

United States SWIM Planning and Implementation Update

Overview Briefing

Presented to: ICAO APAC SWIM Workshop – Hanoi, Vietnam

By: FAA ATO International

Date: 25-27 August 2026



**Federal Aviation
Administration**



SWIM Integrates Air Traffic Operations



Air Traffic systems are integrated with the SWIM platform and capabilities to support daily operations with other systems in support of ATM operations



Airlines, airports, service providers, international partners and other government agencies rely on SWIM for their operations with the FAA



SWIM capability and infrastructure is a key component to protect NAS systems and sensitive information



SWIM infrastructure reduces and avoids telecommunications costs for programs associated with information exchanges

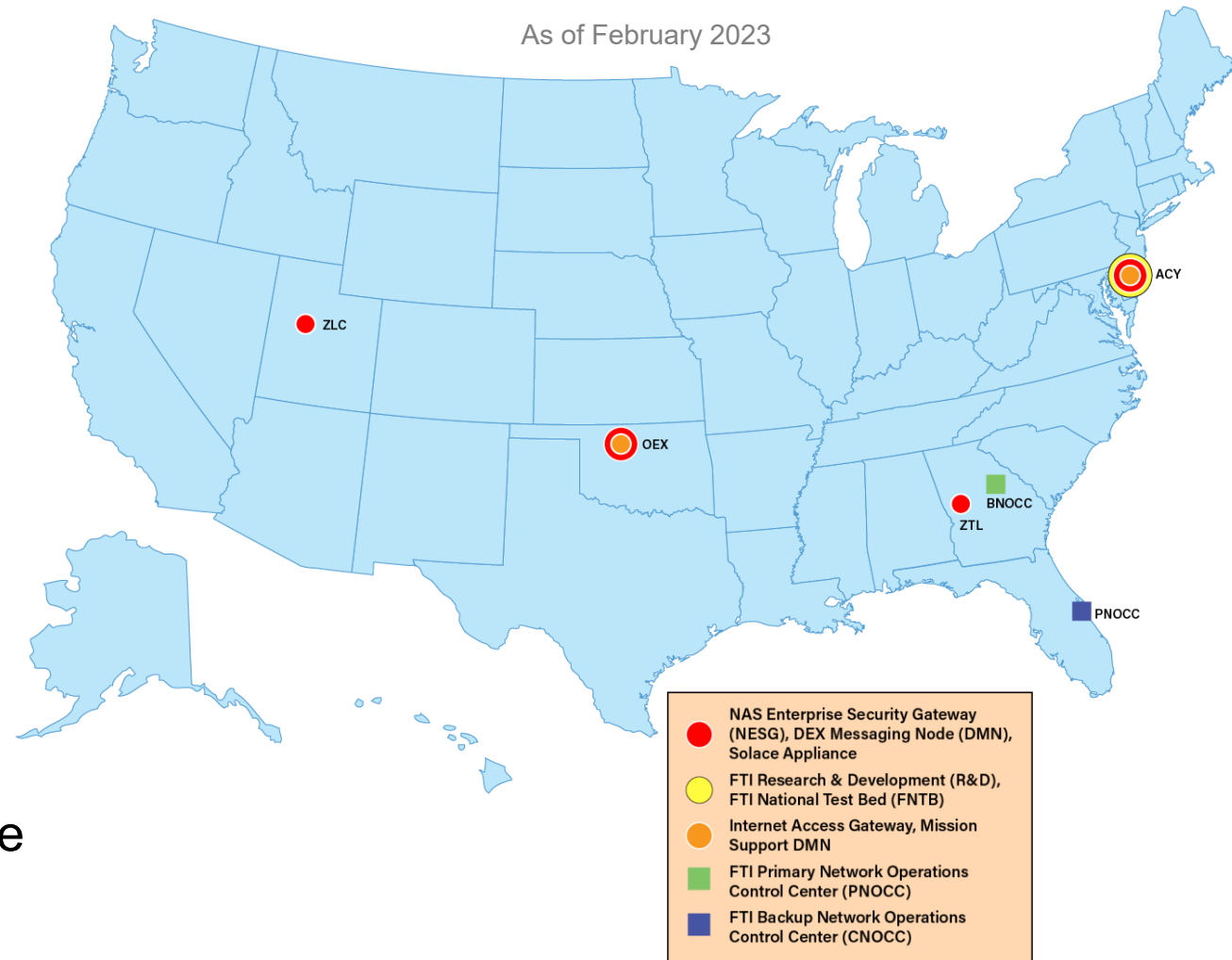
SWIM Infrastructure: NEMS and SCDS

NAS Enterprise Messaging Service (NEMS)

- Allows the seamless exchange of data between producers and consumers
- Enables the FAA to deliver core messaging and publishing data to consumers and other FAA programs

SWIM Cloud Distribution Service (SCDS)

