

AIR TRAFFIC FLOW MANAGEMENT

Introduction to Metron Aviation

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METRON

AVIATION

AN AIRBUS COMPANY



- 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

Metron Aviation Overview

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

Metron Aviation Overview

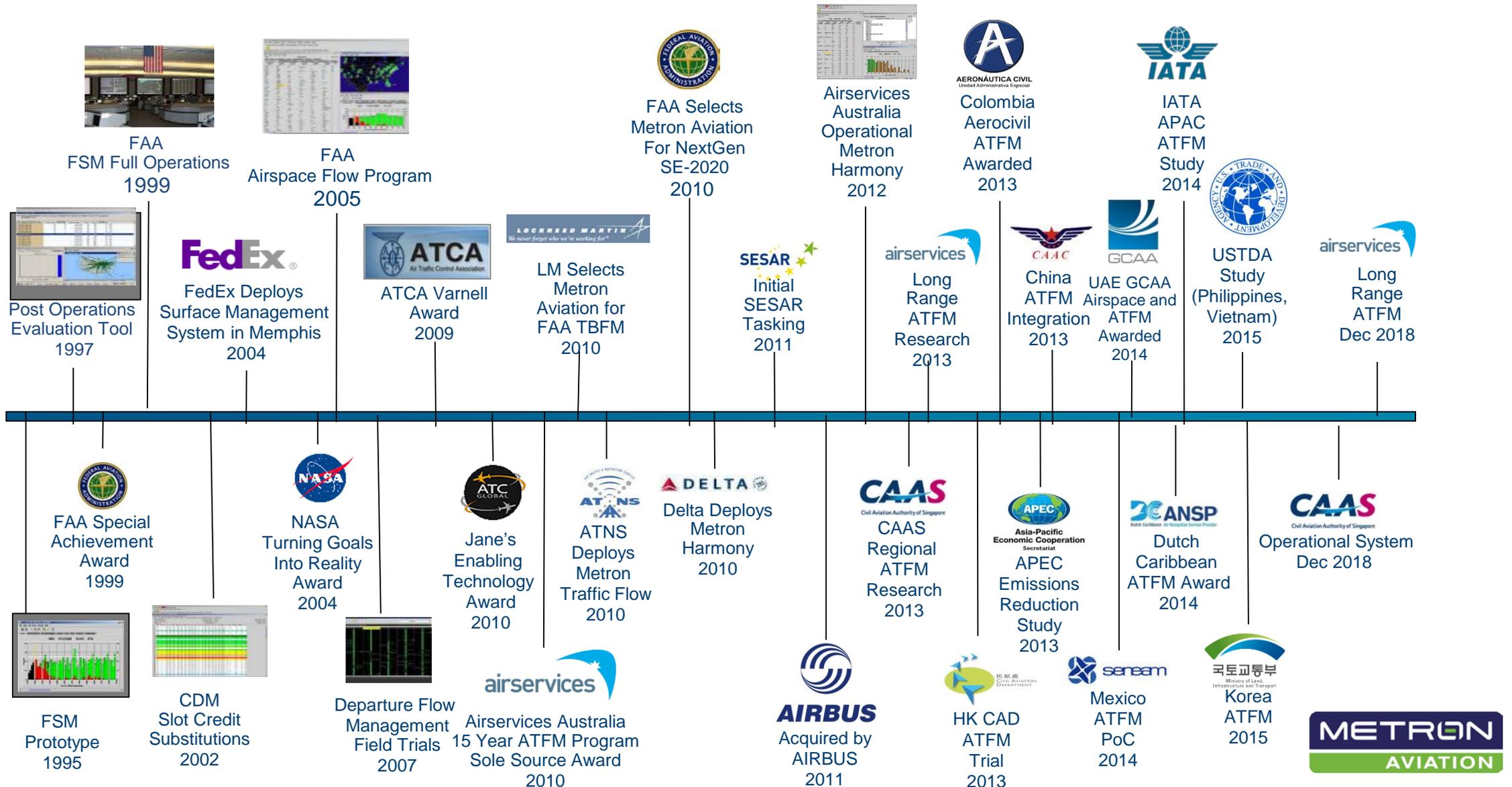
Impressive Track Record

