ATM Network Performance Report

May 2018

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Summary

Overview

The month of May saw a slight increase (of 0.2 minutes) in the 75th percentile of airborne delay with respect to April. There were a total 18 notable events during May, the same number experienced in April. The events experienced this month were primarily the result of routine factors associated with weather in addition to the variability associated with airline schedule and ATFM compliance in peak periods. Details of these events are contained in the report and are depicted in **Figure 1**.

The combined 75th percentile performance for airborne delay across the four major airports (Sydney, Melbourne, Brisbane & Perth) was **3.4** minutes, and the median was **0.5** minutes.

These monthly performance figures were a slight increase compared to the same period last year (i.e. an increase of 0.4 minutes delay for the 75th percentile and 0.1 minutes in the median), and were below the KPI targets of 3.5 minutes and 0.6 minutes for the 75th percentile and median, respectively.

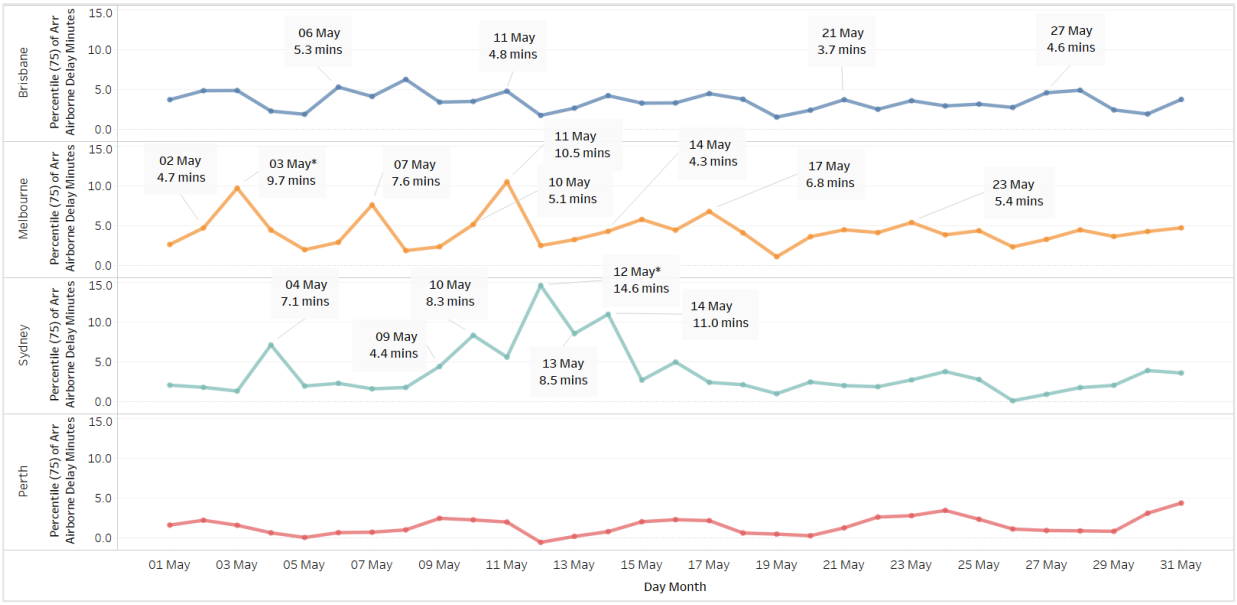


Figure 1: Notable delay impact events during May 2018.

Numbers underneath the dates indicate the extent of the 75th 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.

Figure 1 shows the 75th percentile of airborne delay for each day of the month for the four major airports. A total of 18 notable events across the network have been highlighted. Seven of these notable events resulted in a prolonged and moderately elevated airborne delay for the entire day (i.e. 75th percentile greater than 7 minutes across the entire day).

Eleven events resulted in a shorter and more intense period of elevated airborne delay (i.e. 2 or more consecutive hours where the 75th percentile was over 10 minutes). These events are summarised in **Table 1** (over the page).

Two Post Operational Analysis Reviews were conducted this month, for Sydney on Saturday 12 May and for Melbourne on Thursday 03 May. These reviews can be found in Appendix A.

Location	Day	Local Time	Event Descriptions (*Contributing causes to increased delays*)
Sydney	04 May	17-18	The forecast change from parallel to single runway operations occurred 3 hours early.
	09 May	08-09	Un-forecast reduction in visibility (cloud at 700ft) led to a rate reduction from a planned rate of 50 down to 34 arrivals for 2 hours.
	10 May	18-21	Forecast single runway operations persisted for longer than expected and led to increased delays.
	12 May*	08-14	Single runway operations were in effect for most of the day(from 0800L). Poor weather conditions led to increased spacing and further reductions in achieved arrival throughput.
	13 May	06-08	Tactical reduction in capacity to manage workload following short-notice staffing issues.
	14 May	06-09 & 18-19	Un-forecast low visibility and turbulence led to a reduction in tactical rates of 2 per hour from 06-07L. Tactical reduction in capacity between 17-19L to manage workload following short-notice staffing issues.
Melbourne	02 May	08-09	LAHSO was planned but could not be used due to wind being different to the forecast.
	03 May*	08-09 & 18-20	Exempt, early and late non-compliant aircraft concentrated demand leading into peak periods.
	07 May	08-09 & 11-12	Exempt, early and late non-compliant aircraft concentrated demand leading into a peak period.
	10 May	19-20	A small number of flights presented late, which concentrated demand leading into the busy period.
	11 May	07-09 & 15-18	Multiple MEDEVAC aircraft arriving at Essendon led to increased airborne delay. A Level 3 GDP Revision was run in the evening due to airborne delay reaching 22 minutes and taxi delay reaching 15 minutes.
	14 May	07-09	Fog persisted for one hour longer than forecast leading to increased delays.
	17 May	19-20	Reduced evening arrival rates due to an un-forecast reduction in cloud base caused delays.
	23 May	08-09	Lower than planned rates were run for 06 & 07 due to lower than forecast cloud base. This caused delays in the subsequent hours.
Brisbane	06 May	18-19	A number of late non-compliant and GDP-exempt flights concentrated demand into the busy period.
	11 May	18-20	A number of late non-compliant and GDP-exempt flights concentrated demand into the busy period.
	21 May	18-19	Exempt, early and late non-compliant aircraft concentrated demand leading into a peak period.
	27 May	18-19	Exempt, early and late non-compliant aircraft concentrated demand leading into a peak period.

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.

Network Wide Performance

Airborne delay

The combined median and 75th percentile airborne delay at the four major airports is indicated below. **Figure 2** indicates that the long-term trend is upwards.

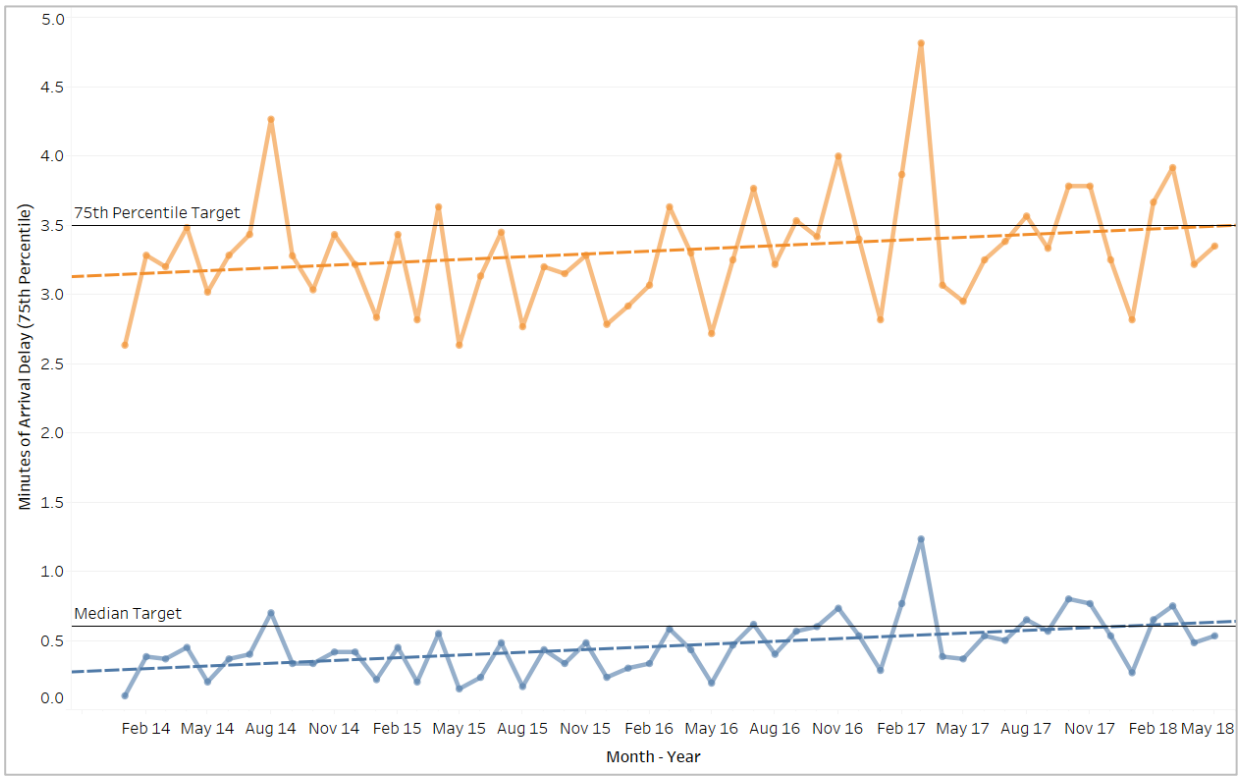


Figure 2: Long-term airborne delay (median and 75th percentile) for January 2014 to May 2018 with corresponding targets.

