Global Information Management

An Introduction To:

Maintenance Management Information eXchange Model

(MMIXM)

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Opening Remarks

The FAA, along with its international partners, has been very successful in the development of information exchange models in the past (i.e., AIXM, WXXM, FIXM).

The Maintenance Management Information eXchange Model (MMIXM) will be developed in accordance with the standards and best practices of the three models that have come before it.

MMIXM will be a data standard to support the exchange of Operations & Maintenance (O&M) information between systems. The use of standardized maintenance data will increase data quality and availability between stakeholders, enabling operational benefits such as increased efficiencies and situational awareness.

Defining MMIXM

- The Maintenance Management Information Exchange Model (MMIXM) has been an operational necessity within ATO Technical Operations for some time, and now that NAS Enterprise Messaging Service (NEMS) has matured, the MMIXM can be developed and implemented within our maintenance environment.
- MMIXM will be an FAA data interchange format for sharing information related to maintenance and monitoring status of the NAS.
- MMIXM will define Data Types and Data Elements for exchanging maintenance related data.
- MMIXM Version 1.0 will be developed for enterprise use within the FAA, and will consist of a limited number of data elements (75-100).

AIX M — An information domain that identifies and describes the infrastructure (e.g., facility, system, airspace), aviation services, and operational rules that ensure stakeholders can operate safely and efficiently within the national airspace system. This information is produced from aeronautical data provided by internal and external entities. Aeronautical Information is a dynamic, shared information resource supporting most of the pre-operational, operational, and post-operational processes used in air traffic management.

WI XM — An information domain that identifies and describes the observation, processing, interpretation, forecasting, distribution and storage of aviation weather information and associated products and services to support all phases of flight. WXXM shall support and facilitate system-wide interoperability and will assure the quality and integrity of the delivered information.

FIX M — An information domain that identifies and describes an extensible and dynamic collection of flight-specific data elements describing an individual flight from planning through operation, including preferences and constraints; where appropriate, aeronautical information is leveraged.

MMIXM — An information domain that identifies and describes a dynamic collection of maintenance related data to support all phases of maintenance related activities. This includes maintenance logging, event coordination, asset tracking, training & certification authority, flight check coordination, NOTAM issuance & cancellations, enterprise monitoring, equipment control capabilities.

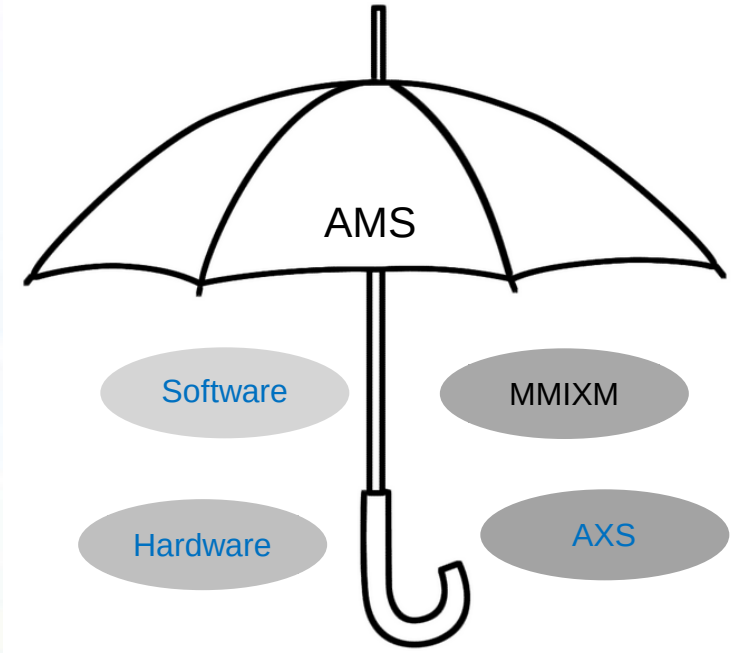
Organizational Responsibilities

ATO, Technical Operations

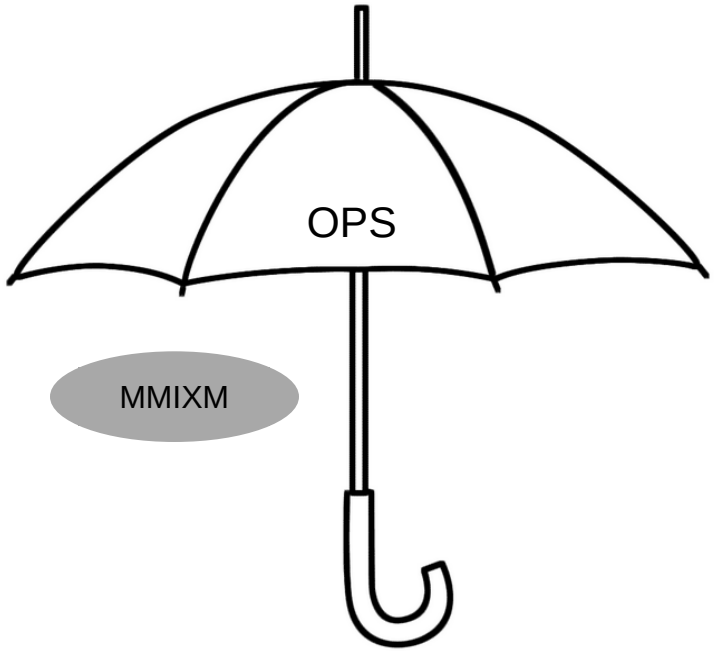
- MMIXM Sponsors:
  David Spencer, Acting Director, Operations Support, AJW-1
- Supporting Sponsor:
  Richard Morgan, Director, National Enterprise Operations, AJW-B
- Management Oversight:
  Kim Taylor, Manager, NAS Integration Support Group, AJW13
- Project Manager:
  Dan Galgano, Maintenance Automation Program, AJW-131
- Contract Support:
  Nick Richardson, Volpe

