

Australia

1. ATM-tailored MET information and services

1.1. Air Traffic Flow Management (ATFM) overview

ATFM is provided by Airservices Australia (Airservices) aimed at achieving a balance between forecast air traffic capacity and actual demand. Airservices Network Coordination Centre (NCC) operates as the Australian ATFM Centre. The NCC plan strategic flow management and coordinate pre-tactical and tactical operations. To achieve this, the NCC collaborates with relevant stakeholders, including the Australian Bureau of Meteorology (Bureau), Air Traffic Control (ATC), airports and domestic airlines. The NCC Bureau of Meteorology Unit (NCCMET) was embedded within the coordination centre to enhance overall capability.

The ATFM process is outlined below:

- Australian airlines send their flight schedules to the NCC on the day prior to operations. Airports Coordination Australia (ACA) manages the allocation of slots for specific Australian airports upon which airline flight schedules are then based.
- Airservices establishes the projected airport capacity, using set procedures and parameters to guide the collaborative process. Programmed works, unavailability's, and adverse weather such as fog, thunderstorms and strong and/or gusty winds are considered.
- Airservices publishes an agreed-industry plan, known as a Ground Delay Program (GDP). This is applied to Australian domestic scheduled flights, to balance the demand with the available capacity. The GDP instructs aircraft to delay pushback and taxi, on the ground, for their turn to depart, aiming to reduce excessive airborne holding at destination aerodromes. The intent is then to optimise runway capacity. ATFM provides increased predictability for airlines, giving them a greater understanding of available air traffic capacity, and provides an improved basis for their operational planning. This aligns with the importance of ATM-tailored MET information services.
- Throughout the actual day of operations, industry stakeholders work collaboratively to monitor the aviation network performance to respond to any events which put the network plan at risk. These include unforeseen adverse weather events and reduced service delivery/infrastructure or system failures. In instances when these events impact the network performance to a sufficient degree to warrant action, an updated GDP will be agreed-upon by industry.

1.2. About Ground Delay Program

1.2.1. GDP – Arrivals (GDP-A)

Implementation of GDP-A at Sydney, Brisbane, Perth, and Melbourne airports reduce airborne holding for airlines. For example, when weather conditions change (for better or worse) GDP-A revisions provide new arrival rates.

1.2.2. GDP – Departures (GDP-D)

Implementation of GDP-D at Perth regulates departure timings on weekdays between 2130 to 0030 UTC. The process commences at 0815 UTC the day before, using a similar process as GDP-A to determine capacity based on meteorological and airport conditions.

1.2.3. GDP Revisions

When weather conditions at a GDP airport change or unforeseen situations occur such that the airport acceptance rate will be significantly different, the GDP may be revised.

There are 3 levels of GDP Revisions:

- **Level 1** – is a standard revision, consistent with set criteria, such as an improvement or deterioration of the weather forecast, and the planned rates need to be amended.
- **Level 2** – is used when circumstances are deteriorating rapidly and the GDP airport is no longer able to maintain the rates derived from the ATFM pre-tactical plan, and/or airborne holding is

unsustainable. For example, un-forecast weather/storms or any other operational restriction resulting in sudden decrease in Airport Acceptance Rate (AAR).

- **Level 3** – is used when the GDP airport is critically constrained for a period of time, and as a result unsustainable airborne holding and airspace congestion occurs or anticipated to happen. For example, runway flooding, unexpected fog, or a slow-moving severe storm overhead stoppings all arrivals and significantly increasing congestion and airborne holding.

1.3. Meteorological Collaborative Decision Making (MET CDM)

Historically, GDP rates were determined by weather products that were not specifically tailored to enhance ATFM, for example, the Terminal Area Forecast (TAF). MET CDM, in Australia, has evolved to purposely consider a pre-tactical period, that is the day before operations. MET CDM aims to optimise runway capacity by closing the gap between planned and actual arrival rates. The process uses enhanced weather forecast information to determine arrival rates that aim to better suit weather conditions on the day.