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

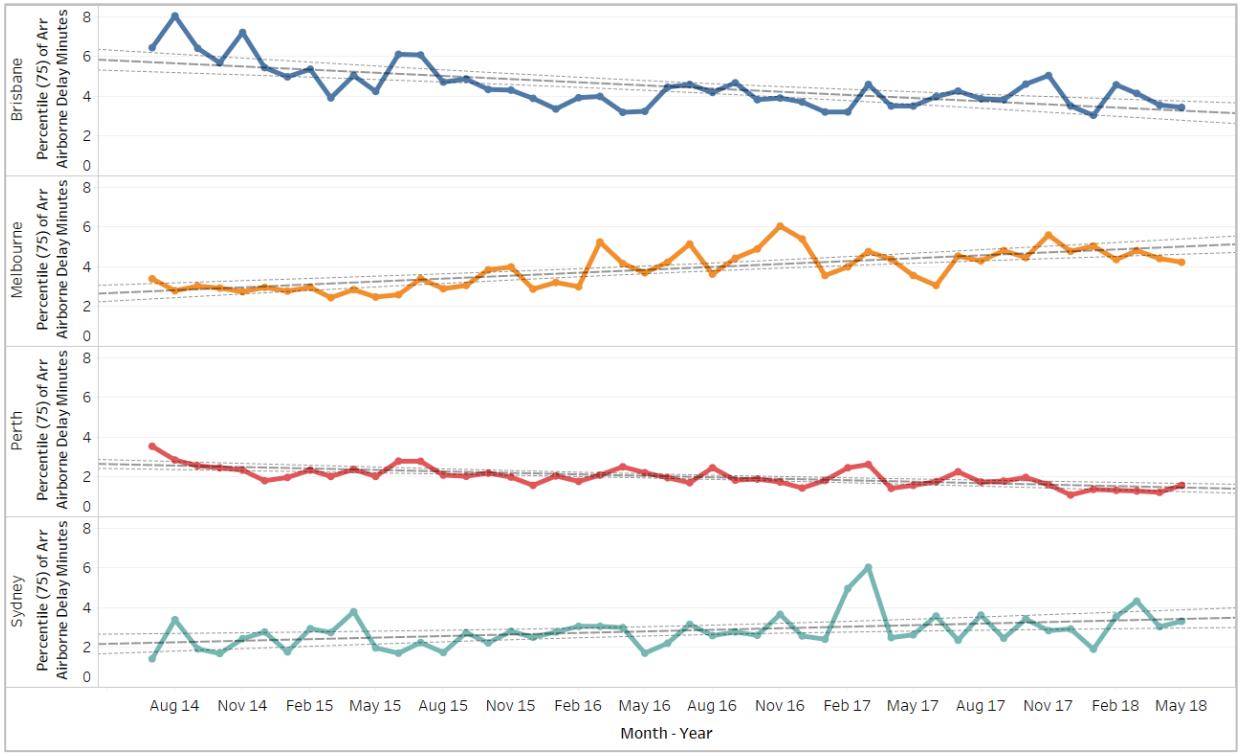


Figure 3: Long-term airborne delay 75th percentile by airport (July 2014 to May 2018)

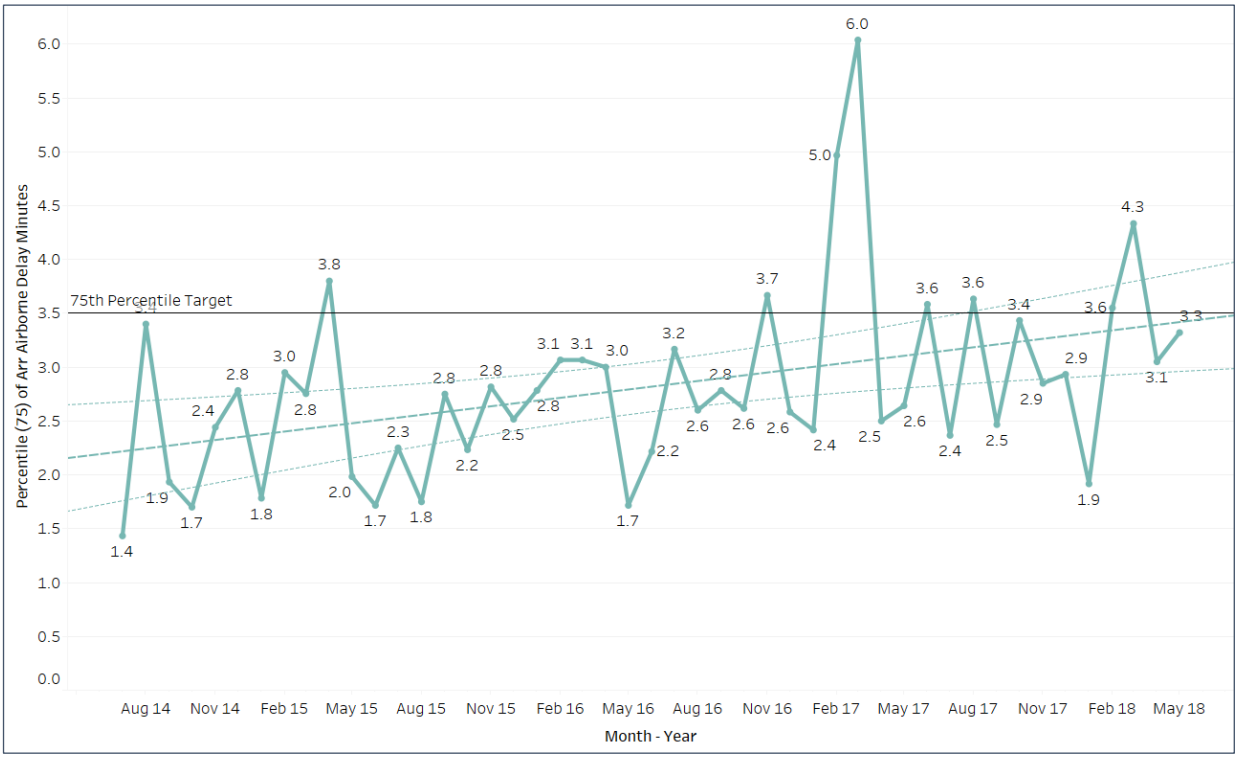
Sydney

Airborne delay

The 75th percentile performance figures for airborne delay at Sydney are indicated in **Figure 4.**

May performance met the targets (0.2 minutes median and 3.3 minutes 75th percentile). However, there was an increase in delay from the same period last year (0.0 minutes median and 2.6 minutes 75th percentile). The long-term trend for airborne delay at Sydney is upwards.

There were three Level 2 GDP Revisions (one on the 04 May and two on 12 May), and two Level 1 GDP Revisions (on the 11 May and 31 May) conducted this month.



Notable events

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

- 04 May (1700-1800 Local)
  - The forecast change from parallel to single runway operations occurred 3 hours early (1350-1815z), leading to a Level 2 GDP Revision. An increase in delay occurred before the effects of the Level 2 GDP Revision were realised.
  - Tactical releases were offered and accepted when parallel runway operations resumed at 1815.
- 09 May (0800-0900 Local)
  - Un-forecast reduction in visibility (cloud at 700ft) led to a tactical rate reduction from a planned rate of 50 down to 34 arrivals for 2 hours.
  - No GDP revision was conducted as the reduction was only expected to last 30-45 minutes.

- 10 May (1800-2100 Local)
  - Forecast single runway operations persisted for longer than expected and led to increased delays due to a capacity-demand imbalance.
  - Additional traffic metering for departures out of Sydney and Melbourne was initiated for 30 minutes due to the airborne holding reaching 45 minutes.
- 12 May (0800-1400 Local)
  - From 0800L, single runway operations were in effect for most of the day. Poor weather conditions led to increased spacing and further reductions in achieved arrival throughput.
  - Two Level 2 GDP Revisions were executed to manage the delays. A Post Operational Review was undertaken for the second GDP Revision conducted at 1700 local. A summary is provided below and the full report can be found in Appendix A.
- 13 May (0600-0800 Local)
  - Planned rates were reduced to manage workload as several late-notice staffing shortages reduced capacity. Delays reached 25 minutes for several aircraft.
- 14 May (0600-0900 & 1800-1900 Local)
  - Low visibility and turbulence at the airport led to a tactical reduction in rates in the morning by 2 per hour from 06-07L. A teleconference was held and the consensus was not to conduct a GDP Revision and to absorb the delay.