Background on Getting Started

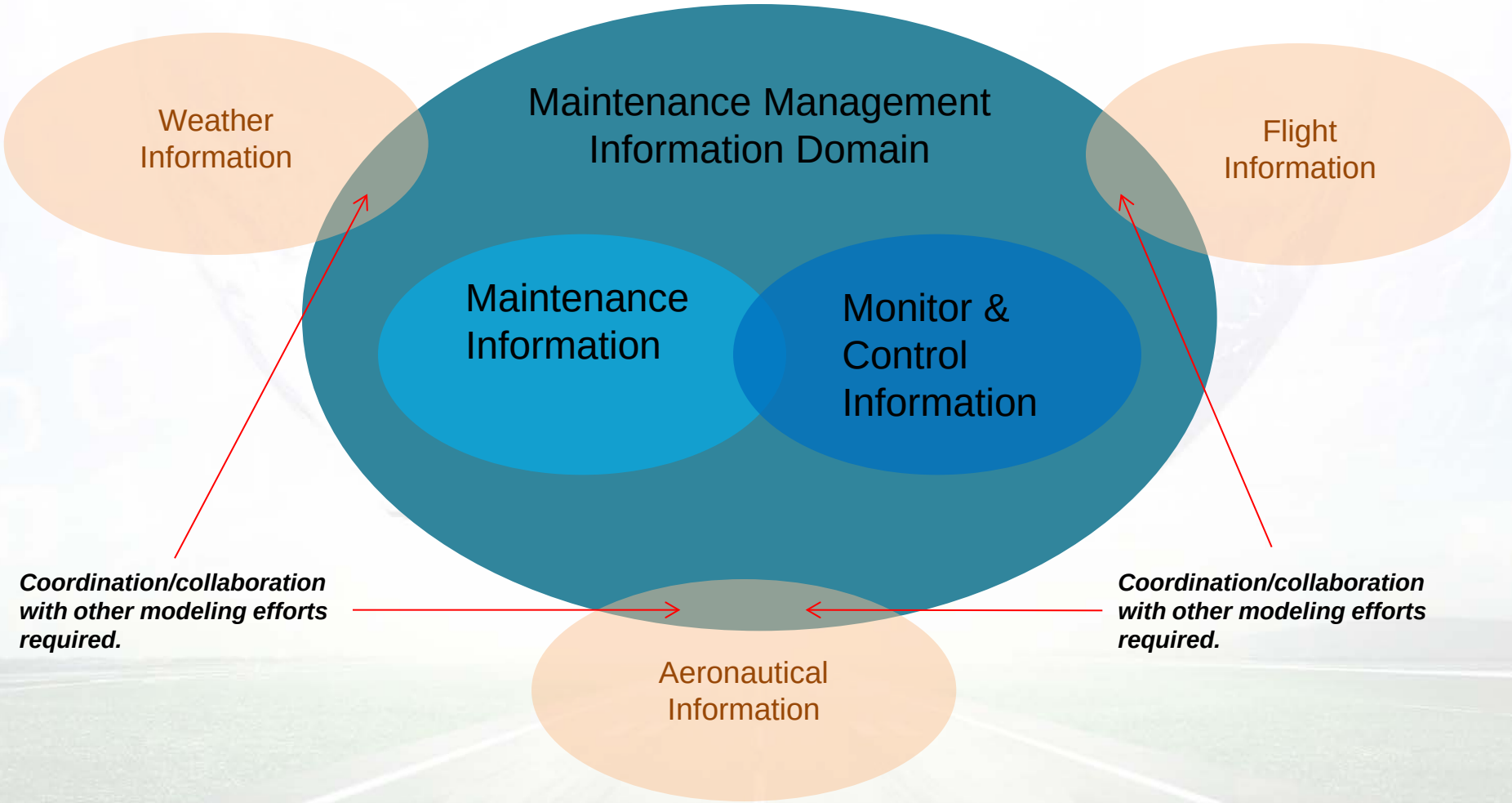
Automation Maintenance Management System (AMMS)



Standalone Initiative



MMIXM Domain



MMIXM - Data of Interest

Maintenance Activity Information

All of the primary data associated with performing maintenance activities to include, but not limited to, **log data, facility information, parts/inventory, shipping data, maintenance schedules, parameter settings, etc.**

Event Coordination Information

All of the primary data associated with coordination activities to include, but not limited to, ***log data, work schedules, phone numbers, email addresses, flight check schedules, outages, NOTAMs, etc.***

Administrative Information

All of the information related to employees that is needed for administrative functions to include, but not limited to, ***certification, credentials, PII, training, permissions, reporting data, etc.***

FAA Property Information

All of the data describing FAA property to include ***real estate (including leased property), NAS facilities, test equipment, assets, etc.***

Reference Materials Information

All identified reference materials used to supplement daily maintenance activities ***(i.e, technical instructions, technical performance data, handbooks, etc.).***

Monitor NAS Information

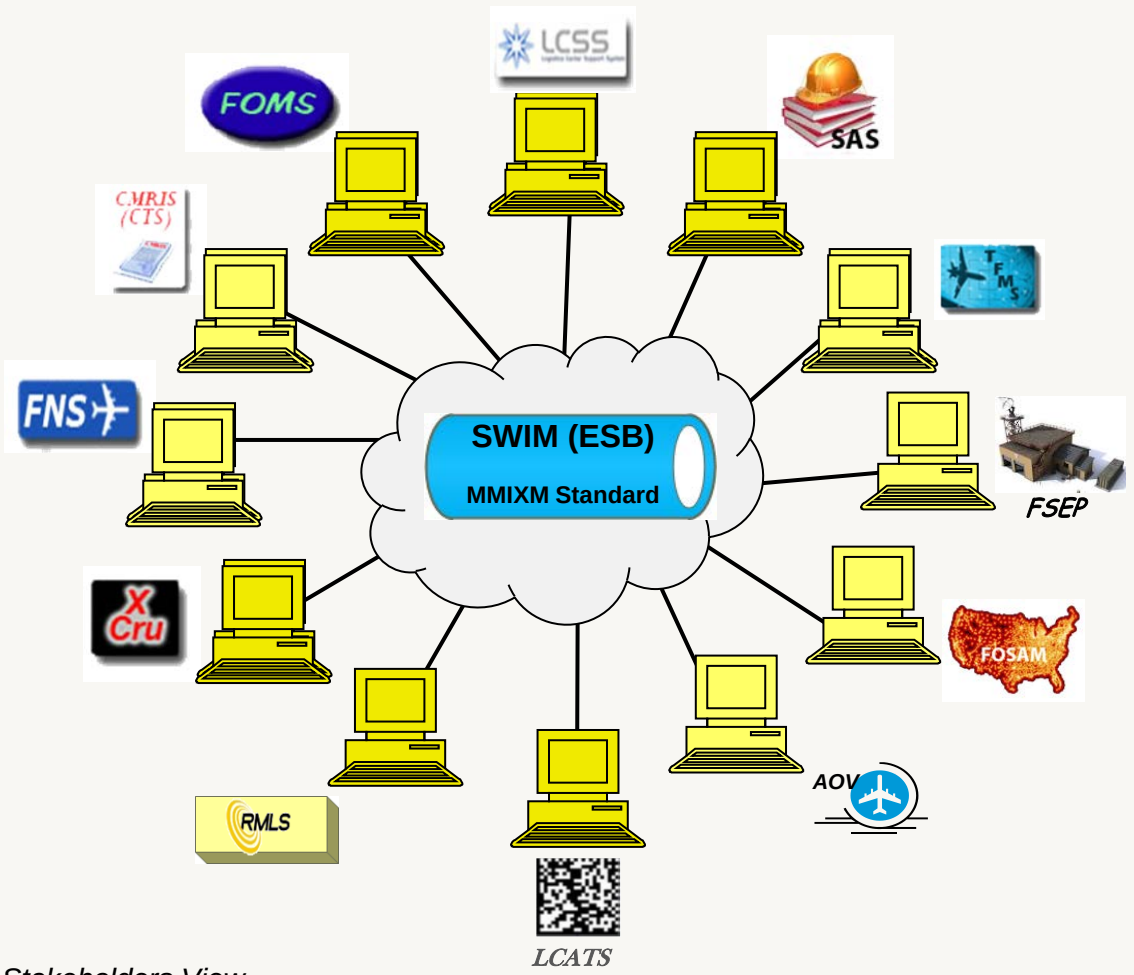
All of the information related to monitoring the ***health*** and ***performance*** of NAS systems and services. (non-NAS is excluded from this release)