MET CDM entails collaboration between Airservices and relevant stakeholders to generate a forecast product used to inform pre-tactical traffic management strategies. The MET CDM process analyses aviation-related weather criteria contained in weather forecasts, assesses other meteorological requirements, obtains expert advice from NCCMET, Bureau Forecasters and Airline Meteorologists (AVMET) to assess the potential impact on the arrival rates used for ATFM. The final MET CDM product is produced after consulting with NCC Line Managers, ATC Shift and Traffic Managers to ensure planned arrival rates best suit the enhanced forecast used to determine the GDP.

The program delivers scheduled ATFM measures to reduce airborne delays via GDP at Melbourne, Sydney, Brisbane, and Perth airports. The aim is to provide predictability and minimise alterations to published GDP. The planning process aims to optimise runway capacity by closing the gap between planned and actual arrival rates.

1.4. About Network Coordination Centre Meteorology Unit (NCCMET)

NCCMET provides Airservices with meteorological intelligence to support all operational decision making. NCCMET manages, develops, and delivers tailored meteorological products and services to enhance safety and optimise air traffic delivery.

1.4.1. NCCMET supports pre-tactical planning with:

- MET CDM products and services.
- a 72-hour rolling forecast (today, tomorrow and the following day), with a focus on prediction of major weather event(s) likely to cause disruptions or impact airport capacity, an example is provided in Figure 1.
- three-day forecast as part of the [ATFM Daily Plan](#) are issued three times a day each morning, midday, and evening, or as otherwise amended, an example is provided in Figure 2.
- seven-day meteorological impact outlook for the Network Operations Weekly Debrief and teleconference.
- The NCC is open 24 hours a day 7 days a week with the above information made publicly available on the [Airservices NCC website](#) and via secure industry portals managed by Airservices.

