

Air Traffic Flow Management

Harmony for ANSPs

Briefing Paper for Pilots

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The purpose of this briefing paper is to provide pilots with a high level overview of the air traffic flow management (ATFM) system in Australia, and specifically the processes involved in the management of ground delay programs.

This document is uncontrolled in paper form and will be updated periodically and placed on the Airservices Australia website at the following address:

<http://www.airservicesaustralia.com/services/air-traffic-flow-management/>

Note: For up-to-date authoritative documentation refer to the AIP

1. Introduction

ATFM refers to a series of measures to ensure the orderly flow of air traffic to or from an airport or through an airspace volume, and aims to balance air traffic demand with the available capacity.

During 2012 Airservices implemented daily Ground Delay Programs (GDPs) for arrival into Sydney, Brisbane and Perth airports using Metron Traffic Flow. The software has been renamed Harmony for ANSPs and the GDPs extended to include Melbourne arrivals and Perth departures. The primary objective of a GDP is to reduce airborne congestion and the amount of airborne holding by applying a structured and equitable allocation of ground delay at the departure airport. For Perth departures, the aim is to deliver a managed flow of aircraft to the manoeuvring area, thereby reducing taxiway congestion and runway holding point delays.

The system allows airlines and aircraft operators to manage their fleet in accordance with their network requirements. Arrival GDPs assign a Calculated Off Blocks Time (COBT) for an aircraft's departure airport to ensure a controlled allocation of demand. The Perth departure GDP operates in a similar way.

This briefing paper summarises the ATFM system currently in use in Australia.

2. Stages of ATFM

2.1 ATFM consists of three stages

2.1.1 Strategic – Schedule Management Schemes

The first stage of ATFM commences with the planning of airline schedules in accordance with a schedule management scheme. Sydney, Brisbane and Perth airports have a schedule management scheme which is managed by Airports Coordination Australia. The objective of these schemes is to schedule the traffic to an airport based on the airports declared capacity. Schedule coordination does not take into account the actual operating capacity of the airport on the day of operation.

2.1.2 Pre-tactical – ground delay programs using Harmony for ANSPs

Pre-tactical ATFM utilises the airlines' schedules to produce a ground delay program (GDP) using Harmony for ANSPs.

The GDP is calculated on a day-to-day basis and takes into account runway availability, forecast weather conditions, airport acceptance rates, airport works and other miscellaneous factors. These constraints

may limit the number of arrivals that can be accepted by the airport on any given day and convert any excess airport demand into ground delay. The program calculates a sequence of aircraft and assigns calculated landing times. Once these times are allocated, the system then issues COBTs for each flight from their departure airport.



2.1.3 Tactical – Maestro

Maestro is a tactical sequencing tool used for arrivals at Sydney, Melbourne and Brisbane airports. There are plans to introduce its use in Perth in 2014. It uses actual position and speed information to determine the landing order of aircraft and displays this information to air traffic controllers. The controllers then use this information to sequence aircraft using speed control, vectoring or holding to achieve an orderly air traffic flow.

3. Ground Delay Programs

Airservices, as the Air Navigation Service Provider (ANSP), publishes GDPs for flights operating into Sydney, Brisbane, Melbourne and Perth airports. Most aircraft operating domestic sectors to a destination GDP airport are required to operate in compliance with their COBT. International flights are exempt from ground delay but still hold a slot in the program. Airservices also publishes GDPs for flights operating out of Perth Mon – Fri between 2130UTC and 0030UTC.

3.1 GDP Operating Times

Sydney arrivals	2000 - 1300 UTC (non daylight savings)
Perth arrivals	0030 - 1400 UTC Mon – Fri
Perth departures	2130 - 0030 UTC Mon – Fri
Brisbane arrivals	2000 - 1300 UTC
Melbourne arrivals	2000 - 1300 UTC (non daylight savings)

3.2 Daily Process

Upon receipt of the 0600 UTC TAF for each airport, the appropriate Terminal Manoeuvring Area (TMA) Shift Manager inputs the proposed runway configurations and capacities for the following day's operation.

