SWIFT:

SWIM Industry Collaboration Workshop #6

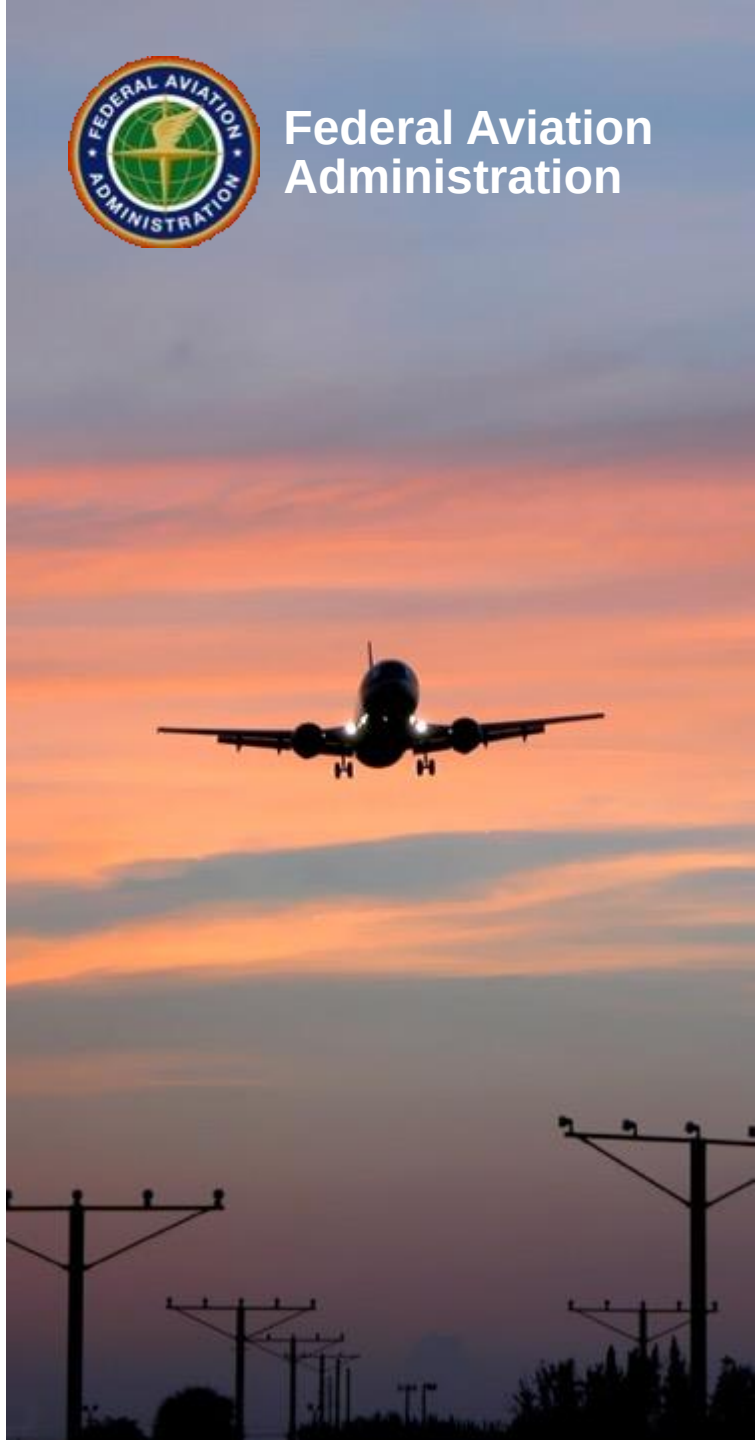
SWIM, Services & SWIFT (SWIM Industry-FAA Team)

FAA SWIM Program

Communications, Information and Network Programs

May 21-22, 2018

Federal Aviation Administration



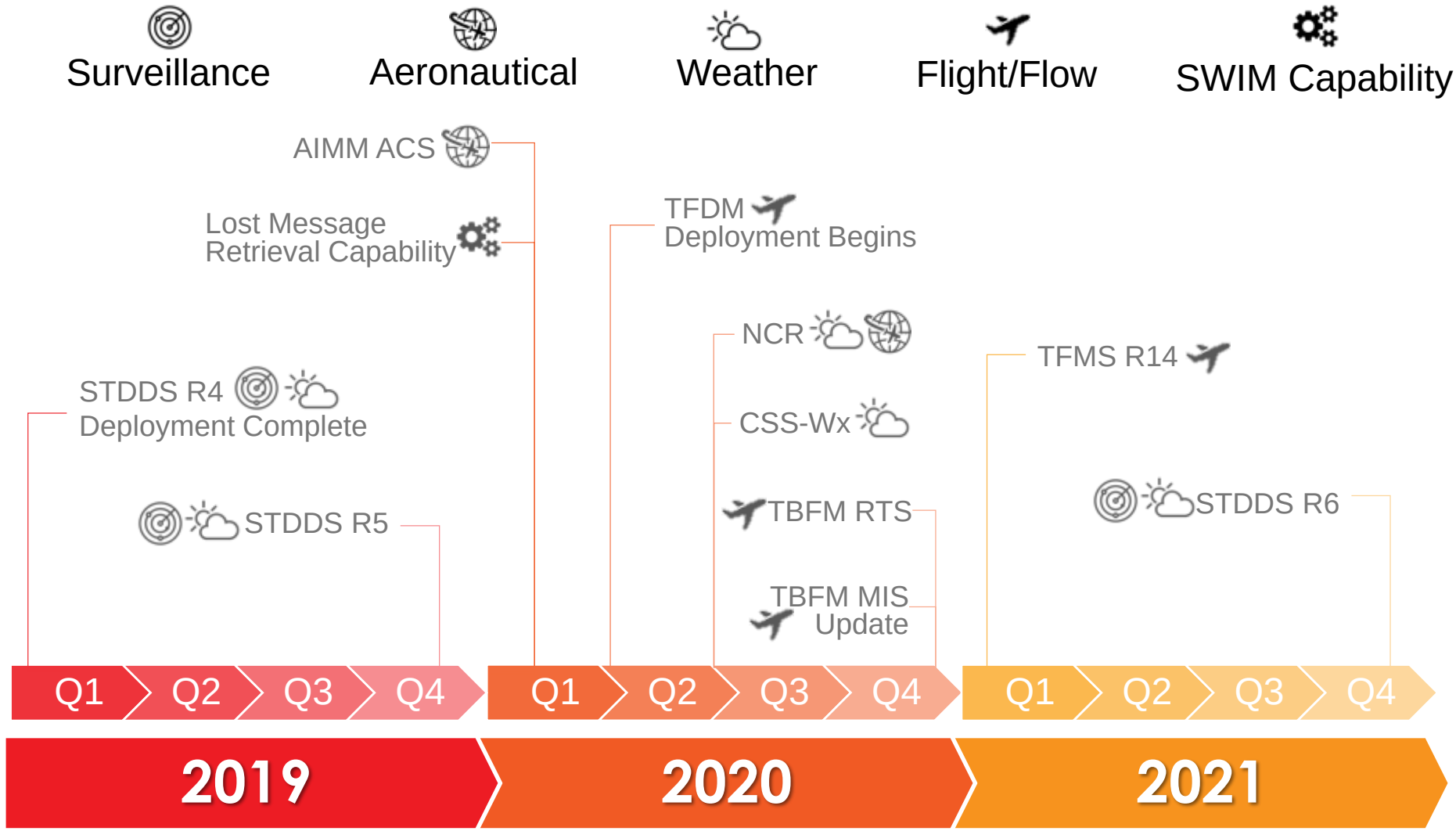
SWIFT Collaborative Workshop #6: Day 1 Agenda

- **Day 1: General Session**
  - Opening & Update on Focus Group Status
  - SWIFT Widget Case Study
  - Special Topic: How Southwest Airlines is structuring for SWIM
  - **Break**
  - Special Topic: Aeronautical Common Services (ACS)
  - NBAA Case Study
  - **Lunch**
  - Traffic Flow Management System: Program & SWIM Service Updates
  - Special Topic: SWIM International and Global Strategy
  - **Break**
  - Special Topic: Enhanced SWIM Cloud – Concepts & Use Cases
  - Close out: Operational Value of Day 2 activities

SWIFT Collaborative Workshop #6: Day 2 Agenda

- **Day 2: ATD-2 and TFDM Special Session**
  - **Arrive and Sign-in**
  - Introduction & Session Kickoff
  - Learn to Swim with ATD-2
  - **Break**
  - Fuser:
    - Why Everyone Should Have One
    - Fuser Deeper Dive & Mediation Use Cases
    - Fuser Database – How ATD-2 stores all the data
  - **Lunch**
  - SWIM Data Analysis:
    - Turning SWIM data into consistent reports for analysts and users
    - Use of SWIM Data for ATD-2 Analysis
  - **Break**
  - TTP – How it fits in
  - Where are we now and where we going?
  - Q&A and Close-out
  - “Extra Innings”

SWIM Planned Deployment Roadmap



SWIFT Focus Group: Operational Context & Use Case Documents

Update on Focus Group Status

Kathryn Crispin, American Airlines

Jay Zimmer, LS Technologies

May 21, 2019

Federal Aviation Administration

Operational Context Documents

- **Document Progress**
  - STDDS – SMES — DELIVERED — UPDATED
  - TFMS Flow — DELIVERED — UPDATED
  - TFMS Flight — DELIVERED — UPDATE IN PROGRESS
  - TBFM – MIS — DELIVERED
  - SFDPS – Flight — DELIVERED
  - SFDPS – Airspace — DELIVERED
  - STDDS – TAIS — DELIVERED — UPDATED
  - FNS-NDS — DELIVERED
  - ITWS — DELIVERED
  - STDDS – TDES — DELIVERED
  - STDDS – APDS — UNDER REVIEW
  - DCNS – DLD — IN DEVELOPMENT

- **Stable Document Format**
  - Document template/style has been static since SWIFT #4
    - Added references to supporting documentation
    - Added data element descriptions, formatting and restriction information
    - Consistent document naming convention on SWIFT portal
    - Documents have successfully clarified how these systems work and how individual data elements relate to specific real-world activities

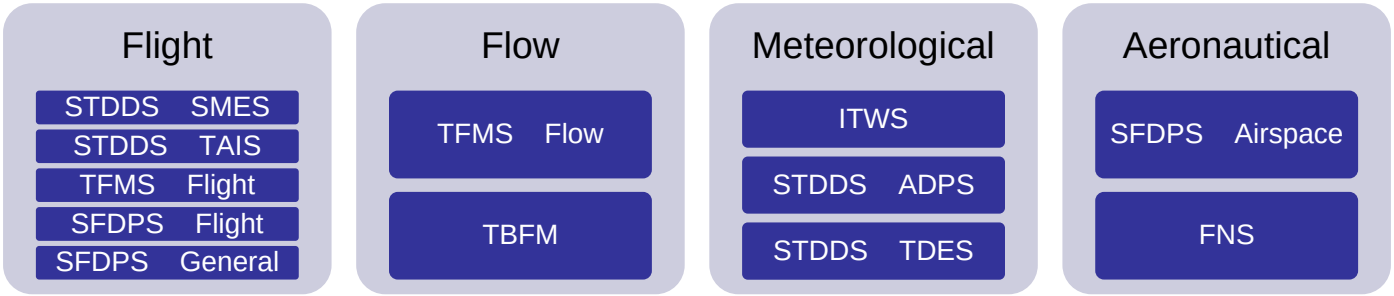
Operational Context Document Template

1. **Introduction**
   - Briefly describe purpose of document
   - Briefly describe the FAA systems with which the information service interfaces and what type of information it publishes
2. **Domain System Description**
   - In depth discussion of internal FAA systems that create the data ingested and published by the information service
   - References to additional information (e.g., ConOps, JMSDD, ICDs)
3. **Information Service Overview**
   - Describe how the FAA system data interfaces with, and is published by, the information service
   - Describe each message published by the information service
4. **Information Service Message Types**
   - In depth description of XML structure and each data element
   - Includes data formats and examples of populated data elements, as needed

Appendix A: Acronyms

Use Case Documents

- **Document Progress**
  - Individual Information Service Documents
    - STDDS – SMES ✓ DELIVERED
    - TFMS Flow ✓ DELIVERED
    - TFMS Flight ✓ DELIVERED
    - TBFM – MIS ✓ DELIVERED
    - SFDPS – Flight ✓ DELIVERED
  - Domain Information Service Documents
    - Flight Domain ✓ DELIVERED
    - Flow Domain ✓ DELIVERED
    - Meteorological Domain ✓ DELIVERED
    - Aeronautical Domain IN DEVELOPMENT
- **Updated Document Format**
  - Focus Group decided to group information services by domain and only draft use cases for flight, flow, meteorological and aeronautical domains



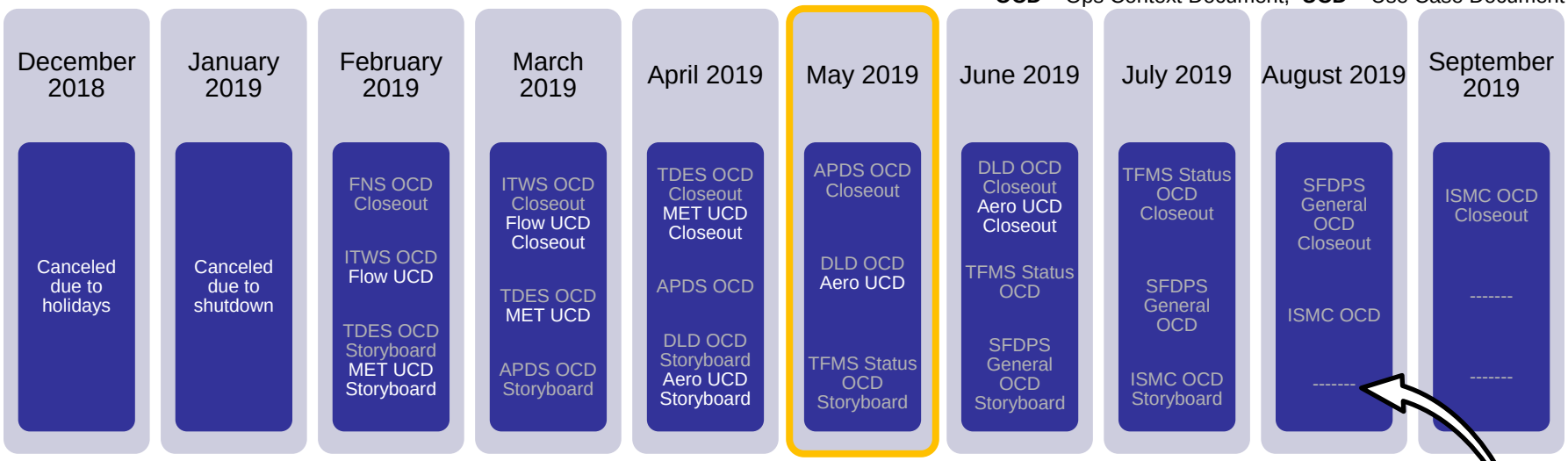
Domain Use Case Document Template

1. **Introduction**
   - Purpose of document
   - Description of SWIM information services to be addressed
   - Discussion of how the data provided by these information services will be used in an operational context and the phase of flight with which the services will apply
2. **Current State**
   - Problem statement describing issues/inefficiencies with current operations
   - Perspectives/roles of operational decision-makers
   - Current state operational example describing a specific end-to-end flight and how operations would proceed under a given set of constraints
3. **Future State**
   - Future state operational example describing a specific end-to-end flight and how operations would proceed under a given set of constraints with the addition of SWIM information for more informed decision-making
   - Benefits describing increased efficiencies gained by SWIM information
   - Conclusions

