SWIFT: FAA Industry Collaboration Workshop #14

SWIM Services & SWIFT (SWIM Industry-FAA Team)

Presented to: User Community

By: FAA SWIM Program Communications, Information and Network Programs

Date: May 27, 2021
Who is in the “Zoom Room” at SWIFT #14?

Attendee Organizations

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
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</thead>
<tbody>
<tr>
<td>Airline Industry</td>
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<tr>
<td>Government</td>
<td>107</td>
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<td>Vendor to Industry</td>
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<td>Other</td>
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<td>FPRDC</td>
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<tr>
<td>Support Organization</td>
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</table>

*Other defined as: Consultant, Operator, Researcher, Safety, Academia, ATM Vendor, Association, ANSP*

Attended a SWIFT Meeting Before?

- I’m a Veteran: 342
- No, I’m New: 96

438 attendees
FAA Collaborative Workshop #14

- On-line Virtual Conference Starts Promptly 12:30pm
- Welcome and Introductions
  - David Almeida (LS Technologies)
  - Opening Remarks
  - Mark DeNicuolo (FAA)
- Focus Group General Updates
  - Operational Context – Ray Mitchell (LS Technologies)
  - Operational Issues (Ops Issues) Chris Gottlieb (JetBlue)
  - Development & Analytics - Erin Cobbett (Delta) and Mike Jagmin (United)
- Special Topic: NOTAMS Industry Update
  - Jeri Groce (FAA)
- NAS Program: TFDM Lab Connection
  - Doug Swol (FAA)
- SWIFT Update: New York Area Study On Early Planning For Disruptions
  - Chris Gottlieb (JetBlue) and Mark Hopkins (LS Technologies)
- Special Topic: Trajectory Based Operations Update
  - Steve Bradford (FAA)
- SWIFT Portal
  - Michael Pozsgay (FAA) and Doug Harvey (L3Harris)
- SWIM Data: Widget Case Study Briefing
  - Sandie Steele (LS Technologies)
- Information Services Roadmap Update
  - Xavier Pratt (LS Technologies)
- Close out
SWIFT: At the Intersection of Operations, Technology & Data

- **SWIFT addresses industry recommendation to:**
  - A community forum that acts as a clearinghouse for collaborative engagement around NAS information and data sharing
  - **Educate**: Synchronize community on information services
  - **Collaborate**: Discuss issues most relevant to community
  - **Communicate**: Inform community about SWIM & NAS programs
“Airwave Procedures”

• Please note during the session all attendees are muted. Use the zoom controls to the right to interact with presenters.

• To ask questions or engage during a topic of interest please use the “QA” feature. The SWIFT Team will either announce your question/comment or unmute you time permitted
SWIFT: Announcements

- TFMS Technical Webinar: Every Second Thursday of the month @ 1PM EST
  - Next Meeting scheduled for June 10th, 2021
  - Send questions or topics to Chris.Burdick@faa.gov
Focus Group Status Updates
Operational Context Document Focus Group

SWIFT 14 Update

Presented to: SWIFT

By: Ray Mitchell – LS Technologies

Date: May 27, 2021
# Focus Group Updates & Schedule

## January 2021
- CSS-Wx Web Mapping Tile Service (Update – Close Out)
  - NCR Update
  - TTP - Flight Data Service (Update)
  - TTP – Airport Information Service (First Draft/Update)

## February 2021
- Canceled due to SWIFT 13

## March 2021
- NCR WFS Update Draft
  - TTP – Flight Data Service (TBD)
  - TTP – Airport Information Service (TBD)
  - TTP – Flight Delay (Storyboard)

## April 2021
- NCR WFS Final Draft
  - TTP – Flight Data Service (Updated Draft)
  - TTP – Flight Delay (First Draft)
  - TTP – Airport Information Service (First Draft Update)

## May 2021
- Canceled Due to SWIFT 14

## June 2021
- TTP – Operational Metrics (Storyboard)
- TTP – Flight Delay (Close Out)
- TTP – Traffic Management Restrictions (Storyboard)
- NCR – Web Map Service (Storyboard)

## July 2021
- TTP – Surface Meter Program (Storyboard)
- TTP – Traffic Management Restrictions (First Draft)
- NCR – Web Map Service (First Draft)

## Important Notices
- Please submit any comments/feedback by our June 24th Session

## Schedule Subject to Change

## Interested in Joining? Please contact Ray Mitchell @ ray.mitchell@lstechllc.com

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**SWIFT 14 May 27th 2021**
Operational Issues Focus Group

SWIFT 14 Update

Presented to: SWIFT

By: Chris Gottlieb – JetBlue Inc.

Date: May 27, 2021
Ops Issues Focus Group

- **Lead:** Chris Gottlieb, JetBlue
- **Goal:** Address NAS-wide operational issues that might benefit from information sharing between organizations

**Current Prioritized Issues:**
- TBFM delays (United) who, what, why it matters
- Flight Planning over IP (SWA)
- Early Planning for Disruptions
  - Early Detection Deviation over Fix (JBU)
  - Early Detection for Airport Surface Delays (JBU)
  - Taxi Out Return to Gate (Delta)
  - Long taxi issues (JBU) at JFK
- TBFM/TFMS double delays

**Bolded Issues** – actively engaged

Analyzing potential linkages
Flight Planning over IP

Goal

• Align FAA Flight Plan Modernization efforts with Flight Operators’ needs
  – Understand operator systems’ technical needs for Flight Planning, Filing and Data Sharing through CSS-FD
  – Better foresight into NAS constraints and impacts to Ops planning and decision-making
  – Improve service through increased reliability of operations

Current Activities

• FAA CSS-FD Constraints Working Group (CWG) activities were initiated in January 2021 and recently concluded in March 2021. The CWG involves FAA stakeholders with various disciplinaries.
  – Started list of constraints based on Radio Technical Commission for Aeronautics (RTCA) recommendations for CSS-FD (2017) and identified a total of 39 constraints relevant to pre-departure flight planning.
  – List was refined based on impact to pre-departure flight planning and availability in digital format
  – The constraints are categorized by types of constraints, e.g., traffic management, airspace constraints, etc.
  – In phase 1 of CSS-FD, 27 constraints, except for ATC constraints, will be provided as references, whereas ATC constraints will be provided in a form of flight plan amendment.
Flight Planning over IP

Next Steps

• The CWG continues to perform engineering analysis on CSS-FD requirements constraints identified and evaluate different approaches.

• Next CWG and OIFG collaboration meeting is currently is TBD

• A Market Survey/RFI for the CSS-FD program was issued on 14 April 2021
  – The primary purpose of this RFI announcement is to gain a better understanding of Industry capabilities and obtain feedback on initial program documents in order to meet the program objectives. Responses to the RFI must be submitted NLT 28 May 2021 at 4:00pm EST. Link to CSS-FD Request For Information (RFI): https://beta.sam.gov/opp/9d4c748bd0f8404f82886ac8886d8790/view?keywords=CSS-FD&sort=-relevance&index=opp&is_active=true&page=1to

• Next month, an industry announcement will be posted to beta.sam.gov that will have more details about the CSS-FD Risk Reduction Activity and a deadline for when interested parties can express their interest.
Want your Ops Issues to be heard?? Join us!