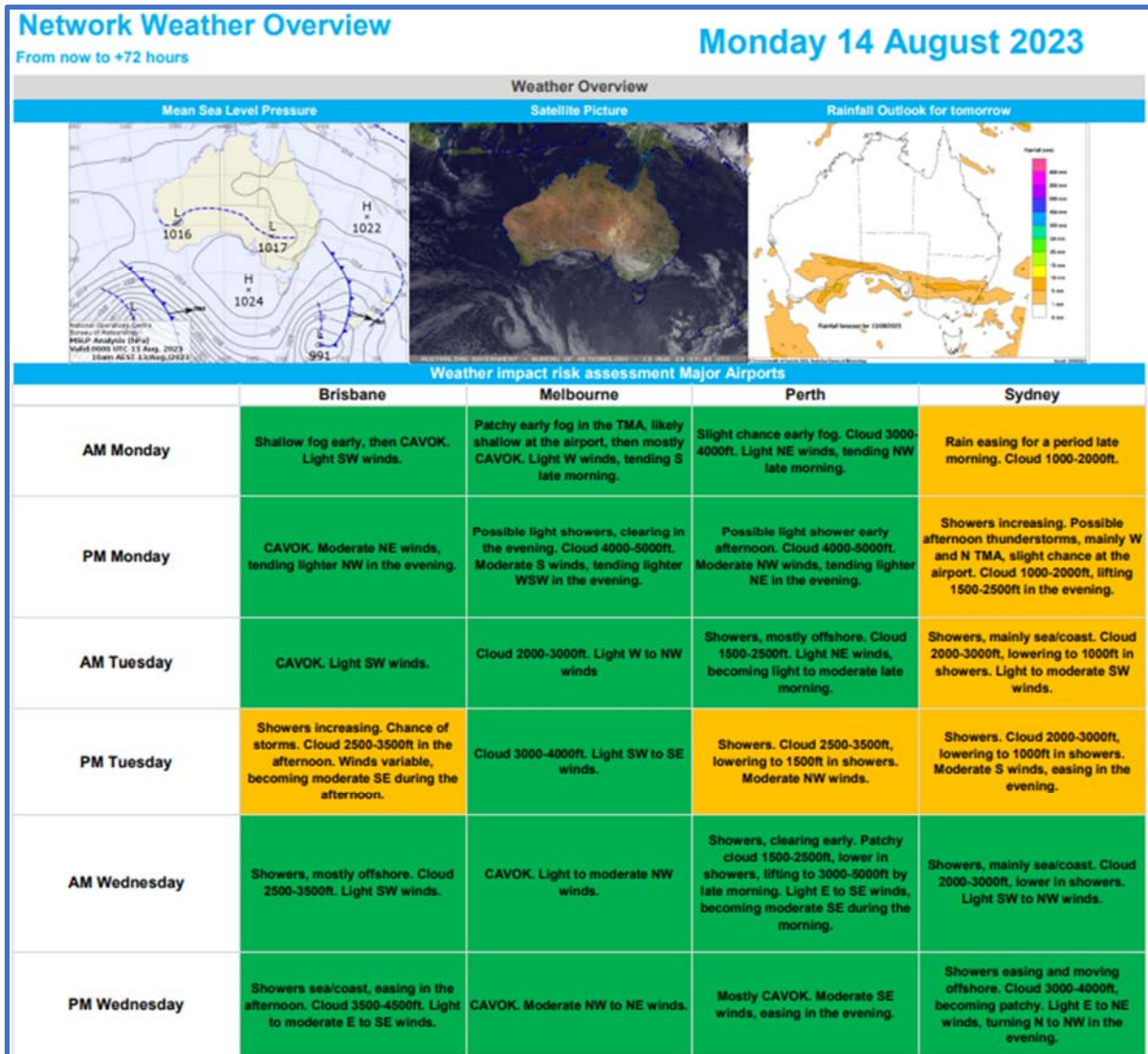


Figure 1 - Weather impact risk assessment

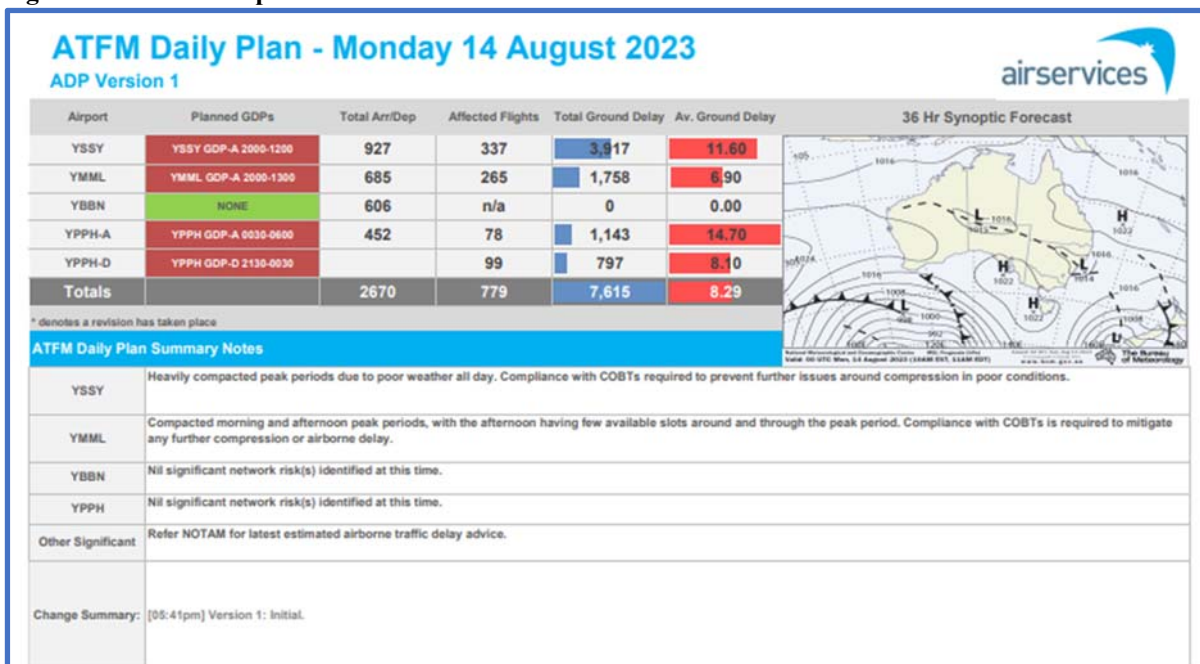


Figure 2 - ATFM Daily Plan

1.5. MET CDM Process

MET CDM was identified as a priority by Airservices, the