Appendix A: Acronyms

Current Document Schedule

***OCD** – Ops Context Document, **UCD** – Use Case Document



- **Deliver one SWIM service Ops Context Document per month**
- **Deliver one domain Use Case Document every two months**
- **Schedule moved 2 months to the right due to December and January meeting cancellations**
- **At SWIFT #5 the group was interested in D-ATIS, which included in the STDDS-TDES feed**
  - TDES storyboard inserted to the February schedule and moved subsequent Ops Context documents 1 month to the right
- **Added DCNS DLD to April 2019, all other Ops Context Docs move 1 month to the right**
- **Plan to address Request/Reply services once all Pub/Sub services are completed**

SWIFT Documentation

- **All SWIFT Documentation can be found at: https://connect.lstechllc.com/index.cfm/main/swifthome**

Next Steps: Operational Context & Use Cases

- **Awaiting feedback on:**
  - STDDS-APDS Operational Context
- **In development:**
  - Aeronautical Use Case
  - DCNS-DLD
- **Harmonizing Operational Context Documents**
  - Continue to retroactively update older documents to new template (TFMS-Flight)

SWIFT WIDGETS

Purpose of SWIM Widgets

- **SWIM data is often visualized in ways that look nice but may not be the most functional based on the operational need**
  - Moving map of aircraft
  - Weather map of CONUS
- **Widgets have been developed to visualize SWIM data in operationally-actionable ways**
  - Enable faster, more accurate decisions based on useful visualizations of data
- **Lightweight web-based applications that can be scaled to desktop or mobile devices**
- **Prototype SWIFT widgets can be found at:**
  http://ec2-52-10-209-24.us-west-2.compute.amazonaws.com/content/pages/widget-flight-times.php

SWIFT Widget Site

- **Prototype SWIFT widgets can be found at: http://ec2-52-10-209-24.us-west-2.compute.amazonaws.com/content/pages/widget-flight-times.php**

Flight Arrival/Departure Intervals

- **Sort and filter data to identify how early or late individual flights departed or arrived**
- **Identify which airports/airlines are subject to delays**
- **Visualization of SFDPS live data**

Flights from 12:00 am GMT

Display 5 records per page

Search:

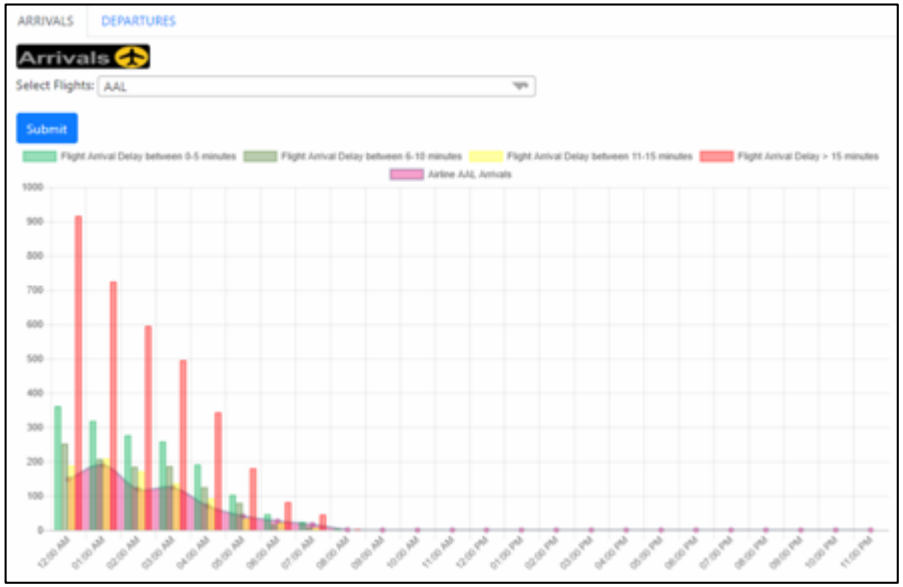
Airline	Flight ID	Departure City	Estimated Departure	Actual Departure	Departure Interval	Arrival City	Estimated Arrival	Actual Arrival	Arrival Interval
AAL	AAL1833	KCLT	2018-10-30 19:00	2018-10-30 19:16	0:16	KLAX	2018-10-30 23:40	2018-10-31 00:00	0:20
AAL	AAL2320	KPHX	2018-10-30 19:31	2018-10-30 19:54	0:23	KBOS	2018-10-30 23:37	2018-10-31 00:00	0:23
DAL	DAL2758	KATL	2018-10-30 23:00	2018-10-30 23:28	0:28	KAVL	2018-10-30 23:35	2018-10-31 00:00	0:25
DAL	DAL433	KATL	2018-10-30 23:20	2018-10-30 23:29	0:09	KCAE	2018-10-30 23:52	2018-10-31 00:00	0:08
EJA	EJA693	KIAD	2018-10-30 21:00	2018-10-30 23:02	2:02	KBDL	2018-10-30 21:52	2018-10-31 00:00	2:08

Showing page 1 of 1,513

First Previous 1 2 3 4 5 ... 1513 Next Last

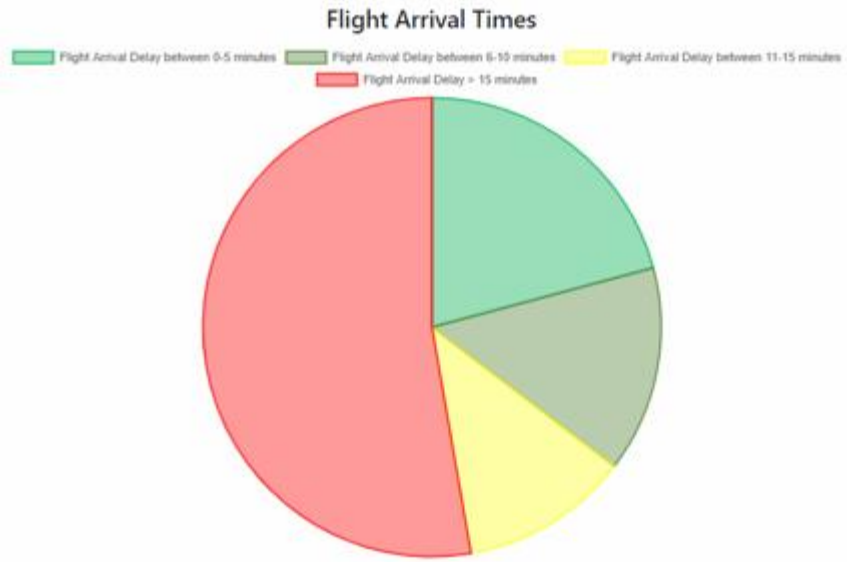
Arrival and Departure Delay Bar Charts

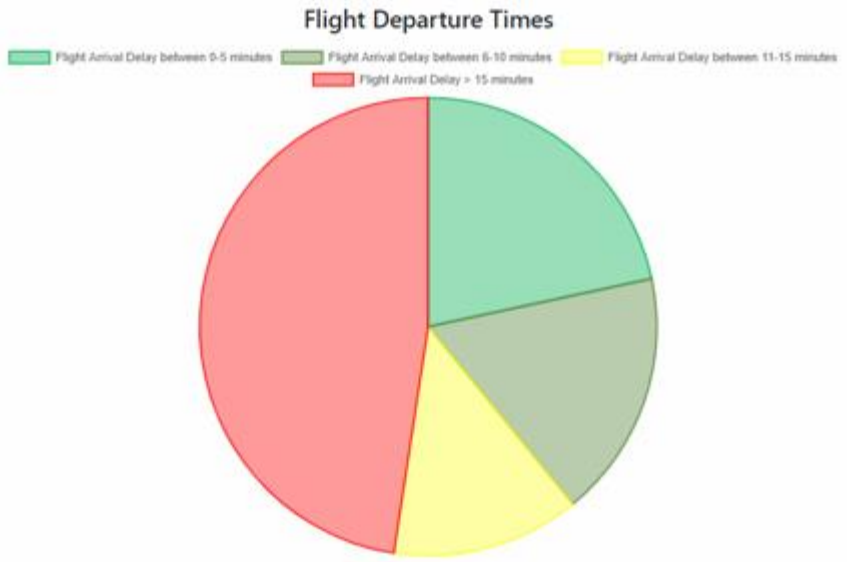
- **Plot overall NAS arrival and departure delays per hour**
- **Identify severity of delays and periods of high demand**
- **Plot arrivals per hour by airline**
- **Visualization of SFDPS live data**



Arrival and Departure Delay Pie Charts

- **Easily recognize overall severity of NAS arrival/departure delays**
- **Visualization of SFDPS live data**





En Route Fix Loading Viewer

- **Developed to support taxi-out use case**
- **Current MIT and MINIT restrictions at specific fixes**
- **Fix loading projections for next hour**
  - Leverages methodology to calculate fix load percent in 15-minute periods
  - Identify specific fixes with limited capacity - this supports informed reroute requests
- **Can be extended to include flight list functionality**
- **Visualization of TFMS, TBFM (currently static data)**

Fix	Miles In Trail	Minutes In Trail	1000 - 1015	1016 - 1030	1031 - 1045	1046 - 1100
WAVEY		10	80	75	60	40
GAYEL	5		60	70	65	60
NEION			60	50	45	40
RBV	15		90	100	95	90
BIGGY	10		75	70	75	80
WHITE			50	40	45	50

Weather Route Availability Tool

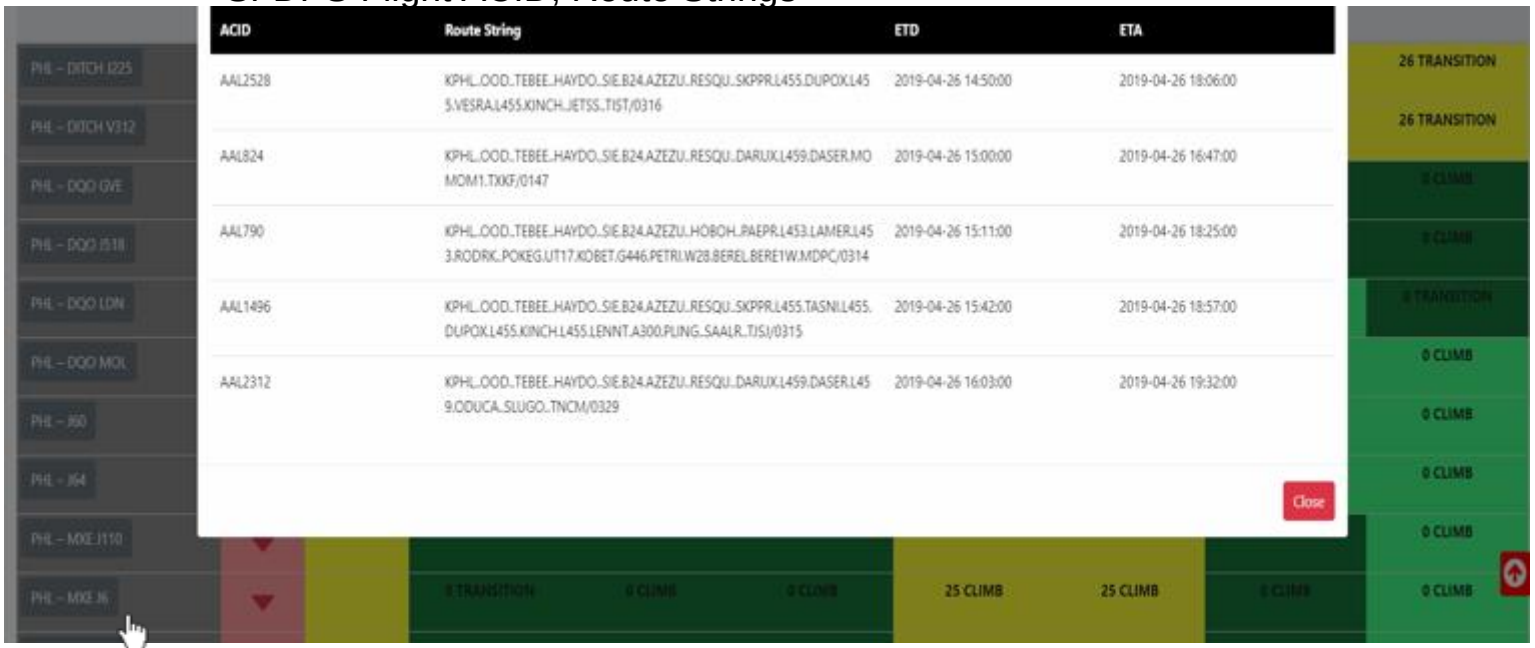
- **Developed to support taxi-out use case**
- **Show departure route availability projections for next 30 minutes due to weather constraints**
  - Identify specific departure routes/fixes with limited capacity - this supports informed reroute requests
  - Identify altitude of echo tops, blockage locations
- **Filter routes by metroplex**
- **Visualization of TFMS**
  - Route Availability Planning Tool (RAPT)

Desktop View

Mobile View

Weather Route Availability Tool with Flight List

- **Developed to support taxi-out use case**
- **Adds additional capability to Weather Route Availability Tool**
- **Show scheduled flights on each route for next 30 minutes**
  - Upon clicking route, a table pops up with flights scheduled to depart on that route
  - AOC can identify affected flights, as well as capacity concerns
- **Visualization of TFMS and SFDPS**
  - Route Availability Planning Tool (RAPT)
  - SFDPS Flight ACID, Route Strings



Desktop View

Mobile View

SWIFT Widget Case Study: Arrival/Departure Solution

“SWIM Data: New insights solving old problems”

