutes)

Perth

Airborne delay

The 75th percentile performance figures for airborne delay at Perth are indicated in **Figure 9**. January performance (-0.5 minutes median and 1.2 minutes 75th percentile) met the targets. Compared to the same month last year, there was a decrease in the airborne delay median performance (from -0.3 minutes) and 75th percentile performance (from 1.4 minutes).

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

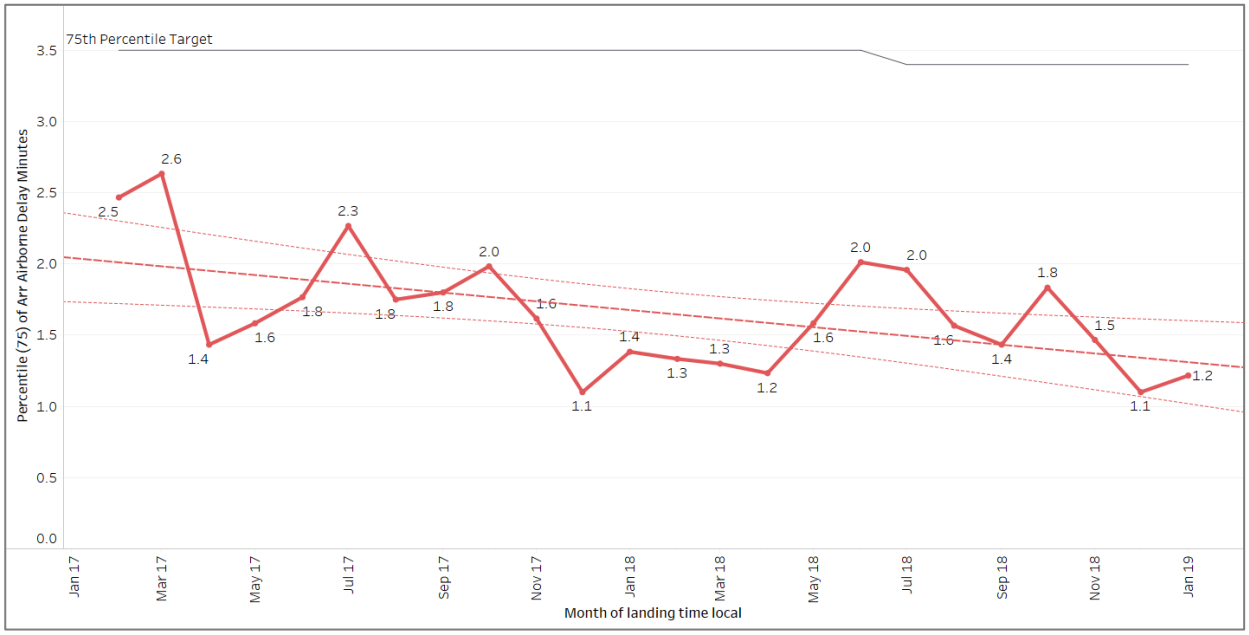


Figure 9: Perth airborne delay 75th percentile (last 24 months)

Notable events

There were no notable events in Perth in January.

Appendix A

Post Operational Performance Review – Melbourne 30/1/2019

Executive Summary

During the afternoon of Wednesday 30th January, Melbourne Airport experienced a series of thunderstorms (from 0545Z/1645L), resulting in 4 periods with few to none successful approaches and airborne arrival delays in excess of 60 minutes. This ultimately led to two Level 3 GDP Revisions to cap airborne delays.

This report shows that the effects of forecast thunderstorms were adequately planned for, in collaboration with the airlines, through the MetCDM process. When the thunderstorms eventuated, the dynamic nature of the situation led to an increase in workload within the Melbourne Operations Rooms and whilst the response was generally well managed, there are opportunities for improvement.

Once airborne holding started to increase, there may have been scope to instigate Level 2 GDP Revisions earlier rather than Level 3 GDP Revisions. Decisions were made at the right level, but communications may have been more streamlined during the high workload period.

Analysis

ATFM Plan

Thunderstorm risk for the later afternoon and evening had been identified through the MET-CDM process the day prior to operations. The ATFM plan included a hedging arrival rate of 22 due to the uncertainty of the severity of the thunderstorms. This hedging rate is to account for some periods where no landings take place. Due to the lower capacity the GDP was fully subscribed for the period of the event with no relieve periods.

During the day of operations, a METCDM review conducted late morning reassessed the ATFM rates for the afternoon thunderstorm situation. Agreement was reached with the airlines meteorologists (AVmets) that the current ATFM plan was still the best possible in the light of available evidence at that point in time; nil update to ATFM plan was made as a result.