- 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

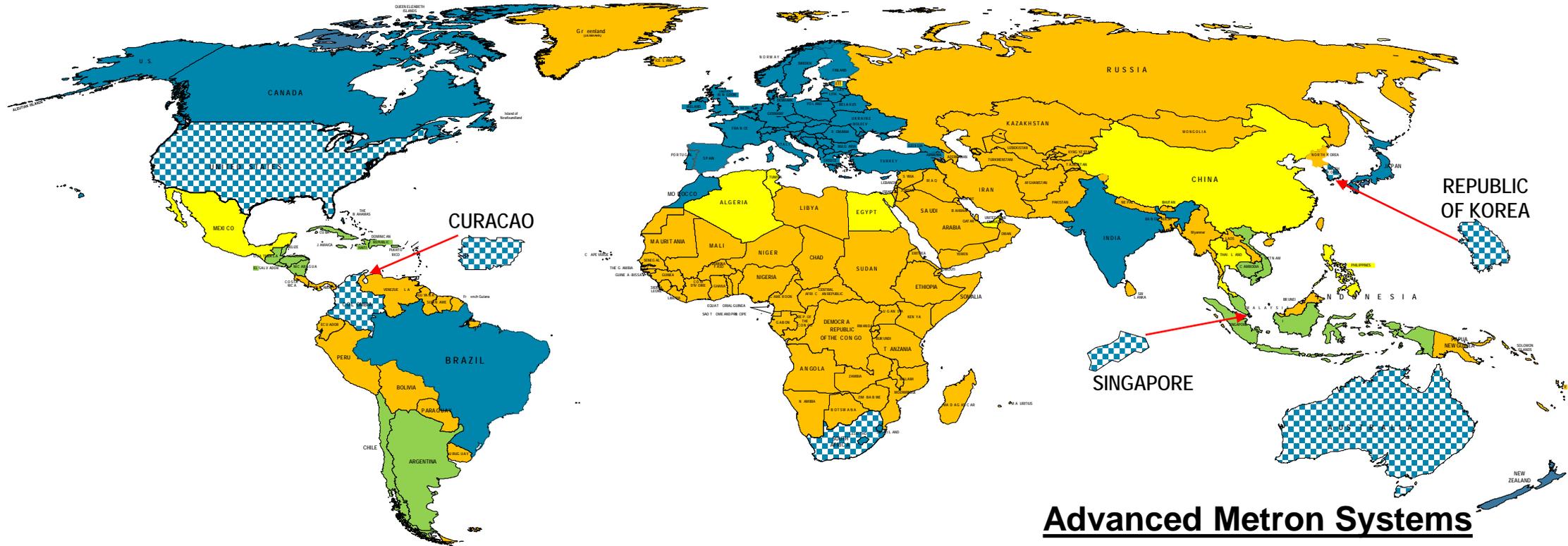
ATFM/CDM International Involvement

- 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



ATFM Global Implementation



Level Characteristics

1	Advanced and Integrated ATFM/CDM Procedures & System
2	Mature ATFM/CDM Procedures and Initial System
3	Initial ATFM/CDM Procedures but No System
4	No ATFM/CDM Procedures or System