Summary of Post Operational Performance Review - 12 May 2018

A Post Operational Performance Review was undertaken for the 12th May. This review focused on explaining an observed early and late presenting aircraft concentrating demand for the 07z hour, which began increasing from about 0600z.

In response to the elevated delay a second Level 2 GDP Revision was implemented at 0700z. The result of continued concentrated demand led to around 18 minutes of airborne delay (75th-percentile) during 07-08z.

Airborne arrival delay had been dropping up to this point after a previous Level 2 GDP Revision at 2350z, down to 3.5 minutes during 06z. However, the airport had been landing flights matching the tactical rate for the four hours (03-06z) prior to the concentrated demand.

Aircraft began to present in the Terminal Manoeuvring Area (TMA) at times materially different than planned due to issues with compliance to their Calculated Take-Off Time (CTOT) (seven late and four early – five compliant but deviating by ten minutes or more from CTOT), and inaccurate flight time estimates (fourteen flights by at least five minutes) – this caused an accumulation of delay.

Melbourne

Airborne delay

The 75th percentile performance figures for airborne delay at Melbourne are indicated in **Figure 5.**

May Performance (1.2 minutes median and 4.2 minutes 75th percentile) did not meet the targets and delay increased with respect to the same period last year (0.8 minutes median and 3.6 minutes 75th percentile). The long-term trend for airborne delay at Melbourne is upwards.

There was one Level 2 GDP Revision (14 May) and three Level 1 GDP Revisions (03 May, 04 May and 18 May). Tactical releases were also given on 08 May and 09 May.

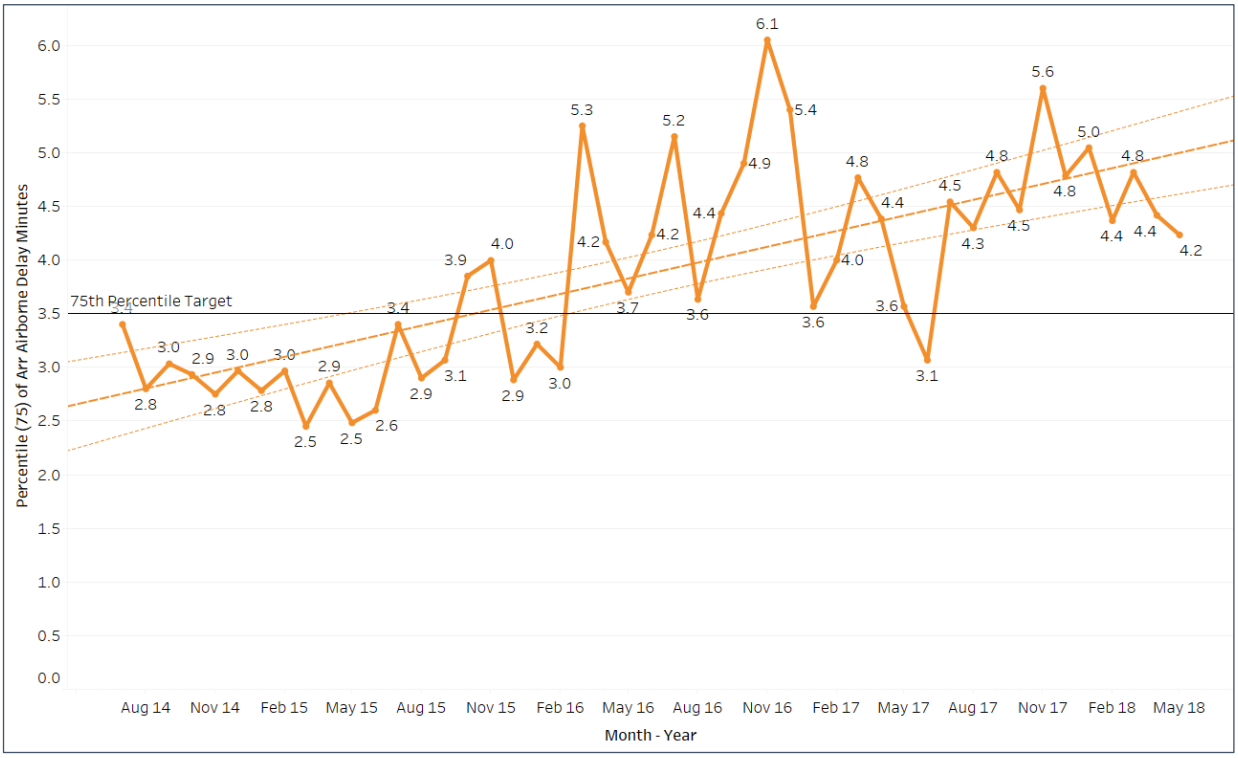


Figure 5: Melbourne airborne delay 75th percentile

Notable events

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

- 02 May (0800-0900 Local)
  - LAHSO was planned but could not be used due to wind being different to the forecast. A GDP revision was not an option as the affected aircraft were already airborne.
- 03 May (0800-0900 & 1800-2000 Local)
  - Exempt, early and late non-compliant aircraft concentrated demand leading into a busy period, leading to demand greater than capacity.
  - A Level 1 GDP Revision was run to manage the elevated delays. A Post Operational Performance Review summary is provided below and the full report can also be found in Appendix A.

- 07 May (0800-0900 & 1100-1200 Local)
  - Exempt, early and late non-compliant aircraft concentrated demand leading into busy periods.
- 10 May (1900-2000 Local)
  - A small number of flights presented late and concentrated demand to the busy period.
- 11 May (0700-0900 & 1500-1800 Local)
  - Multiple MEDEVAC aircraft arriving at Essendon and multiple go arounds at Melbourne led to increased airborne delay. A Level 3 GDP Revision was run in the evening due to airborne delay reaching 22 minutes and taxi delay reaching 15 minutes.
- 14 May (0700-0900 Local)
  - Fog persisted for 3 hours, meaning a low arrival rate of 15 per hour (vice a typical rate of 24). This was one hour longer than forecast, which lead to increased delays
  - A Level 2 GDP Revision was run at 0715L to mitigate the airborne delay.
- 17 May (1900-2000 Local)
  - Reduced evening arrival rates due to an un-forecast reduction in cloud base caused elevated delays.
  - Tactical rates were reduced between 8-16 arrivals for 5 hours (1500-1900) from what was planned. A constant rate of 24 was used for the period.
- 23 May (0800-0900 Local)
  - Tactical rates lower than planned rates were run for 0600 & 0700 due to lower than forecast cloud base.
  - The rates were reduced from 23 to 20 for 0600 and 0700. This caused elevated delays in the subsequent hours. Delays reached up to 20 minutes.

Summary of Post Operational Performance Review - 03 May 2018

A Level 1 GDP Revision for Melbourne was run at 1930z (0530L) on 03 May to realign demand. Despite the revision, early and late non-compliant aircraft concentrated demand reappeared in the program after around 90 minutes. This review was initiated to consider what impact the revision would have had on these flights if it had been run at different times during the morning.

The revision reassigned Calculated Landing Times (CLDTs) to all international aircraft within five minutes of their ETA. At the time of the revision all international flights were airborne and 67% were in Australian airspace. The revision was likely more effective than would have been the case if it had been performed earlier in the morning. This is because at 1930z a large majority of international flights were in Australian airspace and would be expected to have more accurate ETAs than it would be the case at earlier times. In contrast, revisions before 1830z would have had less than half of the international flights in Australian airspace.

Brisbane

Airborne delay

The 75th percentile performance figures for airborne delay at Brisbane are indicated in **Figure 6**.

May performance met the 75th percentile target (0.9 minutes median and 3.5 minutes 75th percentile) but not the median target. There was no change in delay from the same period last year.

The long-term trend for airborne delay at Brisbane is downwards.