For more information:
• Join the **SWIM Flight Planning Modernization** Teams Group page for updates and continued dialogue

OR...

Contact Us:
• Chris Gottlieb – [Christopher.Gottlieb@jetblue.com](mailto:Christopher.Gottlieb@jetblue.com)
• Xavier Pratt- [Xavier.Pratt@lstechllc.com](mailto:Xavier.Pratt@lstechllc.com)
Development & Analytics Focus Group (DAFG)

SWIFT 14 Update

Presented to: SWIFT

By: Erin Cobbett – Delta & Mike Jagmin – United Airlines

Date: May 27, 2021
**Development & Analytics Focus Group**

**Leads:** Erin Cobbett, and Mike Jagmin – Delta & United

**Background & Purpose Recap:**
- Collaborate with Operational Issues Focus Group
- Leverage the expertise of participants to present solutions using SWIM data
- Identify top community priorities via SWIFT meetings and by the Operational Focus Group

**Status:**
- Sprint 2 Closeout Resolution Discovery Continues
- SWIM ETA Full Timeline – On Hold
Goal remains the same – determine the departure delay given to a flight by TBFM

- Delay should be the difference between aircraft ready time and the scheduled departure time
- CTM / ETD fields initially set as ready time, but can be updated for many reasons, not transparent to the end SWIM user

**Current Activities & Status**

- Efforts continue with Bi-weekly Meetings to achieve longer term solution
- TBFM team captured 5 issues/enhancement areas on MIS. As the weeks continued this collaborative effort has produced a priority ranking that both the TBFM & Airline Team vetted, along with options for placement in the deployment roll-out schedule. Those efforts will continue to allow each group to more closely examine the proposed solutions to ensure they improve operations.
SWIM ETA Full Timeline

Problem Statement:

– Airlines lack the ability to easily see downstream impacts on the NAS from their modifications to the ETA (and other data points) submitted to the FAA. Currently this leads to ambiguity between input and output data, and no insight into the full impact on ETA. Aggregating and analyzing a full set of inputs and outputs from the FAA systems will provide a better understanding of how these changes impact flights, as well as foster change to benefit the industry as a whole.

Status:

– On hold, team will re-evaluate future plans for this initiative at the next DAFG Meeting
Now that we have your attention…. Join us!

Next full DAFG scheduled for June 17th  @1pm EST

– Provide out brief on Sprint 2 Resolution Discovery
– Provide out brief on SWIM ETA
– Provide general status of focus group
– Last call: Identify any additional issues industry is looking to working

Contact Us:

Erin Cobbett – Erin.Cobbett@delta.com
Mike Jagmin - Michael.Jagmin@united.com
Ray Mitchell - Ray.Mitchell@lstechllc.com
Remaining DAFG Initiatives – What’s the Next Priority

• Double delays
• Gate Returns
• NE SWAP Routing issues
• FFICE
• Demand over an Entity
• Estimated Times
NOTAM System Modernization

NOTAM Application Programming Interface (API)

Presented to: SWIFT

By: Jeri Groce – FAA

Date: May 27, 2021
NOTAM API Challenge

Motivation – Industry feedback for:
“a simplified machine-to-machine interface to help improve access to NOTAM data”

FAA and NASA collaborated to conduct an industry challenge to develop NOTAM API’s

What is the NOTAM API “Challenge”? 
- Innovative software development approach that involves developers across the industry and across the globe
- 21 individual solution building challenges were launched for industry response
- Challenge deliverables were integrated to deliver final NOTAM API product in Spring 2021
- Collaboration with NASA enabled the FAA to leverage industry talent and accelerate delivery of the solution industry requested
NOTAM Application Programming Interface (API)

What is the NOTAM API?
- Machine-to-machine interface providing NOTAM query and filter capability
- Standards based: OpenAPI specification compliant with REST service endpoints
- NOTAM API portal for developer registration and API key management
- NOTAM API currently in prototype phase
- Non-operational use

How is the NOTAM API different from other FAA NOTAM sources?
- Quick onboarding and access, to include API documentation
- Multiple output formats to cater to different user needs
- Enables direct NOTAM query (doesn’t require end system to store all NOTAMs)

Who is the target audience for the NOTAM API?
- System / application developers

When will it be available?
- Target launch in Fall 2021
- Agency communications outreach planned

Target Launch Date: Fall 2021
Benefits of NOTAM API

Quick and Easy access
• Register online and get access to service end-points, keys, documentation, and development kit

Simplicity & Easy Integration
• REST API following Industry standard OpenAPI specification
• Both human and machine-readable documentation

Query Interface with Filtering & Sorting capability
• Eliminates the need to maintain a separate database
• Get relevant NOTAMs leveraging filtering capability
  – example: Get Runway NOTAMs at an Airport

In three formats meeting different stakeholder needs

All NOTAM and available Geometry data from a single source
• Integrates NOTAMs from FNS with published Temporary Flight Restriction (TFR) and Special Activity Airspace (SAA) geometries (where available)
• Enables graphical visualization
Use Cases for NOTAM API

How might end users take advantage of the NOTAM API? The options are endless…

- Mobile developer creates an app that integrates and displays nearby NOTAMs
  - Uses the NOTAM API geometry radius search based on end user’s current location georeferenced data

- Developer creates a website focused on NOTAMs for a local airport authority
  - Easily accesses only NOTAMs for local airport using NOTAM API query filter parameters

- Developer has minimal available resources and is unable to consume the rich/heavy AIXM NOTAM payload
  - Uses the lighter weight GeoJSON format from the NOTAM API

- Tower light operator wants to integrate current NOTAM outages into their tower management application
  - Uses NOTAM API geometry radius search for Obstacle features
NOTAM API Concept

Receives NOTAMs from the Federal NOTAM System (FNS) (authoritative source)

- NOTAM Distribution Service (Pub/Sub) over SWIM Cloud Distribution Service (SCDS)

Integrates with additional & relevant geometry information

- TFR and SAA sources

Provides integrated NOTAM data through API deployed as a cloud native application
IFDC 1/3831 ZMA FL..AIRSPACE COCOA BEACH, FL..TEMPORARY FLIGHT RESTRICTION. PURSUANT TO 14 CFR SECTION 91.145, MANAGEMENT OF ACFT OPS IN THE VCY OF AERIAL DEMONSTRATIONS AND MAJOR SPORTING EVENTS, ACFT OPS ARE PROHIBITED WI AN AREA DEFINED AS 5NM RADIUS OF 282008N0803602W (MLB015013.9) SFC-15000FT UNLESS AUTHORIZED BY ATC. EFFECTIVE 2104161430 UTC UNTIL 2104161930 UTC, 2104171530 UTC UNTIL 2104171930 UTC, AND 2104181530 UTC UNTIL 2104181930 UTC. DUE TO COCOA BEACH AIR SHOW AERIAL DEMONSTRATIONS. WAYNE BOGGS, TEL 813-340-5623, IS THE AIRSHOW POINT OF CONTACT. PATRICK /COF/ ATCT, TEL 321-494-0355, IS THE ATC CDN FACILITY. 2104161430-2104181930