Advanced Metron Systems

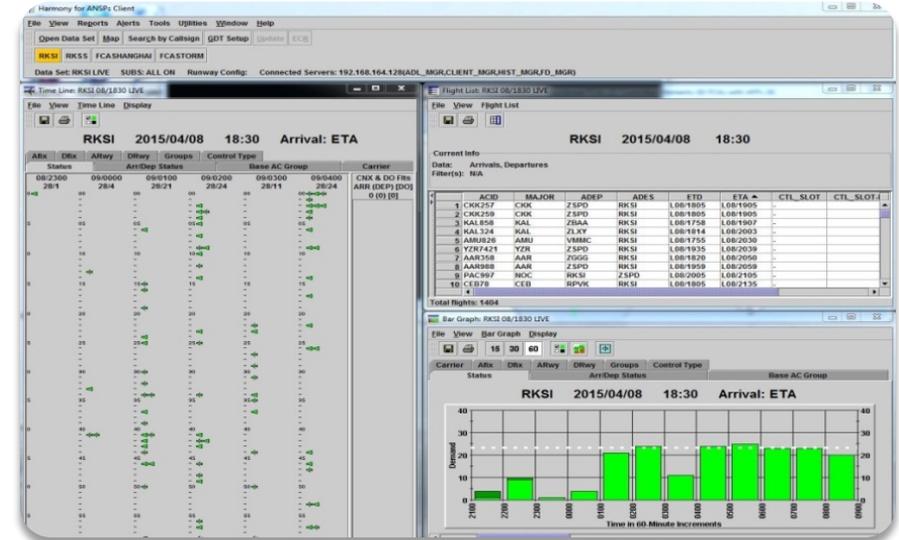
- 
 - USA
 - Columbia
 - Singapore
 - South Africa
- Dutch Caribbean
 - South Korea
 - Australia



