

System Wide Information Management (SWIM) Segment 1 Status Update



Federal Aviation
Administration

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Date: May 14, 2009

The “Problem”

May 14, 2009

V1.0



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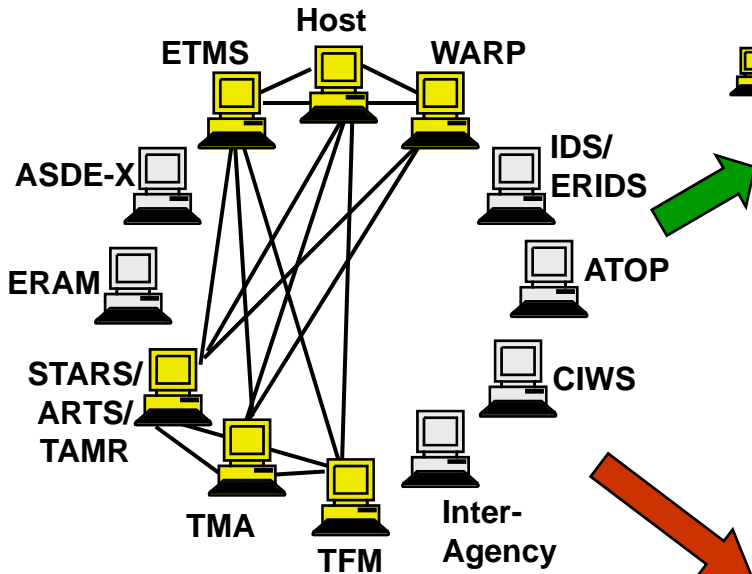
Key Deficiencies in Current Approach

- **The National Airspace System (NAS) is not an agile air traffic system**
- **Costs to develop, test, deploy, and support new NAS interfaces and NAS applications are too high**
- **Data sharing in the NAS is labor-intensive**
- **Timely access to common data is lacking in the NAS**
- **The underlying tools to support becoming a performance-based organization are currently lacking**



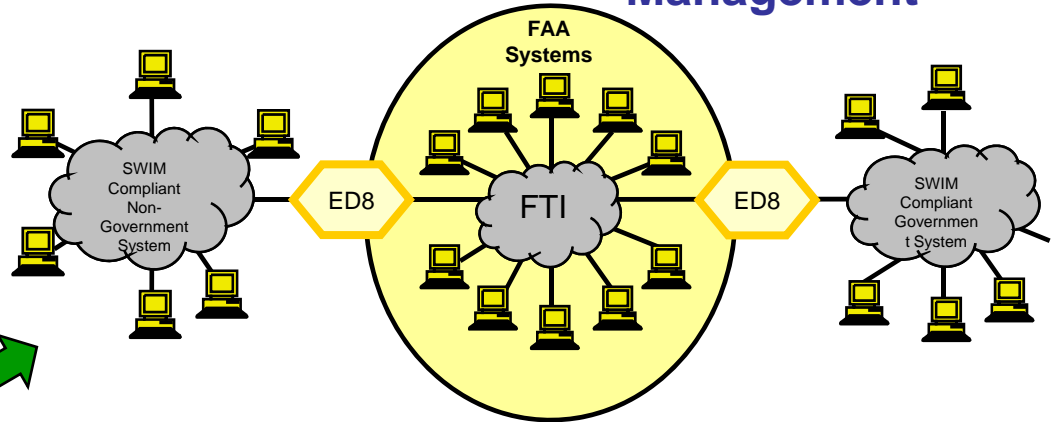
The Challenge

Today

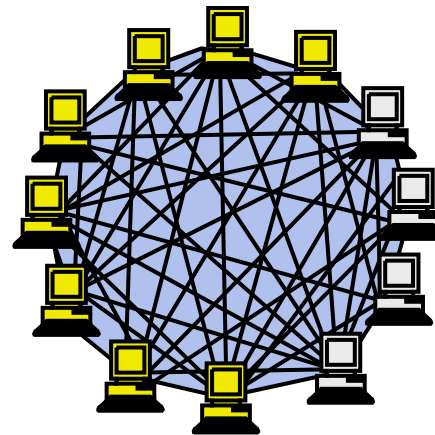


- Existing point-to-point, hardwired NAS
- Unique interfaces, custom designs

Enterprise Management



Business as Usual (NextGen without SWIM)



- More unique, point-to-point interfaces
- Costly development, test, maintenance, CM
- New decisions linked to old data constructs
 - Cumbersome data access outside of NAS

The “Solution”

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Program Concept

SWIM is an IT infrastructure program that will operate in the background to provide data to authorized users

SWIM will:

- Identify industry standards, best practices and COTS products for use by NAS programs
- Establish governance policy, process, mechanisms and metrics
- Implement a Service-Oriented Architecture (SOA) in the NAS

In order to:

- Ensure interoperability between systems as required by NextGen
- Lower costs for information exchange
- Reduce time needed to establish new interfaces
- Increase common situational awareness
- Increase NAS agility