Control NAS Information

All of the information related to ***commands sent to control*** NAS systems and services. (non-NAS is excluded from this release)

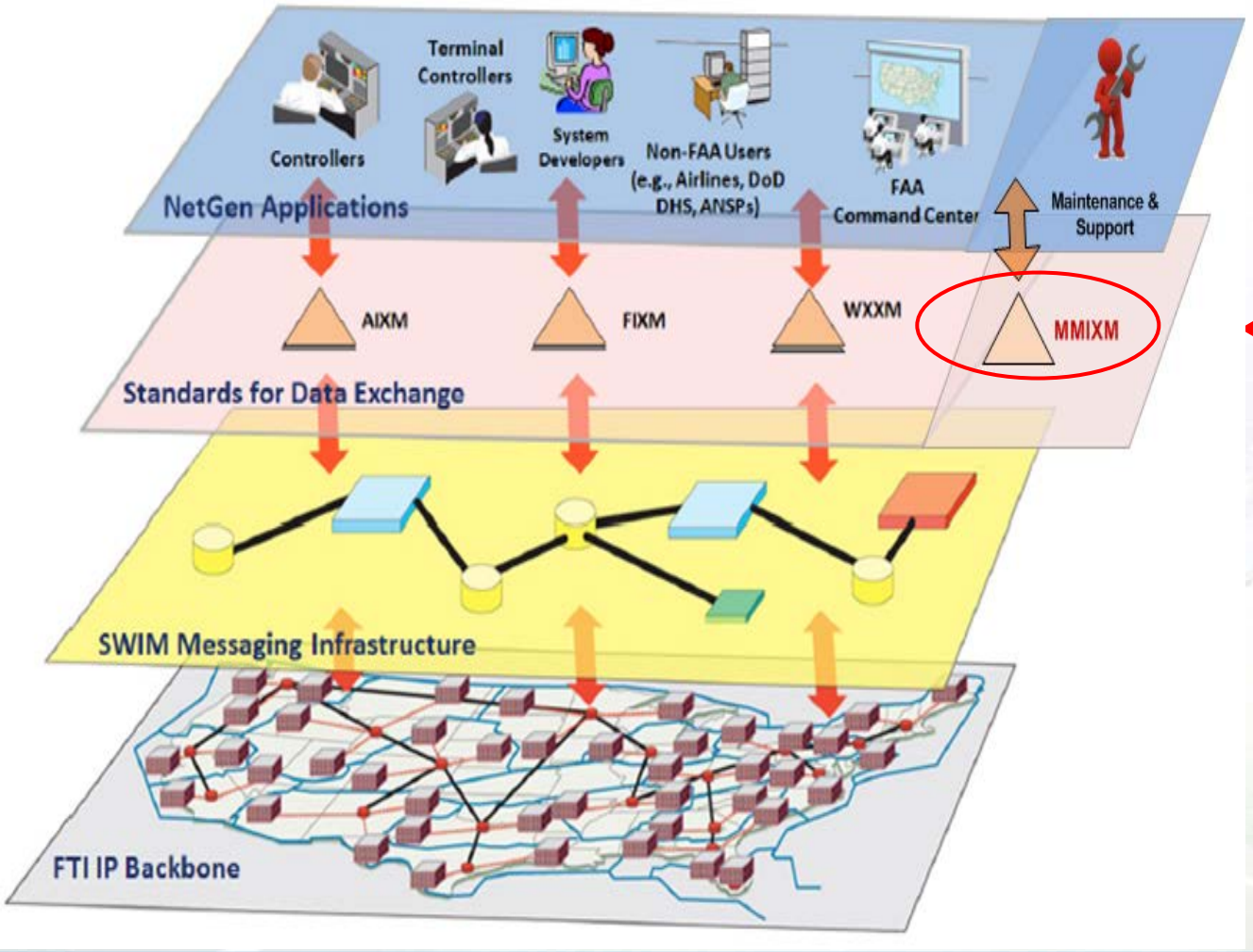
Tomorrow's Maintenance Systems

- Systems interfacing via a common method
- Data standardization and governance
- Authoritative data sources documented



Sample Stakeholders View

MMIXM: Within the FAA NAS Enterprise



Mission Services

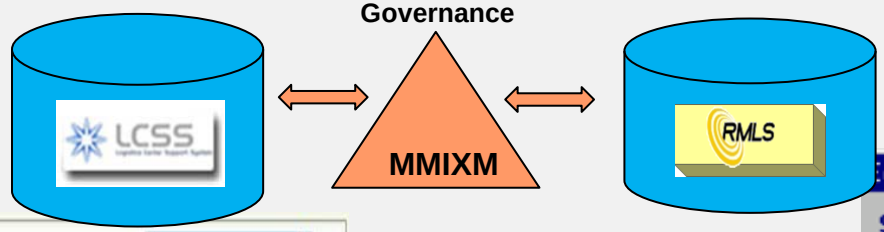
Common Support:
Data Standards & Harmonization