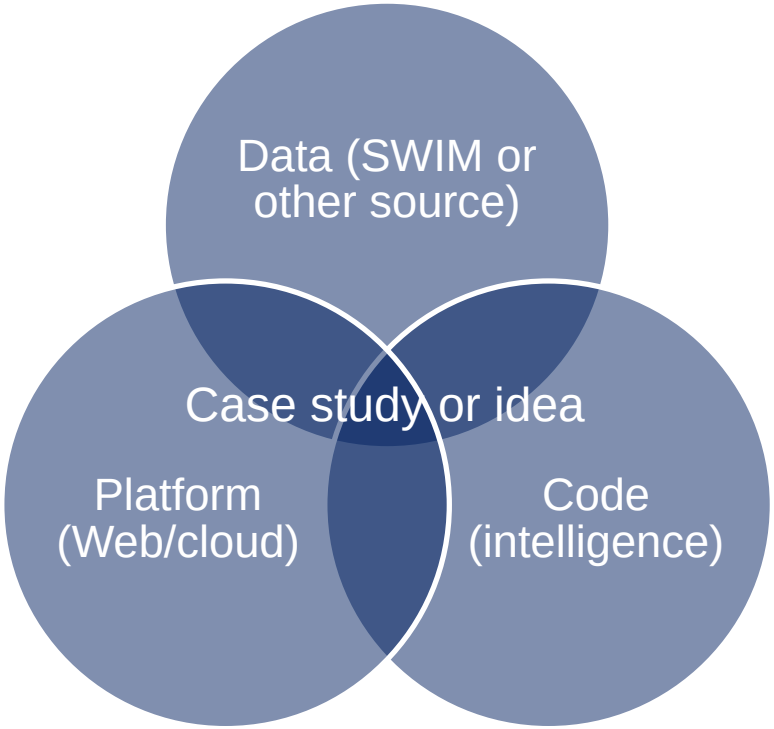
Captain Rob Goldman

Delta Airlines

May 21, 2019

Rob's vision of a widget

Widgets offer a quick way to visualize data and to develop operationally significant concepts with little to no cost or time:



Simplified Storyboard for IDRP

- **IDRP – Integrated Departure Route Planning**
- **Combines route availability predictions during SWAP with demand predictions**
  - Convective Supply and Demand reconsolidation
  - Identified value to FAA and industry
  - Today's Acquisition Management (ACM) process:

- **IDRP has been in prototype for over 10 years and is slated for TFMS R16 targeted for 2022**
- **Can spiral development improve our industry response?**
  - EIDS vs ERAM

RAPT with Flight List = IDRP

- **Developed to support taxi-out use case**
- **Adds additional capability to Weather Route Availability Tool**
- **Show scheduled flights on each route for next 30 minutes**
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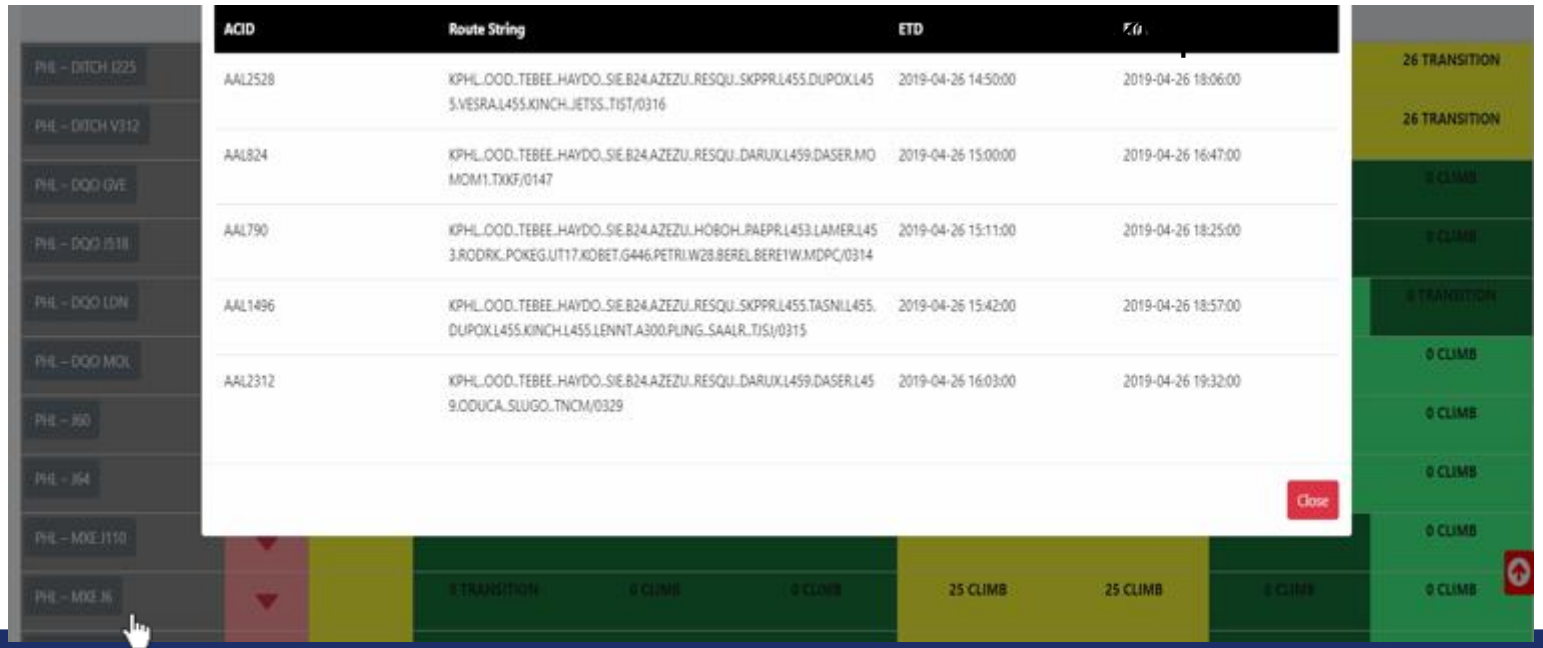


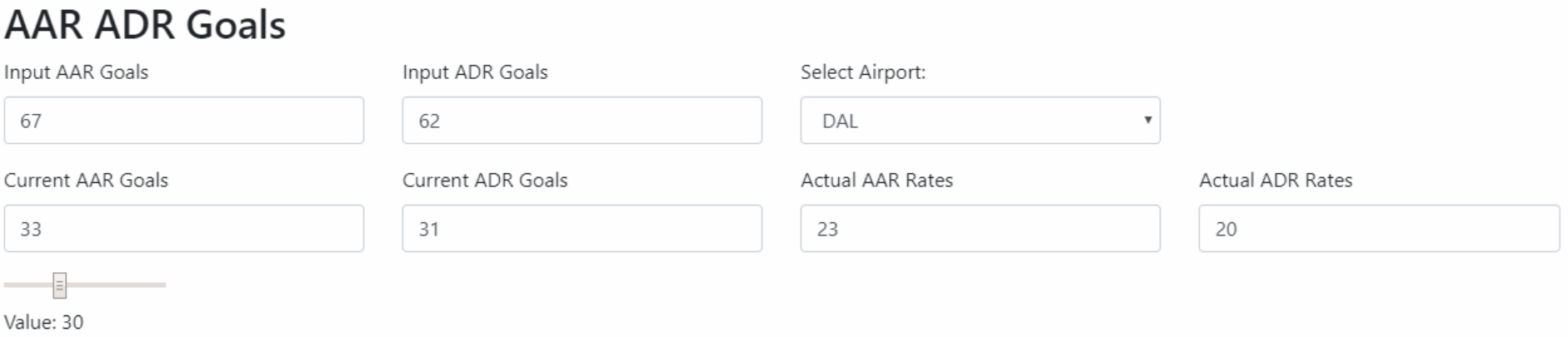
Mobile View

Simplified Storyboard for AAR/ADR

- **PERTI - Plan Execute Review Train Improve**
- **Process and goal selection is a current industry focus activity:**
  - Airlines are embedded in the ATCSCC
  - Develop meaningful and impactful goals that positively impact our customers
  - Develop actionable insight and get air traffic engagement
  - Cascade goals to frontline controllers

Arrival/Departure Rates

- **Allows user to input AAR/ADR goals for an airport then compare to actual rates**
  - Current mockup allows for manual input of goals into widget
  - Rate goals could also be ingested from TFMS
- **Rates can be scaled to 15-60 minute periods**
- **Visualization of TFMS, SFDPS**
  - SFDPS – count of actual departures and arrivals for time period
    TFMS – airportConfigMessage (AAR & ADR, currently notional data)



SWA SWIM Approach & Slot Optimization Example

Created for SWIFT May 2019 Meeting

SWA SWIM Approach and Slot Optimization Example

- Overview of SWA SWIM Approach
- Purpose of Slot Optimization
- Overview of Current ADL Communication for Substitution
- Relevant SWIM Data Elements
  - TFM Flight
  - TFM Flow
  - TFM Request Reply
- Potential Benefits of SWIM Request Reply
- Application Features Enabled by SWIM Request Reply
- Lessons Learned from SWIM Request Reply Connectivity Steps

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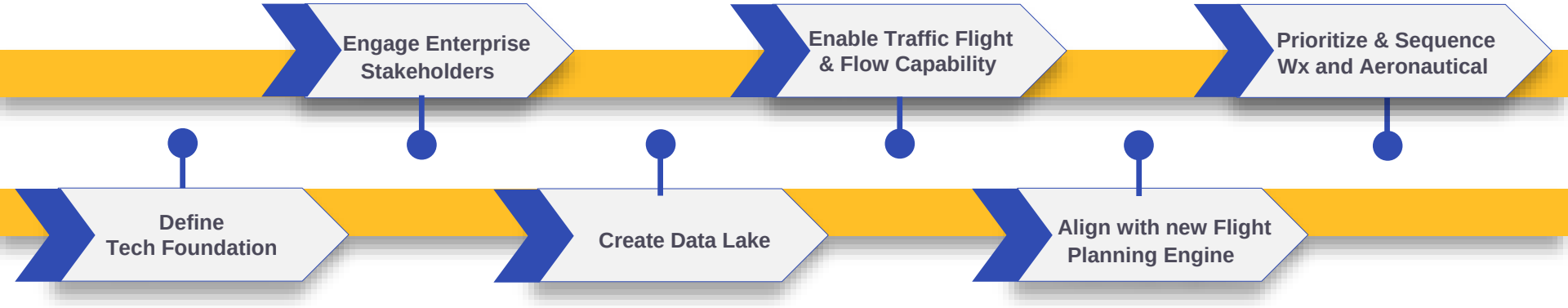
SWA-SWIM Long Term Strategy

Conduct a series of Enterprise Workshops to:
- Engage various workgroups to validate all impacted Enterprise stakeholders
- Identify Operational constraints and data gaps
- Build out use cases to help prioritize implementation of data feeds

The 11 Surface CDM Elements are the first capabilities that will enable enhanced traffic flow management between ATC towers, controllers, and airports to share and exchange real-time data.

By utilizing the data lake, we will be able to better understand our Weather and Aeronautical strategy through enhanced pre-ops analytics, while aligning with the EWINS and One Mind effort.

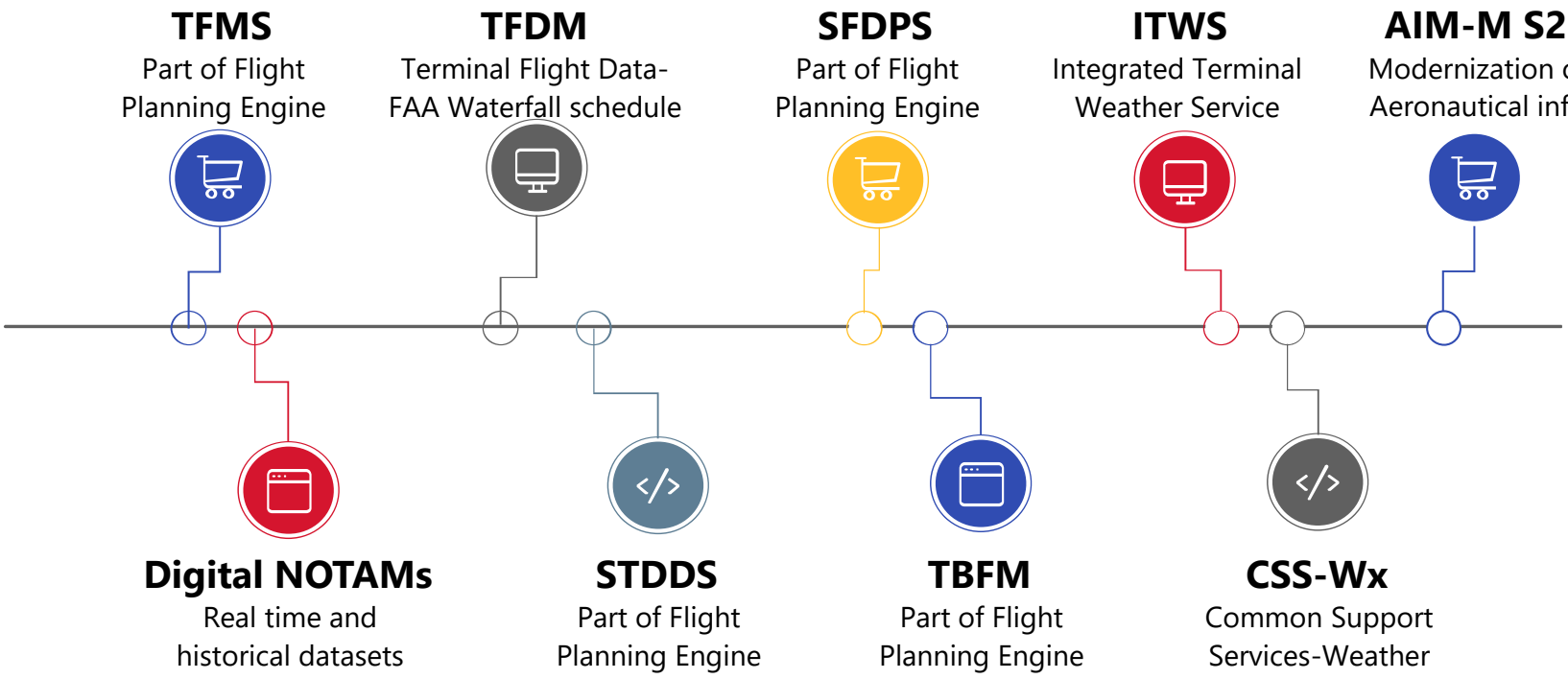


This will enable new data elements and allow us to prepare to retire Legacy feeds and ARINC AOCNET, including:
- Establishing dedicated circuits to the FAA data centers
- Integrating with Solace message broker
- Coordinating with the Integrated Data Foundation

As we pull data feeds to support these capabilities, we will also work on creation of a data lake (a centralized repository that allows for storing all structured and unstructured data at any scale)
By storing the data in a data lake, we can:
- Store data as-is
- Run different types of analytics (dashboards, big data processing, machine learning) to guide better decisions

Align the SWA-SWIM Roadmap with the SWIM data feeds needed for our Vendor recommended Flight Planning Engine

SWA-SWIM Data Priority



SWIM Product Plan

Phase 1 New Connections to/from FAA

Phase 2 Data Feeds

Phase 3 Use Cases

ASDI Migration	11 CDM Elements	Data Feeds	Features / Use Cases
1. Add VPN connection to FAA	1. Send 11CDM Elements to FAA from Schedule Domain in OpsSuite	1. Receive TFMS Data into Parser in Data Lake, Parser sends data to OpsSuite, Data Lake, and any other systems that subscribe 2. Receive Digital NOTAMs into Parser 3. Receive TFDM into Parser 4. Receive STDDS into Parser 5. Receive SFDPS into Parser 6. Receive TBFM into Parser 7. Receive ITWS into Parser 8. Receive CSS-Wx into Parser 9. Receive AIM-M S2 into Parser	**1. TFMS** • SWIM EOBT • NASA ATD-2 • Pre-Departure Clearance Time • SWIM-enabled ESM Tool • Taxi-Start/Takeoff Times • CSC/FLIFO Real-time data exchange • TFMS Airport Deicing Status **2. NOTAMs** • Digital NOTAMs historical dataset • SWIM NOTAMS Distribution Service **3. TFDM** • SWIM TFDM • Etc.