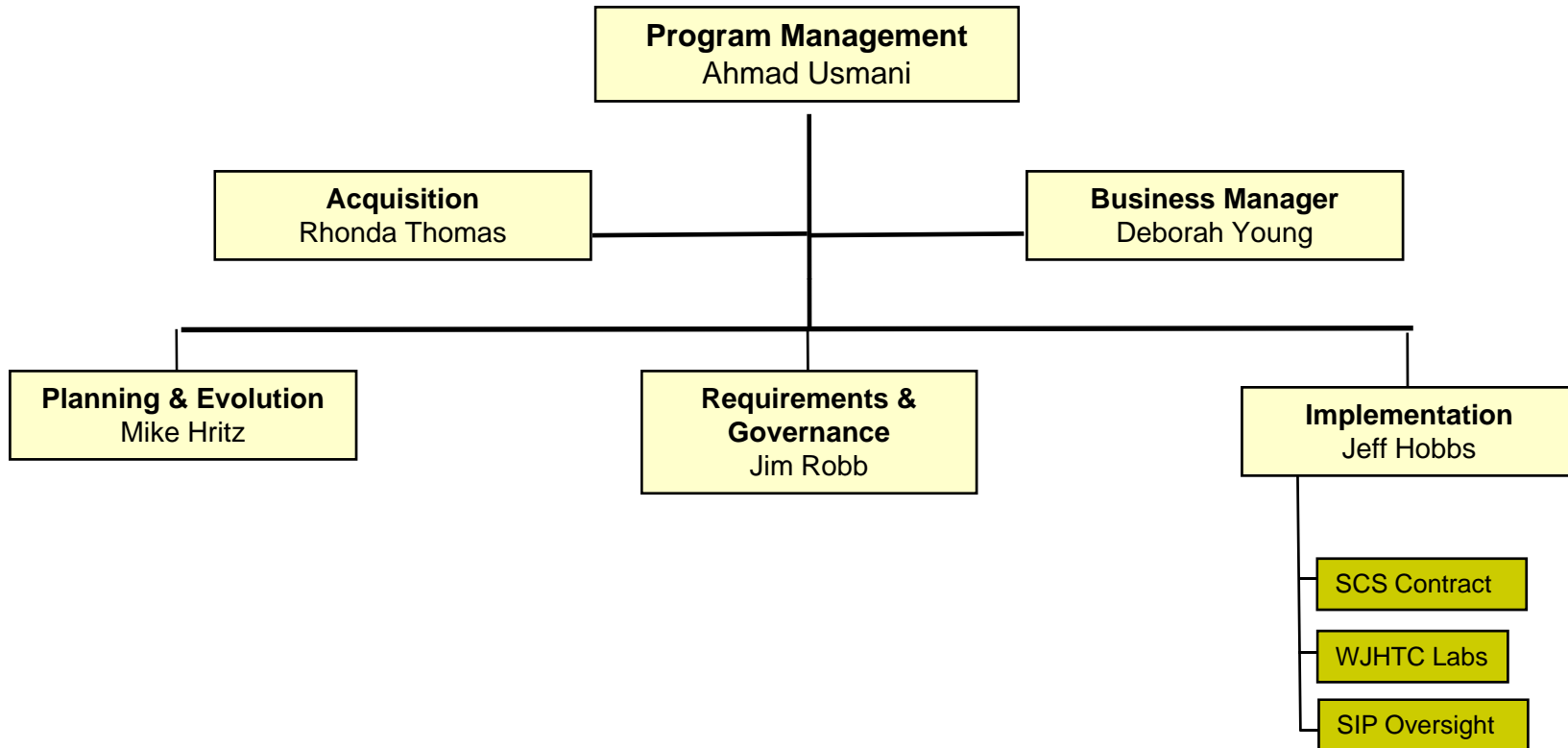
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SWIM Program Office