Enterprise:
SWIM Core Services

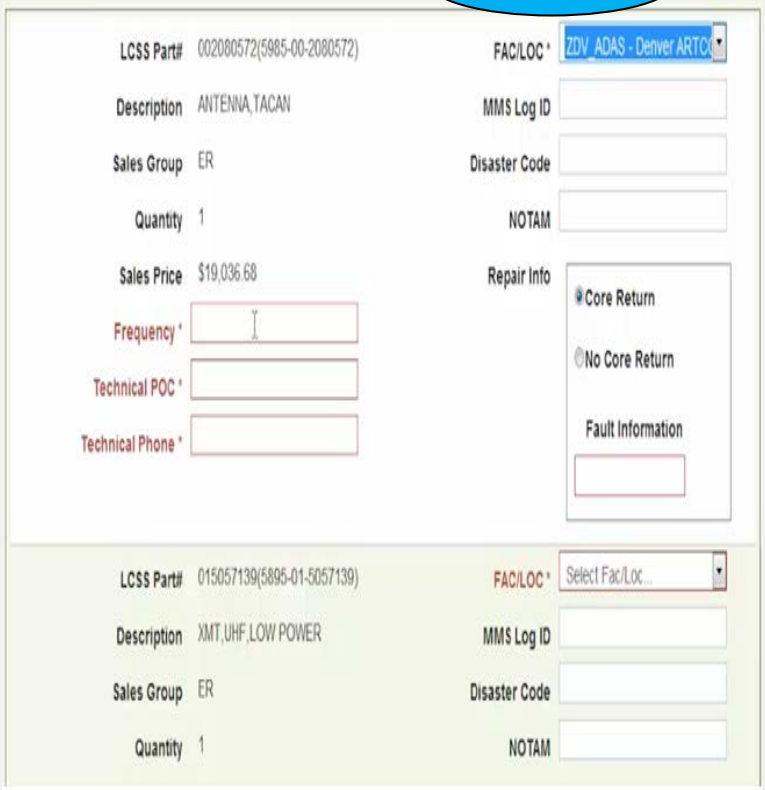
Network:
FTI OPS/MS

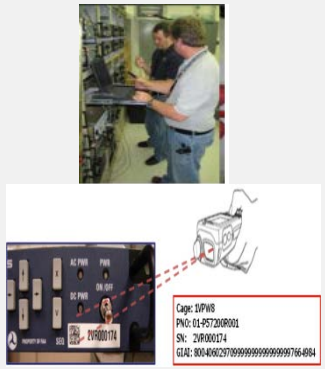
Use Case - Benefits

Governance

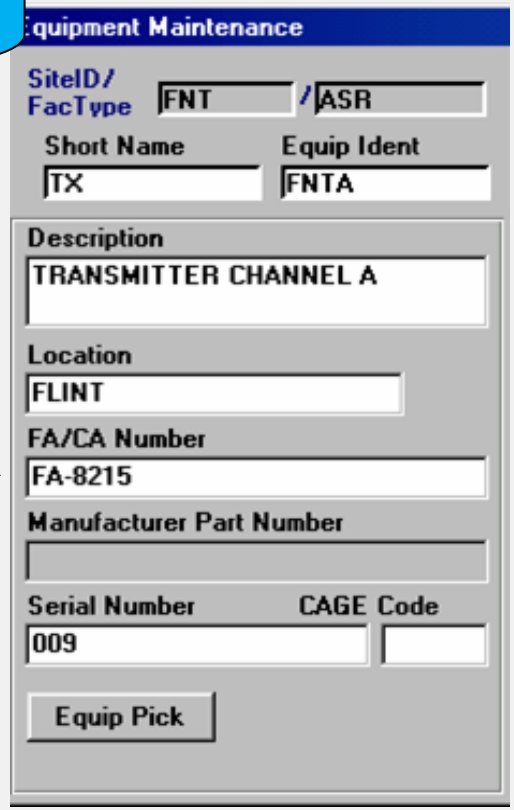


Parts/Inv. Application





Technician Logging Application



MMIXM Work Group

Air Transportation Information Exchange Conference - Global Information Management

Member Participation

WG Makeup

Core Members

People/Organizations directly impacted by MMIXM development and/or usage (i.e., system owners, data management, etc.)

Development Team Members

People/Organizations directly involved in the definition and development of the data standard (i.e., system/software engineers)

Ad Hoc Members

People/Organizations providing guidance (i.e., previous modeling experience (AIXM, WXXM, FIXM), security, etc.)

Work Group Representation

Air Traffic

AJR-D (Management/Data Services)
AJM-311 (SWIM)
AJW-B5 (NEO)
AJW-17 (CFWG)
AJV-7 (Tech & Ops Requirements)
AJW-1B (Ops Support)
AJW-261 (Enterprise CM)
AJI-233 (Training Policy & Requirements)

Finance and Management

AML-044 (Logistics-Program Mgmt.)

NextGen

ANG-C34 (Aviation Weather)

Aviation Safety Oversight

AOV-200 (Air Traffic Safety Oversight Service)