- Publicly accessible cloud-based infrastructure
- Provides near real-time SWIM data to the public





Internal
Producers
& Consumers



FLIGHT/FLOW

TFMS

TBFM

TFDM

SFDPS

STDDS



WEATHER

ITWS

CSS-Wx

WMSCR

WARP/EWD

STDDS



AERONAUTICAL

AIM

SFDPS



SURVEILLANCE

SFDPS

STDDS

MicroEARTS

SWIM Enables NAS Operations



Government
Agencies



Airport Facilities
& Authorities



International &
Standards
Bodies



Industry



Professional
Associations



Airspace
Users

External Producers
& Consumers



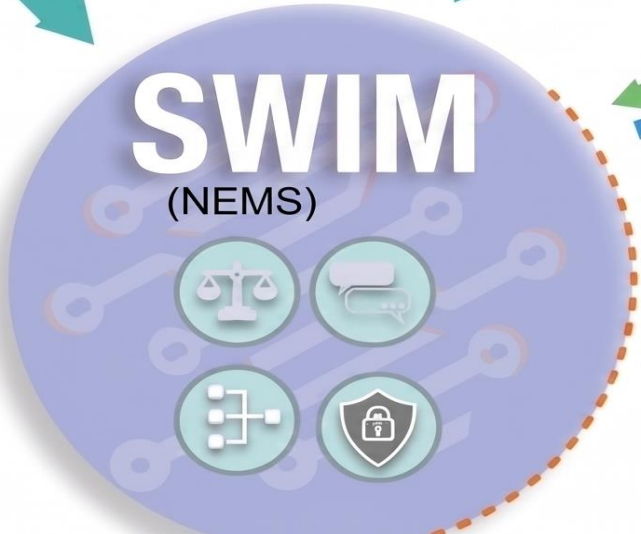
Mission Partner
Producers &
Consumers



Mission Partner
Producers &
Consumers



External
Pub-Sub
Consumers



NESG



NESG



NESG

ESCS

SCDS
Portal

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FAA SWIM Modernization Priorities



Modular **bi-directional** cloud-native **architecture** for **operational SWIM services** with **loose coupling**, **high availability**, and **scalability**; **comprehensive messaging capabilities** via **event brokers** and **API Gateways**



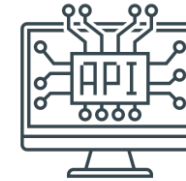
Flexibility with hybrid deployments, and messaging protocols .



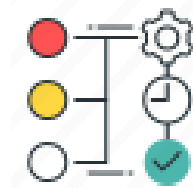
Transition from site-specific legacy hardware dependencies and tech refreshes to adoption of **modern commercial services**, **cloud containerization**, and **emerging technologies**.



Accelerated onboarding, **self-service** portals, **Automation testing** (CI/CD), elevated user experience



Introduction of enterprise **API Gateway** and **API Management** solution for NAS data exchange



Introduce **automation tool suite** for **monitoring**, **standardization**, **security**, **troubleshooting** and **governance**

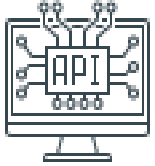
Enhanced SWIM Cloud Services

- The Federal Aviation Administration (FAA) is **modernizing its enterprise information exchange capabilities** by deploying the Enhanced System Wide Information Management (SWIM) Cloud Services (ESCS).
- ESCS will be a secure, cloud-native messaging platform that improves performance, resiliency, and onboarding for National Airspace System (NAS) stakeholders.
- Builds on FAA's existing SWIM and NAS Enterprise Messaging Service (NEMS) capabilities and **aligns with the FAA's strategy for the NAS Trusted Cloud (NTC), FAA's current activity to deploy an API Gateway and Manager and unified management of SWIM services.**
- **ESCS is being developed iteratively. Release 1 is centered around cloud hosting of Solace messaging infrastructure. Release 2 will feature integration with API Gateway and introduction of unified SWIM portal for unified data management, accelerated service provisioning, and self-service discovery.**



APIM Introduction

With emerging web technologies and FAA BNATCS / ICAO web service requirements, the NAS requires modern and dedicated enterprise API Gateways. An integrated enterprise API Gateway and Manager for harmonized development, discovery, governance, and lifecycle management of NAS APIs.



Simplified API Design: Create web APIs of all types (REST, SOAP, gRPC, GraphQL, Webhooks etc.); and Full API lifecycle management.



Comprehensive management and security: Centrally integrated IAM, advanced security, governance, automated workflows, testing, traffic management.



Telco and Environment agnostic solution: Can be deployed in any FAA environment independent of the network infrastructure. Harmonized SWIM modernization on-prem and in cloud.



Monitoring & SLA Tracking: Built-in monitoring/logging, SLA tracking. Native integration with enterprise monitoring tool, Datadog, for 1st and 2nd level support.



