

THE EVOLUTION OF AIR TRAFFIC FLOW MANAGEMENT

Harmony Product Suite



METRON
AVIATION

AN **AIRBUS** COMPANY

THE EVOLUTION OF AIR TRAFFIC FLOW MANAGEMENT

Air traffic is expected to grow 4.7 percent annually until 2032 with a simultaneous increase of 20,000 new aircraft. This growth coupled with existing demand means that we must prepare our skies today for the capacity demands of tomorrow. A key solution to improving airport and airspace efficiency and increasing capacity is Air Traffic Flow Management (ATFM). ATFM is a service established with the objective of contributing to a safe, orderly and expeditious flow of air traffic by ensuring that ATC capacity is utilized to the maximum extent possible, and that the traffic volume is compatible with the capacities declared by the appropriate ATS authority.

Founded in our work with the U.S. Federal Aviation Administration (U.S. FAA) where we designed and developed Flight Schedule Monitor (FSM), the core algorithms, and user interfaces for the U.S. FAA's Demand Capacity Balancing capability, Metron Aviation now tackles ATFM challenges worldwide from gate to gate. Metron Aviation has worked with air navigation service providers (ANSPs) from North America, South America, Africa, Australia, Asia and Europe to deliver solutions that improve air traffic flow throughout their regions, resulting in less fuel burn, fewer emissions, a reduction in airborne delays and lower operating costs.

Benefits of Air Traffic Flow Management

- Increases Efficiency
- Increases Predictability
- Reduces Fuel Costs
- Reduces CO₂ Emissions
- Reduces Airborne Holding
- Improves Flow Control
- Maximizes Capacity
- Fully Supports CDM



Metron Harmony Suite—Capabilities Comparison Chart

The Harmony product suite epitomizes the evolution of air traffic flow management (ATFM). In 1995, Metron developed the prototype of the Flight Schedule Monitor (FSM) for the U.S. Federal Aviation Administration (U.S. FAA). FSM went fully operational in 1999. In 2009, Metron Aviation deployed Harmony—a commercial ATFM system—which balances air traffic demand with available capacity. Available to air navigation services providers (ANSPs), airports and aircraft operators, Harmony is an advanced ATFM solution that provides strategic, pre-tactical and tactical Demand Capacity Balancing (DCB), post-operations metrics and performance analysis of air traffic operations. Metron’s newest addition to the product suite is Harmony Horizon, a situational awareness tool that offers all stakeholders visibility into the demand horizon for airports and airspace to support operational decision-making. In addition, Metron Aviation offers Harmony SIM, an interactive ATFM simulation platform that enables ATFM solution development, training and ongoing support to the operational environment.

FUNCTIONALITY	HARMONY HORIZON	HARMONY
Common Situational Awareness	■	■
Strategic, Pre-Tactical and Tactical Demand Predictions	■	■
Airport and Airspace Demand Graphs	■	■
4D Trajectory Prediction	■	■
Real-Time Flight and Surveillance Data	■	■
Aircraft Operator Flight Intent	■	■
Strategic Airport Slot Data Integration	■	■
System-to-System Data Platform and Exchange	■	■
Web-Based Interface	■	■
Map-Based Situational Display	■	■
Integrated Weather Overlay	■	■
Operational ATFM Expertise	■	■
24-Hour Support	■	■
Automated ATFM Measures for Demand-Capacity Balancing		■
What If Modelling for ATFM Measures		■
Aircraft Operator Slot Substitutions		■
Advanced Aircraft Operator Schedule Management		■
Flow Manager Thick Client Interface		■

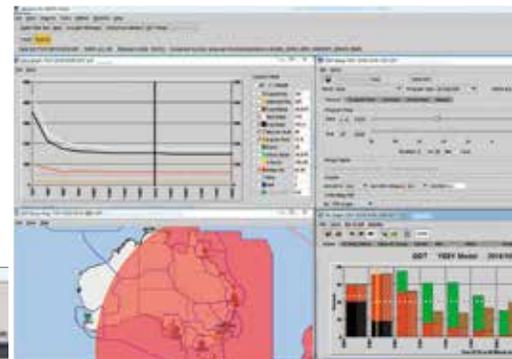
HARMONY

The Evolution of Air Traffic Flow Management

Metron Harmony is a comprehensive Integrated Air Traffic Flow Management (ATFM) solution that provides a framework for exchanging flight data among users who share the need for a common view of air traffic flow operations.