Prior to 0800 UTC airlines upload their schedule for the following day directly into Harmony using a web based interface. Where possible itinerant operators should contact the Airservices National Operations Centre (NOC) prior to the running of the GDPs to ensure their flight is included in the GDP.

GDPs are published to the industry at the times published in AIP ENR 1.9, paragraph 3.8 (or as varied by NOTAM).

In addition to these run times, the program for Sydney is revised every morning at 0400 L to capture accurate ETA information of the morning international arrivals, and the Brisbane program is revised on

most weekday afternoons at 0600 UTC. In each case, the accuracy and integrity of the resultant program is improved.

After the program is published airlines have the capability to swap flights and manage their fleet in accordance with their own network requirements using a direct interface into Harmony for ANSPs. The airlines can control which aircraft ground delay is applied to. Practically this means that if an airline needs to have a flight run on schedule, e.g. critical network connections, then it can 'swap' the delay with other company flights.

3.3 Airline Capability

Airline operators have access to two different interfaces into the Harmony software tool which allow them to upload schedules, swap slots, obtain demand/capacity information, and produce reports.

1. The 'thick client' is used by the major operators and contains a higher level of functionality which includes a module called the Enhanced Substitution Module (ESM). This allows numerous swaps to be conducted simultaneously, as well as containing a modelling capability.
2. The 'web client' interface is accessed through a web browser, enables single swaps per action and is somewhat simpler to manage. It is also the only interface which allows schedule uploading.

Both interfaces have a function called Inter Operator Slot Exchange (ISE) which allows airlines to conduct blind swaps with other carriers. When an airline cannot use its allocated slot and does not have any other company aircraft to swap with, it ISEs the flight to facilitate the allocation of a more appropriate slot. The system then calculates the best outcome for all flights such that overall airborne delay is reduced and the subject flight is positioned in an achievable slot.

3.4 How does a pilot get a COBT?

Airlines that have access to the Harmony system will provide pilots with a COBT for their operation. Operators who do not have access to the Harmony system can obtain their COBT from Airservices NOC on **1800 020 626**. If you have provided your contact details to the NOC prior to the running of the GDPs, you shall receive an automated message via SMS or email of your COBT.

Pilots are required to operate in accordance with the compliance management requirements as detailed below.

3.5 Compliance Requirements

Compliance is defined as 'a measure of the difference between a flight's actual operating time and the programmed time in the ATFM system.' To be deemed compliant flights must operate within -5 /+15 minutes of their COBT.

Compliance with the GDP is monitored by Airservices and reported on to the whole of industry on a daily basis. Airservices proactively works with airlines to improve compliance procedures and practices.

Tower and flow controllers for GDP airports, may actively manage aircraft in accordance with the compliance procedures.

3.5.1 Tower controller compliance management

The following towers provide compliance management services:

Adelaide Tower	Alice Springs Tower	Avalon Tower	Albury Tower
Brisbane Tower	Cairns Tower	Canberra Tower	Coffs Harbour Tower
Darwin Tower	Essendon Tower	Gold Coast Tower	Hamilton Island Tower
Hobart Tower	Karratha Tower	Launceston Tower	Mackay Tower
Melbourne Tower	Perth Tower	Port Hedland AFIS	Rockhampton Tower
Sunshine Coast Tower	Sydney Tower	Tamworth Tower	Townsville Tower
Williamstown Tower			

3.5.2 Early non-compliance (departing >5 minutes before COBT)

If a pilot requests push back or taxi clearance more than five minutes prior to COBT clearance shall be withheld, and the pilot shall be advised of the reason.

If a significant gate or apron operational requirement necessitates push back or taxi more than five minutes prior to COBT, the tower shall, if practicable, appropriately delay the flight on the ground by other means.

Towers may issue a clearance to push back or taxi earlier than COBT – 5 minutes if there is a reasonable expectation that, due to taxi or holding point delays, the required amount of ground delay will be achieved.

If it is not possible to absorb any or all of the assigned ATFM delay and the flight departs early non-compliant, any residual delay may be managed airborne by the destination flow controller.