Details of Segment 1

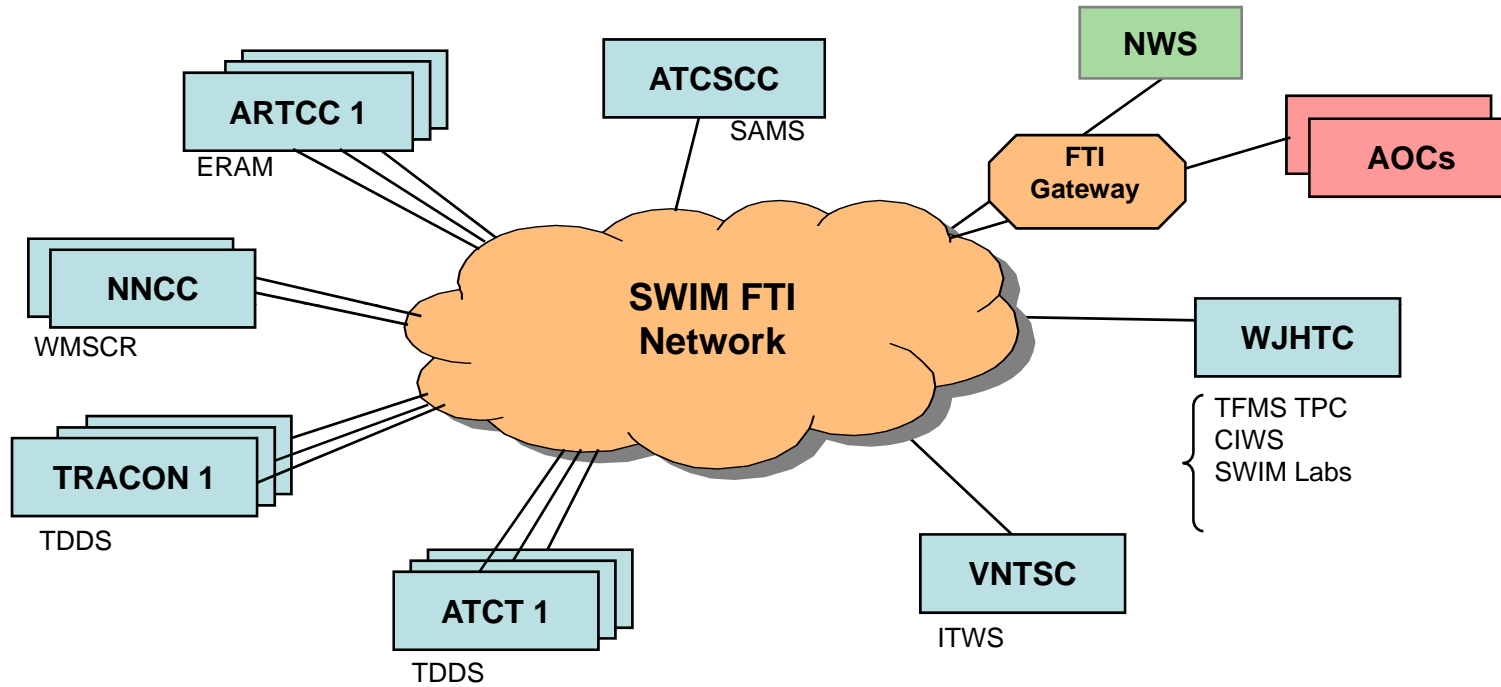
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SWIM Segment 1