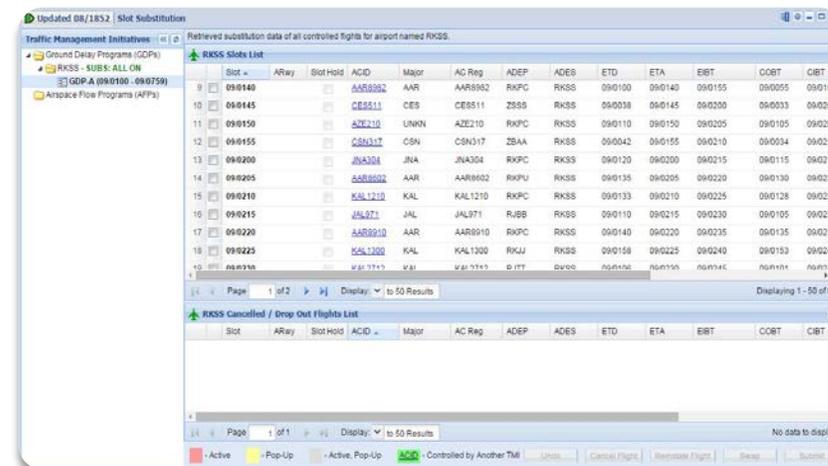
Metron's Harmony for ANSPs

- 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

DCB Evaluation and Implementation

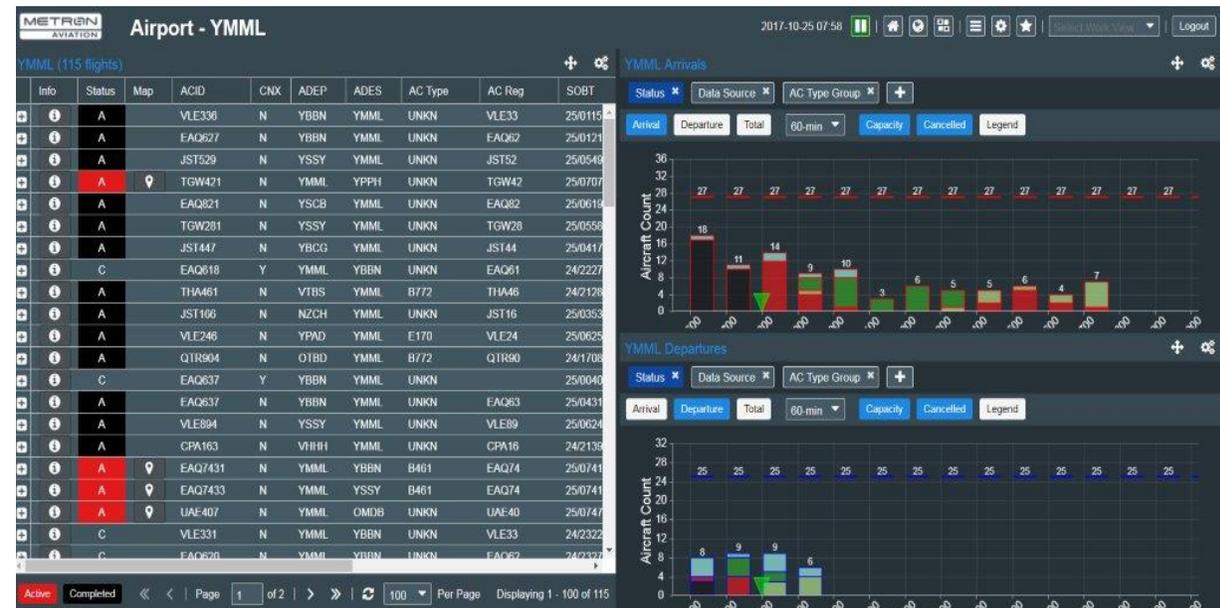


Web-based CDM for ATFM Measure Implementation



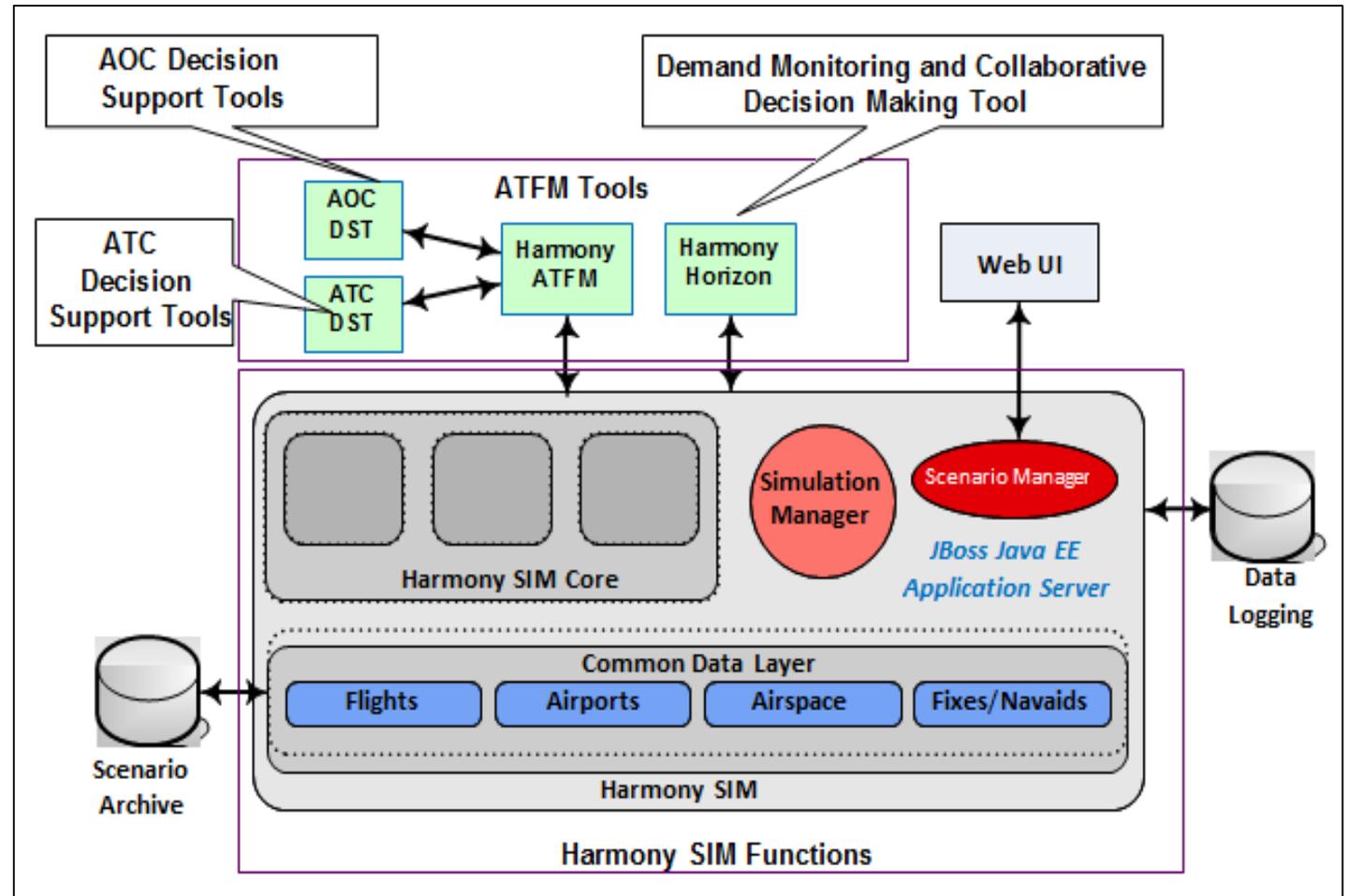
Metron's Horizon

- 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

Info	Status	ACID	CNX	ADEP	ADES	AC Type	SOBT	EOBT
	A	EAQ419	N	YSSY	YMML	UNKN	08/1544	A08
	A	VLE824	N	YSSY	YMML	E170	08/1544	A08
	A	JST575	N	YBBN	YMML	UNKN	08/1359	A08
	A	EAQ7334	N	YPPH	YMML	UNKN	08/1354	A08
	A	VLE219	N	YMML	YPAD	UNKN	08/1653	A08
	A	JST431	N	YBCG	YMML	UNKN	08/1359	A08
	A	UAL99	N	YMML	KLAX	UNKN	08/1659	A08
	A	PAL210	N	YMML	RPLL	UNKN	08/1659	A08
	A	JST43	N	YMML	WADD	UNKN	08/1659	A08
	A	EAQ679	N	YMML	YPAD	UNKN	08/1659	A08
	A	VLE1615	N	YMML	YMIA	E170	08/1704	A08
	A	EAQ495	N	YSSY	YMML	UNKN	08/1559	A08
	A	EAQ1502	N	YMHB	YMML	B712	08/1629	A08
	A	EAQ1528	N	YMML	YSCB	B712	08/1714	A08

SWIM is currently is 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

Raw Weather Data

Capacity Estimation

Demand Prediction

Constraint Identification

FCA / TMM Analysis



Integrated Airport Capacity Model (IACM)

- **Motivation**

- Airport capacity estimates are among key inputs for implementing many ATFM Solutions
- Inaccurate predictions result in unrecoverable capacity loss