Contract Support

Volpe
Mosaic ATM
A3 Technologies

MMIXM Systems of Interest

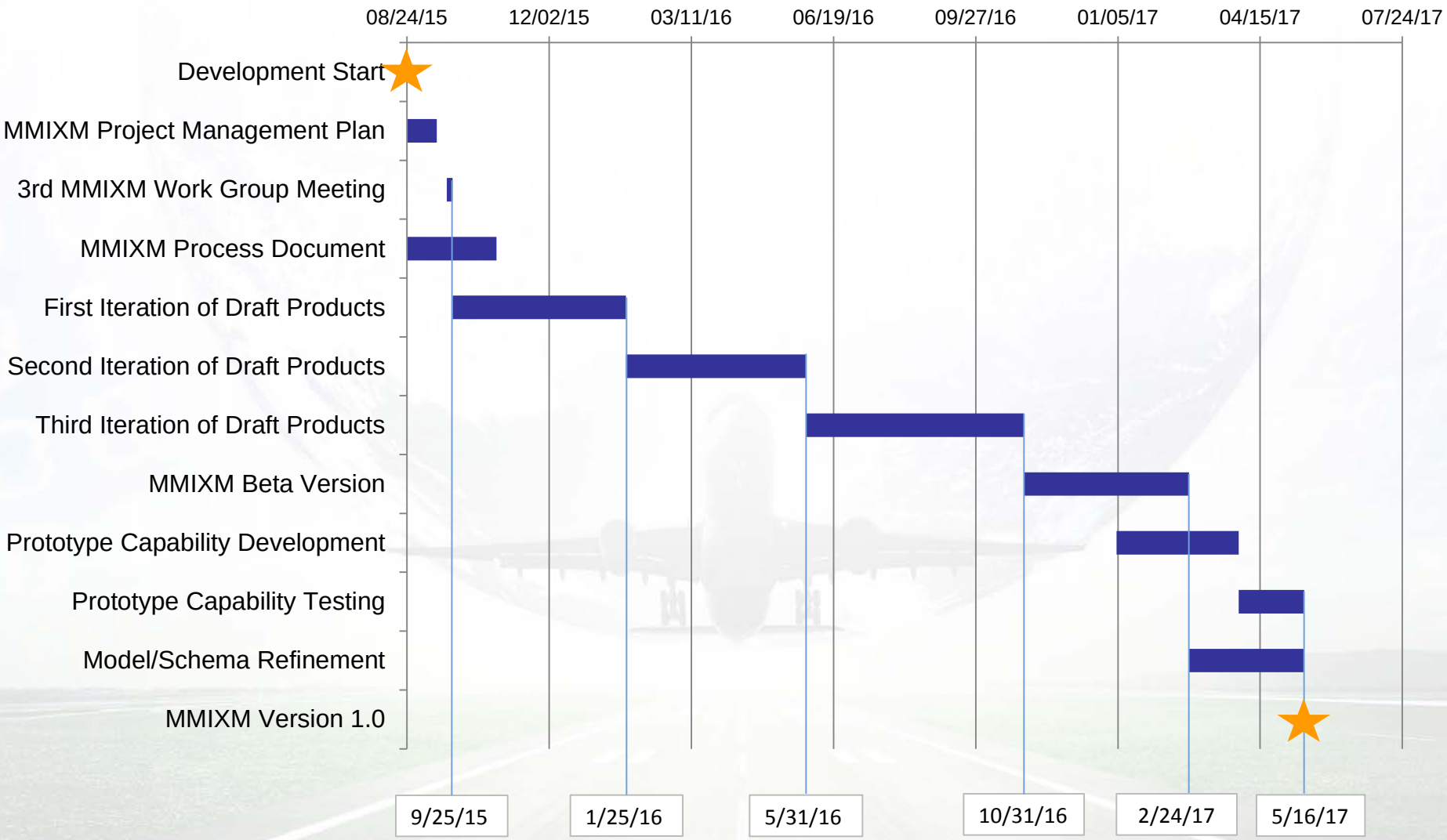
- Flight Operations Management System (FOMS) **
- Facility Service and Equipment Profile (FSEP) **
- Air Traffic Safety Oversight Service (AOV) – Credentialing **
- Remote Monitoring and Logging System (RMLS) National Logging Network (NLN), National Remote Maintenance Monitoring (RMM) Network (NRN) **
- Life Cycle Asset Tracking System (LCATS) **
- Certification Tracking System (CTS) / Comprehensive Management Resource Information System (CMRIS) **
- Federal Notice to Airmen (NOTAM) System (FNS) **
- Logistics Center Support System (LCSS) **
- Document Management System (DMS) **
- Automated Inventory Tracking System (AITS) **
- Traffic Flow Management System (TFMS)
- Labor Distribution Reporting (LDR)
- Two-Dimensional Bar Coding (2DBC)
- Purchase Request Information System (PRISM)
- Systems and Services being monitored for situational awareness

Database Schemas

** Obtained
** Request Pending

MMIXM v1.0 Development Schedule

Air Transportation Information Exchange Conference -
Global Information Management



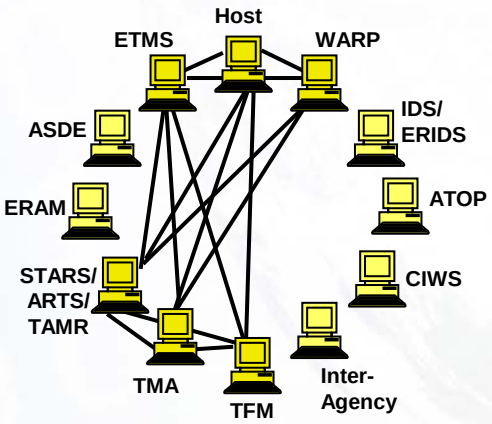
Enterprise Monitoring

How MMIXM can help solve the problem of Enterprise Monitoring

SWIM Evolution Challenges

- We've all seen the slide that shows the NAS evolving…

From this



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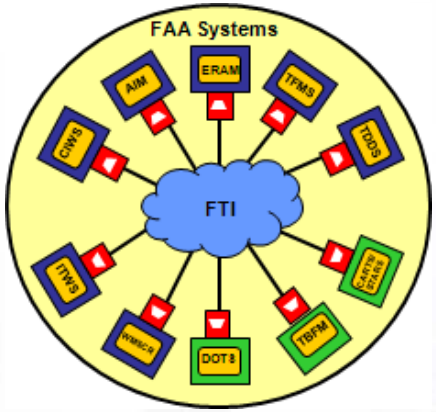
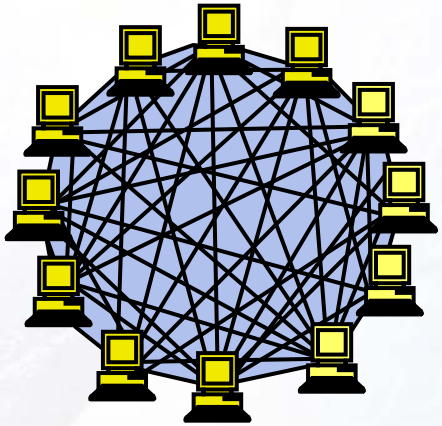