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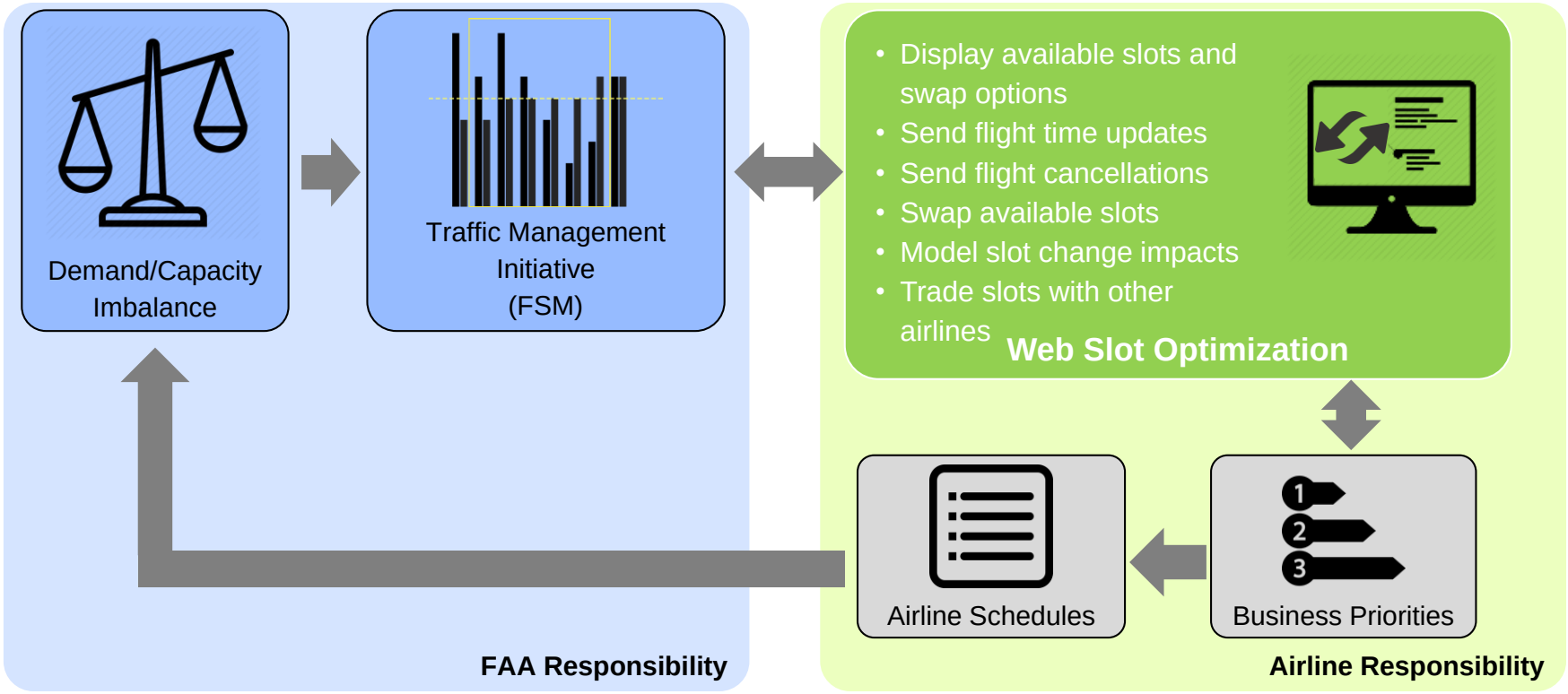
Purpose of Slot Optimization



Potential Benefits: General Benefits of Slot Optimization

- Reduced workload for slot coordination
- Improved traffic management measure compliance because airlines are incentivized to make the best use of their slots
- Reduced communication latency

FAA Benefits

- Cost savings of crew duty time for prioritized flights for substituted or downstream flights
- Reduced ATC delay and corresponding cost savings if delay taken at gate
- Increased predictability of gate management
- Additional SWIM specific benefits on next slide

Airline Benefits

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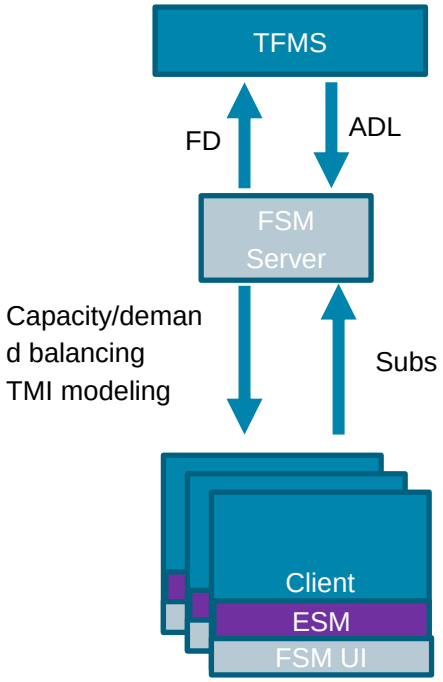
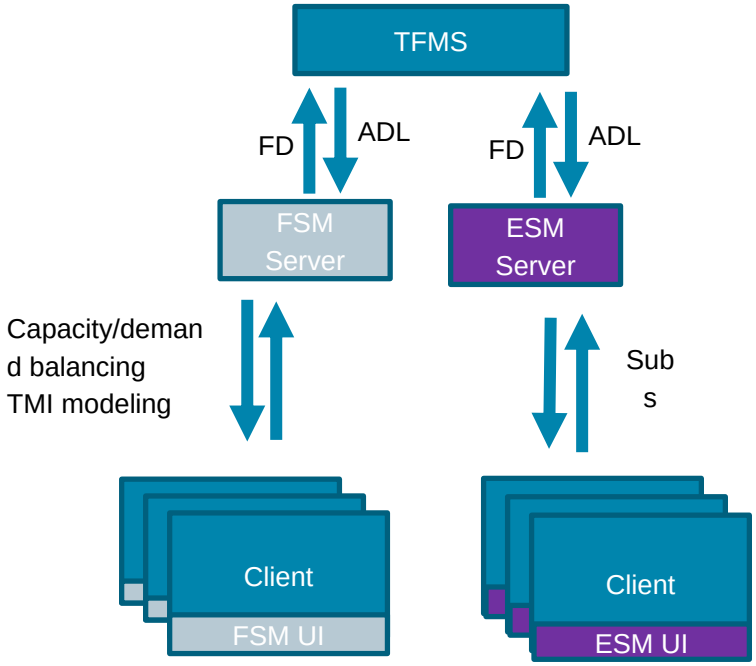
Overview of Current ADL Communication for Substitutions



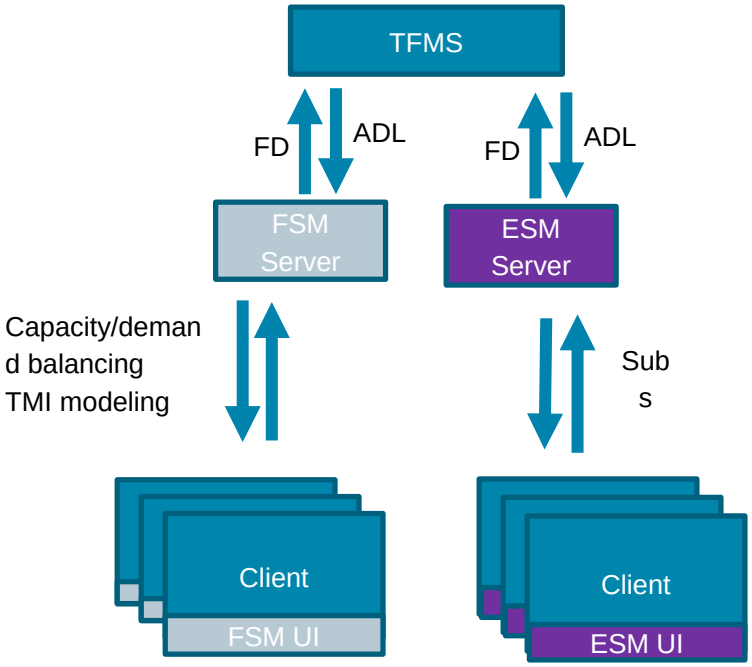
Prior to ESM Version 13.X
(Prior to 2017)

Changes to account for Java security updates



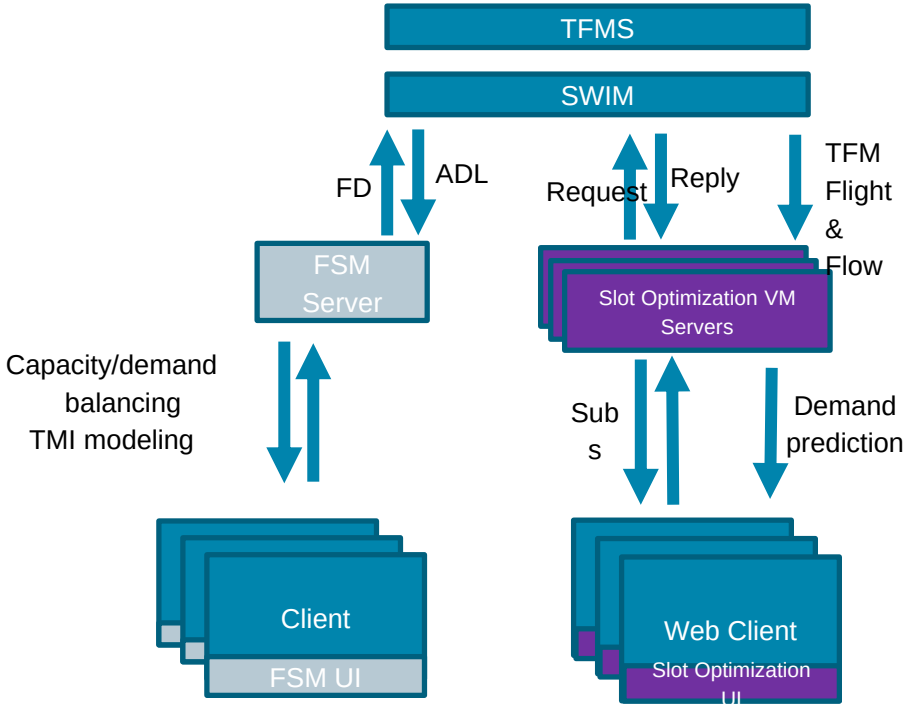
ESM Version 13.X
(2017 – 2019)

Overview of SWIM Communication for Substitution Slot Optimization



ESM Version 13.X
(2017 – 2019)

Changes to account for switch to SWIM data



Slot Optimization with SWIM
(2019 and Beyond)