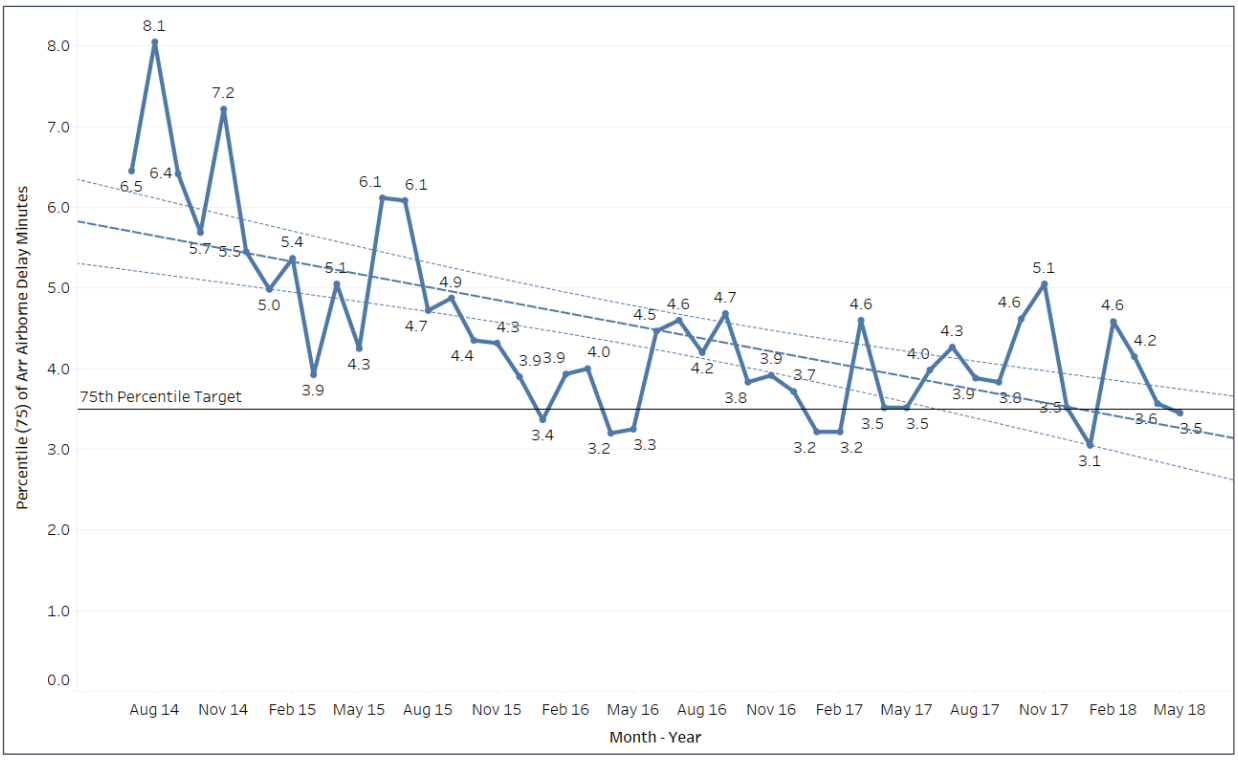


Figure 6: Brisbane airborne delay 75th percentile

Notable events

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

- 06 May (1800-1900 Local)
  - Increased airborne delay was experienced for 2 hours during the evening peak. Exempt, early and late non-compliant aircraft concentrated demand leading into a peak period. Delays reached up to 17 minutes.
- 11 May (1800-2000 Local)
  - Increased airborne delay was experienced for 3 hours during the evening peak. Exempt, early and late non-compliant aircraft concentrated demand leading into a peak period. Delays reached up to 23 minutes.
- 21 May (1800-1900 Local)
  - A full arrival program for 2 hours saw small shifts in arrival times lead to a build-up in delay, with delays reaching up to 18 minutes.

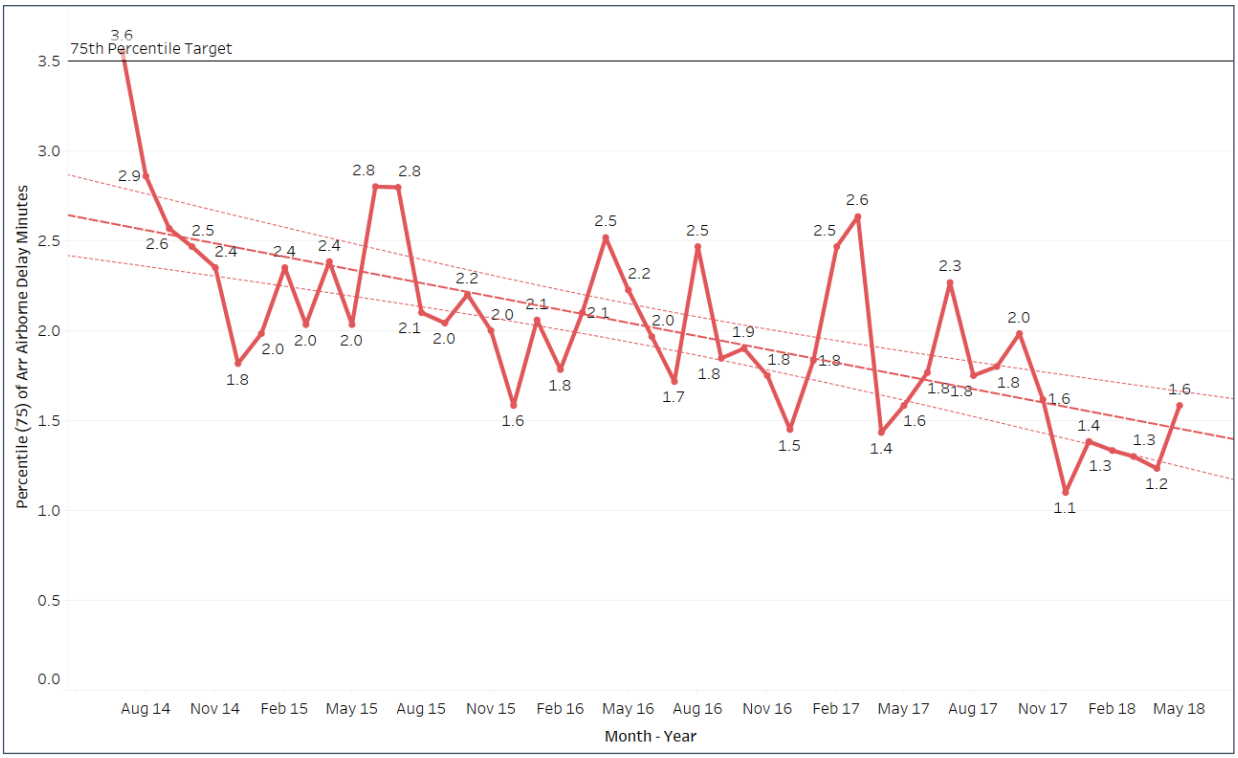
- 27 May (1800-1900 Local)
  - Increased airborne delay was experienced for 2 hours during the evening peak.
  - Exempt, early and late non-compliant aircraft concentrated demand leading into a peak period, with delays reaching up to 19 minutes.

Perth

Airborne delay

The 75th percentile performance figures for airborne delay at Perth are indicated in **Figure 7**.

May performance (1.6 minutes) met the target (3.5 minutes) and airborne delay did not change from the same period last year (1.6 minutes). The long-term trend for airborne delay at Perth is downwards.



Notable events

There were no notable events during May in Perth.

Appendix A

Post Operational Performance Review

Sydney – 12 May 2018

Event Description

A review was initiated for operations at Sydney Airport on 12 May 2018 for an observation regarding an oversubscription during 07z[1]. Rates were set relatively low (21-23) due to the crossing runway (runway 25) being the only available arrival runway. Figure 1 shows the actual arrival rate matching (or one less) than the tactical rate during 03-06z (top), and 75th-percentile delay values (bottom) – data sourced from the Enterprise Data Warehouse (EDW). A Level 2 GDP Revision was conducted at 2350z[2] to prevent airborne arrival delay from becoming unmanageable, after which from 00-06z each hour saw 20 or more minutes of ground delay (except 02z and 05z), with a peak during 01z of 80 minutes. The revision worked as intended and from 01z to 06z the arrival delay began to slowly drop from 20 to 3.5 minutes (75th percentile). Then, after 06z, oversubscription for the 07z hour started to suddenly grow, and a second Level 2 GDP Revision was implemented at 0700z.