To avoid this

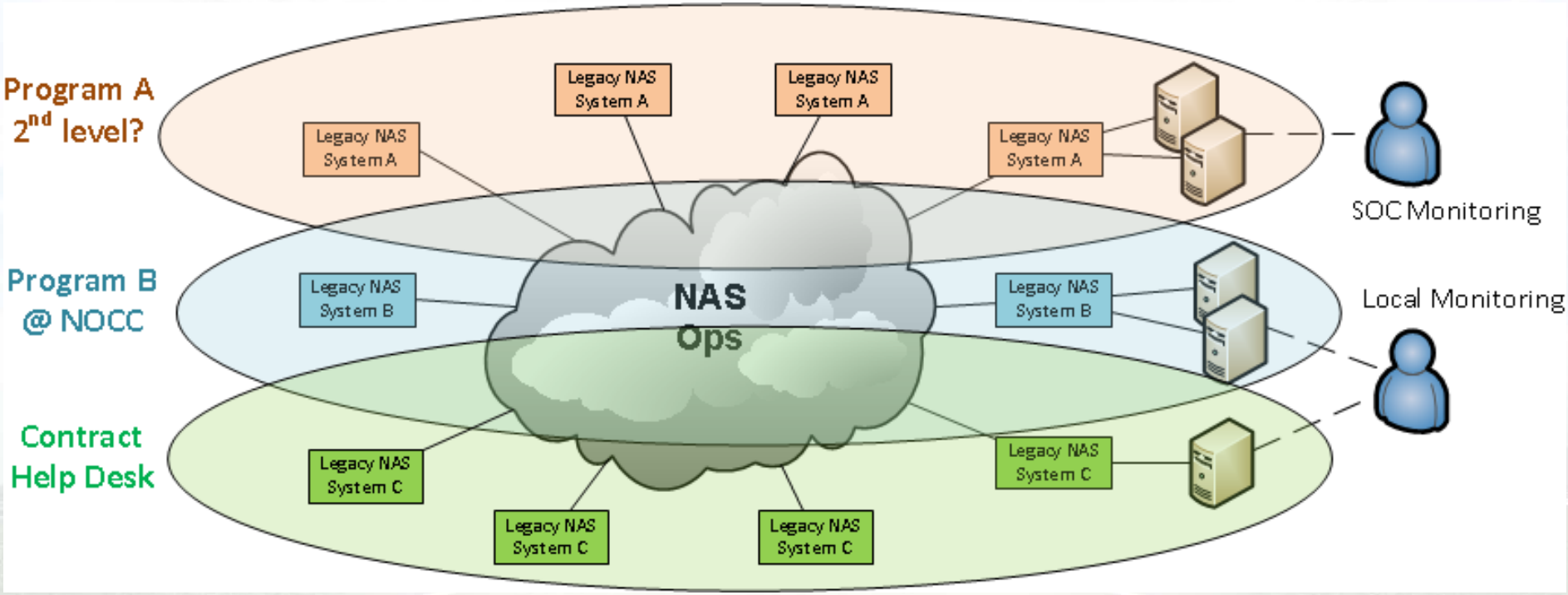


- Positive changes in technology HAVE created better system interoperability, reusable, easily consumable, sources of data
  - Service monitoring & management complexity *has NOT* disappeared

- Benefits of SOA do NOT diminish enterprise operations impact
  - Actually ***complicates*** the task of getting to the root of an issue

Legacy NAS Monitoring

- Legacy systems had clearer domains of responsibility
  - Operations engage vendor or system owner to determine problems/impacts
  - FAA Work centers or vendor handle problems within each domain
  - System-to-system interactions present, but more limited



