

Net-Enabled Traffic Flow Management (TFM)

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FAA MOIE



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Problem



- **The Federal Aviation Administration (FAA) faces the challenge of building a technology infrastructure using emerging net-enabled information sharing technologies proposed for the System Wide Information Management (SWIM) program**
 - **Electronic information sharing across National Airspace System (NAS) domains currently uses proprietary interfaces**
 - **Net-enabled information access is a key capability for the Next Generation Air Traffic System (NextGen).**
- **Can CAASD apply new technologies to evolve our existing TFM research and development (R&D) platform to net-enable information sharing within and outside our lab environment?**

Background

Net-Enabled Information Sharing for TFM



CURRENT REALITY

PROBLEMS with current reality

Impedes our:

- R&D flexibility
- Responsiveness to requests
- Agility for change
- Scalability.

CAASD's Current
TFM Architecture

Non-standard, proprietary ways to interact with capabilities and access information

FUTURE GOAL

CAASD TFM with
Service Oriented Architecture
(SOA) Design

Data/net-centric design with reusable, standard service interfaces for production and consumption of data to net-enable information sharing

CONCEPTS alone will not allow us to achieve our goal

Need to:

- Explore net-enabled concepts
- Research SOA technologies
- Implement capabilities
- Test performance.

Objective



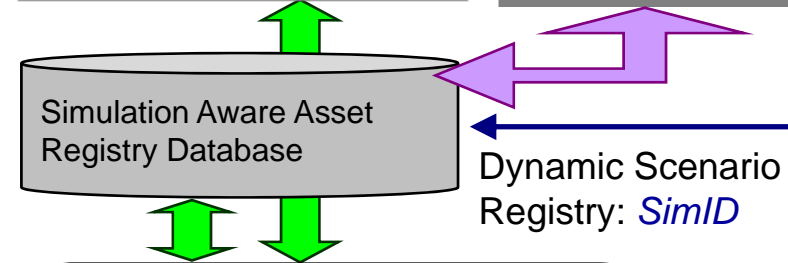
- **Develop a flexible, scalable, and extensible TFM architecture framework to meet NextGen research needs.**
- **Demonstrate agility in research and capability deployment through rapid integration of reusable, discoverable service interfaces.**
- **Learn how best to use information for advanced visualization prototyping and net-enabled shared decision-making.**
- **Understand SOA technologies proposed for use in the NAS by SWIM to ultimately enable NextGen concepts.**

Activities



- **Complete new TFM research platform core (*tfmCore*) for CAASD**
 - Flexible data-centric design to accommodate any data model
 - Service-oriented model with Publish/Subscribe and Request/Respond data exchange
 - Deploy at Command Center, ZKC, ZID, and Tech Center.
- **Explore new applications of the heart of the *tfmCore*, The DataManager**
 - Raise awareness of highly utilitarian nature
 - Take data production and service hosting to a new level.
- **Complete deployment of SOA SimManager and SOA ServiceRegistry**
 - Hand off to MITRE SOA Working Group.

Highlight - SOA Simulation Management



Browser-based Simulation Management Interface: Create and Configure Assets
Assemble Scenarios
Manage Simulations.

Analyst / Developer



Scenario X

Configured Asset A:

- Description: NAS traffic from a busy day in 2007
- Services provided: Track data, flight data, etc.
- Services needed: Wx data, adaptation data, etc.

Configured Asset B:

- Description: Experimental trajectory modeler
- Services provided: Build trajectory
- Services needed: Flight data, Wx data

Configured Asset C:

- Visualization tool
- Services consumed: Track data, flight data, Wx data, trajectories
- Services needed: none

Static Service P:

- CIWS weather data

Static Service Q:

- NAS adaptation data

Examples of an *ASSET* in a given *SCENARIO*

- ATM Lab CSM* configuration defined to run a *tfmCore* simulation
- Thin-client visualization tool consuming services
- Static, stand-alone services providing data.

*CSM – Central Simulation Manager

Impacts



- ***TfmCore* is CAASD Strategic Research**
 - Value is aimed at improving CAASD capabilities
 - Enable CAASD to do NextGen-era TFM research for our FAA sponsors
 - Transfer *tfmCore* technology to CAASD's baseline work program
 - Shortened development cycle lets us do more in less time.
- **Enabling technology opens door to new possibilities**
 - Seamless inter-simulation environment data exchange
 - Data and functionality with high availability and ease of use
 - Directly supporting other MITRE research and work program areas.

Future Plans: SOA Research Beyond TFM