ISUAE 04/894 ZDC AIRSPACE **R6606** ACT SFC-FL230 2104122101-2104131159
NOTAM API: Formats

NOTAMs can be requested in the three formats:

**AIXM 5.1**  
unmodified from FNS-NDS

**AIDAP**  
legacy – supports system transition from older NOTAM feed

**GeoJSON**  
condensed compared to AIXM, including additional geometry
NOTAM API: Enables Easy Visualization

Query NOTAM API for GeoJSON formatted NOTAM

Integrate into simple open tools/apps to visualize

Visualize NOTAM Geometries

Simple example – Developers can easily use the NOTAM API to programmatically bring NOTAM data and geometries into their custom applications.
NOTAM API: Query Parameters

NOTAM API supports a range of Query/Filter parameters to better deliver the specific NOTAMs of interest to the user

- Enables delivery of refined NOTAM results to end application users
- Supports requests for improved NOTAM filtering abilities from the industry

NOTAM API Query/Filter Parameters

- Location (Domestic or ICAO identifier)
- NOTAM Type/Classification
  - 5 types: domestic (DOM), FDC, Military (MIL, LMIL) and International (INTL)
- Location and NOTAM Number
- Effective start and end dates
- Affected feature types (example: Runway, Taxiway)
- Geometry search (Location coordinates and a radius in NM)
- NOTAMs from a date (last update date)
NOTAM API: Open API Specification

Open API Specification - standard/language-agnostic interface documentation provided to developers

Interactive Swagger implementation supports developer familiarization with NOTAM API – with no code development

Enter desired parameters and see code examples
NOTAM API: Developer Portal

NOTAM API Developer Portal provides users with ready access to development resources

- Simple registration and user approval process
- NOTAM API documentation – based on Open API Specification (OAS)
- API Access Key generation and management
- Software Development Kit (SDK) in JavaScript
- Support link
NOTAM API: Documentation

Comprehensive NOTAM API documentation

- Registration and Access Key Management
- NOTAM API endpoints, parameters, and errors
- NOTAM SDK Examples
NOTAM API: Administration

Easy access to NOTAM API administration and usage statistics

- Easy dashboard navigation
- User management
- Access Key management
- API activity statistics
NOTAM API: What’s Next

How can you get access?

• Currently, prototype accessible to AIS Coalition only
• Target availability for wider use in Fall 2021
• Stay tuned to FAA communications
  • [https://www.faa.gov/about/initiatives/notam/](https://www.faa.gov/about/initiatives/notam/)
TFDM Program Overview

Implementation:

Two Configurations
- Configuration A – 27 sites
- Configuration B – 62 sites

Additional TFDM Information: https://www.faa.gov/air_traffic/technology/tfdm/
Progress During COVID

TFDM Progress to Date:

– Developed remote TFDM lab access for developmental testing of the TFDM software

– Completed Build 1 software updates and completed most Build 1 developmental testing

– Completed Build 2 preliminary software development

– Completed TFDM testbed for early industry connection to TFDM

Build 1: Electronic Flight Data

Build 2: Surface Management
TFDM Recovery Plan

– **TFDM Build 1**
  • **Key Site:** Phoenix Sky Harbor International Airport (PHX)
  • **Pre-COVID IOC Date:** June 2020
  • **New Projected* IOC Date:** May 2022

– **TFDM Build 2**
  • **Key Site:** Charlotte-Douglas International Airport (CLT)
  • **Pre COVID IOC Date:** November 2021
  • **New Projected* IOC Date:** May 2023

– New TFDM Deployment Waterfall available in Fall 2021

* Pending full access to FAA facilities, travel, and dependencies on other FAA programs
TFDM Testbed Introduction

- TFDM developed laboratory testbed to allow industry to connect to TFDM before TFDM is deployed operationally

- Allows testing of both TFDM Terminal Publication (TTP) and TFDM FOS Collaboration Service (TFCS)

- Objectives:
  - Understand the data elements produced/consumed by TFDM
  - Understand TFDM’s messaging structure
  - Modify/change industry tools to utilize TFDM data

- Utilizes canned scenario data initially
  - Planning to utilize SCDS to offer more real-time testing in the future
FOS Testbed Environment

Testbed Details
- TFDM Software Build 2.1
- Adapted as CLT
- Replay of messages from 2/19/2020
Testbed - Message Routing

Simulated NAS Environment

TFDM Producer

FOS vLab

TFDM Software

TTP FlightData

(1 per TTP service)

TFCS Reply

TFCS Request

Ext Int Queues

Ext Int Queues

Ext Int Queues

ActiveMQ

TSIM

Simulated SWIM

Simulated NEMS

Bridge(s)

TTP FlightData

(1 per TTP service)

TFCS Reply

TFCS Request

TFCS Request Queue

TFCS Request Topic

TFMS Flight Data

TBFM-MIS

Solace PubSub+

External Environment

FOS

FOS Testbed
Testbed – TFDM system

Simulated NAS Environment

TFDM Producer
- FOS vLab
- TFDM Software
- TTP FlightData (1 per TTP service)
- TFCS Reply
- TFCS Request
- Ext Int Queues
- Ext Int Queues
- ActiveMQ
- TSIM

Simulated SWIM
- Bridge(s)
- TTP FlightData (1 per TTP service)
- TFCS Reply
- TFCS Request Queue
- TFCS Request Topic
- TFMS Flight Data
- TBFM-MIS
- Solace PubSub+

External Environment

FOS Testbed

FOS

Federal Aviation Administration
Testbed – Simulator

Simulated NAS Environment

TFDM Producer

FOS vLab

TFDM Software

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(1 per TTP service)

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Federal Aviation Administration
Testbed – Simulated NEMS

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FOS Testbed

External Environment

FOS

Federal Aviation Administration
Testbed – FOS Simulator

Simulated NAS Environment

TFDM Producer

- FOS vLab
- TFDM Software
  - TTP FlightData (1 per TTP service)
  - TFCS Reply
  - TFCS Request
  - Ext Int Queues
  - Ext Int Queues
  - Ext Int Queues
  - Ext Int Queues
  - ActiveMQ
  - TSIM

Simulated SWIM

- Simulated NEMS
  - Bridge(s)
  - TTP FlightData (1 per TTP service)
  - TFCS Reply
  - TFCS Request
  - TFCS Request Queue
  - TFCS Request Topic
  - TFMS Flight Data
  - TBFM-MIS
  - Solace PubSub+

External Environment

FOS

FOS Testbed
## FOS Testbed Queue Information

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## Test Cases

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<td>Flight Substitution</td>
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Flight Departure Test Case

• Flight Departure – simple
  • Overview: A departure pushes back, transits the ramp, crosses into the AMA, taxis to the runway and takes off.
  • Steps:
    • FOS receives TTP-FlightData FlightAdd message triggered by input to the TFDM system from an external system such as TFMS or FDIO.
    • FOS receives TTP-FlightData FlightUpdate messages as the flight progresses to the runway. These messages contain fields such as:
      • Flight identification fields: ACID, DEP, DEST, IGTD, GUFI, CID, TFDM ID
      • Operational Flight State (AT_STAND, RAMP_TAXI_OUT, AT_SPOT_OUT, AMA_TAXI_OUT, LUAW, TAKEOFF_ROLL, DEPARTED)
      • EOBT, ETD, AOBT, ActualRunwayEntryTime, ATOT, Estimated taxi times, Elapsed taxi time, ActualDepartureSpot, Runway
NMA Closure Test Case

• NMA Closure

  • Overview: Flight Operator closes a section of the NMA and observes the closure as reflected by the TFDM system.