Communications

The ATFM plan was communicated the day before operations (BAU), with a day of operations midday update (BAU) highlighting again the potential risk in the late afternoon.

Communications between NCC, TM and ORM were effective leading into the disruption. When the thunderstorms eventuated, internal communications reduced. Last advice from ML Operations to the NCC was that situation was manageable and to wait for further instruction. The NCC was then notified approximately 30 minutes later that limited approaches had been made over that 30 minutes period. Airborne delays had by then grown significantly and a Level 3 GDP revision was requested by the ML TM to manage the situation. Neither party made connect with one another in this 30 minute period. Consequently, external communications to industry turned from pro-active to reactive as the thunderstorms moved through. This remained reactive throughout the remainder of the day.

To communicate the events internally, The “ATFM GDP revision” distribution list was used (this includes ANS Service Managers and DREs). Rather, the “significant weather” distribution list should have been used, which also includes EGM and office of CEO. Rationalisation of the different internal distribution lists will occur in response to this event.

Decision Making

Decision for the Level 3 GDP revisions was coordinated between TM and ML ORM before the instruction to the NCC was provided. This was not clear from the communications on the night, but was verified post operationally by Melbourne Operations Service Manager. When instructed to perform a Level 3 GDP revision, NCC DLM verified with the TM that the requirement was indeed to send aircraft back to the gate. NCC DLM requested permission on behalf of some operators to approve departures for aircraft already at the holding point, which were not approved by the ML ORM.

Outcomes and Impact

Figure 1 shows the delay curves (arrival and ground delay), overlayed with key events between 05Z-12Z.

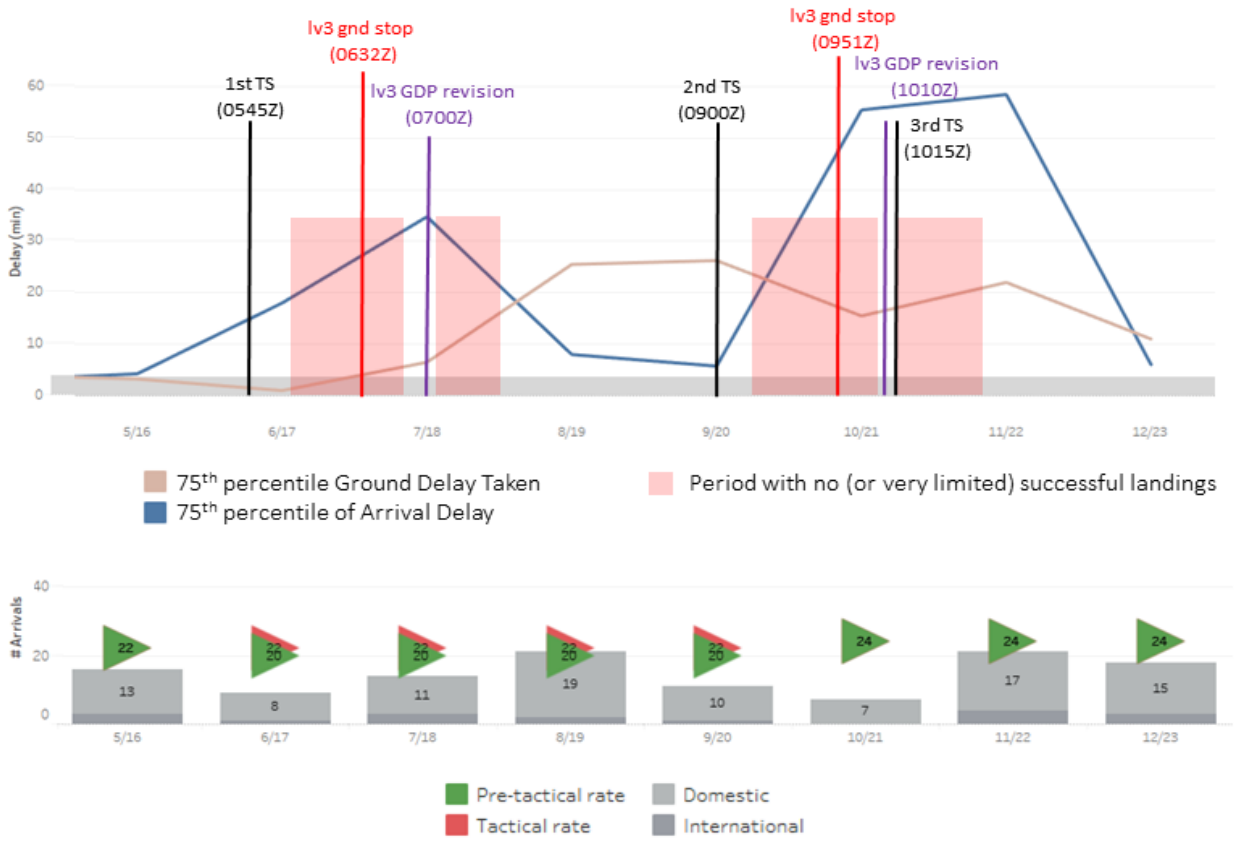


Figure 1: Timeline of airborne & ground delay (top) and capacity rates & throughput (bottom). All times are shown as UTC/local.