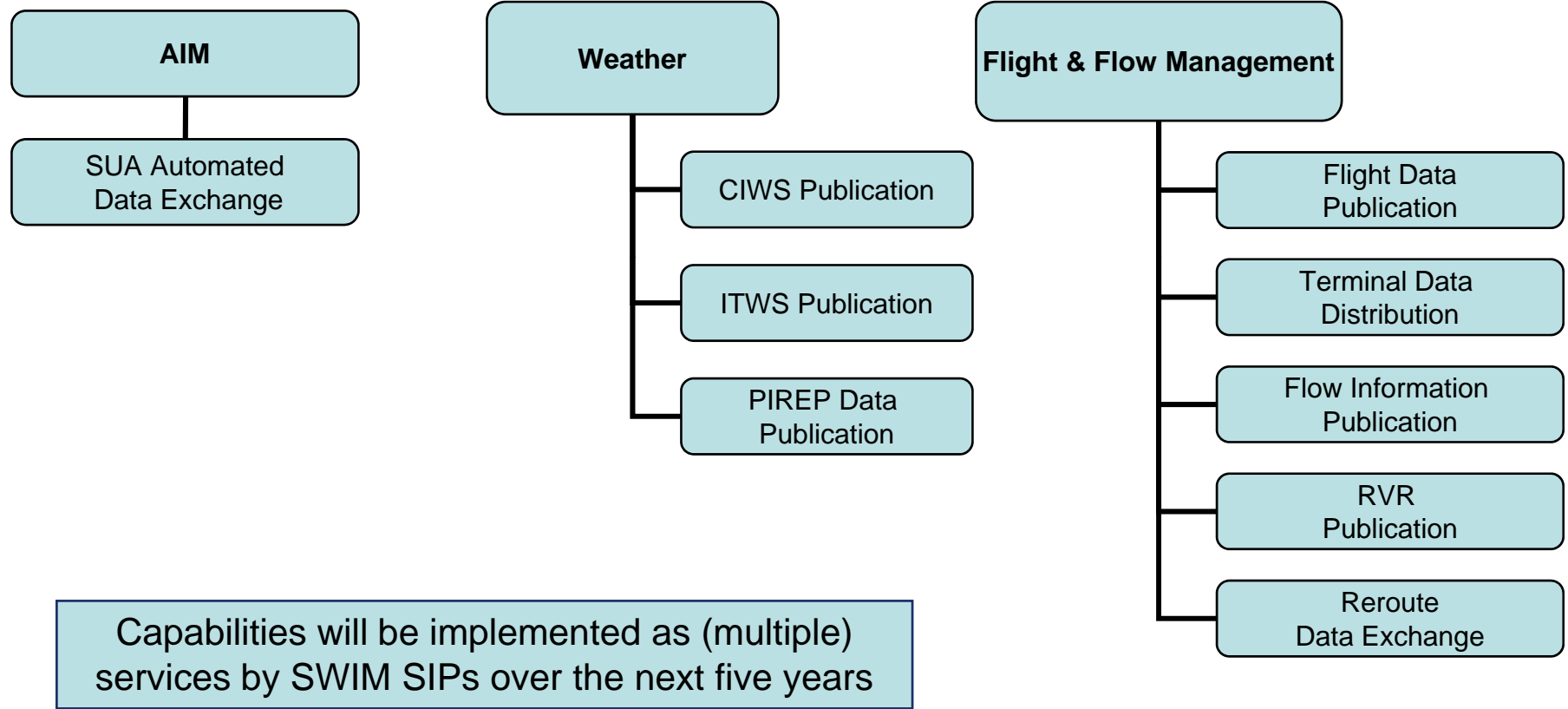


Segment 1 Overview

- **Nine Segment 1 capabilities were derived from Communities of Interest:**
 - Aeronautical Information Management (AIM)
 - Flight & Flow Management (F&FM)
 - Weather
- **SWIM will meet its Segment 1 Goals using a “Federated Architecture”**
 - SWIM will leverage existing infrastructures, processes, resources, and logistics chains that are part of the SWIM Implementing Programs (SIPs)
 - SWIM Governance will establish operating rules for the stakeholders and their services to ensure use of common protocols and interfaces,
 - Common commercial software products for some Core Services will be mandated to ensure interoperability



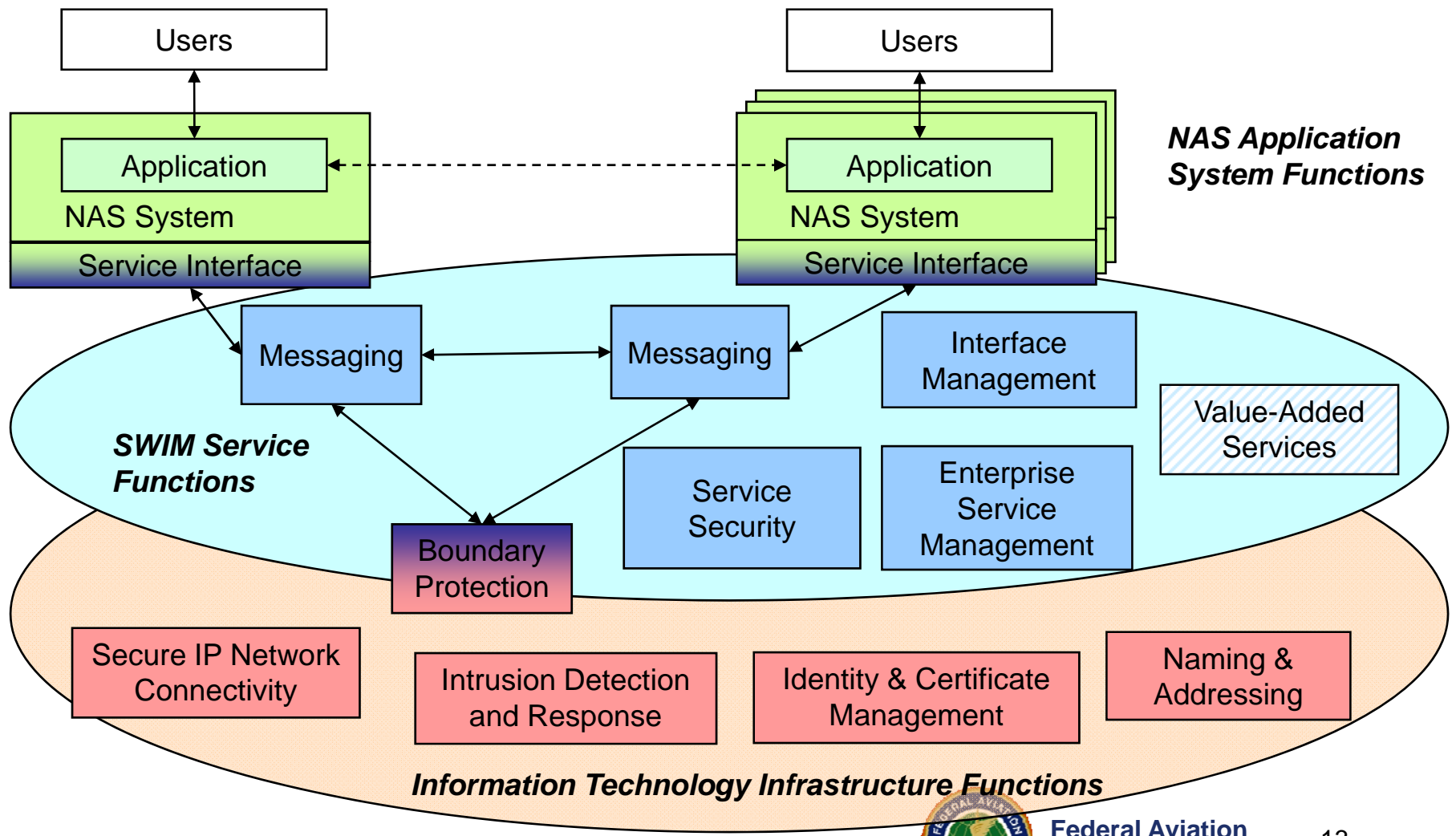
Segment 1 Capabilities



Core Services



SWIM Functional Architecture



Core Services Components

- **Core Services SWIM supports include:**
 - Interface Management
 - Interface Specification
 - Interface Discovery
 - Schema Management
 - Service Invocation
 - SWIM Basic Profile
 - Messaging
 - Reliable messaging routes will be provided on a case by case basis by NAS integration partners



Core Services Components (cont'd)