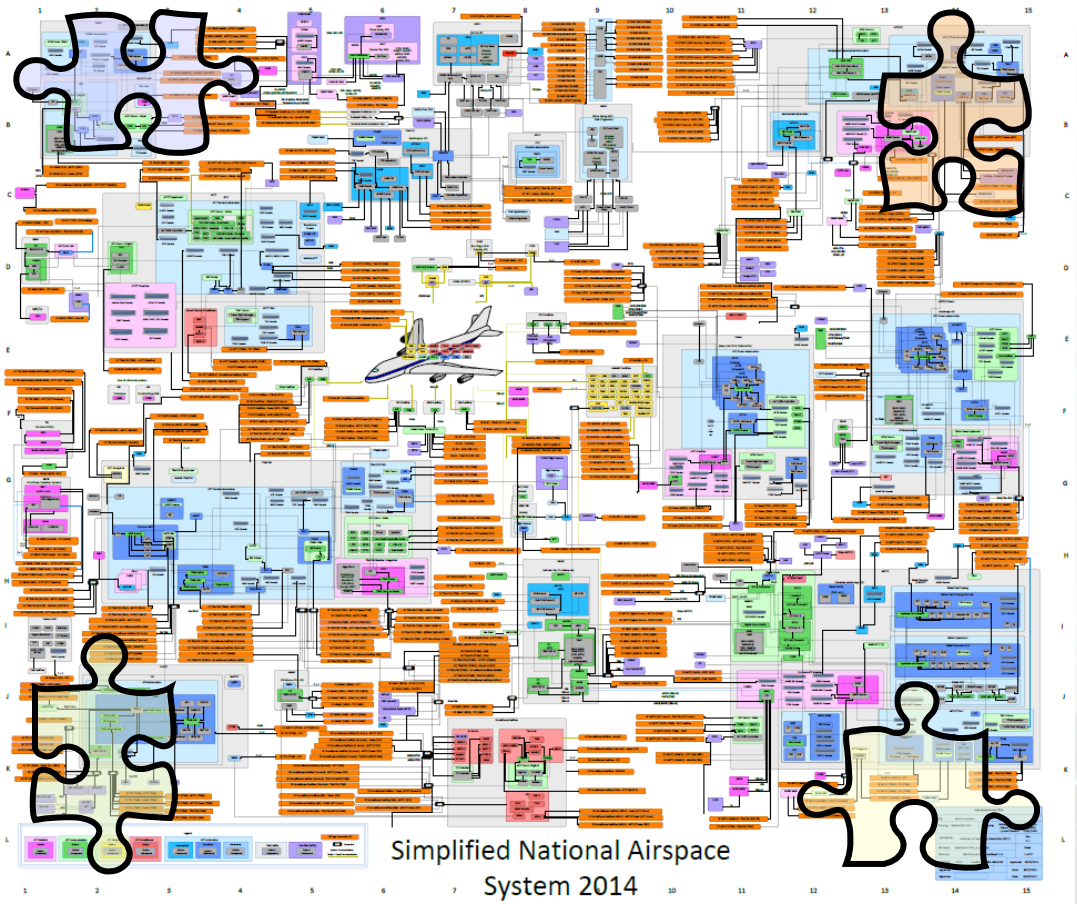
The “Simplified” NAS

- No one service model describes how all NAS systems interact

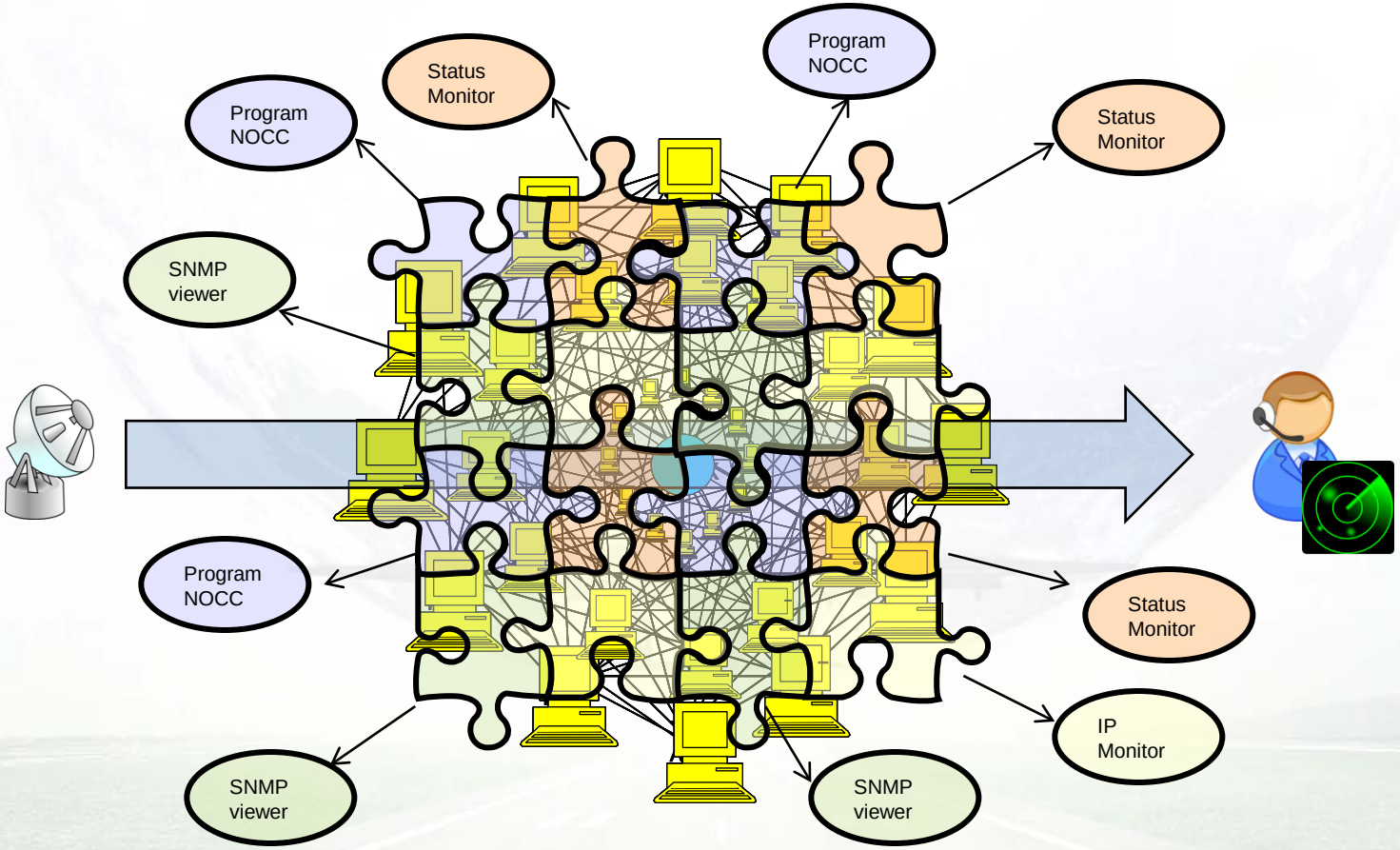
- NAS Simplified Drawing is the closest model that ties everything together

- This a static model - Design-time vs. run-time

- Need a common service model to capture the architecture/configuration for the whole NAS

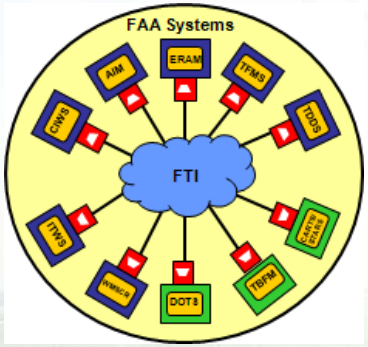


Not that simple after all



Operations Challenges

- In the FAA NAS environment, SWIM product & sub product data flows cross many system domains with multiple responsible parties
  - Vendor systems: FTI (PNOCC, Security, NEMS)
  - FAA (OCC's, ARTCC/TRACON SOC's, NEMC, NAS System Owner, SWIM Implementing Program)
- Which stakeholder is contacted for outage resolution?
  - SWIM PO?, FTI?, OCC?, SOC?, NEMC?, TPC?, AIM CSG?