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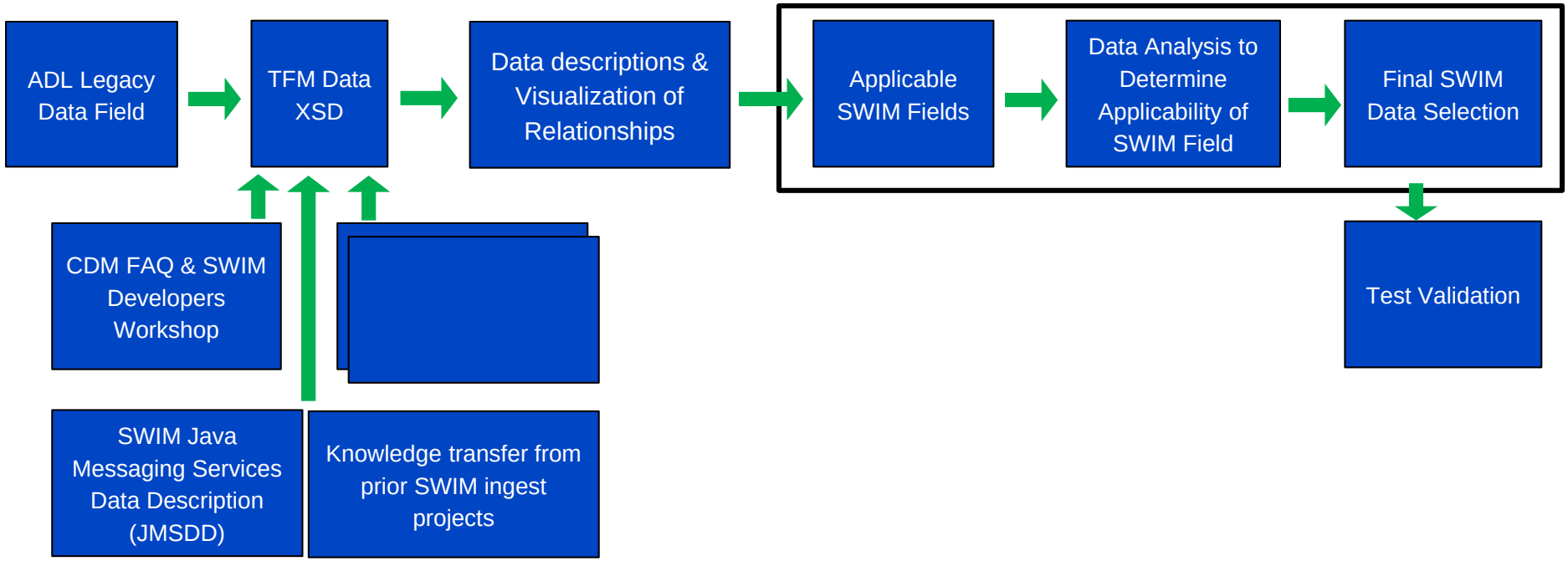
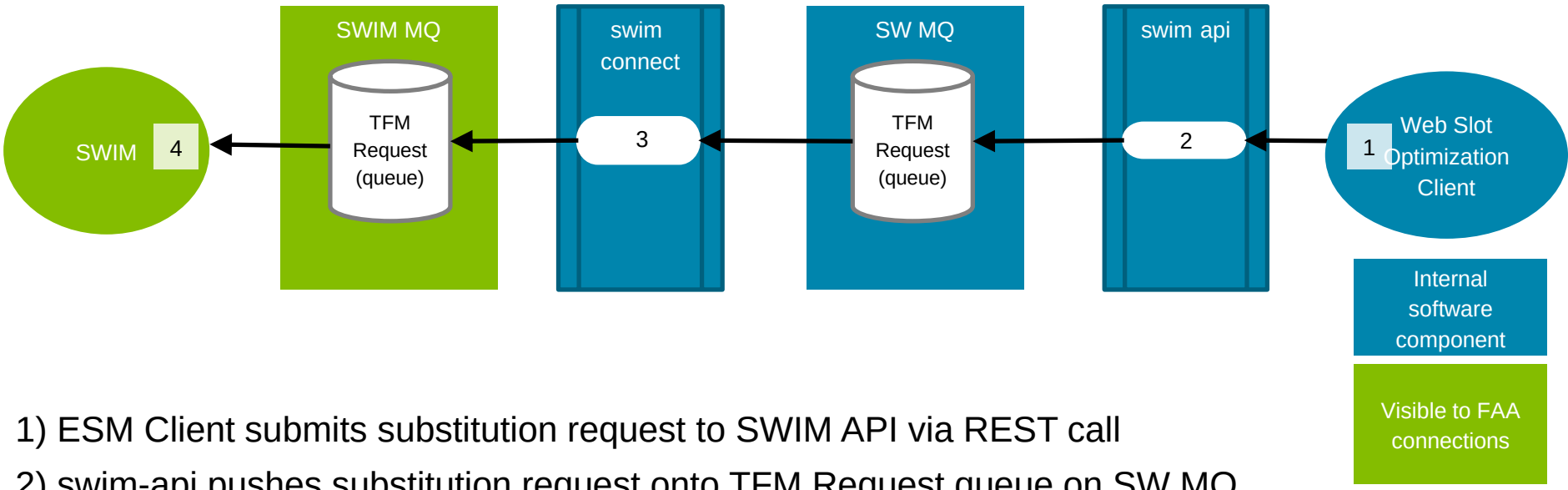
Relevant SWIM Data Elements: Identification Process



Relevant SWIM Data Elements: Notable Data Elements

Focus of the Application	Used When Necessary
• **FlightControl** • **FlightCreate** • **FlightModify** • **CDMUpdate** • **TMIFlightList** • **AFP / GDP / FXA** • FlightPlan • FlightPlanAmendment • FlightPlanCancellation • Track • GS • FADT • CTOP • FXASecondaryFilter • PARAM AFP/GDP/GS/BLANKET/COMPRESSION • AirportConfiguration	• Arrival • Departure • BoundaryCrossingUpdate • FlightControl • FlightCreate • FlightModify • FlightRoute • FlightScheduleActivate • FlightTimes • Track • GeneralAdvisory • PARAM AFP/GDP/GS/BLANKET/COMPRESSION • Reroute • Deicing • Restriction • RAPT

Relevant SWIM Data Elements: Substitution Request Flow



1) ESM Client submits substitution request to SWIM API via REST call
2) swim-api pushes substitution request onto TFM Request queue on SW MQ
3) swim-connect consumes substitution request from SQ MQ and forwards it onto TFM Request queue on SWIM MQ
4) SWIM consumes substitution request

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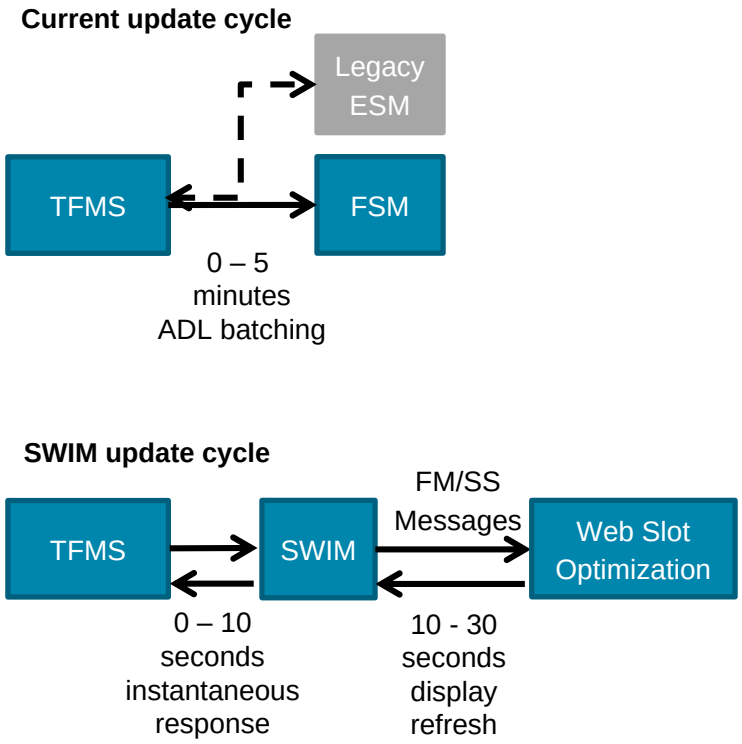
Possible Slot Optimization SWIM Benefits



FSM Notes

- FAA's roadmap to get FSM on a SWIM-enabled connection is still undefined

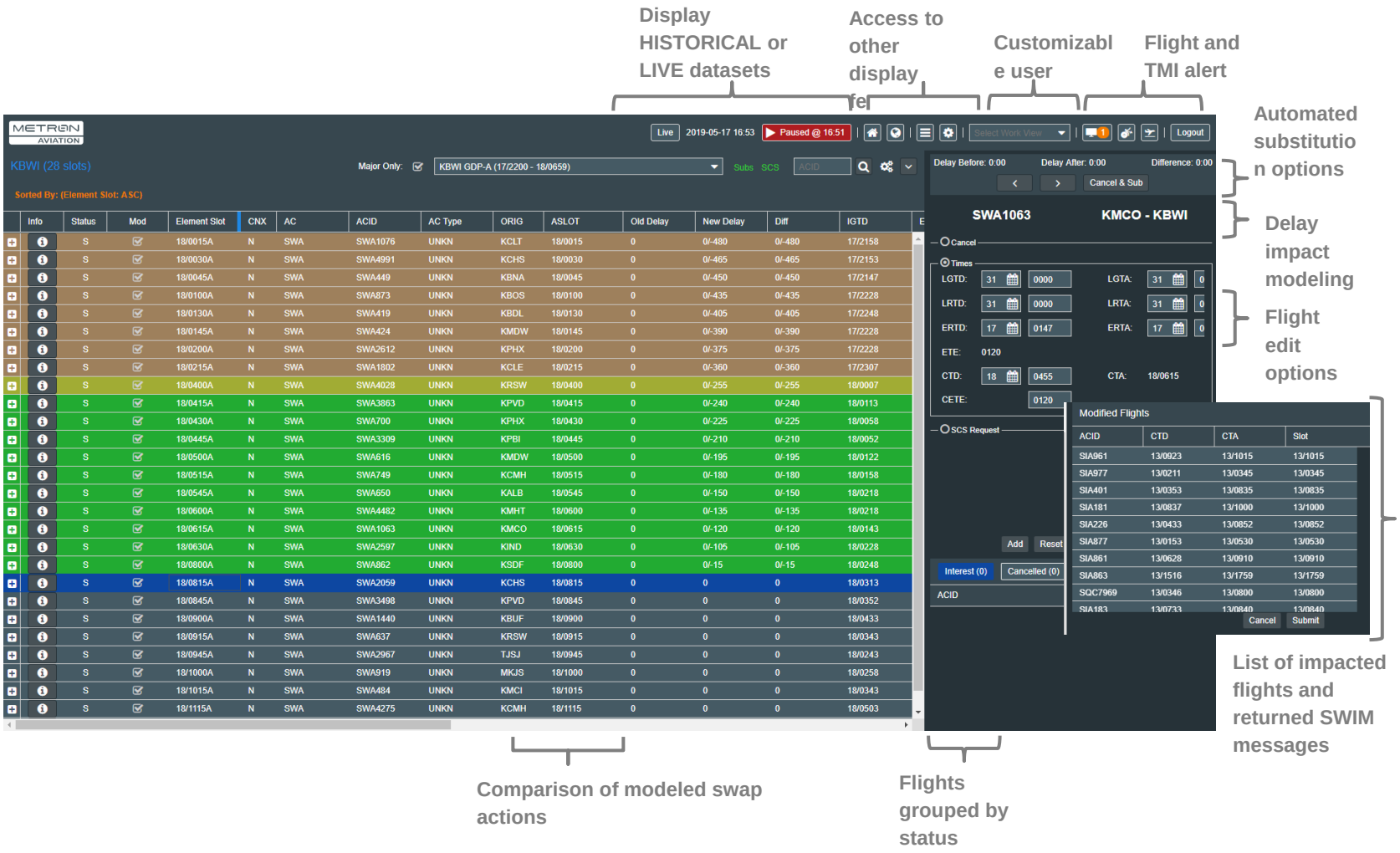
Until FSM transitions to SWIM, there are possible benefit areas:

- Greater likelihood of messages accepted due to display of TFM data matching current TFM data state ahead of ADL batching
  - Results in more flexibility to use airline compression and other automated substitution options
- Ability to see TFMS modifications more frequently
  - Results in more flexibility to make use of available slots or time updates
- Enable other airline applications to make use of cleaned & processed SWIM data

SWA SWIM Approach and Slot Optimization Example

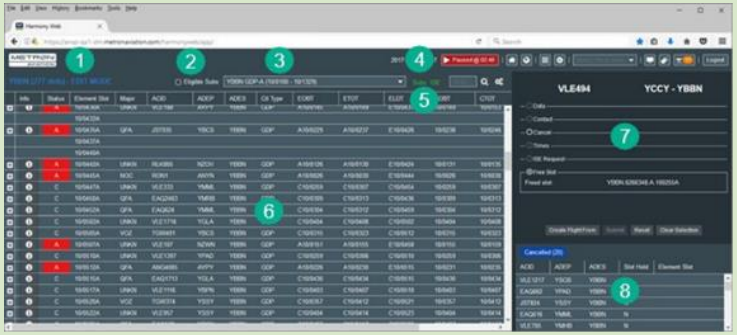
- Overview of SWA SWIM Approach
- Purpose of Slot Optimization
- Overview of Current ADL Communication for Substitution
- Relevant SWIM Data Elements
  - TFM Flight
  - TFM Flow
  - TFM Request Reply
- Potential Benefits of SWIM Request Reply
- **Application Features Enabled by SWIM Request Reply**
- Lessons Learned from SWIM Request Reply Connectivity Steps

Substitution List



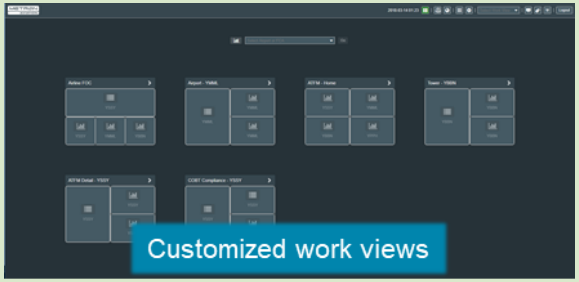
Application Features Enabled by SWIM

Basic Capabilities

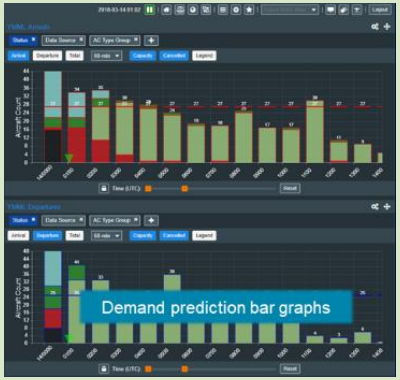


Flight list view with swap option highlighting

CDM message summary



Customized work views



Demand prediction bar graphs

Capabilities Enabled

Advanced Schedule Management

Ability to edit, cancel, and perform simple and advanced flight substitutions (such as airline compressions, insert and shift, swap option highlighting)

Flight Lists

Display of predicted demand and associated flight attributes

SWIM Data Management

Replaces TFMS data connection (ADL/FD tags) with SWIM ingest and request/reply data interfaces

Drag and Drop User Customization

Simplifies the process of customizing the layout of ESM with saved user profiles and moves away from file-based customization

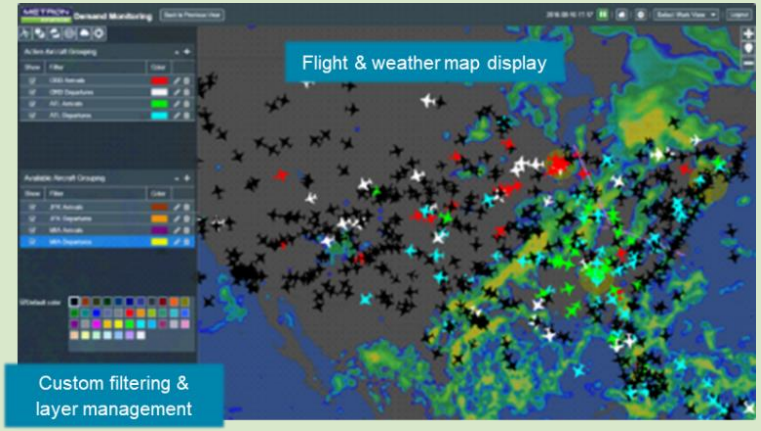
Demand Monitoring Bar Graphs

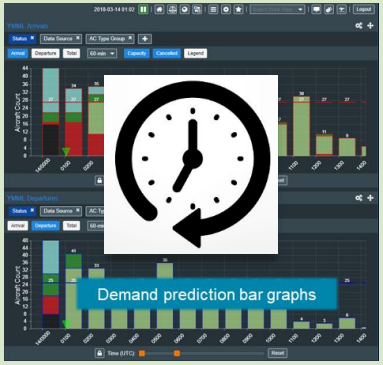
Processes and integrates schedule data from SWIM to create demand predictions for arrivals, departures or total demand as well as additional demand groupings such as aircraft type, major or status up to thirty six hours in the future.