- **Approach**

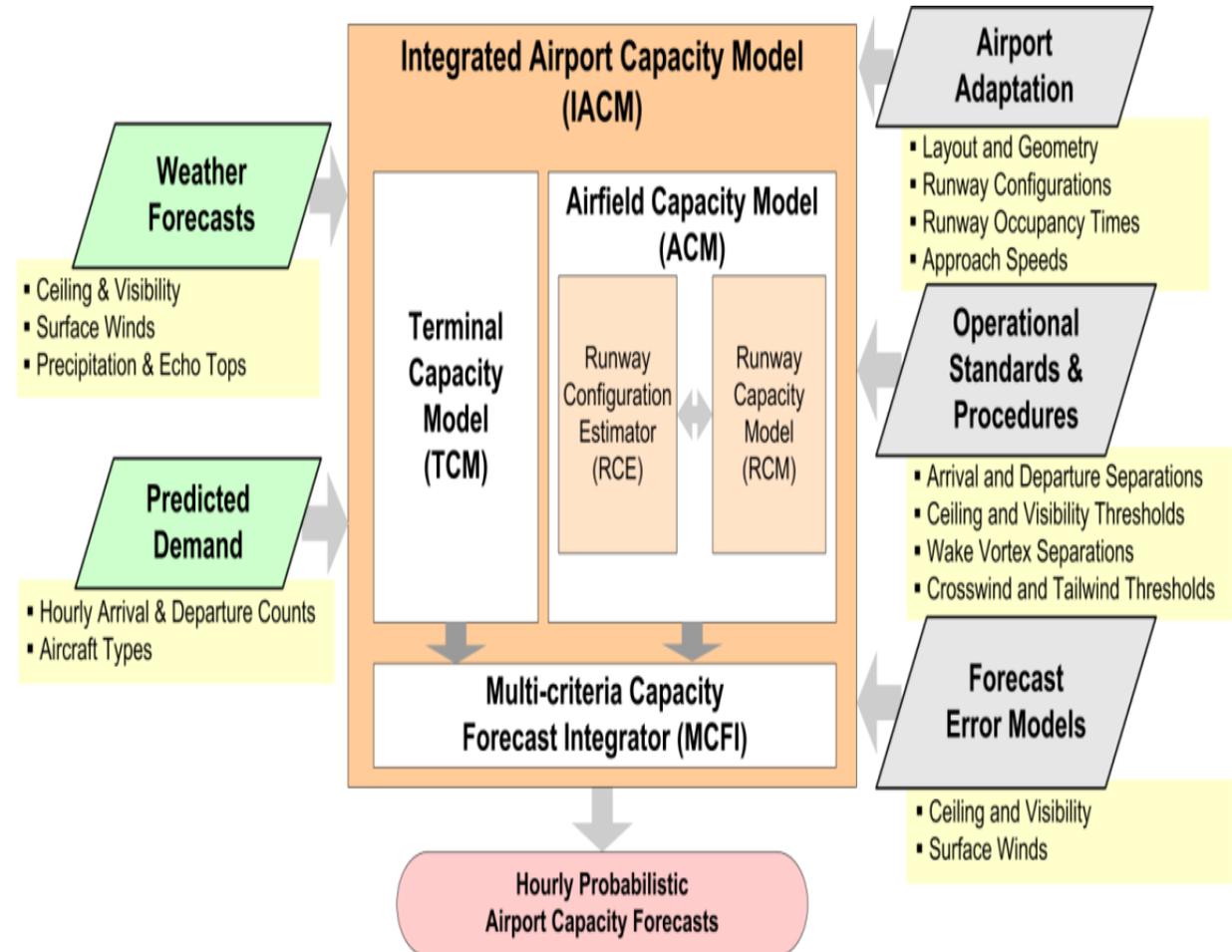
- Airport capacity model that explicitly integrates weather information and translates it into predicted airport capacity estimates
- Implementation supporting rapid computation and easy adaptation for many airports

- **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/GSSs)



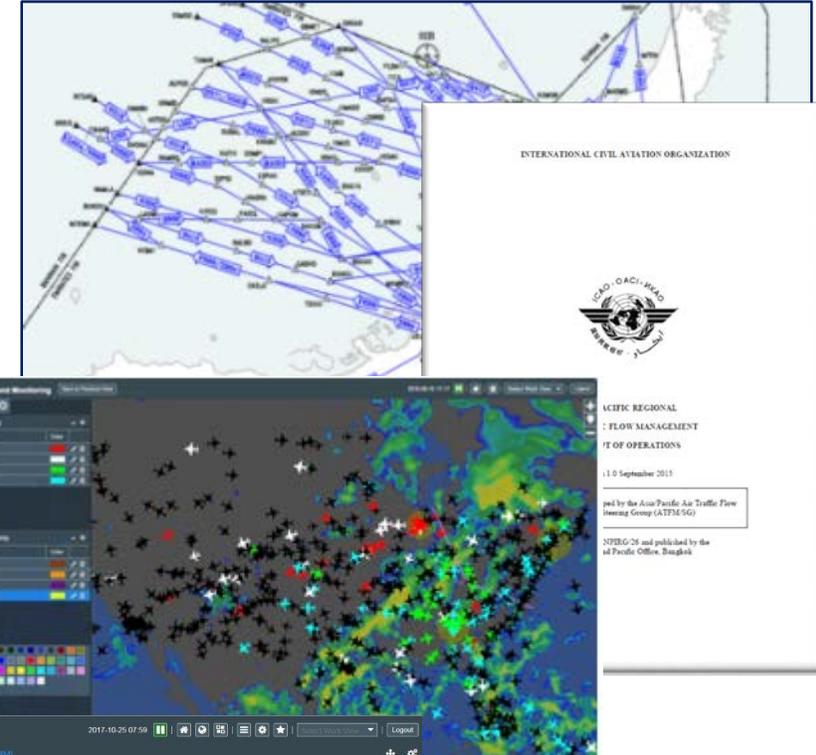
Metron Aviation – Provider of ATM / ATFM Services

- 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