3.5.3 Late non-compliance (departing >15 minutes after COBT)

If a flight requests push back or taxi clearance more than 15 minutes after COBT, clearance shall NOT be withheld but the pilot shall be advised of the flight's non-compliance using the following phraseology:

(CALLSIGN), YOU ARE NON-COMPLIANT WITH FLOW MANAGEMENT. EXPECT AIRBORNE DELAY

3.5.4 What if a flight cannot make the COBT within the compliance limits?

Pilots shall make arrangements for a new or amended COBT through their company or the NOC. Pilots shall NOT request a new or amended COBT from the Tower.



Non-towered airports

Non-compliant flights departing from non-towered airports will not receive advice of being non-compliant upon departure.

Flow controllers at program airports will monitor the GDP for non-compliance of all inbound flights and may take action to de-prioritise non-compliant flights where appropriate.

Metro D towers

Metro D towers are not involved in compliance management and are therefore not equipped with Harmony for ANSPs. Procedures for flights from Class D towers to the nearest GDP airport are contained in AIP.

3.6 Flow controller compliance management

Flow controllers for GDP airports have access to a Harmony display which identifies aircraft that have departed non-compliant with their GDP Calculated Take Off Times (CTOTs). The flow controller may use this information to actively de-prioritise non-compliant aircraft to ensure that compliant aircraft are not disadvantaged. Tactical decision-making in the operational realm means that this may not always be possible with matters such as relative traffic dispositions and safety of the ATM system precluding this active de-prioritisation.

3.7 Phraseologies

Tower

- If a pilot requests push back or taxi clearance more than five minutes prior to COBT, clearance shall be withheld, and the pilot shall be advised of the reason using the following phraseology:

(CALLSIGN), PUSH BACK (OR TAXI) CLEARANCE NOT AVAILABLE DUE TO FLOW MANAGEMENT. EXPECT CLEARANCE AT TIME (COBT – 5 minutes).

- If a flight requests push back or taxi clearance more than 15 minutes after COBT, clearance will not be withheld but the pilot will be advised of the flight's non-compliance using the following phraseology:

(CALLSIGN), YOU ARE NON-COMPLIANT WITH FLOW MANAGEMENT. EXPECT AIRBORNE DELAY

Enroute

The phraseology for use by enroute controllers to advise aircraft of airborne delay due to non-compliance is:

(CALLSIGN), YOU ARE NON-COMPLIANT WITH FLOW MANAGEMENT. EXPECT AIRBORNE DELAY

3.8 Program revisions

When weather conditions at a GDP airport change or another issue such as equipment failure occurs, such that the airport acceptance rate will be significantly different, the GDP may be revised. This will be coordinated between the TMA shift manager, the NOC and airline operators.

When this occurs, the COBT for all aircraft changes to reflect the new program rates.

Airline operations centres shall relay the new operating times to their pilots.

Airlines have 30 minutes to comply with the new COBTs. At times, there is a requirement to apply immediate compliance whereby new COBTs must be complied with by pilots immediately following the revision.

3.9 What governs the effectiveness of ground delay programs?

Main factors which are critical to the success of the system:

- Accuracy of flight information

The ATFM system relies heavily on accurate information about a flight's location and future intentions. Incorrect data within the system has the potential to increase demand/capacity imbalances and consequently airborne holding.

- Pilot compliance to COBT

Should a number of aircraft operate non-compliant over a period, an imbalance of demand and capacity occurs and this results in airborne holding. If this occurs at the start of a peak period then this excess airborne holding is carried through the entire peak period.

- The setting of achievable capacity rates

It is also vitally important that the system is configured with airport acceptance rates which are constantly achievable. Failure to achieve those rates also results in additional airborne holding.

3.10 The role of the NOC

The NOC's role in the management of ground delay programs is:

- Updating and maintenance of accurate system information
- To ensure a complete airline schedule upload
- In consultation with the TMA shift managers to run the GDP taking into consideration network issues
- To monitor compliance with Harmony calculated times and provide specific advice to flow controllers on non-compliant flights
- To monitor GDP performance taking into consideration weather forecasts and other potential factors affecting GDP performance with a view to initiating GDP re-runs if necessary
- To assist airline operations controllers in manipulating flights to ensure COBTs are up-to-date
- To manage itinerant flights, and
- To produce industry compliance reports.