- **Core Services (cont'd):**
 - Security
 - Authentication and authorization will be manually coordinated and integrated by NAS integration partners
 - Enterprise Service Management
 - Service monitoring and configuration
 - Not to be done with SWIM administered HW or SW
 - Will be accomplished by leveraging existing SIP program system monitoring capabilities and coordinating them across NAS programs

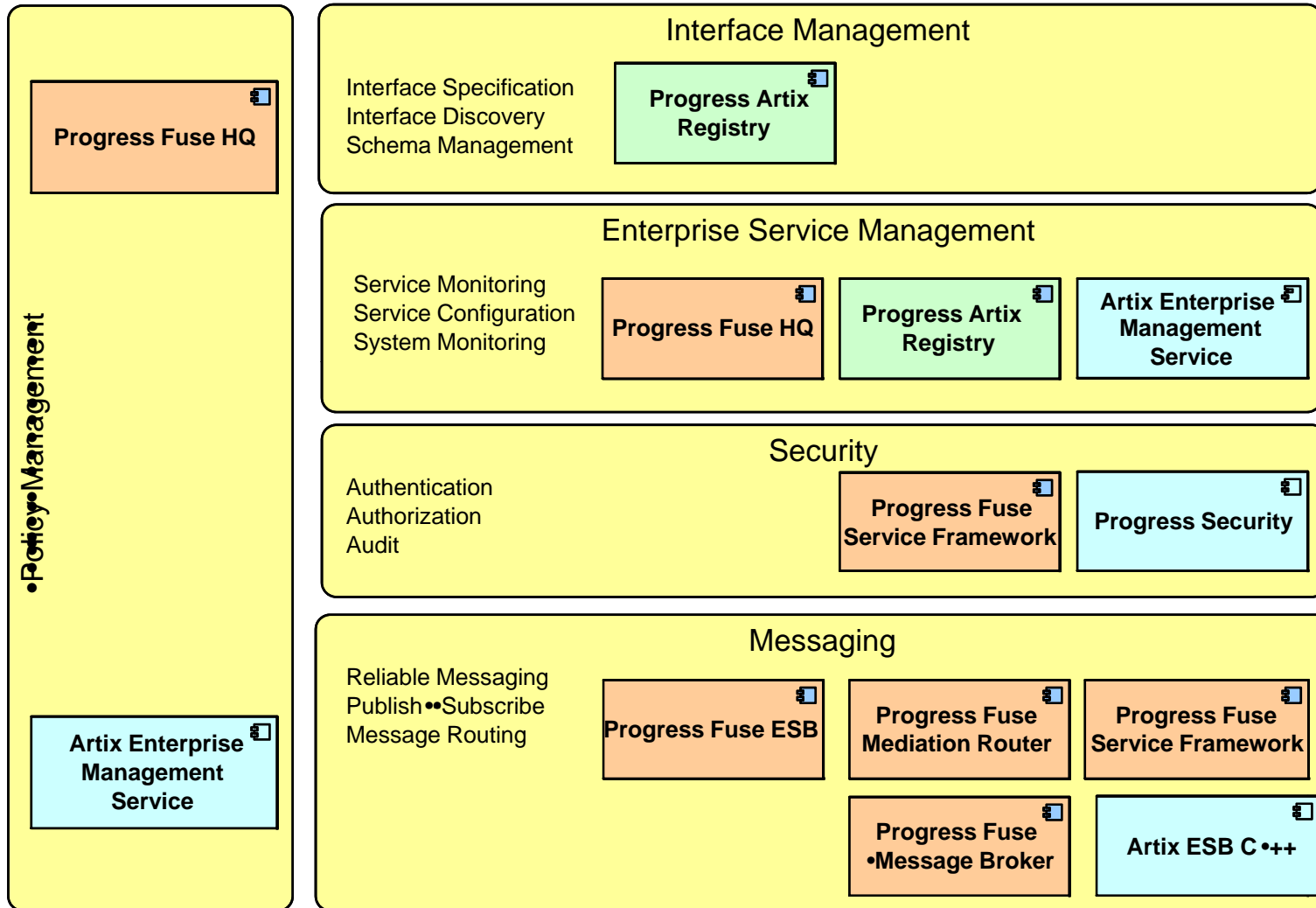


Registry/Repository

- **Design-Time Service Registry will be developed and maintained by SWIM**
 - V1.0 – Systinet 1 from FAA Oracle Enterprise License Agreement (ELA) is running in the William J. Hughes Technical Center (WJHTC) SWIM Lab
 - V1.1 – Systinet 1 with new Taxonomy running at the WJHTC on the Administrative LAN allowing external internet access
 - V2.0 – Procurement is in process
 - Screening Information Request (SIR) expected to be released next month
 - Evaluation expected to be complete early 2010
 - Contract award expected late February 2010
 - Operational Registry/Repository on the Administrative LAN in July 2010



SWIM Core Services Product Stack



Progress Software

- **Progress Contract is managed by SWIM Implementation**
- **SWIM will coordinate and schedule all training for Progress products (Segment 1 SIPs and other FAA Programs)**
- **SWIM will purchase licenses and training on the contract**
 - Segment 1 SIPs are funded by SWIM
 - Others will need to provide funding
- **SWIM will track named users for licenses as required by Progress for both development licenses and production licenses**
- **SWIM will authorize consulting, as needed**
- **Additional tools available on contract**
 - DataXtend Semantic Integrator (DXSI)
 - Progress Actional Team Server (MindReef SOAPScope)