METRON AVIATION

Application Features Enabled by SWIM

Enhanced Capabilities





Capabilities Enabled

Map Display with Flights

Provides a web-based map display with traffic management initiatives, standard geo-political boundaries, aviation data layers (airports, approach controls, sectors, and centers). Traffic management initiatives include the display of flow constrained areas (FCAs) and airspace flow programs (AFPs) issued by the FAA.

Map Display showing Weather Overlay

Provides the current weather from the Rapid Refresh (RAP) convective weather data source with an update rate between 1 and 12 times per hour. Customer-specific weather products could also be displayed; however, specific arrangements would need to be made to account for the other weather products.

Map Display with FEA Creation

The ability to view predicted demand for any geographic area by drawing a line, circle, or airspace element-based Flow Evaluation Area (FEA). Once drawn, users are able to view the associated flight lists and demand graphs for flights entering that airspace. These internal FEAs are not transmitted to the FAA.

Historical Schedule Playback

Ability to view flight data for a 2-week historical period to assist in troubleshooting and business process change considerations. Historical data archiving begins from the start of the first operational day of the Slot Management product.

METRON AVIATION

SWA SWIM Approach and Slot Optimization Example

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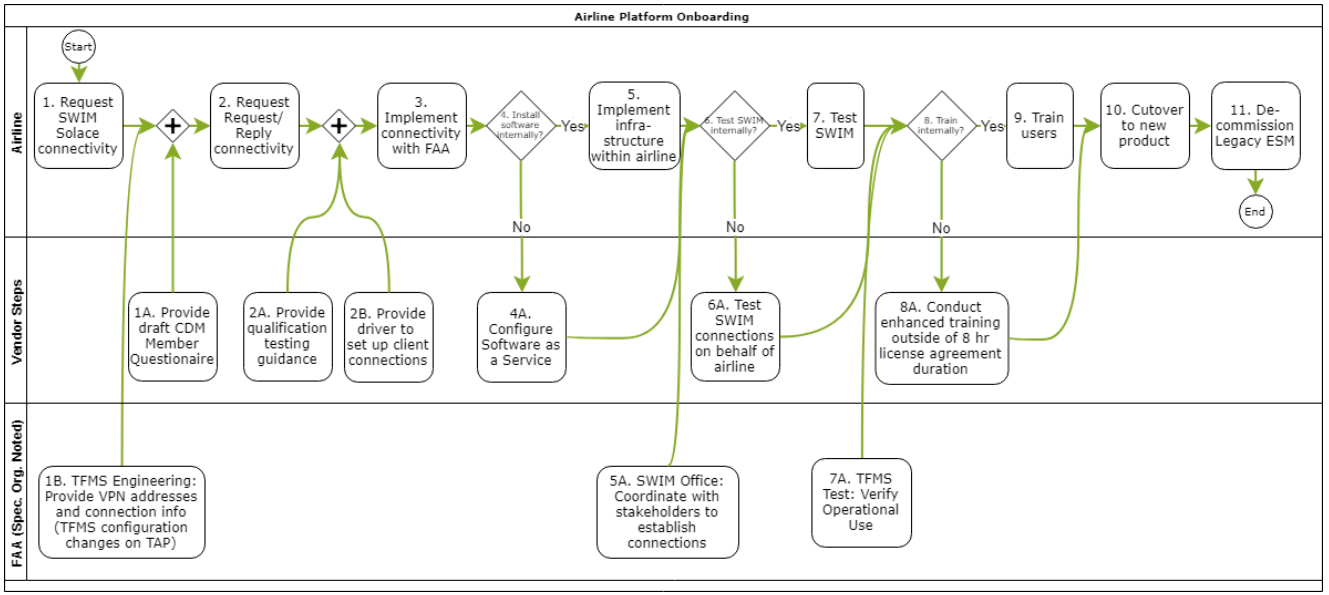
- Relevant SWIM Data Elements
  - TFM Flight
  - TFM Flow
  - TFM Request Reply
- Potential Benefits of SWIM Request Reply
- Application Features Enabled by SWIM Request Reply
- **Lessons Learned from SWIM Request Reply Connectivity Steps**

Lessons Learned from SWIM Request Reply Connectivity Steps

- Request/Reply coordination requires steps beyond SWIM ingest
- Not part of the cloud connectivity process
- Be prepared to execute qualification steps
- Having software which is configured to interface with request/reply will speed the qualification process
- Validation of the airline's use is required beyond the normal software installation steps



DEDICATED TO HELPING BUSINESS ACHIEVE ITS HIGHEST GOALS.

NBAA

NBAA Case Study: Refining Airspace Restrictions with SWIM

May 21, 2019 | Dallas, Texas

Ernie Stellings

Executive Summary

Environment:

- Many NBAA operators are caught in AFPs when they are overflying areas with no plans to descend, so they receive unnecessary restrictions
  - –Common in ZJX on southbound flights to Caribbean, ZOB/ZNY on eastbound flights to New England
- ZJX ATC is aware of the situation but unable to issue waivers to only high-altitude overflights due to airspace design (only 1 altitude block in higher en route sectors)
- ZNY has both low and high-altitude en route sectors
- NBAA members vary in size and lack access to pertinent NAS data (OIS, etc) in a mobile delivery mechanism

Problem statement:

- No clear tools available to help traffic managers determine if overflights should be captured in AFP initiatives when landing in more distant areas than the constrained area

Executive Summary (Cont'd)

Impact:

- If it can be proved that delayed overflights are a common problem across user groups, it may be beneficial to amend AFP procedures in ZNY, potentially other airspaces with similar issues
- Depending on top of altitude where flight are exempt, for example, an AFPs at FL120-FL380 would also benefit some of the air carriers who operate above that on overflights.
  - –In essence, by removing NBAA flights/higher air carrier flights, the AFP delays are less for all operators due to less demand

Goal:

- Use SWIM data to resolve how common it is for overflights to be caught in AFPs and unnecessarily delayed
- Use CDM processes to make ZNY aware of the issue and see if it can be ameliorated

Problem Description

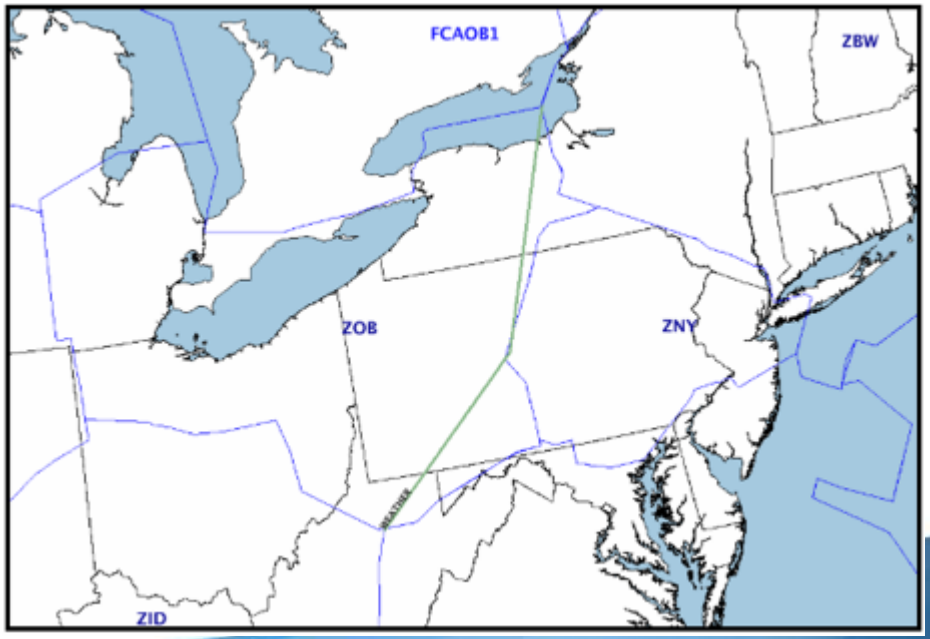
- **ZOB/ZNY AFPs include traffic restrictions for overflights at higher altitudes that are landing outside of ZOB/ZNY**
- **Can we use SWIM data to show restrictions can be refined to lower altitudes to avoid overflights that are adversely impacted?**
- *Metrics: Minutes saved per program, time savings for members (loss of efficiency), arrival airport resources (i.e., logistical problems, like Limo Services; potentially qualitatively)*

ATCSCC Advisory

ATCSCC ADVZY 029 FCAOB1 06/06/2010 CDM AIRSPACE FLOW PROGRAM

MESSAGE:
CTL ELEMENT: FCAOB1
ELEMENT TYPE: FCA
ALTITUDES INCLUDED: FL120 TO FL600
ADL TIME: 1425Z
DELAY ASSIGNMENT MODE: DAS
ENTRY ESTIMATED FOR: 06/1700Z - 07/0259Z
CUMULATIVE PROGRAM PERIOD: 06/1700Z - 07/0259Z
PROGRAM RATE: 90/90/95/95/100/100/100/100/100/100
POPUP FACTOR: 6/6/6/6/6/6/6/6/0/0
FLT INCL: ALL FLIGHTS IN FCAOB1 DYNAMIC FLIGHT LIST
DEP SCOPE: (ALL) ZAB ZSE ZFW ZKC ZME ZTL ZOA ZLC ZLA ZAU ZMP ZDV ZID ZMA ZHU ZJX ZBW ZOB ZDC ZNY
CANADIAN DEP ARPTS INCLUDED: NONE
MAXIMUM DELAY: 104
AVERAGE DELAY: 43
IMPACTING CONDITION: WEATHER / THUNDERSTORMS
COMMENTS:

EFFECTIVE TIME: 061429 - 070359
SIGNATURE: 10/06/06 14:30



Methodology

Record flight data for days with ZOB/ZNY AFPs

Identify flights that do not descend in ZOB/ZNY

- Analyze route strings/altitudes to identify the where ‘non-descending’ flights operate
- “Are there common routes where this situation commonly occurs?”

Identify flight stratums/locations where majority of flights are overflights that receive unnecessary restrictions

- “If my flight is at X altitude above Y fix it always gets hit with this delay unnecessary so what can I do about it?”

Potential Solutions

Early identification of affected flights/routes leads to earlier CDM possibilities

Use conclusions to improve CDM options

Possible CDM/TFM solutions

- Direct negotiation with ARTCC for specific flights/altitudes for tactical flight management
- Reduce ceiling of AFPs so high altitude flights are not restricted/throughput restricted
- Exempt flights landing outside of ZOB/ZNY or ARTCCs that do not require descent in ZOB/ZNY (e.g., eastbound to New England)
- Modify shapes of AFPs to allow a track for overflights

NBAA Air Traffic Services Product for Members

NBAA provides a service to members with email updates throughout the day of NAS conditions

- TMIs, delays, restrictions, reroutes, TFRs, facility outages

Process involves combining information from OIS webpage, meteorological services, and subject matter expertise to provide a summary

Labor intensive process that could be made easier with automation and SWIM data

- Restrictions, TMIs, from TFMS
- Need for more machine readable route advisories
- TFRs from SFDPS, FNS-NDS

Product Delivered to NBAA Members

Federal Aviation Administration

Air Traffic Control System Command Center

ATCSCC Home | Products | What's New | Site Map | ATCSCC FAQ | Diversion Forums | Text-Only Version

ATCSCC Advisory

ATCSCC ADVZY 038 DCC 02/08/2019 OPERATIONS PLAN

RAW TEXT:

```
EVENT TIME: 08/1500 - AND LATER
                    OPERATIONAL GOALS FOR 02/08/19
- MANAGE EWR, JFK, AND LGA AIRPORT OPERATIONS TO KEEP DEPARTURE DELAYS TO
LESS THAN 30 MINUTES.
- MANAGE SFO AIRPORT OPERATIONS TO KEEP DEPARTURE DELAYS TO LESS
THAN 45 MINUTES.
-MANAGE TEB AIRPORT OPERATIONS TO KEEP DEPARTURE DELAYS TO LESS
THAN 45 MINUTES.
THE REFERENCE FOR LGA INITIATIVE WAS UPDATED TO AFTER 18Z. SFO HAS OPENED
ON A WEST FLOW WITH VISUALS, HOWEVER CONDITIONS ARE EXPECTED TO DETERIORATE
LATER. A SFO SIDEBAR  WILL TAKE PLACE TO DISCUSS THE STRATEGY AND POSSIBLE
PARAMETERS FOR AN INITIATIVE IF/WHEN CONDITIONS REDUCE THE RATE. LIMITED
AIRBORNE HOLDING IS POSSIBLE FOR PHL DUE TO DEMAND.
TERMINAL ACTIVE:
NONE

TERMINAL PLANNED:
AFTER 1500       -PHL GROUND STOP POSSIBLE
AFTER 1700       -SFO GROUND STOP/DELAY PROGRAM PROBABLE
AFTER 1800       -LGA GROUND STOP/DELAY PROGRAM PROBABLE
AFTER 1800       -EWR GROUND STOP/DELAY PROGRAM PROBABLE
AFTER 1800       -JFK GROUND STOP/DELAY PROGRAM POSSIBLE
AFTER 2000       -SEA GROUND STOP/DELAY PROGRAM POSSIBLE

TERMINAL CONSTRAINTS:
DCMETS/PHL/NYMETS/BOS/- LOCIGS/GUSTY WINDS
DTW/SEA- SNOW SHOWERS
SFO- RAIN/LOW CIGS/WIND
DFW RUNWAY 17C/35C CLOSED UNTIL 2/14/19
IAH RUNWAY 15L/33R CLOSED UNTIL 3/23/19

ENROUTE ACTIVE:
UNTIL 1600       -FCA001:NO_AR_ROUTES_TO_PBI_RSW_AREAS
UNTIL 2300       -Q100/Q102, Y280/Y290 CLOSED AOB230
UNTIL 0430       -FCAEWR:WIND_ROUTE_EWR
UNTIL 0430       -FCAJFK:WIND_ROUTE_JFK

ENROUTE PLANNED:
NONE

ENROUTE CONSTRAINTS:
ZJX/ZMA- MILITARY ACTIVITY


NEXT PLANNING WEBINAR: 1615z
081429-081659
19/02/08 14:29  DCCOPS.lxstn35
```

< Back to Results << Back to Search Form <<< Back to Most Recent Advisory

NBAA

- 9/1346 - BALTIMORE, MD area (VP)
- Details: www.nbaa.org/vip-tfr

Operations Plan:
TERMINAL CONSTRAINTS:
ATL- WIND
ORD/MDW/DCMETS/PHL/NYMETS/BOS/- LOCIGS/GUSTY WINDS
ORD/MDW/DTW/SEA- SNOW SHOWERS
SFO- RAIN/LOW CIGS/WIND
DFW RUNWAY 17C/35C CLOSED UNTIL 2/14/19
IAH RUNWAY 15L/33R CLOSED UNTIL 3/23/19

ENROUTE CONSTRAINTS: **Tuesday, May 7, 2019 at 7:20:36 PM Eastern Daylight Time**
ZJX/ZMA- MILITARY ACTIVITY

Subject: Re: [NBAA-ATS] AM update - 2/8/19 - 1245z
Date: Tuesday, May 7, 2019 at 7:19:59 PM Eastern Daylight Time
From: David Almeida
To: Ernie Stellings

From: NBAA Air Traffic Services <airtraffic@nbaa.org>
Sent: Friday, February 8, 2019 7:47 AM
To: ATS@AIRMAIL.NBAA.ORG
Subject: [NBAA-ATS] AM update - 2/8/19 - 1245z

Good morning,

NAS Notes:

Our issues today are going to be low ceilings and winds in the northeast, snow in Seattle, and low ceilings in San Francisco.