  • Steps:

    • Flight Operator support manipulates FOS to send a TFCS request message, the intent of which is to schedule an NMA closure.
      • FOS receives TFCS response message indicating success of request.
      • FOS receives TTP-AirportInformation message indicating the NMA regions are scheduled for closure.

    • Flight Operator support manipulates FOS to send a TFCS request message, the intent of which is to activate the NMA closure.
      • FOS receives TFCS response message indicating success of request.
      • FOS receives TTP-AirportInformation message indicating the NMA regions’ closure has been activated.

    • Flight Operator support manipulates FOS to send a TFCS request message, the intent of which is to update information pertaining to the NMA closure.
      • FOS receives TFCS response message indicating success of request.
      • FOS receives TTP-AirportInformation message indicating the NMA regions’ closure has been updated.

    • Flight Operator support manipulates FOS to send a TFCS request message, the intent of which is to deactivate the NMA closure.
      • FOS receives TFCS response message indicating success of request.
      • FOS receives TTP-AirportInformation message indicating the NMA regions’ closure has been deactivated.
SMP Affirm Test Case

• SMP Affirmed (& effect on departures)

  • Overview: Building on a previous Test Case, a recommended SMP is affirmed. TMATs are assigned. Some flights are held at the gate, some progress. Metrics are gathered.

  • Steps:
    • LFIS TMC affirms the SMP.
    • FOS receives TTP-SMP smpDataMessage containing information about the SMP including the new status of “affirmed”.
    • FOS receives TTP-FlightData FlightUpdate messages for flights affected by the SMP and their newly assigned TMATs.
    • FOS receives TTP-SMP smpFlightListUpdate message listing the flights affected by the affirmed SMP and their TMATs.
    • LFIS controller issues commands for a subset of the flights to advance them toward the runway and eventually the strips are archived.
    • Periodically, at 15 minute intervals, FOS receives TTP-OperationalMetrics messages. These messages contain metrics such as:
      • Airport Throughput KPI
      • Airport Canceled Demand KPI
      • Calculated Fuel Burn KPI
      • Queue Length Accuracy KPI
      • SMP Changes KPI
      • RDR Accuracy KPI
      • Metering Time Compliance KPI
      • Stability of Metering Times KPI
      • Flight Times Actual vs. Predicted
Flight Substitution Test Case

- **Flight Substitution**

  - **Overview:** Building on previous Test Cases, the Flight Operator makes a Substitution Request and observes changes to flights’ target times.

  - **Steps:**
    - Flight Operator support manipulates FOS to send a TFCS request message, the intent of which is to swap TMATs between flights.
    - FOS receives TFCS response message indicating success of request.
    - FOS receives TTP-FlightData FlightUpdate messages for flights with their newly assigned target times.
Questions?
SWIFT Update: New York Area Study On Early Planning For Disruptions

Presented to: SWIFT
By: Chris Gottlieb – JetBlue Inc.
Mark Hopkins – LS Technologies
Date: May 27, 2021
SWIFT Recap & Context

• **Case Study Origins:**
  – Selected NY Metro Area for case study due to their daily vulnerability for SWAP
  – Sought alerting capabilities to support real-time tactical decisions by FAA and Carriers

• **Approach to Modeling Case Study:**
  – Visualize Traffic Management Initiatives (TMI) -related delays resulting from aircraft deviations over fix
  – Leverage open-source data to evaluate deviations along flight trajectories
  – Support back-end database and analytics for post Ops studies

• **Case Study Evolution:**
  – Seek to improve delay forecasting outlook for NAS stakeholders
  – Compare results with other legacy forecasting tools
  – Apply case study model to other NAS Metroplexes to mitigate impacts
Case Study Trajectory

Identify

SWIFT 9 - 11
• Define Problem Statement
• Define Operational Context
• Identify Ops Impacts through Tabletop Discussions

Investigate

SWIFT 12 - 14
• Solicit Ops SME Input
• Investigate Data Gaps through SWIM Services
• Solicit DAFG Support
• Leverage Historical ZNY/N90 Studies

Analyze

SWIFT 15 - 17
• Engage DAFG for Model Development & Support
• Apply Context to Data
• Compare Legacy Forecast Tools with Model Results
 Operational Condition: Setting the Stage

• **NAS Operational Improvement Goals:**
  – Identify drivers and key indicators that would inform disruptions to airspace user operations earlier
  – Apply SWIM Information Services to improve operational decision-making through advanced planning
  – Use Tabletop exercise to capture key procedures, operational processes and relevant information to study application of data analytics and machine learning to improve operational decision-making

• **Operational Problem Statement:**
  – Traffic Management Initiatives (TMI) and related delays resulting from Aircraft deviations over fix
    o There is no clear way to readily identify aircraft deviation indicators (e.g., weather, traffic volume) and anticipate en route delays
    o There is a lack of available post-ops data analysis to determine threshold boundaries for traffic deviation and where disruptions are severe
    o This limits the operational community from effectively planning or implementing work-arounds for airspace condition changes and resource constraints

• **Environment:**
  – NAS Northeast Region Centers: ZNY, ZOB, ZBW, ZDC
  – New York metro and Vermont airports: LGA, JFK, EWR, TEB, HPN and BTV
  – Airways and jet routes impacted by Traffic Management Initiatives (TMI) events or closures
Access to early alerting based off historic, filed or amended trajectories.
Understanding deviation location and severity.
- Honeycomb application can drive fix deviation visualization
  - Escalation of alerts based on how severe flight deviations are
  - Notionally display the operational timeline and metrics of fix utilization
Approach: Case Study Methodology

- Analyze drivers that lead to Irregular Ops (IROPs) that result in NAS impacts
- Distinguish root cause (deviation from trajectory) & related symptomatic issues
- Investigate available & relevant data elements from SWIM Information Services
- Identify additional data elements that may not be published via SWIM
- Begin to look at other contributing factors (i.e., weather), and related sources
- Analyze previous work to identify relevant contributions
- Connect to SWIM Information Services & collect relevant data
- Identify key parameters that can be modeled for analysis
  - Analyze collected data vs real-world IROP conditions to identify operational environmental drivers
  - Forecasted vs Actual: Delay Metrics – (Demand Vs Capacity, Trajectory Deviations, etc.)
- Build prototype AI/ML algorithms for predictive analysis
Approach: Brainstorming Desired Outcomes