Metron Harmony supports current and emerging Collaborative Decision Making (CDM) concepts to improve efficiency and predictability. Harmony:

- Integrates data from multiple sources across all time phases
- Monitors airport and airspace traffic in real-time
- Provides demand predictions into the future
- Balances demand and capacity for airports and airspace
- Aligns with International Civil Aviation Organization (ICAO) guidelines for demand-capacity balancing
- Allows users to model different ATFM Measures based on traffic scenarios, including weather conditions, controller staffing and equipment outages
- Supports decision-making capabilities in a changing environment
- Provides flexible schedule management capabilities for Aircraft Operators
- Promotes collaborative-decision making and common situational awareness across all airspace and airport stakeholders



Metron Harmony covers all planning, operations and post-operations phases of air transportation and ATM.

HARMONY HORIZON

The Evolution of Air Traffic Flow Management

Metron Harmony Horizon is an Air Traffic Management (ATM) solution that provides common situational awareness for monitoring air traffic demand and capacity. Like Harmony, it provides strategic, pre-tactical and tactical predictions for airports and airspaces.

Metron Harmony Horizon supports Collaborative Decision Making (CDM) concepts to improve efficiency and predictability. Harmony Horizon:

- Integrates data from multiple sources across all time phases
- Monitors airport and airspace traffic in real-time
- Provides demand predictions into the future
- Leads to alignment with International Civil Aviation Organization (ICAO) guidelines for demand-capacity balancing
- Supports decision-making capabilities in a changing environment
- Promotes collaborative decision-making and common situational awareness across all airspace and airport stakeholders



Real-time traffic monitoring that creates situational awareness for ANSPs, aircraft and airport operators.

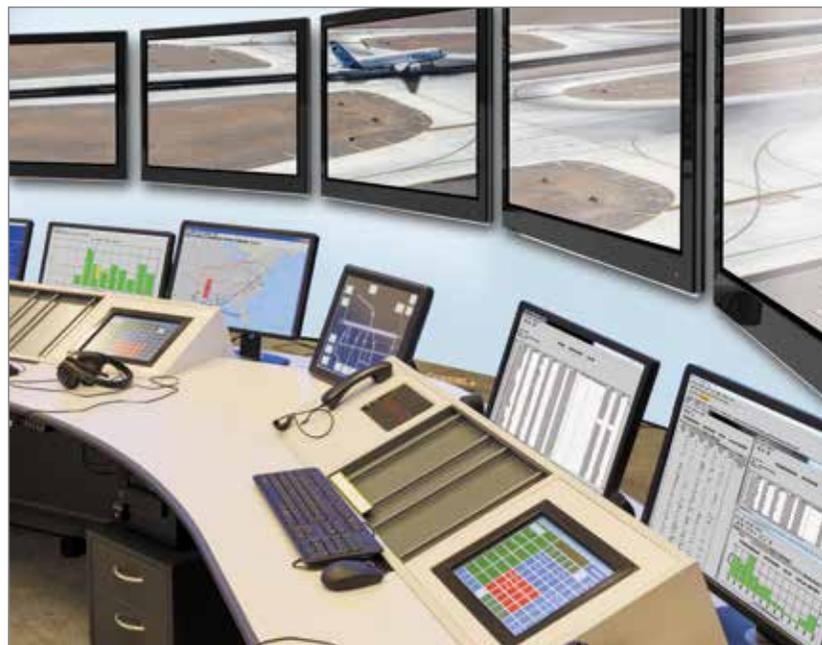
HARMONY SIM: ATFM SIMULATION

The Evolution of Air Traffic Flow Management

In collaboration with ANSPs, airspace users, and airport operators worldwide, Metron Aviation offers Harmony SIM: an ATFM simulation platform to evaluate potential ATFM scenarios and improve the development of concepts in a collaborative manner. The Harmony SIM simulation platform enables users to ensure the correct solution is applied to the operational environment.

Harmony SIM:

- Is installed locally to facilitate stakeholder engagement
- Incorporates operational data from local and regional ANSPs to develop scenarios for replay
- Acts as the ANSP ATFM solution, allowing real-time evaluation and discussion of different traffic flow management (TFM) techniques and strategies
- Can be integrated with Metron Harmony ATFM products or local Flow Management products
- Increases stakeholders' preparedness in what-if scenarios
- Identifies training opportunities and can be used to facilitate training curricula
- Demonstrates new concepts and techniques
- Evaluates gaps in existing operational tooling
- Includes analysis to identify and evaluate key performance indicators (KPIs) during the simulation to ensure activities are constantly improving operations



Metron Collaborative Lab