In the northeast, we are starting the day with low ceilings, but those will move out and be replaced by strong westerly winds between 15z and 18z. The first issue will likely be PHL, where they will probably need a ground stop for the 14z, as the ceilings are too low to allow for a second runway. We'll likely see a GDP in the short term for LGA as well due to the ceilings. After the winds pick up, EWR and JFK may need GDPs after 18z due to the winds. At TEB, the runway closure this morning has ended, meaning we should not have any significant departure issues there. In the DC metros, we'll keep an eye on both DCA and IAD after 17z - the winds will be gusting over 30kts by that time and that could force IAD into a ground stop or GDP if they have to go single runway (RWY30).

In the southeast, things should remain pretty quiet - we have strong northwesterly winds in ATL, but nothing problematic. Also, this is the last day that we should see the ARs closed to APF/BCT/FMY/FPR/MKY/PBI/RSW/SUA/VRB and it is only between 14z and 16z today.

In the central US, Detroit and Chicago will both see strong westerly winds all day, with snow showers. We are not expecting significant issues in either area, but there could be de-icing delays. In the Gulf, please note that Q100/Q102/Y280/Y290 are closed below FL230 until 23z due to military operations.

Out west, Seattle is getting 1-3 inches of snow today - they expect to drop to low IFR after 21z, so a GDP for SEA is likely by that time. Down in SFO, they are going to see rain showers and low ceilings all day, making a GDP likely there after 15z. The rest of the west looks good today. Have a great morning.

Current Delay Programs or Ground Stops:

- None

Departure Delays:

- None

Current Reroutes:

- FCA001:NO_AR_ROUTES_TO_PBI_RSW_AREAS
- EWR/JFK wind routes - required routes to EWR/JFK from portions of the western US
- See Current Reroutes page for details - http://www.fly.faa.gov/ratreader/jsp/index.jsp

VIP TFR NOTAMs:

NBAA Potential Widget

User input

Key fields from Advisory

Escape route

Key Restrictions

TMI in FL

Scheduled Facility Outages:
BOSTON, MA (BOS) ASDE 1500-2000Z.
HONOLULU, HI (HNL) ASDE 1600-1700Z.
PHILADELPHIA, PA (PHL) RWY 09R/27L (PHL/GLC) LOC/GS 1300-1700Z.
DALLAS FT WORTH, TX (DFW) RVR 1400-1700Z.
MINNEAPOLIS, MN (MSP) RWY 12L (PJL) LOC/GS 1500-1730Z.
CHICAGO, IL (MDW) RWY 04R (HKH) LOC/GS 1500-2100Z.
DULLES, VA (IAD) RWY 01R (IAD) GS 1700-1915Z.
HONOLULU, HI (HNL) RWY 04R (IUM) LOC/GS 1700-2200Z.
DALLAS FT WORTH, TX (DFW) RVR 1830-2030Z.
WASHINGTON, DC (DCA) RWY 01 (DCA) LOC/GS 2100-09/0300Z.
MEMPHIS, TN (MEM) RWY 36C (TSE) LOC/GS 2200-09/0100Z.
DETROIT, MI (DTW) RWY 22R (JKI) LOC/GS 09/0200-0500Z.
IF THERE ARE ANY QUESTIONS PLEASE CONTACT THE NOCC AT (540) 359-3110

Email

NBAA

DEDICATED TO HELPING BUSINESS ACHIEVE ITS HIGHEST GOALS.

National Business Aviation Association 1200 G Street NW, Suite 1100 Washington, DC 20005 (202) 783-9000 www.nbaa.org

Aeronautical Information Modernization Management

Federal Aviation Administration

SWIFT Forum

Bob McMullen, FAA
Aeronautical Services
Program Manager

Suzanne Koppanen, FAA
AIMM S2 and E1
Program Manager

May 21 – 22, 2019

Agenda

- **NOTAMs**
- **Aeronautical Common Service (ACS)**
  - AIMM Overview and Scope
  - ACS Data and Web Services
  - ACS Consumer Testbed (ACT)
  - ACT / ACS Onboarding Process
  - AIMM Timeline

NOTAM Topics

- **FNS-NOTAM Distribution Service**
  - Summer 2019
- **AIS Reform Coalition**

AIMM Overview

- **Three phases planned for Aeronautical Information Management Modernization (potential for more):**
  - AIMM S1 (Complete):
    - Improved CARF for planning, coordinating, and approving ALTRV requests
    - Established the Federal NOTAM System (FNS)
  - AIMM S2 (In-Progress):
    - Implements the Aeronautical Common Service (ACS) which will provide AI services using SWIM
    - ACS receives aeronautical data from authoritative sources, and then integrates and distributes AI to authorized consumers
  - AIMM E1 (Future):
    - Additional aeronautical data

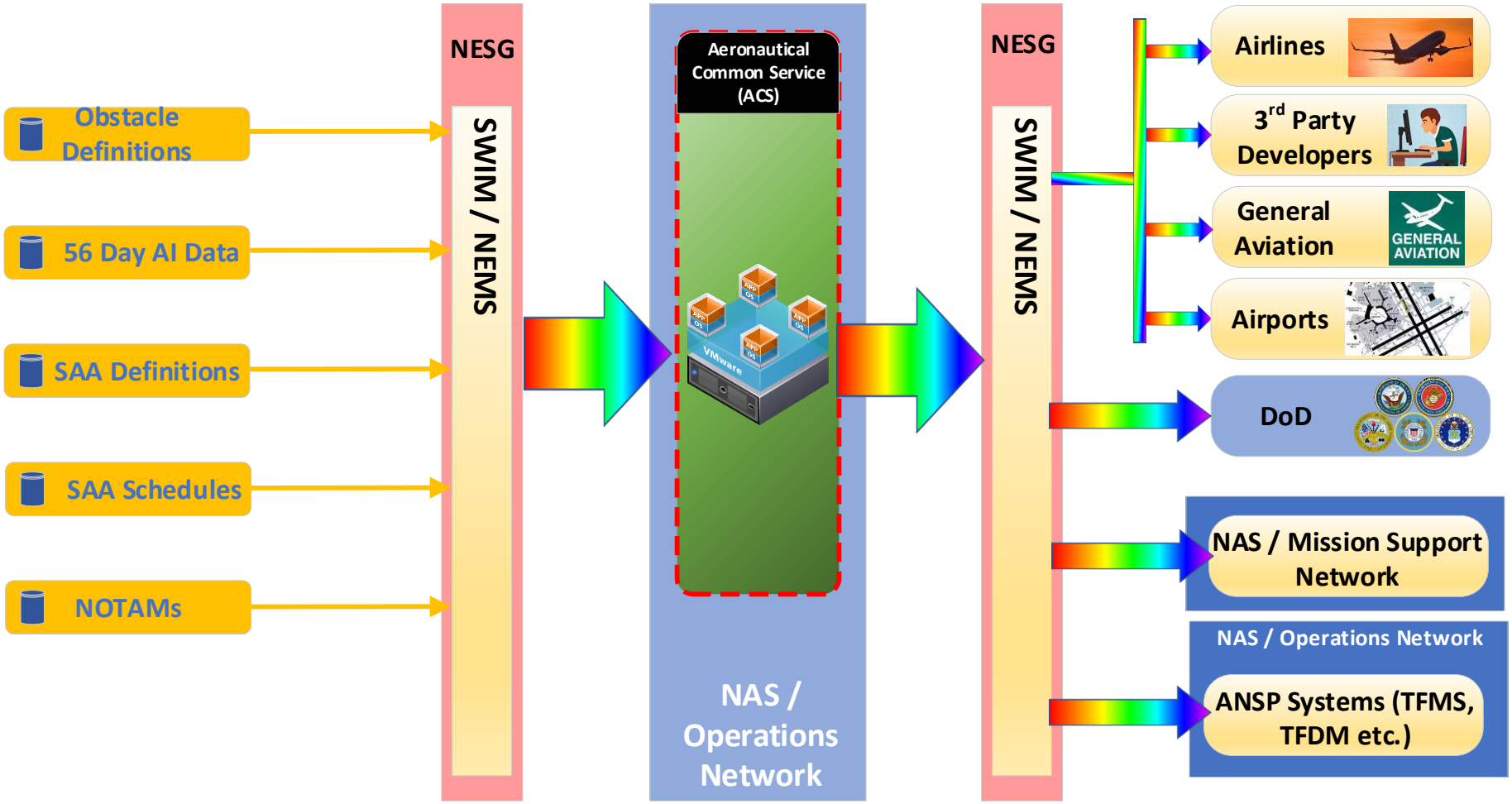
AIMM S2 Scope

- **Digital Data Ingestion**
  - Exchange of data with authoritative providers using automated tools and systems
  - Authority and integrity of the authoritative sources maintained

- **Aeronautical Common Service (ACS)**
  - ACS will transform, validate (for integrated products), verify, store, and distribute Aeronautical Information

- **System Integration and Data Exchange**
  - ACS will establish functional two-way data exchange using web services through SWIM

ACS Data Sources and Web Services



ACS Web Services

ACS users have the ability to query the various sets of aeronautical information (AI) that the ACS makes available

Web Service	Function
Web Feature Service	Query AI data via AI features
Data Query Service	Submit pre-defined complex queries for retrieving AI feature data
Data Subscription Service	Receive notifications to topics of different feature groups that the user can subscribe to
Web Map Service	Receive a map image that integrates and layers information in a spatial context of the requested AI
Web Map Tile Service	Receive a map tile that integrates and layers information in a spatial context of the requested AI
Airspace Conflict Detection	Awareness of airspace conflicts
Geodetic Computation	Provides a set of geodetic computations
Post Operational Metrics	Pre-defined reports for statistical data analyses

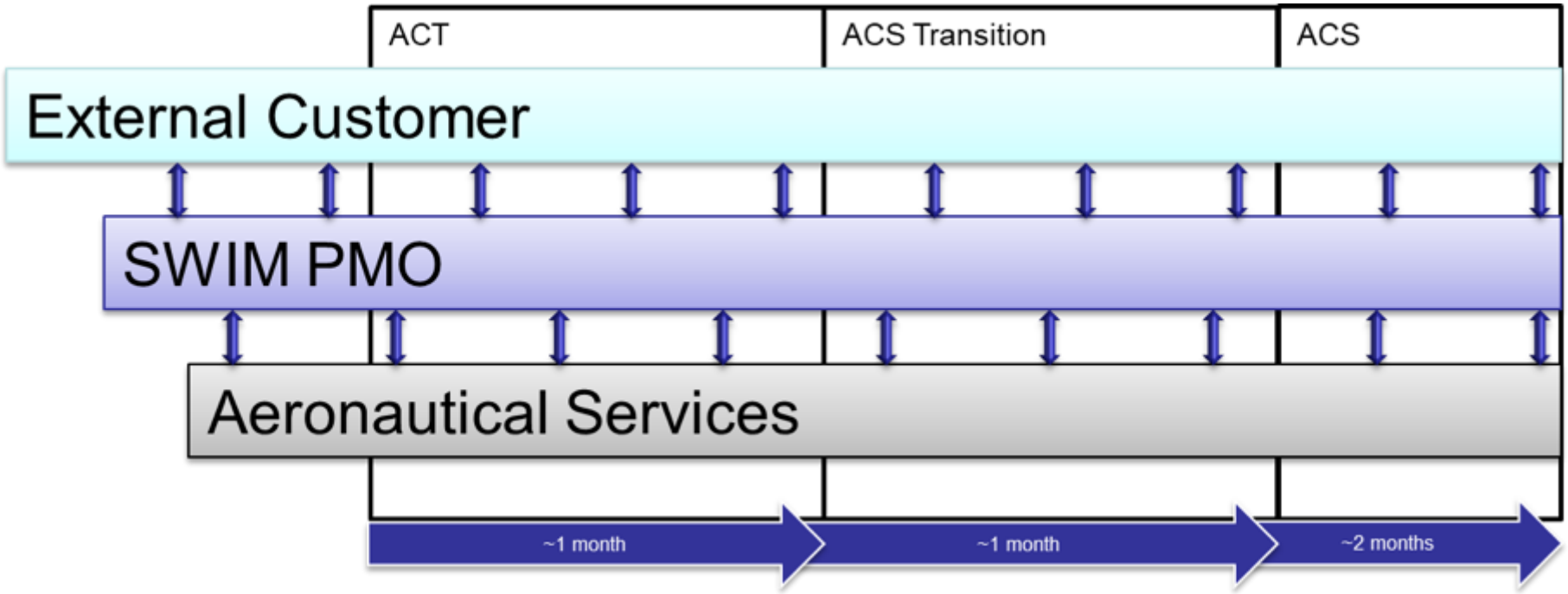
ACS Consumer Testbed (ACT)

- **Created in the R&D domain to provide ACS services**
  - Stakeholders get an early look at available data, service functionality, onboarding processes, consumer design constraints and recommended practices, and a familiarization with the integrated aeronautical data environment introduced by AIMM S2
  - Two instances: canned data (ACT1) and live data (ACT2)

- **ACT will provide users the ability to:**
  - Develop and test their interface with the ACS
  - Develop and test use, functionality, and capability of ACS web-services
  - Interact with, and understand, aeronautical information data set available through the ACS
  - Initial step to on-ramping to ACS