• **Goal:** How do we improve planning and execution for IROP events?
  – Improved customer scores/ reduce customer disruption
  – Reduction in gate returns (pushing)
  – Prediction of overall delays
  – Reduction in overall delays

• **Objective:** Identify factors and variables that drive suboptimal throughput
  – Prioritized list of Ops impacted by disruptions
    • Crew times
    • Customer impacts
    • Equipment schedule and usage / Ground Ops
    • ATC improved planning and execution for IROPs
  – Identify anticipated level of impact on operations
    • Arrival trajectories
    • Departure trajectories
Approach: Brainstorming Problem Inputs

• **Level of control ATC will impose via TMI**
  - Initiatives or actions typically taken tactically or based on SOPs
  - Predicting airport rates beyond 1-hour mark

• **Airlines input into TMI program rates**
  - Adjusting parameters based on actual (real-time) NAS Ops performance
  - Cancelling or adjusting programs early

• **Surface Management execution**
  - Insight into how departure fixes are available and allocated
  - Insight into the interdependency between departure resources and environmental constraints
Information Gap: Aggregating data on DEP fix constraints to support alerting around crew issues.

- Relevant SWIM Business Service: SFDPS – En Route Airspace Data Publication
  - ERADP is the SFDPS service that publishes airspace assignment, status, and other airspace-related messages derived from messages received from HADDS.
  - Sector Assignment Status message (SH) provides information associated with airspace. The Sector Assignment Status Message is used to communicate current sector and TRACON configurations. A sector or TRACON may either be closed or open. If the sector or TRACON is open, it is composed of one or more FAVs.
  - Route Status message (HR) is used to communicate whether some adapted departure and/or arrival routes are active or not. A route status is indicated by the route name followed by either “ON” or “OFF.” ERAM generates an HR when an assignment at a center changes, or when reconstituting data. A single HR contains only route assignments for that one center and can include one or more routes.

Information Gap: Speed restrictions may be imposed at ARTCC when traffic begins to flow off-nominally. In certain cases, this may not be communicated to TRACON. This information is typically not logged or shared unless the controller informs their supervisor, who in turn, would inform traffic management. In this case, speed restrictions could be deduced from the radar view (e.g. observing ground speeds).

- Relevant SWIM Business Service: SFDPS – En Route General Data
  - General Information message (GH) is used to communicate a free-form text message from one facility to one or more other facilities. The content of the message is the free-form text, contained in an interfacility remarks field (11c).
**General Fix Availability**

**Information Gap:** Departure deviations are difficult because the route structures in N90 are very close together. We would want to know where a pop-up storm could develop that could lead to deviations on a route. We could then coordinate ways around the weather, or ways outbound.

We also want to know if we should reroute flights on the ground waiting; estimates on how long fixes would be impacted also help. Its problematic when routes are shut off, so we would want to get reroutes in earlier and make use of all available routes. This supports decision points for dispersing traffic over multiple available fixes.

- **Relevant SWIM Business Service: TTP: Flight Delay Service**
  - The TTP Flight Delay service provides flight-specific information about the current delays for all flights departing from or arriving to the TFDM facility. The **Aircraft Departure Delay Time** data elements provide information on surface aircraft delay start and end times.

  - ITWS provides a variety of weather information in graphic and textual forms, such as wind shear and microburst predictions, storm cell and lightning information, and terminal area winds aloft. For example:
    - The Microburst TRACON Map Product is made up of a microburst header containing information about the TRACON, followed by a list of from one to four radars (TDWRs).
    - The Gust Front Product is made up of a gust front header, followed by a list of radars (TDWR). Each radar structure includes zero to five gust front detections.
En Route Flight Track Changes

**Information Gap:** Understanding when and why ATC issues flight reroutes or events that involve changing a flight trajectory (e.g. DEP fix, ARR fix, waypoints)

- **Relevant SWIM Business Service: SFDPS – En Route Flight Data Query**
  - Flight Amendment Information messages (AH) are used to resend all data/fields in the Flight Plan Information message when an amendment has been made to one or more of those fields. This message includes the AH ERAM.

- **Relevant SWIM Business Service: TFMDATA: Flow**
  - The Reroute Message defines a Reroute TMI. It is sent when a Reroute is proposed, issued, revised, or cancelled.
  - Associated Flight Data Messages: TFMS sends messages to model flights on their assigned routes, or to model flights back on their historical routes after a Reroute is cancelled.
  - **Note:** The TFMDATA service includes data about restrictions and constraints that are created, issued, and maintained externally to TFMS. TFMS receives notifications for some of these TMIs. In these cases, TMI generates a message passing through the definition of the TMI. For example:
    - Restrictions are received from NTML and sent using a restriction (flow) message. Restrictions are primarily used to define mile-in-trail (MIT), altitude, and speed restrictions. Restrictions have start end and times like TMIs. If a restriction is revised or cancelled, TFMS sends a new restriction message.
Managing Deviations Beyond TRACON

**Information Gap:** Due to routes into ZNY being tightly knit (e.g. flights coming in from ZOB), separating flights by altitude is somewhat difficult and requires internal TRACON coordination. This is easier to do with flights coming from ZDC rather than ZOB. During severe weather, we would want to move traffic out of ZNY, away from departures. We must know where to cut off the line from the west and perhaps reroute flights to ZBW, for example.

- **Relevant SWIM Business Service:** TBFM Metering Information Service
  - STAs and ETAs
  - Airport Configuration Information
  - Satellite Airport Configurations

Partial Airspace Restrictions

**Information Gap:** During weather events, we would typically restrict the entire flow into ZNY airports (e.g. AFPs, GDPS, etc.), but sometimes only the southern routes require restrictions. For example, if there are clear routes from ZBW to ZNY, why restrict these areas too? Combining routes (which is difficult to do in TRACON space) is something that wasn’t done enough. ZDC does this routinely, which also helped manage flows into EWR and LGA without needing a GDP (ZNY-bound flights).