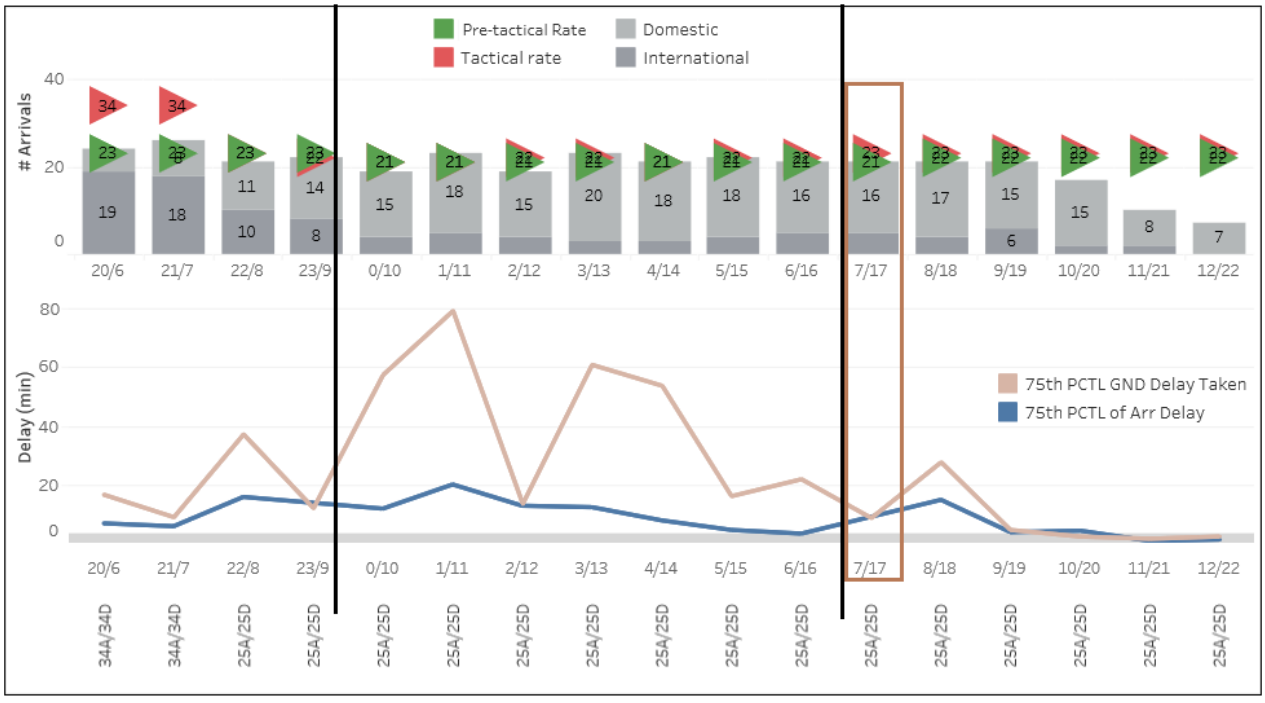


Figure 1 – From top to bottom: 1. Actual arrival rate compared to the targeted arrival rate. 2. The 75th-percentile of airborne arrival delay and ground delay. The black vertical lines (from left to right) show the times of the two Level 2 GDP revisions at 2350z and 0700z, respectively. The brown box (immediately after the 2nd revision) shows the period of interest during 07z where in the two hours leading up to there appeared to be an oversubcrsiption of aircraft in this hour, with arrival delay values beginning to climb.

[1] Two digits followed by 'z', e.g. 01z, refers to the entire hour from 0100-0159 UTC

[2] Four digits followed by 'z', e.g. 0115z, refers to the exact time of 0115 UTC

For comparison, Figure 2 shows the median and 75th-percentile of airborne arrival delay from ODAS (Operational Data Analysis Suite) sourced data (a more accurate source). The values are about 3 minutes higher than the EDW data for 75th-percentile of airborne delay, except during 07z where it is about 8 minutes higher. EDW airborne arrival delays are calculated as ALDT minus the first MAESTRO ETA, while the ODAS airborne arrival delay is calculated as the actual flight time within 250NM of the destination minus the estimated (unimpeded) flight time within 250NM which is derived from the trajectory created by Dali using the flight plan message.

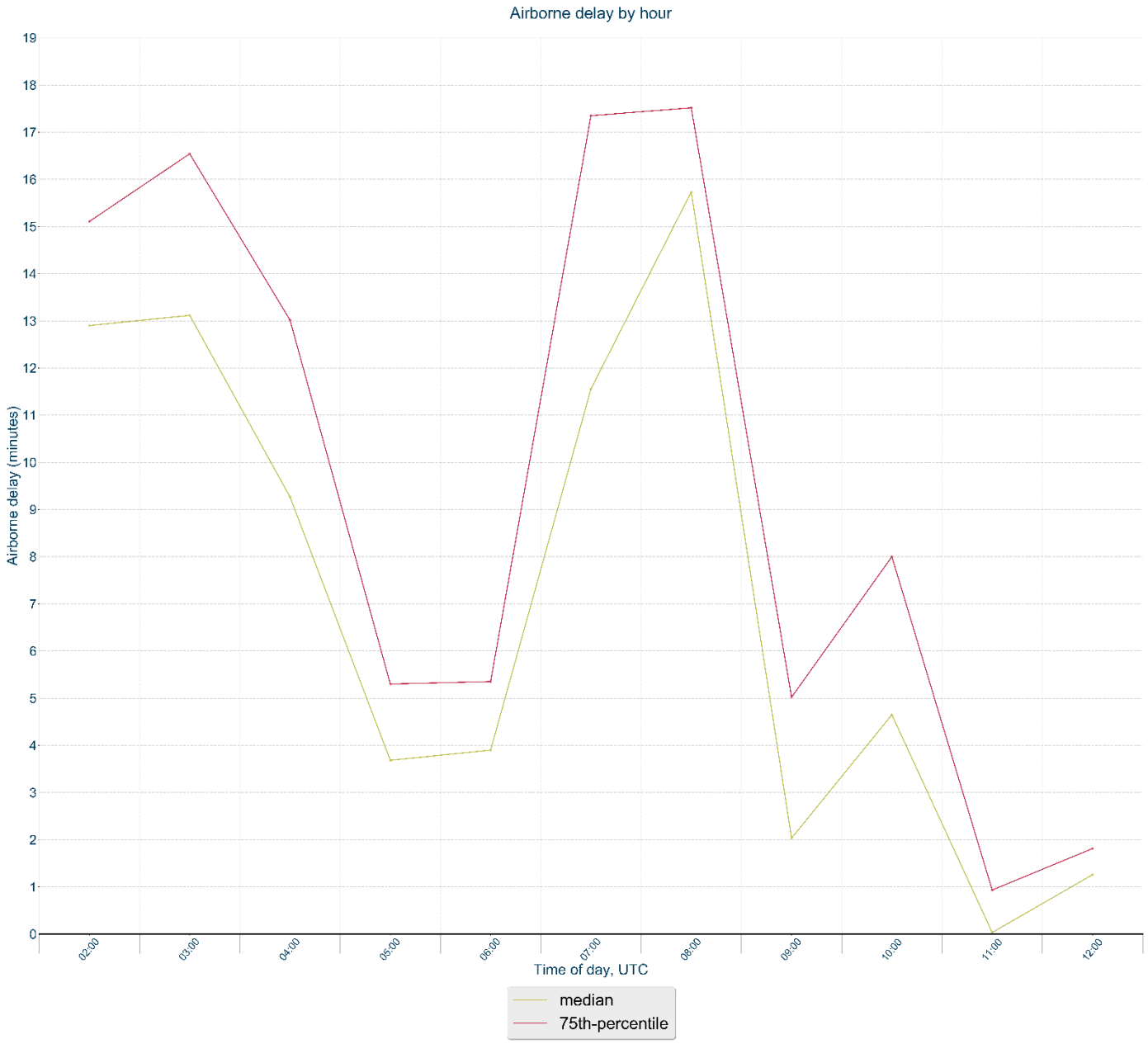


Figure 2 – Airborne arrival delay calculated using ODAS data. 75th-percentile shown in red, and median shown in yellow.

Analysis

Analysis concentrates on the period 06-07z. There were a number of flights during this period which were arriving at times different than their assigned arrival slot – due to several non-compliant flights and flights with static flight times (in Harmony) different to observed flight times (wind direction may influence this).

Five flights were compliant, but with a difference between ATOT and CTOT of at least ten minutes, **seven** flights were late non-compliant, **four** flights early non-compliant. An additional **fourteen** flights (including nine internationals) appear to have Harmony static flight times which differed by five minutes or more from observed flight times – the departure airports of the five domestic flights are: YPPH, YBBN, YGTH, YMAY and YPKS.

Figure 3 shows oversubscription expected during 06z (top image at 0530z) and during 07z (bottom image at 0600z).

