AIR TRAFFIC FLOW MANAGEMENT

Introduction to Metron Aviation
• Introduction to Metron Aviation

• Years of ATFM success

• Global Implementations

• Metron Products
  – Harmony
  – Horizon
  – Swim Based ESM

• Decision Support Tools
  – Dynamic Capacity and Weather Resilience Tool
  – Integrated Airport Capacity Model Tool

• Services
  – ATFM consulting
  – ATFM training
  – Airspace studies
Core Competencies

- Air Traffic Flow Management (ATFM) and Collaborative Decision Making (CDM)
- Environmental and Energy Analysis
- Weather Impacts to Aviation
- Operational Concept Development and Validation

Metron Aviation fuses advanced science and mathematics with unparalleled air traffic management expertise to provide ground-breaking optimization and collaborative decision making solutions for the world’s leading Air Navigation Service Providers, Airspace Users, and Airports.
Impressive Track Record

- Innovation: Industry’s first ATFM platform and CDM solution
- Customer Value: Significant, measurable economic and environmental benefits
- Excellence: Numerous awards from FAA, NASA, ATCA, Jane’s ATC Global

ATFM/CDM International Involvement

- Contributing Authors to ICAO Doc 9971 (ATFM/CDM)
- CANSO Co-Chair for the ATFM Work Group
- Support CANSO and IATA in the Asia Pacific Multi-Nodal ATFM Activity
- Support for CANSO CADENA (Caribbean, Latin America ATFM Implementation)
Metron History of Innovation and Success

- **FAA FSM Full Operations**: 1999
- **FAA Airspace Flow Program**: 2005
- **FedEx Deploys Surface Management System in Memphis**: 2004
- **ATCA Varnell Award**: 2009
- **LM Selects Metron Aviation for FAA TBFM**: 2010
- **FAA Selects Metron Aviation For NextGen SE-2020**: 2010
- **Airservices Australia Operational Metron Harmony**: 2012
- **Colombia Aerocivil ATFM Awarded**: 2013
- **FAA Special Achievement Award**: 1999
- **NASA Turning Goals Into Reality Award**: 2004
- **CAAS Regional ATFM Research**: 2013
- **Jane’s Enabling Technology Award**: 2010
- **Delta Deploys Metron Harmony 2010**: 2011
- **ATCA Varnell Award**: 2009
- **SESAR Initial SESAR Tasking 2011**: 2011
- **China ATFM Integration 2013**: 2013
- **Long Range ATFM Research 2013**: 2013
- **-airservices**: 2010
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ATFM Global Implementation

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<th>Level</th>
<th>Characteristics</th>
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<td>Advanced and Integrated ATFM/CDM Procedures &amp; System</td>
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<tr>
<td>2</td>
<td>Mature ATFM/CDM Procedures and Initial System</td>
</tr>
<tr>
<td>3</td>
<td>Initial ATFM/CDM Procedures but No System</td>
</tr>
<tr>
<td>4</td>
<td>No ATFM/CDM Procedures or System</td>
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Advanced Metron Systems

- USA
- Dutch Caribbean
- Columbia
- South Korea
- Singapore
- Australia
- South Africa

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Metron’s Harmony for ANSPs

• Automates Demand Capacity Balancing (DCB) for improved system efficiency
  - Airport Ground Delay Program
  - Airspace Flow Program (AFP)
  - Ground Stop (GS)
  - Level Capping
  - Fix Load Balancing

• Supports Collaborative Decision-Making (CDM) with aircraft operators through flight intent, schedule management, and slot substitution capabilities
• 4D Dynamic Trajectory Prediction
• Common Situational Awareness
  – Bar Graphs
  – Flight Lists
  – Traffic Situation Display
• Dynamic Airspace/Airport Monitoring
  – User-Defined Shape
  – Adapted Elements
    ▪ FIX
    ▪ Sector
• Integrated Weather Overlay
• Web-Based Interface
ATFM Simulation Environment

• Closed-loop ATFM simulation environment supportive of:
  – Initial and recurring training of ATFM personnel
  – Development and evaluation of initial and improved ATFM procedures
  – Analysis of and improvement on past ATFM strategies and actions
  – Conduct of ATFM research
SWIM Enhanced Substitution Module (ESM)

Function/Benefits
- Substitutes and cancels flights involved in GDPs or AFPs
- Reduction of ATC delay leading to cost savings
- Reenactment of historical situations to model future substitution procedures

Uses
- Substitution, prioritization, and optimization
- Cancellations, time changes, and other edits
- Historical reconstruction
- Identification and resolution of data anomalies
- Message construction and communication

SWIM is currently only implemented in the USA
Dynamic Capacity and Weather Resilience

- Convective weather prediction
- Capacity estimation using convective weather translation techniques
- Sector demands estimated using flight data
- Constraint identification based on demand-capacity imbalances for airspace and/or airports
- FCA and ATFM Measure analysis using ATFM Measure modeling
- Implementation of ATFM measure
• **Motivation**
  – Airport capacity estimates are among key inputs for implementing many ATFM Solutions
  – Inaccurate predictions result in unrecoverable capacity loss

• **Approach**
  – Airport capacity model that explicitly integrates weather information and translates it into predicted airport capacity estimates
  – Implementation supporting rapid computation and easy adaptation for many airports

• **Output**
  – Continued predicted dynamic capacity of Airport

• **Decision Support**
  – Assist Flow Managers in making decision about arrival and departure rates at an airport
  – Mitigation for implementation of ATFM solutions (GDP/GSs)
• ATFM
  – ATFM/CDM tools
  – ATFM/CDM operational concept development
  – ATFM Training – Basic and Advanced ATFM Training
    (ANSP staff, airspace users, and airport authorities)
  – ATFM consulting
  – Pre- and post-implementation benefits analysis

• Other Services
  – Airspace/airport capacity studies
  – Environmental analysis
Conclusion

- Metron has extensive experience in ATFM
- Has developed functional tools currently employed in many countries around the world
- Metron remains at forefront of ATFM systems
- Metron supplies a complete ATFM implementation service
Harmony Overview / Demonstration
Questions
Thank You