- **Relevant SWIM Business Service:** TFMDATA: Flow
  - TFMS Restriction Messages
  - TMI Advisory and Compression Messages
## Notional “Near Term” Timeline

<table>
<thead>
<tr>
<th>Activity</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
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<tr>
<td>Problem Identification</td>
<td>SWIFT 9</td>
<td>SWIFT 10</td>
<td>SWIFT 10.5</td>
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<tr>
<td>Initial Demonstration of FAA Data &amp; Open Source Capabilities</td>
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<td>SWIFT 11</td>
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<td>Refine Problem Statement &amp; Operational Environment</td>
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<td>SWIFT 13</td>
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<td>Tabletop Exercise</td>
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<td>SWIFT 15</td>
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<td>Stakeholder &amp; SME Identification &amp; Engagement</td>
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<td>SWIFT 16</td>
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<td>Root Cause Analysis of Deviations on Operations</td>
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<td>SWIFT 17</td>
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<td>Discovery &amp; Data Collection</td>
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<td>Analysis SWIM Data</td>
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<td>Apply Operational Context to SWIM Data</td>
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<td>Development Analytics Focus Group Engagement (DAFG)</td>
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<td>Identify Key Data Parameters</td>
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<td>Explore Real-world IROP conditions to identify operational environmental drivers</td>
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<td>Analyze Applicable Algorithms (AI/ML)</td>
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<td>DAFG Comparative Analysis Legacy Forecasting Vs New Operational Metrics</td>
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<td>Stakeholder Case Study Validation</td>
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**Legend:**
- Light Blue - In Progress
- Yellow - At Risk
- Red - Behind Schedule
- Green - Complete
- Gray - Planned Not Committed

**Note:** Milestones captured as major SWIFT Events starting with early inception SWIFT 10 projecting out to SWIFT 17, in which there will be ad hoc out brief sessions for the General Ops Issue Focus Group.
Next Steps for SWIFT 15

- **Data Collection & Analysis**
  - Investigate additional information gaps; what else is needed?
  - Correlation between arrival trajectory deviations and taxi-out delays
  - Continued data discovery through SWIM Services
  - Explore previous studies done with the New York Metro Area

- **Engagement with DAFG**
  - Collaborate to incorporate Honeycomb functionality
  - Establish metrics for delay mitigation and/or success criteria
  - Collaborate on indicators for Predictive Analytics
Want to join the case study efforts? Join us!

Contact Us:

Chris Gottlieb – Christopher.Gottlieb@jetblue.com
Mark Hopkins - mark.hopkins_nlst@lstechllc.com
Xavier Pratt- Xavier.Pratt@lstechllc.com
The trajectory describes the lateral, vertical and temporal profile of a flight. TBO shares the common plan for a flight’s trajectory. Accuracy, and control to that plan is tailored to the performance needs of the circumstances. The ATC Clearance is the means through which the trajectory is delivered.

TBO requires an efficiently-converging coordination process across concept components leading to stable, consistent and robust trajectory solutions.

TBO supports a Performance-Based ATM System. For example, the use of trajectory constraints should be minimized to the extent possible and to the tolerance level commensurate with the performance needs of the GATMOC Component it serves. Airborne operations should not be constrained more than is strictly required to meet the performance needs of the ATM System.
Trajectory Evolution

AM – Airspace Management
ATFM – Air Traffic Flow Management
AU – Airspace User
ATC – Air Traffic Control
AO – Aerodrome Operator
Enabler for TBO: Robust Information sharing

We know:
- State & Intent
- Performance
- Constraints
- Uncertainty

Avoid the guesswork
Enabler for TBO: Flow Information eXchange Model (FLXM)

• Required ATFM information is not covered in the core elements of existing Exchange Models (XM).
  
  o To date, Flight, Aeronautical, Weather and Surveillance information have been identified and incorporated into the global exchange models (i.e. FIXM, AIXM, iWXXM, and ASTERIX respectively)

  o Flight Information Exchange Model (FIXM) supports Flight and Flow for a Collaborative Environment (FF-ICE). However, the focus has been predominantly on identifying and incorporating single, flight-specific information rather than flow information.

• Incorporating the ATFM information is necessary to complete the NextGen envisioned operational environment and achieve the pathway to full Trajectory-Based Operations (TBO).

• Flow Information Exchange Model (FLXM) is a new standard proposed by the FAA for ATFM information exchange in support of the broader effort to implement enterprise-wide information exchange standards.
• FIXM is the international data standard for flight information

• FIXM adoption enables interoperability and provides efficient communication between systems, supporting the realization of innovative solutions in aviation

• The FIXM data standard supports the exchange of flight information between NAS systems across multiple domains and International systems
When there is no ATFM measure, is the flight data required for operations?

Yes, then data is represented in FIXM.

When there is an ATFM measure, is the flight data required for the measure or for flight operator flexibility?

Yes, then the data is represented in FLXM.

Flight-specific elements that are artifacts of an ATFM measure in FLXM.

They would not be present if there was no ATFM measure in place.
Automation Evolution Vision

- USER INTERFACE
- BUSINESS LOGIC
- DATA INTERFACE

Safety-critical Stable Core

Objectives → Recommend

Public
Private
Objective - to support the development of the roadmap for TBO:

- Conduct research and validation activities to mature TBO capabilities,
- Identify geographical and information constraints
- Leading to the development of the roadmap that layout the timeline for TBO capabilities including the supporting activities.
Multi Regional TBO Capabilities

- Pre-departure – flight planning (FF-ICE R/1)
- Post-departure - shared trajectory information (FF-ICE R/2)
- Re-route (4D Trajectory) due to destination and/or schedule change (ATFM and FF-ICE)
- Integration of ATFM and AMAN
THANK YOU
SWIFT Portal Release

Overview and Update

Presented to: SWIFT

By: Mike Pozsgay – FAA
    Doug Harvey – L3Harris

Date: May 27, 2021
SWIFT Portal Deployment

**SWIFT Portal Now Live!**
**Deployed on May 26th**

Logging into SCDS will automatically redirect you to the new SWIFT Portal page. Your SCDS account, password, and subscriptions have been migrated automatically.

Redirect will be in place for around a year, but please update your bookmarks!

**Two issues still to be addressed with subsequent updates:**

* Organizations with outbound firewall rules which don’t support the use of hostnames. Static IPs to be provided.

* Portal emails will continue to come from an @cinnato.com address. Future change will come from an easily recognizable @faa.gov email.
SWIFT Portal Overview

SWIFT Portal is a publicly accessible cloud-based infrastructure that brings new capabilities which build upon the SWIM Cloud Distribution Service (SCDS)

This release brings a new initial portal interface comprising of five (5) high-level capabilities that aim to enable aviation partners and community members to discover, learn, support, collaborate, and benefit from access to SWIM data

SWIFT Portal will replace the existing URL (scds.swim.faa.gov) but will not change the underlying SCDS service
Community Forum

Learn the latest SWIM news, share your ideas with others and expand the knowledge base
Discuss and collaborate with fellow aviation partners and community members
Discover, locate and download SWIM Service reference documents from the NSRR
Request data via SCDS or request access to NESG-only SWIM Services
Cloud Distribution

Quickly request and manage your SWIM services via a self-service, easy-to-use, interface
Jumpstart your connections, view sample data, monitor your subscription and metrics
Service Status

Quickly review and monitor real-time or historical status of SWIM services
Choose services for real-time status tracking or view historical outages and incidents
Help & Support

Seek help and obtain guidance and support through a self-service knowledge base. Review FAQs, online guides, monitor ticketing, ask a question or live chat with support.

How to create a SWIFT Portal account

1. Click on the "GET STARTED" button on the Landing Page.
The account request form will then be presented.
2. Fill in the form. (password must be a minimum of 12 characters, contain at least one number, one uppercase letter, one lowercase letter, and one special character) and check the "I accept the terms and conditions".