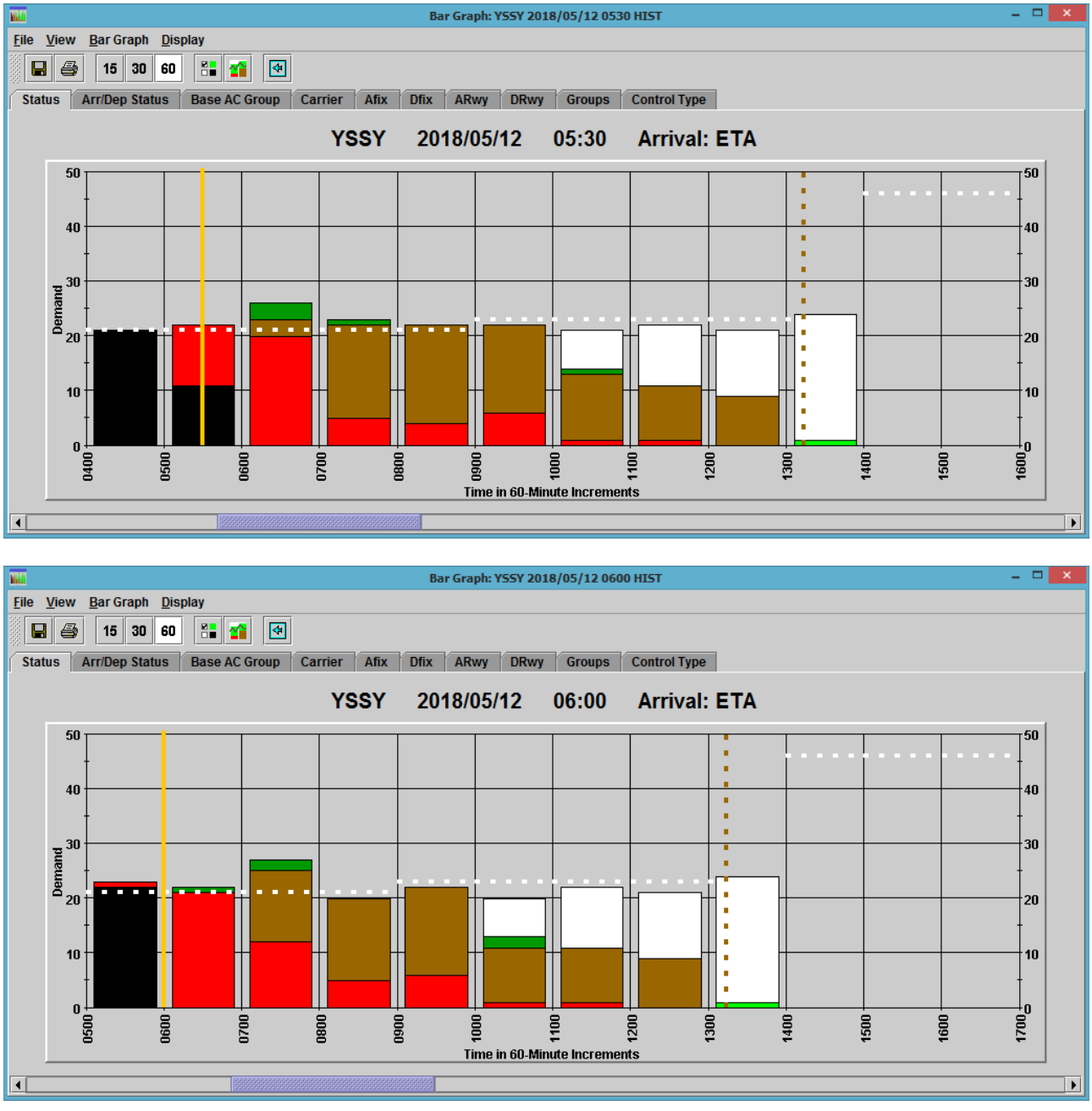


Figure 3 – A view of expected arrivals at 0530z (top) and 0600z (bottom), with an oversubscription during 06z shifting to 07z.

Table 1 shows a summary of flights landing during 06-07z. Compliance to CTOT (and flights with at least a ten minute difference between ATOT and CTOT) appears to have affected the expected sequence of aircraft, as has Harmony static flight times varying from observed flight times. A comparison of the Harmony static flight times to actual flight times, as well as flight times calculated using flight plan information and the Dali trajectory building tool is also provided in the table. The Dali comparison is provided as a confirmation due to the actual flight times being influenced by airborne delay.

Table 1- Flights landing during 06-07z. Fields (from left to right) correspond to aircraft ID, departure airport, take-off time, landing time, difference between ATOT and CTOT (minutes), compliance to CTOT measure, the difference between actual flight time and Harmony static flight time (minutes), and difference between predicted flight time using the Dali trajectory builder and the Harmony static flight time (minutes). Flights highlighted in orange are either: early/late non-compliant, or compliant with at least a 10 minute difference between CTOT and ATOT, or Harmony static flight time is at least 5 minutes different to the Dali predicted flight time. – This represents 30 out of 42 flights during 06-07z

ACID	ADEP	ATOT	ALDT	CTOT-ATOT	CTOT Compliance	actual-static	dali_pred-static
QLK171D	YPMQ	12/05/2018 5:12	12/05/2018 6:01	6	Compliant	-1.6	-2.5
QFA438	YMML	12/05/2018 4:57	12/05/2018 6:04	15	Compliant	4.1	-2.1
VOZ1140	YBNA	12/05/2018 5:06	12/05/2018 6:09	4	Compliant	-5.9	-3.0
FAI	YSBK	12/05/2018 6:04	12/05/2018 6:13	-258	Early Non Compliant	17.0	1.4
RXA917	YMIA	12/05/2018 4:24	12/05/2018 6:15	19	Late Non Compliant	-0.7	-0.6
JST767	YPAD	12/05/2018 4:40	12/05/2018 6:18	4	Compliant	1.7	3.1
VOZ524	YBCG	12/05/2018 5:09	12/05/2018 6:20	-1	Compliant	2.9	3.5
KXL	YPMQ	12/05/2018 5:41	12/05/2018 6:23	-152	Early Non Compliant	1.5	10.1
QFA146	NZAA	12/05/2018 3:20	12/05/2018 6:29	-2	Exempt	9.2	7.1
QLK23	YARM	12/05/2018 5:24	12/05/2018 6:29	2	Compliant	7.0	3.1
SIA241	WSSS	11/05/2018 23:37	12/05/2018 6:31	16	Exempt	-46.2	-50.4
VOZ853	YMML	12/05/2018 5:24	12/05/2018 6:34	29	Late Non Compliant	3.9	-2.3
TGG238	YMML	12/05/2018 5:26	12/05/2018 6:36	21	Late Non Compliant	3.0	-2.3
TGG371	YBBN	12/05/2018 5:21	12/05/2018 6:38	24	Late Non Compliant	4.1	0.1
JST411	YBCG	12/05/2018 5:26	12/05/2018 6:40	1	Compliant	6.1	4.3
RXA359	YWLM	12/05/2018 6:06	12/05/2018 6:43	15	Compliant	7.1	0.9
ICV	YBCG	12/05/2018 5:36	12/05/2018 6:46	-7	Early Non Compliant	5.4	3.9
QFA122	NZQN	12/05/2018 4:00	12/05/2018 6:49	17	Exempt	1.0	-7.0

QFA28	SCEL		12/05/2018 6:52		Exempt	-20.5	-28.2
VOZ1188	YPMQ	12/05/2018 5:54	12/05/2018 6:56	23	Late Non Compliant	5.2	2.6
QFA4	PHNL	11/05/2018 20:44	12/05/2018 6:58	-1	Exempt	-15.5	-18.5
UAE416	OMDB	11/05/2018 17:50	12/05/2018 7:01	-23	Exempt	-3.5	-15.4
JST604	YMAV	12/05/2018 5:50	12/05/2018 7:05	11	Compliant	3.0	-5.5
QFA6031	NTAA	11/05/2018 23:28	12/05/2018 7:08	-18	Exempt	-9.8	-19.6
ETD454	OMAA	11/05/2018 18:01	12/05/2018 7:10	-47	Exempt	-10.5	-19.0
VOZ556	YPPH	12/05/2018 3:02	12/05/2018 7:14	7	Compliant	27.6	18.5
TGG228	YMML	12/05/2018 5:50	12/05/2018 7:16	-169	Early Non Compliant	20.3	-2.2
VOZ1184	YPMQ	12/05/2018 5:48	12/05/2018 7:19	47	Late Non Compliant	31.4	4.7
QLK265	YLHI	12/05/2018 5:11	12/05/2018 7:23	17	Late Non Compliant	26.3	12.7
VOZ484	YBSU	12/05/2018 5:57	12/05/2018 7:25	3	Compliant	3.5	-3.5
QFA533	YBBN	12/05/2018 6:04	12/05/2018 7:27	10	Compliant	9.8	-0.6
QTR908	OTHH	11/05/2018 17:45	12/05/2018 7:30	-2	Exempt	4.8	-10.9
QFA164	NZWN	12/05/2018 4:16	12/05/2018 7:33	9	Exempt	16.0	1.3
RXA468	YGTH	12/05/2018 6:14	12/05/2018 7:37	0	Compliant	-10.5	-28.2
RXA563	YPKS	12/05/2018 6:33	12/05/2018 7:40	0	Compliant	-11.4	-56.5
VOZ528	YBCG	12/05/2018 6:13	12/05/2018 7:42	9	Compliant	20.7	2.6
RXA774	YMAY	12/05/2018 6:24	12/05/2018 7:44	-2	Compliant	15.2	-5.2
QFA736	YPAD	12/05/2018 5:47	12/05/2018 7:47	-1	Compliant	24.3	1.5
VOZ962	YBBN	12/05/2018 6:24	12/05/2018 7:50	-2	Compliant	12.7	-0.7
TGG236	YMML	12/05/2018 6:36	12/05/2018 7:51	1	Compliant	8.2	-2.2
VOZ859	YMML	12/05/2018 6:40	12/05/2018 7:56	11	Compliant	8.7	-3.0
JST825	YBBN	12/05/2018 6:35	12/05/2018 7:57	0	Compliant	0.7	-9.3

Summary

The review focused on an observed oversubscription for the 07z hour which began growing from about 0600z, and a second Level 2 GDP Revision which was implemented at 0700z in response. The result of the oversubscription was 17 to 18 minutes of airborne delay (75th-percentile) during 07-08z.

Airborne arrival delay had been dropping up to this point after a previous Level 2 GDP rerun at 2350z, down to 3.5 minutes during 06z. However, the airport had been landing flights matching the tactical rate for the four hours (03-06z) prior to the oversubscription.

Aircraft began to present in the TMA at times materially different than planned due to issues with compliance to CTOT (seven late and four early – five compliant but deviating by ten minutes or more from CTOT), and inaccurate flight time estimates (fourteen flights by at least five minutes) – this caused an accumulation of delay.