Bureau and airlines in Australia, and forms part of the ICAO Global Air Navigation Plan (GANP). An overview of the process is depicted below, in Figure 3:

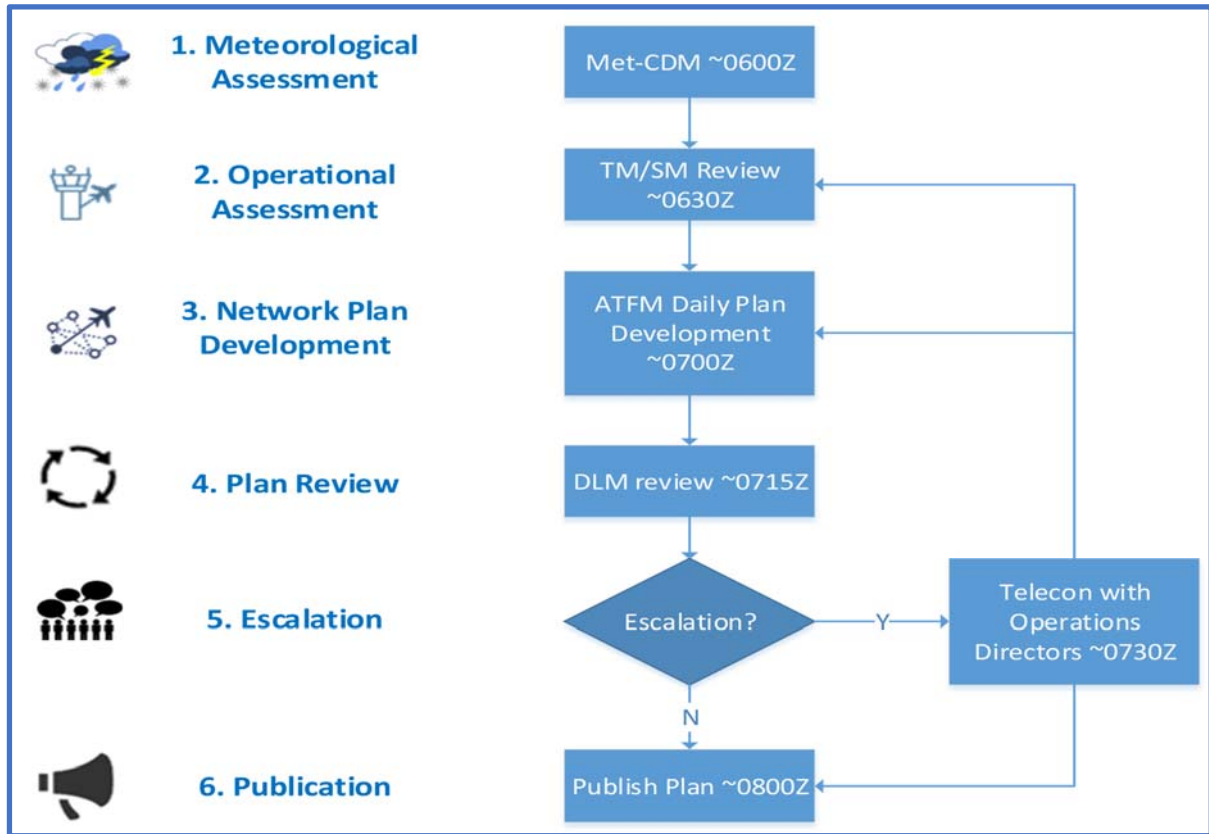


Figure 3 - MET CDM process

Step 1:

- NCCMET, in partnership with AVMET, conduct a meteorological assessment via MET CDM. The collaborative process makes allowance to incorporate local operational knowledge and expertise. An enhanced weather forecast is formulated, for the next day of operations, to provide NCC. The NCC uses this information to model Airport Arrival Rates (AAR) using pre-agreed Business Rules with reference to location specific Airport Reference Cards.

Step 2:

- ATC review MET CDM proposed AAR and may make further adjustments based on operational restrictions, for example airport works, facility availability and staffing.

Step 3:

- NCC develop a Network Plan for the next day which includes proposed ATFM measures. This will take into consideration the expected demand against declared AAR to determine any requirement for GDP. Any airport capacity constraints and en-route airspace capacity issues, such as forecast enroute weather, are incorporated as necessary.

Steps 4 - 6:

- the plan is reviewed;
- discussed, and escalated as required; and
- published with GDP run for the next day.

- if required the process is repeated throughout the day of operations.

1.6. Benefits of MET CDM

The benefits of MET CDM process, used in Australia, include:

- enhanced weather forecast information used to determine pre-tactical arrival rates that will better suit the weather conditions on the day. This results in fewer GDP revisions, less wasted capacity and less restriction where not required.
- greater operational predictability, which provides a better basis for planning.
- collaboration between meteorological experts across stakeholders has built understanding and consensus on the aviation implications of forecasting, with the aim to provide more predictability and to minimise the risk of GDP revisions.
- the process and business rules have more flexibility and responsiveness regarding setting AAR to maximise runway throughput in consideration of weather constraints.
- reduction in airborne delay (holding) saving fuel and money for airlines.

2. Means of Provision

As NCCMET is located within the NCC it assists Airservices in its management of air traffic flow within the Australian Flight Information Region (FIR), and particularly to:

- conducting comprehensive tailored meteorological assessments using the MET CDM process, see Figure 3.
- maintain a national weather watch for the Australian Flight Information Regions (FIR) and provide timely advice on significant changes that could impact on operations both en-route and at aerodromes.
- provide regular scheduled and ad-hoc weather briefings.
- maintain and promote close liaison between the meteorological community and the aviation industry, including working closely with AVMET.
- provide a pivotal point of contact into the Bureau for real-time meteorological issues.
- provide training to Airservices staff on meteorological issues.
- provide meteorological support, as necessary.

3. Other useful information

3.1. Cooperation Agreement

A formal framework of cooperation was established between Airservices (ATS authority) and the Bureau of Meteorology (Australia's meteorological authority) to provide ICAO Annex 3 services.

3.2. Harmony software

Airservices uses a software-based tool called 'Harmony' to operate the GDP. Harmony accepts real-time updates to schedule data, either via flight plan submission, airline day of operations changes to scheduled departure times, or ATC live data. In accepting real-time updates, Harmony can display the most up-to-date demand/capacity information for any monitored airport, which in turn provides airlines, airports, and ATC with an enhanced capability to predict traffic management issues. Further details are available via the [Airservices AFTM website](#). Aircraft and airport operators can view the GDP information for affected flights via web-based access to the Harmony tool.

3.3. Continuous improvement

A formal process of review was created between Airservices, the Bureau and major airlines using a Letter of Agreement – *Meteorological Collaborative Decision-Making Incident Reporting (METCDMIR)*. This formalises agreed protocols to identify the cause of any deficits and recommend corrective actions to continuously improve MET CDM procedures over time.