FAQ
- General
  - What is NDS?
  - Who is the target audience for NDS?
  - How do I create a new account?
  - How do I log in?
  - Forget your password?
  - Account Information
  - Name and Phone Number:

Answers
- Search
- Guides
- FAQs
- Support
- Ticketing
- Live Chat

Search and gain help via an online self-service knowledge base of helpful guides and FAQs. Find answers, create and track your support tickets, and live chat with support staff.
Contact us

Feel free to reach out with question, comment or suggestion to:

SCDS Help Desk
  scds@faa.gov

Mike Pozsgay, FAA
  michael.pozsgay@faa.gov

Doug Harvey, L3Harris
  douglas.harvey@l3harris.com
Arrival Fix Snapshot into DCA/BWI/IAD/PHL May 26, 2021

Wish List:
- Look ahead on planned traffic across arrival/departure fixes
- 15 – 30 minutes into the future
- How are the fixes performing?
- Trending up or down?

Data/app desired:
- The need to see real-time fix capacity 'at a glance'
- Small unobtrusive with quick visual alerts
Fix Availability Ticker

- **The Ticker Widget Possibilities:**
  - Small Footprint
  - Filter fixes by metroplex

- **Turnover Example:** easy day (unaware fixes nearing capacity)

- **Benefits:**
  - Earlier mitigation by the dispatcher
  - Earlier info given to crews
  - Earlier mitigation plan to stations/AOC/ATC

- **Enhancements:** increase look ahead timeframe

Identifies specific fixes with limited capacity
Dispatcher Current View (International Desk)

Dispatchers' bag of apps (to name a few):

DINS (Intl NOTAMs)/FAA NOTAMs; Land and T/O wts; Contaminated rwy correction; Flight Following; Aerobahn; Fusion arrivals; internal flight planning & dispatch apps; screen printer; etops & regular calculator; re-route tool; QRH for every aircraft in air; wx maps for each region; dispatch procedures manual & flight manual. Radio & telephone system.

**Issue:** The need to see real-time fix capacity 'at a glance'

**Solutions:** Add a minimalist 'ticker' to top or bottom of a screen –or- incorporate into company or vendor app to give back monitor real-estate…
Information Services Roadmap

SWIFT 14 Update

Presented to: SWIFT

By: Xavier Pratt – LST

Date: May 27, 2021
SWIM Services By Phase of Flight

**Departure**
- Pre-Departure Flight-Planning
- Current and forecast weather information
- NOTAMS
- Flight Restrictions
- Flow Information
- Trajectory Planning
- Real-time surface movement

**En-Route**
- Flight re-route information
- Current and forecast weather information
- Updates to NOTAMS
- Flight restriction changes
- Flow information changes

**Arrival**
- Arrival metering information
- Real-time surface movement
- Airport surface movement
- Current weather information

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**System Wide Information Management**

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SWIFT 14 May 27th 2021
### SWIM Information Services Roadmap

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<th>CY16-19</th>
<th>CY20</th>
<th>CY21</th>
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#### Departure Phase

**TTP: Flight Delay Service**
- Publishes TFDM flight delay information

**TTP: Traffic Management Restrictions Service**
- Publishes changes to Traffic Management Restrictions captured in TFDM
- Publishes Airport & Surface Operations information

**TTP: Surface Movement Event Service**
- Publishes TFMS TMI definitions, updates & cancellations

**TFM: Flow Data Service**
- Publishes TFMS TMI definitions, updates & cancellations

**TTP: Operational Metrics Service**
- Publishes TFDM-captured airport Ops metrics from arrival/departure flights

**TFMS: Airport Data Information Service**
- Publishes information about current or future SMPs including information about the start and stop time of the program and parameters

**Surface Movement Event Service**
- Publishes aircraft surface movement from aircraft track positions (ASDE-X / ASSC)

**TTP: Airport Data Service**
- Publishes TFDM airport information

**TTP: Tower Departure Event Service**
- Publishes departure events received from EFSTS and D-ATIS and clearance data from TDLS

**TFCS: Airport Data Information Service**
- Submit TFDM non-movement area closure & gridlock notifications

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*Calendar year dates, subject to change*
### SWIM Information Services Roadmap

#### CY16-19

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<th>Q4</th>
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</tbody>
</table>

#### En Route Phase

**Airspace Flow Operations**

- **ACS Data Subscription Service**
  - Publishes changes to Aeronautical Information Data. Sourced from SAA, NAV Lean, SAMS/MADE, other AIMM sources.
- **ACS Airspace Conflict Detection Service**
  - Provides conflict detection information between the scheduled airspace and protected airspace under restrictions or reservations from SAA, NAV Lean, SAMS/MADE, and other AIMM sources.
- **ACS Data Query Service**
  - Allows users to request and retrieve, or subscribe to, multiple user-defined subsets of Aeronautical Information.
- **ACS Geodetic Computation Service**
  - Provides the magnetic declination of a specific point on earth, for a given date, based on data from the National Geodetic Data Center from SAA, NAV Lean, SAMS/MADE, other AIMM sources.
- **ACS Post Ops Service**
  - Allows users to define and request metrics for existing Aeronautical Information from SAA, NAV Lean, SAMS/MADE, and other AIMM sources.
- **ACS Web Feature Service**
  - Allows users to submit queries to return aeronautical features using AIXM features (e.g., airports, navaids, obstacles, procedures, and NOTAMs) that match the query. Sourced from SAA, NAV Lean, SAMS/MADE, and other AIMM sources.
- **ACS Web Map Service**
  - Allows users to produce maps of spatially referenced data dynamically from geographic information as JPEGs, PNGs, or GIFs. Sourced from SAA, NAV Lean, SAMS/MADE, and other AIMM sources.
- **ACS Web Map Tile Service**
  - Allows users to produce a map tile of spatially referenced data dynamically from geographic information, using tile images. Sourced from SAA, OAS, FNS, SAMS/MADE, and eNASR / eNFDD.
- **NAS Common Reference Service**
  - Allows users to consolidate and correlate NAS data and filter NAS constraints based on entered flight route.