Unified Management and Developer Portal: Discovery and access to all NAS information services from a common interface. Native federation with COTS Messaging Platforms across the NAS portfolio (Solace, Google/Apigee, AWS etc).



Native integration with Solace. Protocol mediation to expose Solace events as web services (ex: JMS to REST) or federation for discovery.



Cost savings and Enterprise inheritance: Prevents duplicative costs and conflicting governance, security, and implementation from standalone solutions. Inherit cross cutting enterprise controls to simplify system design.



Decouples NAS producers and consumers: Introduce an abstraction layer between consumer facing interfaces and backend implementations



NAS API Management is powered by Gravitee. Gravitee will be a subsystem of ESCS similar to Solace.

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International Collaborations



- Digital Transformation Work Group**
- **Global SWIM Implementation**
- **Development of SWIM kit publication**
 - Guide and toolkit for hands-on exploration of a SWIM implementation
 - Incorporates SWIM SOA, PANS-IM framework, ICAO guidelines
 - Publication late 2025
 - Adoption workshops planned
- Explore **SWIM maturity model to guide and accelerate implementation**
- **Alignment with FF-ICE R1 and R2 implementation**
- **Correlation of SWIM service adoption and FF-ICE to achieve Complete Air Traffic Systems (CATS) 2045 vision**



ICAO

- Information Management Panel**
- **SWIM Registry Interoperability Concept and Implementation- WG I/S**
- **Information Service Definition Roll out**
- ICAO digital data sets
- **Updates to ICAO 10203 and ICAO 10199 on Global SWIM implementation manual** and technical procedures for information management.
- **Information Service Overview development** to characterize and discover SWIM services via standardized metadata exchange
- Working papers on SWIM messaging, routing, testing etc.



ICAO

- APAC SWIM Task Force**
- FAA presented Strategic Decision to leverage legacy technology investments to support Air Traffic Services (ATS) data exchange, while prioritizing internet-enabled SWIM for Air Traffic Management (ATM) information sharing between aviation partners.
- **APAC SWIM Implementation (2024-2030)**
- **SWIM Discovery Services** (Peer to peer discovery), **registry interconnection**, Governance (standardized data models, schemas)
- **API Gateway Implementation**

FAA and APAC API Collaboration

- ❑ **Federal Aviation Administration (FAA) is working under the SWIM Implementation Pioneer Group (SIPG) and APAC SWIM TF initiatives to enable a harmonized and interoperable SWIM messaging implementation that aligns with International Civil Aviation Organization (ICAO) standards.**
- ❑ **FAA SWIM led SIPG task 7 to develop data models, operational scenarios, test cases for implementation of SWIM Discovery services—which enables a standardized approach for globally interconnected SWIM registries and service discovery.**
- ❑ **SIPG Task 3 is leading APAC Request-Reply MEP implementation efforts on the following in coordination with relevant ICAO APAC groups (ex: FF-ICE ad-hoc):**
 - ❑ Request-Reply Message Exchange Patterns (MEP) Guidance documentation
 - ❑ RESTful API Naming and Structuring Guidance Material documentation
 - ❑ API Gateway Requirements Specification document in APAC Region
 - ❑ Prototype implementation and testing Request-Reply MEP (both sync. and async.)
- ❑ **The FAA is modernizing its SWIM infrastructure with API Gateways for synchronous messaging and Event-Brokers for asynchronous messaging. FAA presented Working papers on SDS and API Gateways at ICAO APAC SWIM TF/11.**
- ❑ **APAC SWIM TF/11 Outcome: FAA SWIM and APAC aligned on data model for implementation of SWIM Discovery Services. Additionally, adoption of API Gateways was agreed upon for request-reply web services.**

SWIM Discovery Service (SDS) and Registry Interoperability

- ❑ SWIM Discovery Service (SDS) is a standards-based web service that enables federated discovery of SWIM services across independently managed service registries.
- ❑ As SWIM implementation expands globally, **without a standardized metadata format and discovery mechanism, cross-registry service discovery becomes constrained**, limiting interoperability and reducing the effectiveness of global information sharing. **SDS addresses this challenge by:**
 - ❑ Enabling **federated discovery** without centralizing metadata storage
 - ❑ **Standardizing service models, metadata structures, and schemas**
 - ❑ Supporting the conceptual data interactions and objectives of the ICAO IMP SWIM Registry Interoperability Job Card



Envisioned end state of Interconnected registries

SWIM Harmonization efforts

Connection Methods

- SWIM is the enabler
- Introduction of APIs
- Information sharing roadmap

FF-ICE Services

- Alignment of services
- Understand implementations
- Identify potential impacts

eFPL Fields

- FF-ICE & FIXM Guidance
- Mandatory & Optional
- Minimize rejections with Ignored vs Forbidden

Timelines & Mixed Mode

- CP1 and implementation targets by region
- ICAO FPL2012 Sunset
- Mixed Mode Realities