SWIM Architecture

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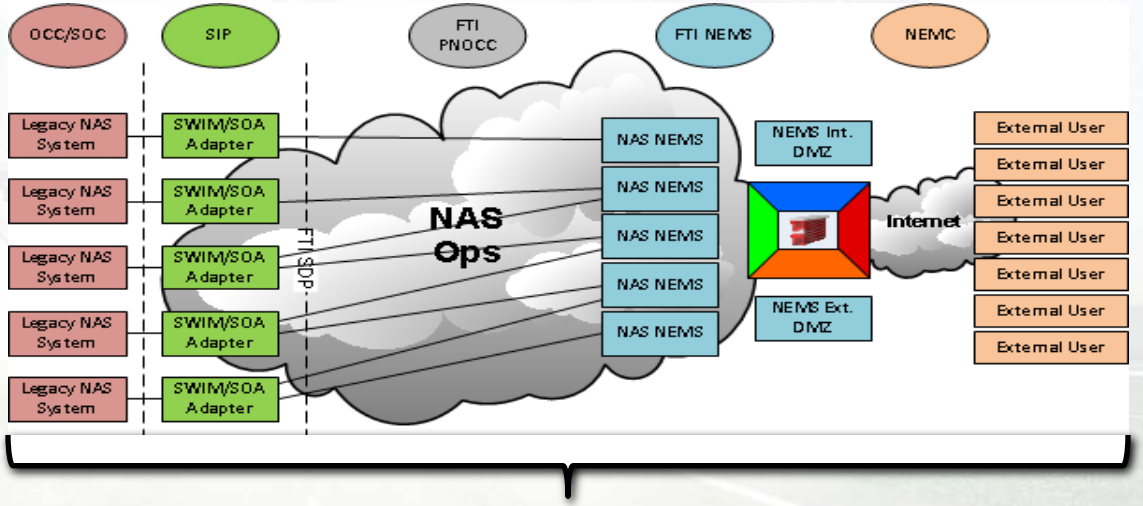
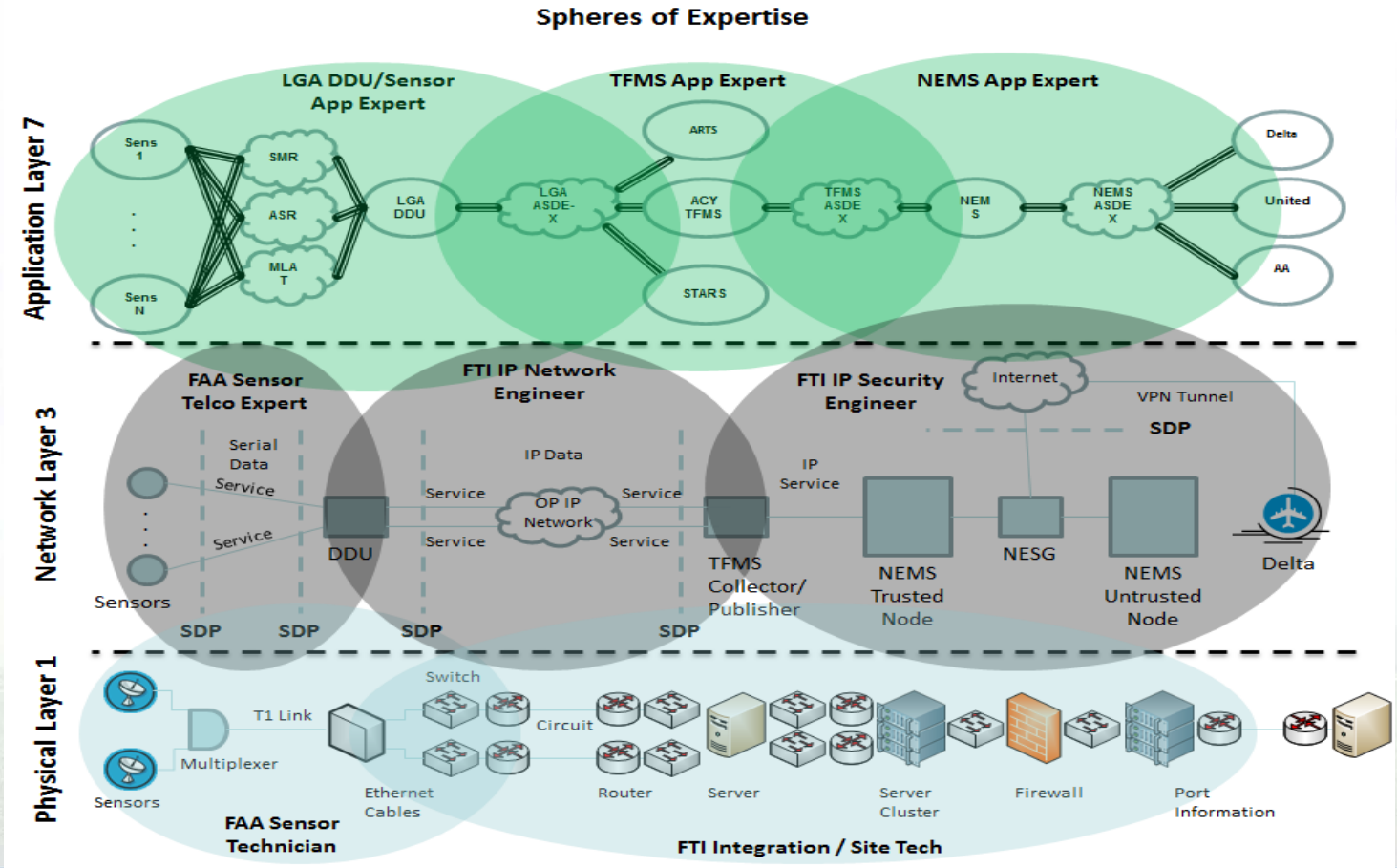


Actual SWIM Service Scope

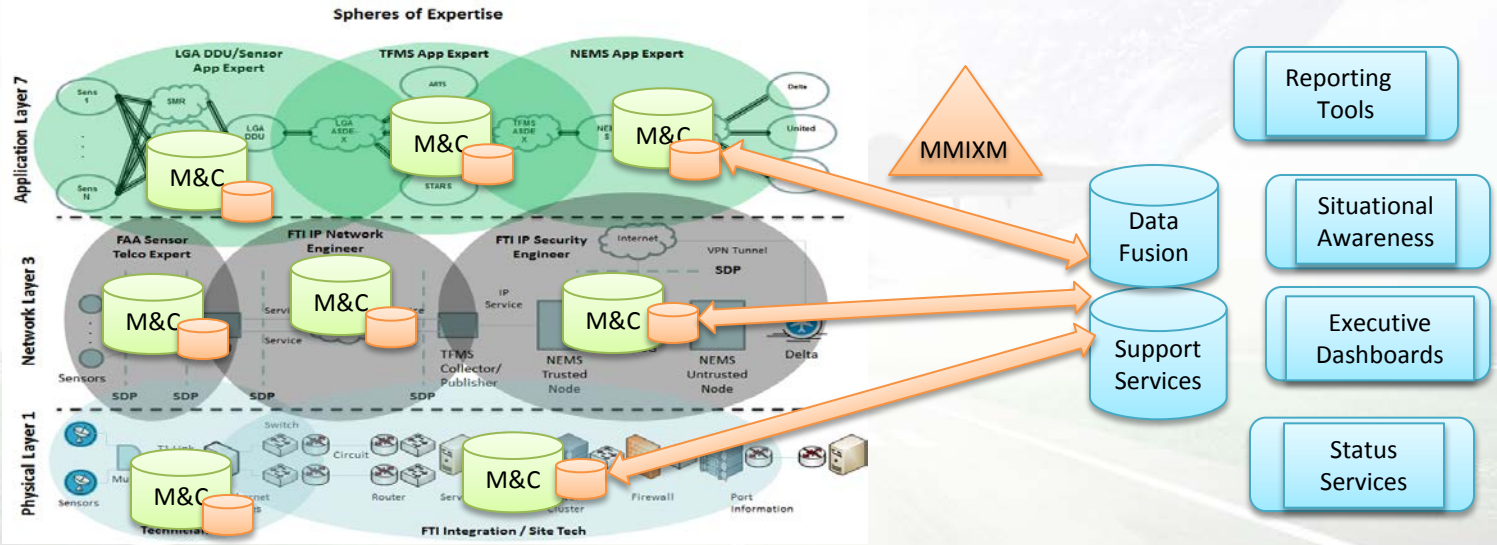
We need a unified model!

- A more federated approach to enterprise situational awareness monitoring, could leverage the expertise in each system domain, applying logic to faults that may cause outages or service degradation



How Can MMIXM Help ?

- MMIXM can help define a common set of data elements (component status, events, alerts) to be adapted and shared from each “link in the chain”
  - Monitoring data from source systems or data aggregators could be synthesized to view the whole puzzle (NAS) in near real time
  - A federated approach would ensure intelligent usable information from each data chain is captured accurately and reliably
- Governance could require each SOA participant system to share situational status information via common asset and status reporting models



Thank You

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