#### SWIFT 14 May 27th 2021

- Federal Aviation Administration
- Aeronautical Data
- Flight/Flow Data
- Surveillance Data
- Weather Data
- Service Information

*Calendar year dates, subject to change*
Final Announcements

#15 Virtual Workshop

• Date
  – August 19th, 2021
  – 12:30 - 4pm EST

• Location
  – Online Session
SWIFT Site Information

**SWIFT@faa.gov**
- Any SWIFT-related questions
- Sign up for SWIFT mailing list

**https://www.faa.gov/air_traffic/technology/swim/swift**
- Register for future SWIFT meetings
- Stay up to date with SWIFT
- Past meeting slides
SWIFT Contact Information

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Stefanie Calabrese, SWIFT Chair & FAA Lead
• Email: Stefanie.C.Calabrese@faa.gov
• Email: SWIFT@faa.gov

David Almeida, SWIFT Community Moderator
• Phone: (321) 735-2774
• Email: David.Almeida@LSTechLLC.com
Back Up
## SFPDS Airspace

### SWIM Flight Data Publication Service (SFDPS)
- Provides flight data and updates to clients for filed and active flight plans

<table>
<thead>
<tr>
<th>Information Category</th>
<th>SWIM Flight Data Publication Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flight Plan Information</td>
<td>✔️ Tentative Aircraft Identification Information</td>
</tr>
<tr>
<td>Flight Amendment Information</td>
<td>✔️ Tentative Flight Plan Removal Information</td>
</tr>
<tr>
<td>Converted Route Information</td>
<td>✔️ Tentative Flight Plan Amendment Information</td>
</tr>
<tr>
<td>Cancellation Information</td>
<td>✔️ Track Information</td>
</tr>
<tr>
<td>Departure Information</td>
<td>✔️ Drop Track Information</td>
</tr>
<tr>
<td>Aircraft Identification Amendment Information</td>
<td>✔️ Interim Altitude Information</td>
</tr>
<tr>
<td>Hold Information</td>
<td>✔️ Automated Radar Terminal System (ARTS) Flow Control Track/Full Data Block Information</td>
</tr>
<tr>
<td>Progress Report Information</td>
<td>✔️ Beacon Code Reassignment</td>
</tr>
<tr>
<td>Flight Arrival Information</td>
<td>✔️ Beacon Code Restricted</td>
</tr>
<tr>
<td>Flight Plan Update Information</td>
<td>✔️ Flight Plan Data Bank (FDB) Fourth Line Information</td>
</tr>
<tr>
<td>Expected Departure Time Information</td>
<td>✔️ Point Out Information</td>
</tr>
<tr>
<td>Position Update Information</td>
<td>✔️ Inbound Point Out Information</td>
</tr>
<tr>
<td>Tentative Flight Plan Information</td>
<td>✔️ Handoff Status</td>
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</tbody>
</table>

### Airspace Data Publication Service
- Published by SFDPS

<table>
<thead>
<tr>
<th>Service Details</th>
<th>SFPDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector Assignment Status</td>
<td>✔️ Special Activities Airspace (SAA)</td>
</tr>
<tr>
<td>Route Status</td>
<td>✔️ Altimeter Setting</td>
</tr>
</tbody>
</table>

### Operational Data Publication Service
- Published by SFDPS

<table>
<thead>
<tr>
<th>Service Details</th>
<th>SFPDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic Count Adjustment</td>
<td>✔️ Beacon Code Utilization</td>
</tr>
<tr>
<td>Instrument Approach Count Adjustment</td>
<td>✔️ Geographic Beacon Code Utilization</td>
</tr>
<tr>
<td>Sign In Sign Out</td>
<td></td>
</tr>
</tbody>
</table>

### General Information Message Publication Service
- Published by SFDPS

<table>
<thead>
<tr>
<th>Service Details</th>
<th>SFPDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Information</td>
<td></td>
</tr>
</tbody>
</table>
# ITWS Data Messages

**Weather Data**

**Integrated Terminal Weather System (ITWS) Data Publication:** Provides specialized weather products in the terminal area.

<table>
<thead>
<tr>
<th>Weather Data</th>
<th>ITWS Status Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configured Alerts</td>
<td>Hazard Text TRACON</td>
</tr>
<tr>
<td>Forecast Accuracy</td>
<td>Hazard Text 5nm</td>
</tr>
<tr>
<td>Forecast Contour</td>
<td>Hazard Text Long Range</td>
</tr>
<tr>
<td>Forecast Image</td>
<td>Hazard Text 5nm</td>
</tr>
<tr>
<td>Gust Front TRACON Map</td>
<td>Hazard Text Long Range</td>
</tr>
<tr>
<td>Microburst TRACON Map</td>
<td>Hazard Text TRACON</td>
</tr>
<tr>
<td>Precipitation 5nm</td>
<td>ITWS Status Information</td>
</tr>
<tr>
<td>Precipitation Long Range</td>
<td>Microburst Automatic Terminal Information Service (ATIS)</td>
</tr>
<tr>
<td>Precipitation TRACON</td>
<td>Runway Configuration</td>
</tr>
<tr>
<td>Storm Motion (SM) Storm Extrapolated Positions (SEP) 5nm</td>
<td>Storm Motion 5NM</td>
</tr>
<tr>
<td>SM SEP Long Range</td>
<td>Storm Motion TRACON</td>
</tr>
<tr>
<td>SM SEP TRACON</td>
<td>Terminal Weather Text Special</td>
</tr>
<tr>
<td>Terminal Weather Text Normal</td>
<td>Wind Shear ATIS</td>
</tr>
<tr>
<td>Tornado Alert</td>
<td>Tornado Detection Wind Profile</td>
</tr>
<tr>
<td></td>
<td>Anomalous Propagation (AP)</td>
</tr>
<tr>
<td></td>
<td>Indicated Precipitation</td>
</tr>
<tr>
<td></td>
<td>AP Status</td>
</tr>
<tr>
<td></td>
<td>Gust Front Estimated Time to Impact</td>
</tr>
</tbody>
</table>

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**Federal Aviation Administration**

<table>
<thead>
<tr>
<th>SWIFT 14 May 27th 2021</th>
<th>104</th>
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</thead>
</table>
# TTP Flight Delay Data

<table>
<thead>
<tr>
<th>Data Element</th>
<th>Description</th>
<th>Importance to Stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft Departure Delay Start Time</td>
<td>The delay start time.</td>
<td>TFDM will provide information regarding TMI delay information, including the reason for the delay and the facility that it is attributed to it. Non-FAA Stakeholders can use this information for awareness of the impacts of NAS initiatives on individual flights. The information can also be used for flight planning purposes (crew planning, aircraft movement planning, etc.), making strategic and tactical coordination efforts with the FAA (e.g., Command Center for reroutes), and post-event analysis.</td>
</tr>
<tr>
<td>Aircraft Departure Delay End Time</td>
<td>The delay end time.</td>
<td></td>
</tr>
<tr>
<td>Impacting Condition</td>
<td>The reason for the delay.</td>
<td></td>
</tr>
<tr>
<td>TMI</td>
<td>The identified TMI cause, if applicable.</td>
<td></td>
</tr>
<tr>
<td>Charge To</td>
<td>The facility the delay is attributed to.</td>
<td></td>
</tr>
<tr>
<td>Remarks</td>
<td>Additional information to explain the conditions or causes associated with the delay.</td>
<td></td>
</tr>
</tbody>
</table>
Flight Restrictions

• Issue: The need to see real-time NAS restrictions at a glance

• Tool: Flight Restrictions Widget
  o Real Time Restricted NAS elements
  o Yellow/Red filter

• Dispatch Desk Example

• Benefits

• Enhancements
EnRoute Fix Load

• Issue: The need to see real-time NAS restrictions at a glance

• Tool: EnRoute Fix Load Widget
  o Real Time Restricted NAS elements
  o Fix Crossing Time

• Dispatch Desk Example

• Benefits

• Enhancements