For further information please contact Network Performance and Analysis @ OPS_ANALYSIS_ADMIN@AirservicesAustralia.com

Post Operational Performance Review

Melbourne – 03 May 2018

Event Description

A Level 1 GDP Revision for Melbourne Airport (YMML) was run at 1930z (0530l) on 03 May 2018 to realign active (international) demand for the morning peak period. Figure 1 shows the Harmony demand at the time of the revision. Oversubscription is observed for the 21z hour.

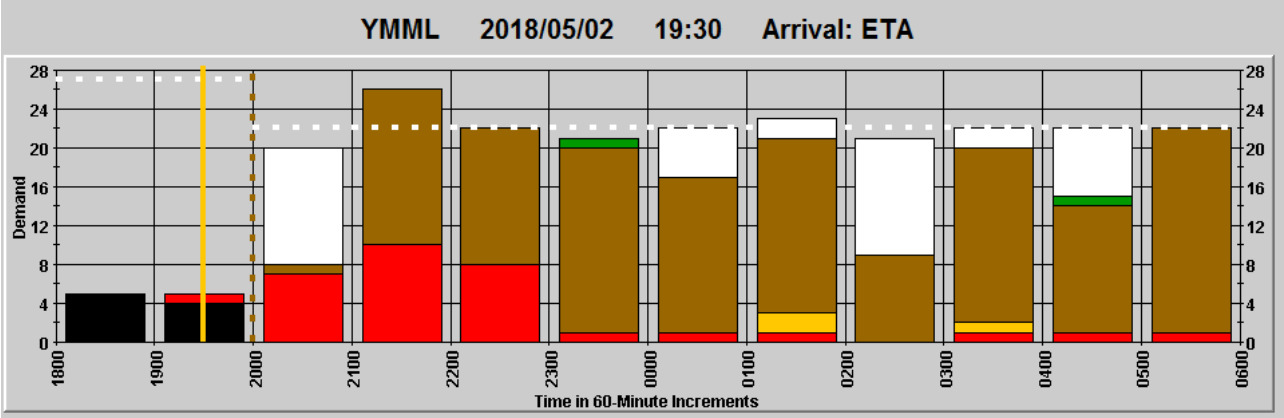


Figure 1: Harmony demand by hour at 1930z (0530l) at Melbourne on 3 May 2018. Demand in the 21z hour was 26 compared to a rate of 22.

Figure 2 shows the Harmony demand at 2100z, 90 minutes after the revision. An oversubscription of six aircraft is observed for the 22z hour despite the revision.

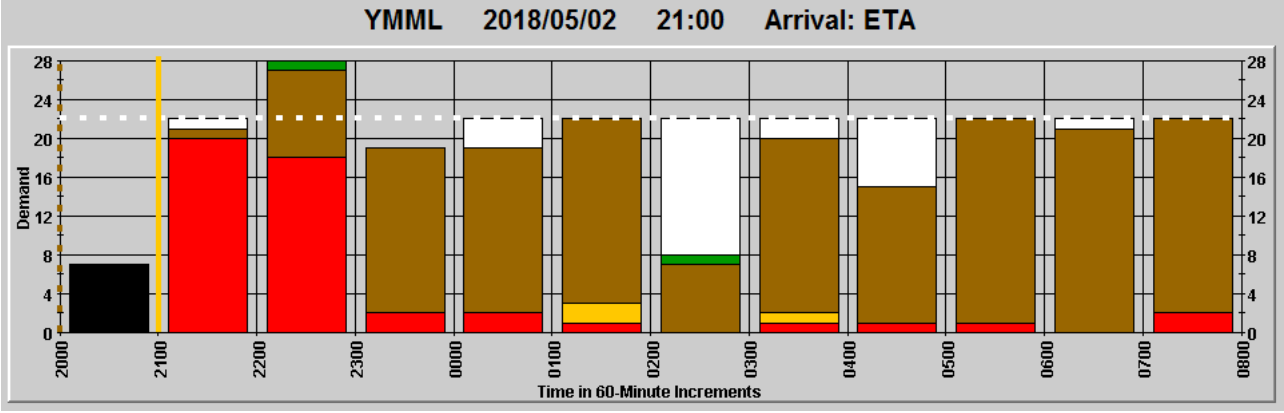


Figure 2: Harmony demand by hour at 2100z (0700l) at Melbourne on 3 May 2018. Demand in the 21z hour was 28 compared to a rate of 22 despite the earlier re-run.

This POPR was initiated to compare the number of international flights that were realigned by the revision to the number that would have been captured if the revision had been run at other points of time. It also examines the slots allocated to international flights after the revision.

Analysis

Table 1 lists the international flights that arrived at YMML between 2000z and 2359z. There were 24 international flights in this period.

ACID	ADEP	ALDT	ATOT	ETA at 1925 UTC	CLDT at 1925 UTC	CLDT at 1935 UTC	Estimated entry to Aust FIR
ANZ891	NZCH	22:03	1826	2145	2132	2148	2006
CCA177	ZSPD	22:14	1146	2154	2121	2157	1756
CES737	ZSPD	22:37	1221	2222	2224	2224	1825
CHH483	ZGHA	20:11	1037	2009	2018	2010	1607
CPA135	VHHH	20:19	1146	2013	-	2012	1622
CSN321	ZGGG	23:02	1357	2240	2254	2240	1843
GIA716	WIII	20:41	1452	2033	2030	2035	1657
HVN781	VVTS	22:56	1513	2236	2248	2237	1903
JST036	WADD	20:24	1533	2017	2021	2018	1707
JST172	NZCH	22:18	1847	2211	2145	2215	2026
MAS149	WMKK	22:11	1438	2151	2205	2154	1835
QFA152	NZAA	23:14	1921	2258	2257	2300	2124
QFA30	VHHH	21:39	1250	2125	2051	2127	1724
QFA38	WSSS	23:09	1615	2253	2310	2257	1917
QFA80	RJAA	21:29	1142	2114	2112	2115	1731
QFA94	KLAX	20:59	600	2056	2048	2054	2012
QFA96	KLAX	22:30	723	2206	2207	2207	2132
SIA227	WSSS	20:57	1421	2050	2045	2051	1716
SIA237	WSSS	23:39	1642	2320	2345	2321	1942
UAE404	WSSS	21:51	1504	2130	2148	2130	1803
UAL98	KLAX	21:08	605	2102	2057	2057	2018
VOZ164	NZAA	22:23	1832	2217	2221	2218	2034
VOZ86	VHHH	21:18	1223	2102	2042	2105	1703
XAX214	WMKK	22:05	1445	2145	2218	2145	1811

Table 1: Summary of international flights that landed at YMML between 2000z and 2359z on 3 May 2018. All times in UTC.

Figure 3 shows the CLDT for each flight before (circles) and after (crosses) the revision relative to its ETA immediately before the revision. The CLDTs allocated after the revision (crosses) are all within five minutes of the ETA.