- The first thunderstorm resulted in two periods (0605-0650Z and 0703-0729Z) with very limited landings and affected1 18 aircraft, with a 75th percentile delay of 35 minutes. Figure 2 shows the weather radar for the Melbourne Area at 0636Z as reported by the BOM.
- The second thunderstorm resulted in a period with limited successful approaches and 3 Go-Arounds (0920-1004Z).
- The third thunderstorm followed immediately after the second one, and resulted in a period without any successful landings (1014-1048Z). A total of 31 aircraft were affected1 by the second and third thunderstorms, with of a delay of 54 minutes (75th percentile).

Operational impacts to airlines included 25 diversions, predominantly to Adelaide, Sydney, and Canberra. In addition, 3 aircraft departing Sydney showed moving taxi time with close to 40 minutes each.

[1] Aircrafts are counted as affected if airborne delay exceeds 3 min & landing time is after the start of the 1st TS.

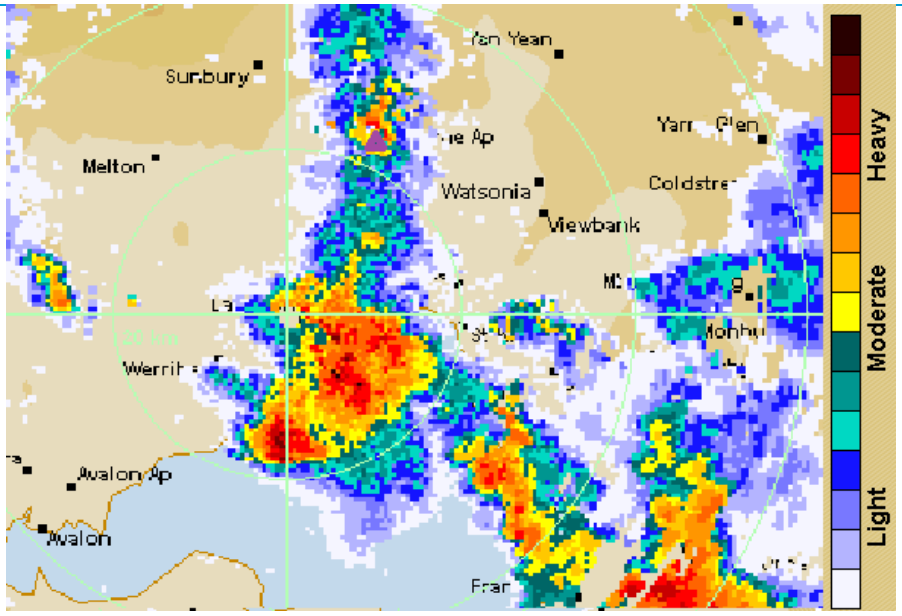


Figure 2 – Weather Radar for 0636Z during the first TS cell. Colours show intensity of rain rate. Melbourne Airport is marked by the purple triangle. Copyright: Image by Bureau of Meteorology.

Summary

An ATFM plan was in place to manage the thunderstorm risk. During the day of operations, this plan was reviewed with participation from the airline meteorologists, all agreeing the plan was fit for purpose given the information available at that time. Management of the risk was therefore pro-active leading to the disruption.

When the thunderstorms actually moved in, this pro-activeness turned into reactiveness as the situation was allowed to evolve to the point where a Level 3 GDP Revision was the only means to cap airborne delays and manage controller workload.

During the Weekly Network Operations Debriefing on 06th February, considering the severity of the weather airlines accepted the requirement to implement two level 3 revisions. Communication to the Airlines provided sufficient transparency around decision making during the event.

Several areas for potential improvement have been identified by this initial review. Further development and collaboration is required to ensure these ideas can be effective in delivering the improvements.

Communication

- Need to remain proactive during disruptive events by all stakeholders involved (Operations, NCC and NCCMET).
- Ensure priority is correctly assigned to disruptive events such that appropriate layers of internal management are being informed.

Procedures and business rules

- No specific MET-CDM rates for thunderstorm periods yet exist for Melbourne (they do for Sydney). It is recommended to review MET-CDM Business Rules for Melbourne to include rates for thunderstorms.

For further information or feedback on this report please contact ATM Network Services @ atm.performance@AirservicesAustralia.com

Appendix B

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).