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FY08 SWIM Accomplishments

- **Completed SWIM Architecture Document and SWIM Service Specification Document (SvSD) for Segment 1**
- **Identified commercial standards applicable to SWIM**
- **Completed SWIM Registry IRD**
- **Established SWIM Wiki**
- **Completed CIWS and ITWS prototypes**
- **Extended ITWS Prototype as initial SWIM Service**



FY09 SWIM Accomplishments

- **Revised SWIM Service Specification Document (SvSD) for Segment 1**
- **Stood Up SWIM Registry V1.0**
- **Stood Up COTS repository**
- **Established COTS Working Group**
- **Established Architectural Working Group**
- **Completed an Extensible Markup Language (XML) Gateway (GW) Qualified Vendor List (QVL)**
- **Stood SWIM Tool Kit (Resource Kit)**
- **Conducted Progress Fuse Training for all 7 SIPs**



Support to SIPs

- **SWIM support to the SIPs includes:**
 - Ensure all parties adhere to the standards via oversight during requirements definition, software development and test phases, and through SWIM governance
 - Provide design guidance
 - Monitors SIP development of services to ensure SWIM requirements are met, and development is in accordance with SWIM standards
 - Holds periodic Technical Interchange meetings
 - Holds monthly Program Management Reviews with each SIP
- **SWIM Wiki initiated to encourage technical interactions**
- **SWIM KSN used as a document repository**
- **SWIM COTS Repository has been established to ensure all SIPs use the same software versions**



What is the purpose of SWIM Resource Kit?

- **To assist the SIP developers in learning and utilizing the SWIM Core Services**
- **To assist the SIP developers in debugging COTS and related third party products**
- **To assist the SIP developers in obtaining and managing the resources required for development.**
- **To assist the SIP developers in identifying the SWIM Service Container components required to implement their Service.**
- **To assist the SIP developers in sharing knowledge.**
- **To provide tools to assist the SIP developers with testing.**



What is the Resource Kit?

- **Guidance Documentation**

- Maven Guidance
- Developers Guide for Fuse ESB
 - Procedures for installing Eclipse, Fuse tools for Eclipse and Maven plug-in
 - Build procedures
 - Debugging procedures
 - Examples

- **COTS Repository**

- Fuse ESB, Fuse Mediation Router, Fuse Message Broker, Fuse HQ, Fuse Service Framework
- Spring
- Eclipse
- Maven
- Ant



What is the Resource Kit? (Cont'd)

- **SWIM Reference Model**
 - Description of Service Container components and interfaces
 - Maps Service Container components to Core Services
 - Decision Tree for identifying which Service Container components and architecture are required to achieve particular operational needs such as guaranteed messaging
- **Governance and Policy Guidance**
- **Standards**
 - Core Service Standards
 - Industry Standards



What is the Resource Kit? (Cont'd)

- **Tools**
 - WS-I Testing Tools
 - iTKO LISA – SOA Test Tool and Virtual Service Emulation (VSE)
- **XML Gateway Qualified Vendor List**
 - Updated Annually
- **Policy Server**
 - Deferred Acquisition
- **SWIM Wiki**
 - https://ksn.faa.gov/km/atow/com/sysegr/SWIM/SIPs/SWIM%20Segment%201/swimwikirequest_pub_0001.pdf
- **Third Party References and Training Information**