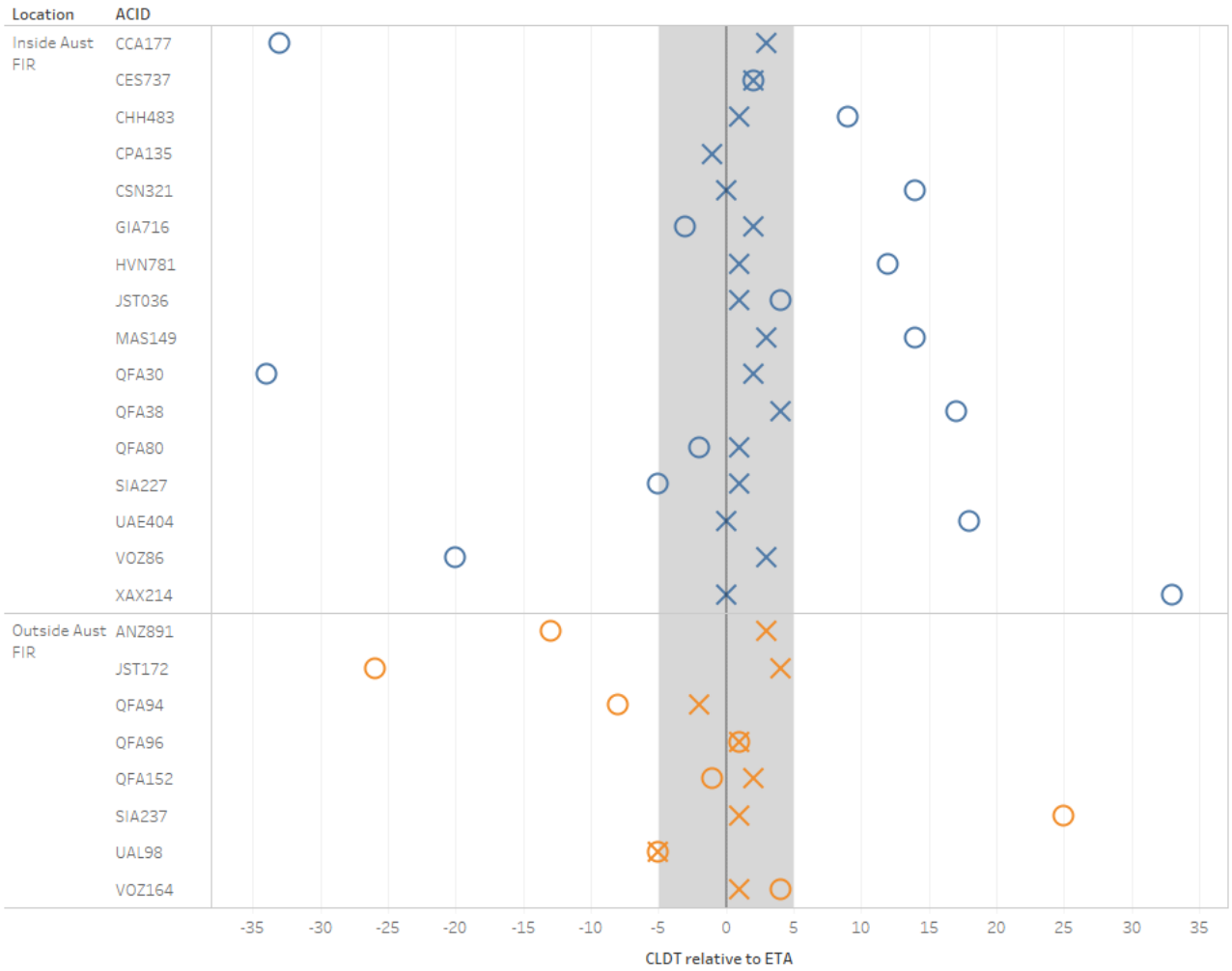


Figure 3: Comparison of CLDT before (circles) and after (crosses) relative to ETA at revision. The revision updates CLDTs to more closely match ETAs, moving the crosses closer to the ETA reference (grey line). Grey shading indicates time with five minutes (+/-) of the ETA at revision.

Figure 4 shows the location (ground, airborne outside Australian FIRs, airborne inside Australian FIR) of each aircraft at 30 minute intervals. When the revision was run at 1930z, all aircraft were airborne and the majority were in an Australian FIR. ETAs are in general more accurate for a flight within an Australian FIR than outside. Therefore in general, the more aircraft within the FIR, the more effective a revision to realign active international demand.

ACID	0300/1700	0330/1730	0400/1800	0430/1830	0500/1900	0530/1930	0600/2000
ANZ891	ground	ground	ground	outside	outside	outside	outside
CCA177	outside	outside	inside	inside	inside	inside	inside
CES737	outside	outside	outside	inside	inside	inside	inside
CHH483	inside	inside	inside	inside	inside	inside	inside
CPA135	inside	inside	inside	inside	inside	inside	inside
CSN321	outside	outside	outside	outside	inside	inside	inside
GIA716	inside	inside	inside	inside	inside	inside	inside

HVN781	outside	outside	outside	outside	outside	inside	inside
JST036	outside	inside	inside	inside	inside	inside	inside
JST172	ground	ground	ground	ground	outside	outside	outside
MAS149	outside	outside	outside	outside	inside	inside	inside
QFA152	ground	ground	ground	ground	ground	outside	outside
QFA30	outside	inside	inside	inside	inside	inside	inside
QFA38	outside	outside	outside	outside	outside	inside	inside
QFA80	outside	outside	inside	inside	inside	inside	inside
QFA94	outside	outside	outside	outside	outside	outside	outside
QFA96	outside	outside	outside	outside	outside	outside	outside
SIA227	outside	inside	inside	inside	inside	inside	inside
SIA237	outside	outside	outside	outside	outside	outside	inside
UAE404	outside	outside	outside	inside	inside	inside	inside
UAL98	outside	outside	outside	outside	outside	outside	outside
VOZ164	ground	ground	ground	ground	outside	outside	outside
VOZ86	outside	inside	inside	inside	inside	inside	inside
XAX214	outside	outside	outside	inside	inside	inside	inside

Figure 4: Location of international flights at 30 min intervals starting at 1700z. Flights are marked as either: on ground (red), airborne outside of Australian FIRs (yellow) or airborne inside and Australian FIR (green).

Figures 5 shows the percentage of flights inside an Australian FIR at 30 minute intervals starting from 1700z. Figure 6 shows the percentage of flights airborne at the same intervals. At the time of the revision, all flights were airborne and 67% were in an Australian FIR. The revision at 1930z was likely more effective than would have been the case earlier in the morning. At 1930z a large majority of flights were in Australian airspace and can expect to have had more accurate ETAs than at earlier times. In contrast, a revision before 1830z would have had less than half of the international flights in Australian airspace.

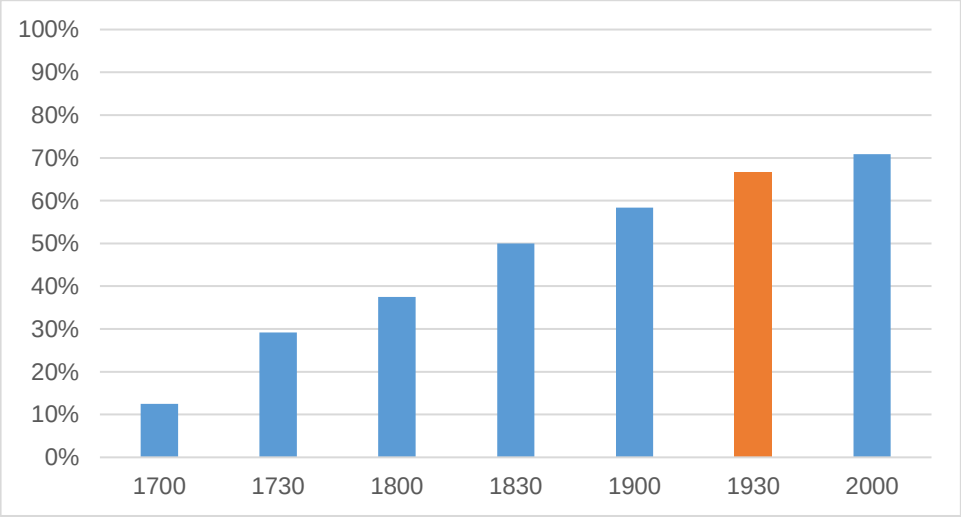


Figure 5: Percentage of flights inside an Australian FIR at 30 minute intervals starting from 1700z.

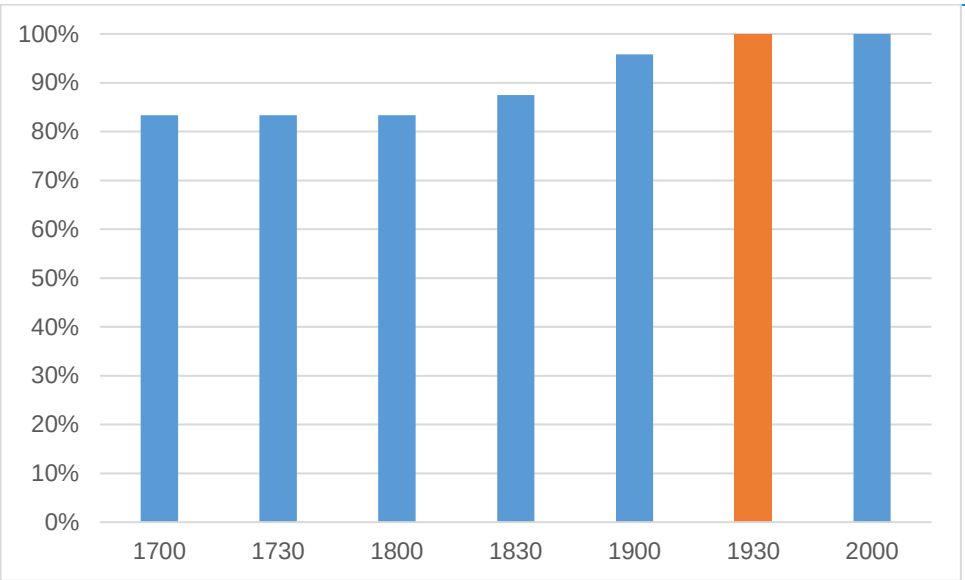


Figure 6: Percentage of flights airborne at 30 minute intervals starting from 1700z.

Summary

A Level 1 GDP Revision for YMML was run at 1930z (0530l) on 03 May 2018 to realign demand. Despite the revision, oversubscription reappeared in the program after around 90 minutes. This POPR was initiated to consider what impact the revision would have had on these flights if it had been run at different times during the morning.

The revision reassigned CLDTs to all international aircraft within five minutes of their ETA. At the time of the revision all international flights were airborne and 67% were in Australian airspace. The revision was likely more effective than would have been the case if performed earlier in the morning. At 1930z a large majority of flights were in Australian airspace and can expect to have had more accurate ETAs than at earlier times. In contrast, revisions before 1830z would have had less than half of the international flights in Australian airspace.

For further information please contact Network Performance and Analysis @ OPS_ANALYSIS_ADMIN@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 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 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 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.