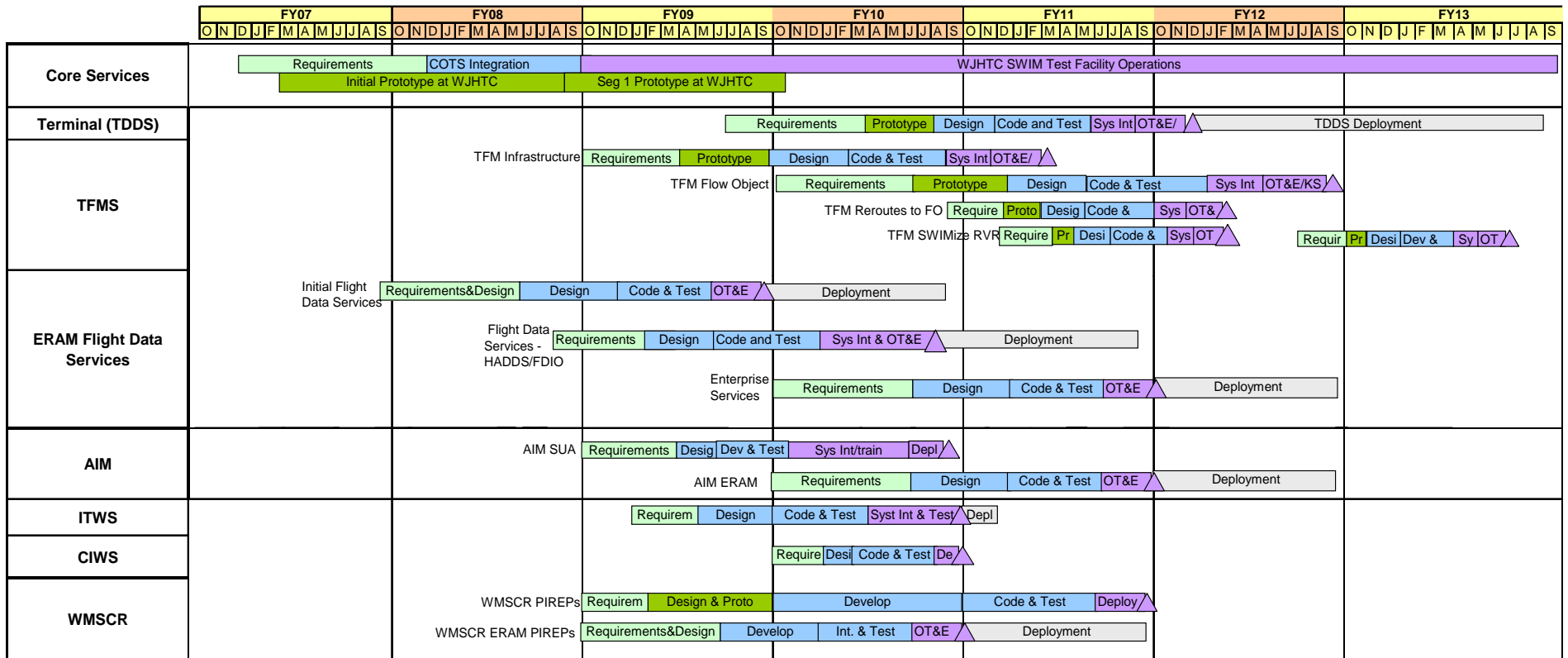


Resource Kit Availability

- **Available on the SWIM Wiki as Resource Kit items**
- **Resource Kit is dynamic**
 - New items will be added as required



SWIM High-Level Program Schedule



Prototypes

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V1.0



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Weather: CIWS Prototype

- **Initial Prototype was an evaluation of the Mulesource Mule Service Container**
- **Development of a follow on Prototype started in January 2009,**
 - CIWS products will be available through the ED-8 gateway to external consumers starting at the end of September 2009.
 - Products
 - Vertically Integrated Liquid (VIL)
 - Echo Tops
 - Quantized VIL
 - Quantized Echo Tops
- **Within the next 30 days consumers will be invited to participate**
- **One of the goals of this prototype is to provide the requirements definition for the operational system.**
- **The CIWS prototype will operate until replaced by the operational system in 2010.**



Weather: ITWS Prototype

- **Initial Prototype was an evaluation of Iona (Progress) Fuse Service Container**
- **Following the service container contract award, development continued to provide ITWS services to external FAA consumers through the Federal Telecommunications Infrastructure (FTI) ED-8 gateway.**
- **The initial prototype provides four services:**
 - Microburst TRACON Map,
 - Gust Front TRACON Map,
 - Terminal Weather Text, and
 - Configured Alerts (text)
- **Sample client software is provided to consumers in order facilitate use of the service prior to integrating it into their own applications.**



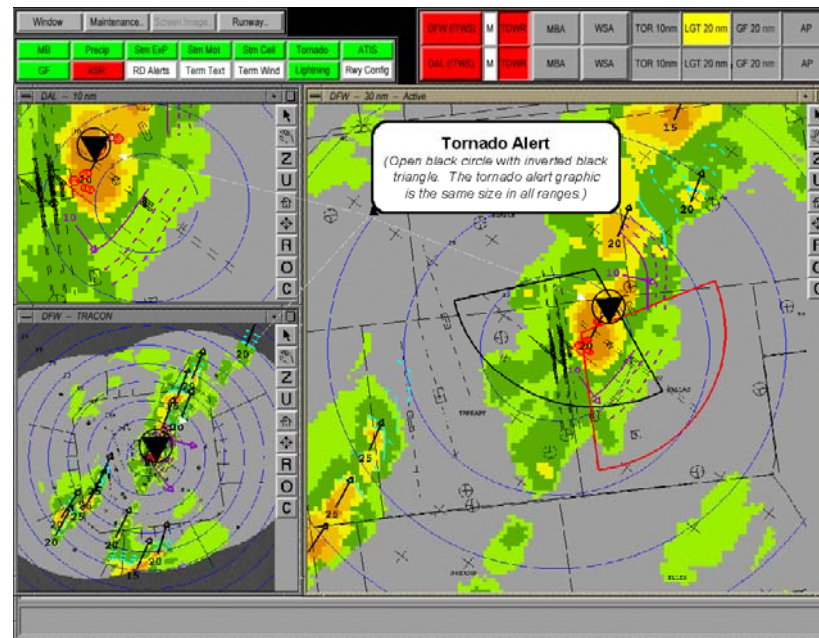
Weather: ITWS Prototype

- **On October 6, 2008 UPS started receiving digital data for the four ITWS weather products.**
- **Additional users are in the process of connecting**
 - (FedEx, NW, PHL Airport Operations, etc)
- **Additional product will be added to prototype over the next several months**
- **For the prototype, consumers can use either a Virtual Private Network (VPN) over the internet to connect to the ED-8 or a VPN over a leased line to the ED-8.**
- **Prototype has provided knowledge and experience with**
 - security using the Progress Fuse Service Container
 - connection to external consumers through the ED-8 Gateway
- **The prototype will continue to evolve with additional products until the operational system replaces it in 2011**

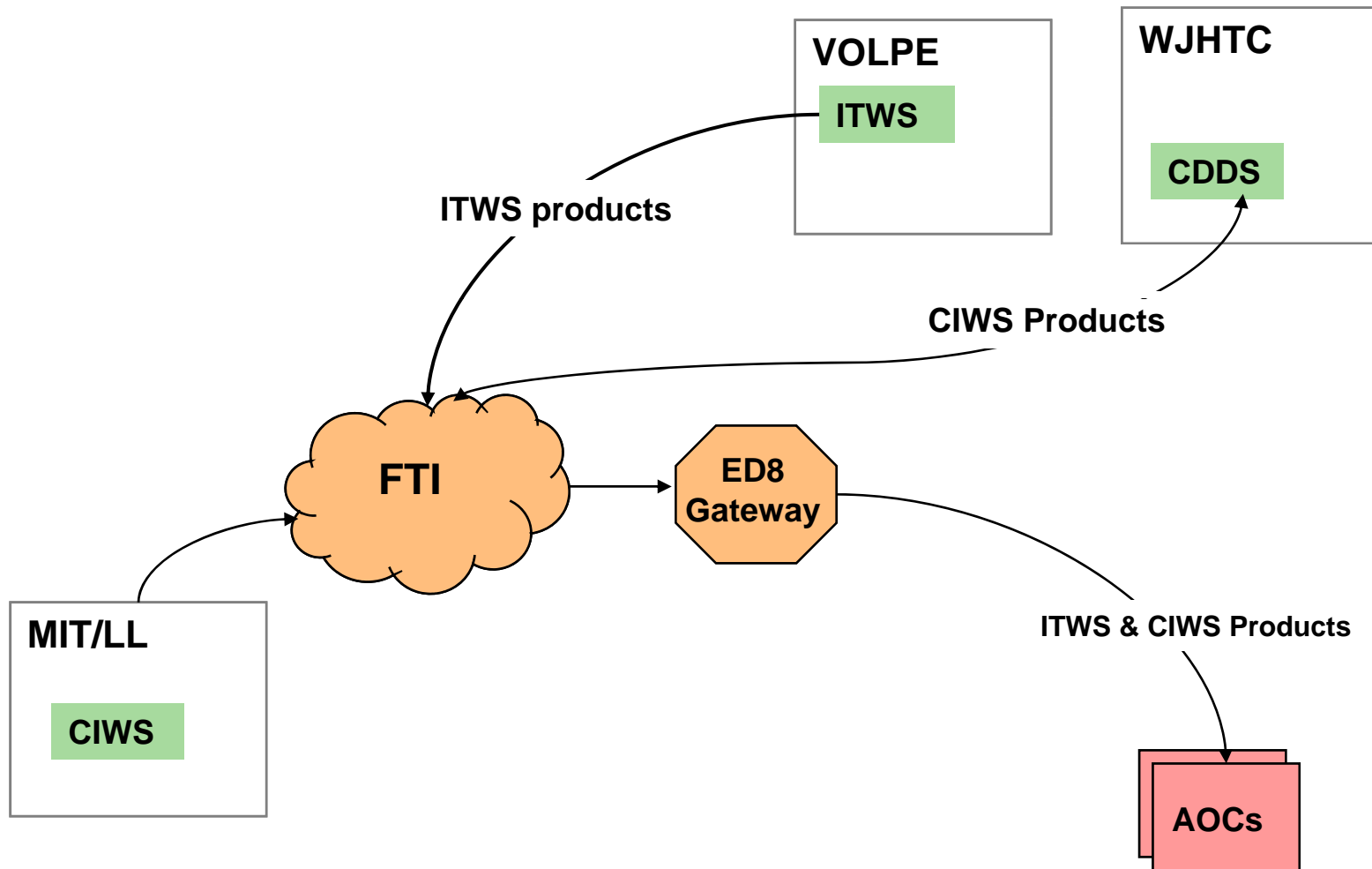


Weather: ITWS Data Publication

ITWS Products
Windshear
Microburst
Gust Front
Precipitation
Six-Level Precipitation
Ribbon Display
Runway Configuration
Lightning in Storm Cell
Storm Motion-Direction
Storm Cell
Long-range Precipitation
Short-range Precipitation
Terminal Convective Weather Forecast
Terminal Winds



CIWS and ITWS Prototypes



Summary



SWIM Segment 1

- **SWIM**
 - Supports OMB endorsed Federal Enterprise Architecture goal to simplify processes and unify work across agencies
 - Allows software applications in the NAS to interact with one another without knowledge of application's underlying platform implementation
 - Simplifies interface requirements to existing NAS system
 - Reduces NAS development and implementation costs and risks for new applications
 - Enables transition net-centric NAS operations from tactical conflict management to strategic trajectory-based operations
- **Additional information on Segment 1 and future segments**
 - www.swim.gov