ACT / ACS On-Boarding

- **SWIM/ACT combined on-boarding process**
  - POCs from SWIM PMO and Aeronautical Services PMO will assist external consumer throughout on-boarding



AIMM Timeline

- **2019**
  - May 21st – 22nd: SWIFT Forum
  - June 13th: SWIM User Forum
  - September: ACT1 – Canned Data

- **2020**
  - March: ACT2 – Live Data
  - July: ACS FOC

Questions

- **Contact Information**
  - Bob McMullen

    Robert.McMullen@faa.gov
  - Suzanne Koppanen

    Suzanne.Koppanen@faa.gov

Producer Program

Traffic Flow Management System: Program & SWIM Service Updates

Chris Burdick

System Engineer
Traffic Flow Management System Development

May 21, 2019

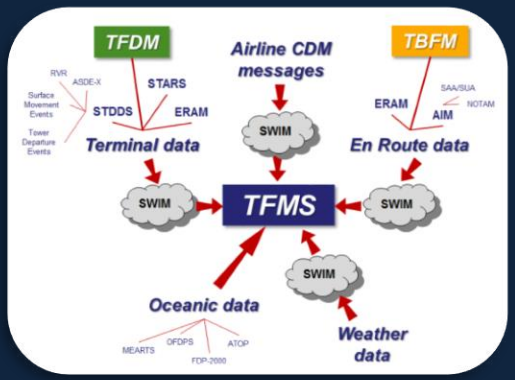
Federal Aviation Administration

TFMS Agenda Items

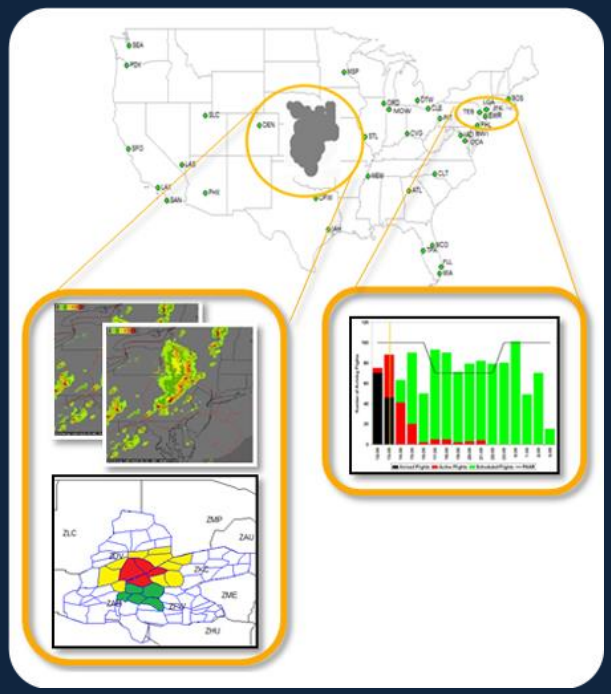
- **TFMS Status**
- **TFMData**
  - TFMData Flight
  - TFMData Flow
  - TFMData Request/Reply
  - TFMData IDP
  - TFMData Status

TFMS: *Focusing on efficiently improving the "greater NAS"*

Monitors demand and capacity for primary NAS resources



Assesses the impact of NAS disruptions and provides alerts



Implements the NAS strategic plan to balance demand with available capacity

Receives updates from other NAS systems and makes adjustments to this plan as needed

TFMS Release 14

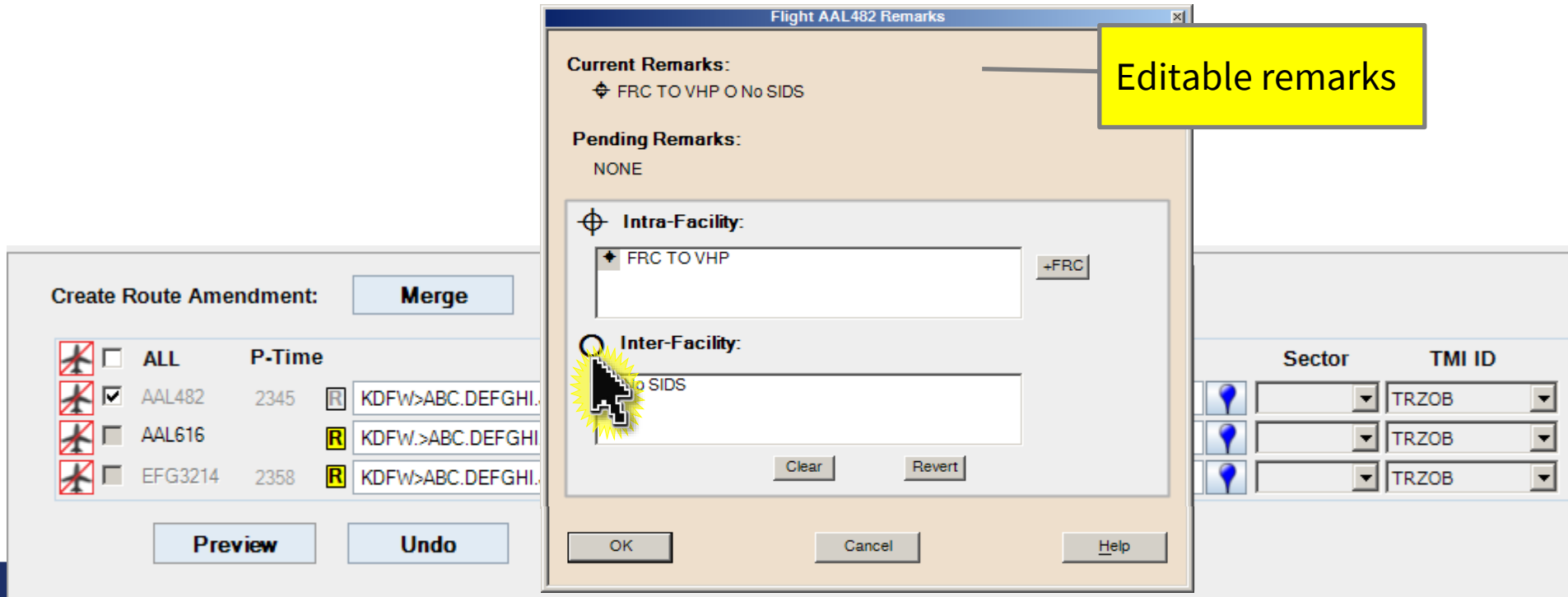
- In conjunction with Terminal Flight Data Manager (TFDM) Build 1, TFMS Release 14 will include a new Surface Viewer capability
- Provides real-time display of airport surface and flight-specific data for surface situational awareness, including:
  - Aircraft movement
  - Flight lists
  - Restrictions information
  - Delay information
  - Taxi times
  - TMI conformance
  - Alerts and notifications
- Aircraft movement available for the 43 airports with ASDE-X and ASSC
- Primary intended user audience is TRACONs, Centers, and Command Center. Also available for Towers. *(No Thin Client Access to be provided)*
- Target deployment of TFMS R14 to Operations: Fall 2020
- In addition to Surface Viewer capability, TFMS R14 will also include:
  - Changes to TFMData
  - ABRR/PDRR enhancements

TFMData Changes in Release 14

- **New TFMData version in TFMS R14 will be TFMData v3.0**
- **TFMData v3.0 changes include various enhancements and bug fixes**
- **Initial details on specific schema changes and development impact to be communicated at our next TFMS Webinar (June 13)**
  - Additional details to be communicated at subsequent monthly TFMS webinars and on the TFMData FAQ webpage
  - Details will include the exact changes made to the specific xsd files, allowing TFMData users to surgically update their TFMData applications, as required
- **TFMData schema changes will be available at least 1 year before R14 deployment (deployment targeted for Fall 2020)**
- **Updated TFMData schema and JAVA Message Services Description Document (JMSDD) to be posted on NAS Service Registry Repository (NSRR)**
- **TFMData mediator ("translator") will be provided at TFMS R14 deployment for ease of user transition**
  - Mediator will provide backward compatibility by "translating" R14's TFMData v3.0 to R13's TFMData v2.0.5

PDRR / ABRR Enhancements in R14

- Provides the TMU the ability to edit a Flight Plan Field 11 (Remarks)
- Allows TMU to enter Coded Departure Route (CDR) as part of route amendment
- Allows operators to send the CDR code as part of the TOS message in first patch after Release 14



TFMS Release 15 & TFMS Release 16

- TFMS Release 15 – Targeted Spring 2021
  - Reroute Impact Assessment (RRIA)
    - Integration of legacy process into core
  - Ingest of TFDM data for ETDs
- TFMS Release 16 – Targeted Spring 2022
  - Integrated Departure Route Planner (IDRP)
    - Provides strategic / tactical forecast of departure route and fix status due to convective weather and traffic volume for specific terminals
    - Adapted for: N90, C90, D10, PHL, PCT, SCT
  - TFMS Ingestion of Common Support Services Weather (CSS-Wx)
    - TFMS will ingest convective weather products from the CSS-Wx System Wide Information Management (SWIM) interface utilizing the Weather Information Exchange Model (WXXM).
    - Replaces the Corridor Integrated Weather System (CIWS) prototype feed. No new functionality.

1. Flight Data (1 of 2)

Description	Message Name	Distribution		
		US Govt Consumer	External Consumer	CDM Participant
Flight Plan Amendment *	flightPlanAmendmentInformation	✓		
Flight Plan Arrival (AZ)	arrivalInformation			
Flight Plan Departure (DZ)	departureInformation			
Flight Plan (FZ)	flightPlanInformation			
Flight Plan Cancel (RZ)	flightPlanCancellation			
Boundary Crossing (UZ)	boundaryCrossingUpdate			
Track Message (TZ)	trackInformation			
Oceanic Position Report (TO)	oceanicReport			
ncsmFlightCreate	ncsmFlightCreate			
ncsmFlightModify	ncsmFlightModify			
ncsmFlightScheduleActivate	ncsmFlightScheduleActivate			
ncsmFlightRoute	ncsmFlightRoute			
ncsmFlightSectors	ncsmFlightSectors			
ncsmFlightTimes	ncsmFlightTimes			
Beacon Code (BZ)	beaconCodeInformation	✓		
ncsmFlightControl (contains control times)	ncsmFlightControl			

* ***If amendment message contains a beacon code, then amendment message split into beacon code message (tagged "Restricted") and an amendment message without the beacon code (tagged "All") (transparent to NEMS)***

1. Flight Data (2 of 2)

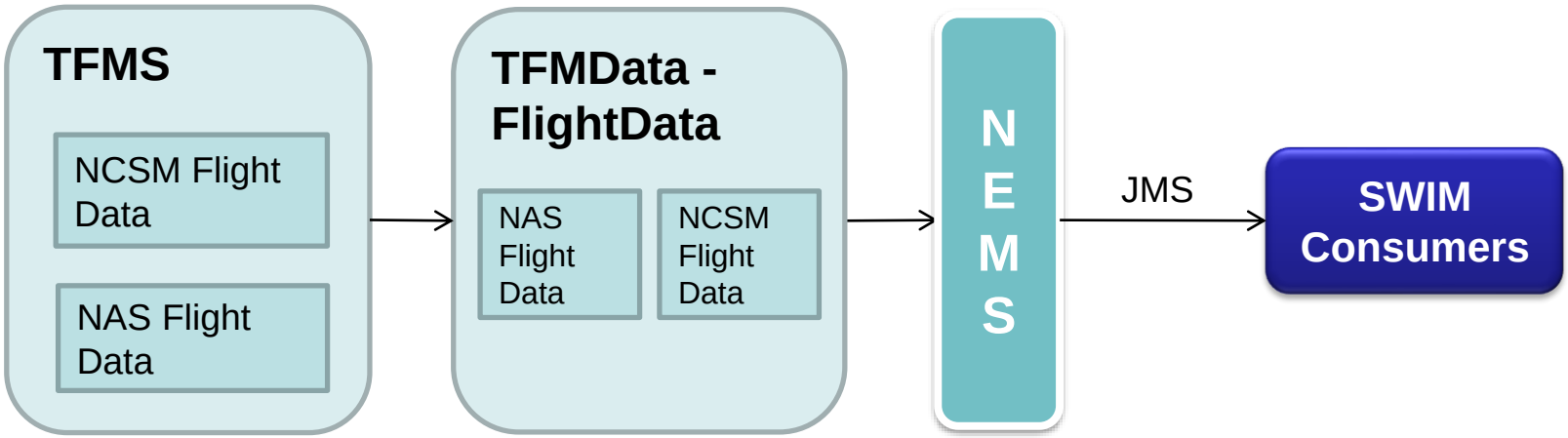
- **Below messages are generated from CDM action, so CDM Participant flag set true on all (except Early Intent)**

Flight Data Sessions	Message Name	Distribution		
		US Govt Consumer	External Consumer	CDM Participant
	ncsmFlightRoute	✓		
Flight Create (FC)	ncsmFlightCreate	✓		
Flight Modify (FM)	ncsmFlightModify			

Simplified Substitution	Message Name	Distribution		
		US Govt Consumer	External Consumer	CDM Participant
		✓		
Slot Create (SC)				
Slot Create Substitution (SCS)	ncsmFlightControl			
Hold All Slot	ncsmFlightControl			

Flight Data Business Function

- **One-way interface for consumers to receive enhanced flight data**
  - NAS Flight Data: Flight data updates based on received flight data messages
  - NCSM Flight Data: Flight data updates computed by TFMS based on internal events (Traffic Management Initiative control data, scheduled flight activation, flight trajectory updates …



Flight Data Business Function

TFMS Flight Data

TFMS NAS Flight Data

- Flight Plan
- Flight Plan Amendment
- Departure
- Position Reports
- Boundary Crossing
- Flight Management Information
- Oceanic Position Reports
- Arrival
- Flight Plan Cancellation

CDM Flight Data

- Flight Create
- Flight Modify

TFMS Internal Flight Data

- Flight Control Data (TMI)
- Flight Schedule Data
- Flight Route Data
- Flight Event Data
- Flight Times Data

TFMS Flight Data in detail

- **TFMS Flight Data provides**
  - Raw message data TFMS receives from external data providers, plus
  - Enhanced, or processed data that reflects the state of the TFMS for each flight
  - In TFMS the term **NCSM,** which stands for NAS Common Situational Model, is used to identify TFMS processed data
  - All data required to be in sync with TFMS with respect to flight data

TFMS Flight Data in detail

- **Key features of Flight Data**
  - Unique TFMS Reference number provided with each message to provide identifier for the specific flight the message applies to
    - Consumers do not need to implement matching algorithms
  - Updates only published when received flight data modifies the internal TFMS state of a flight
    - Example: TFMS discards received flight message from ERAM due to validation error, no data update published

TFMS Flight Data in detail

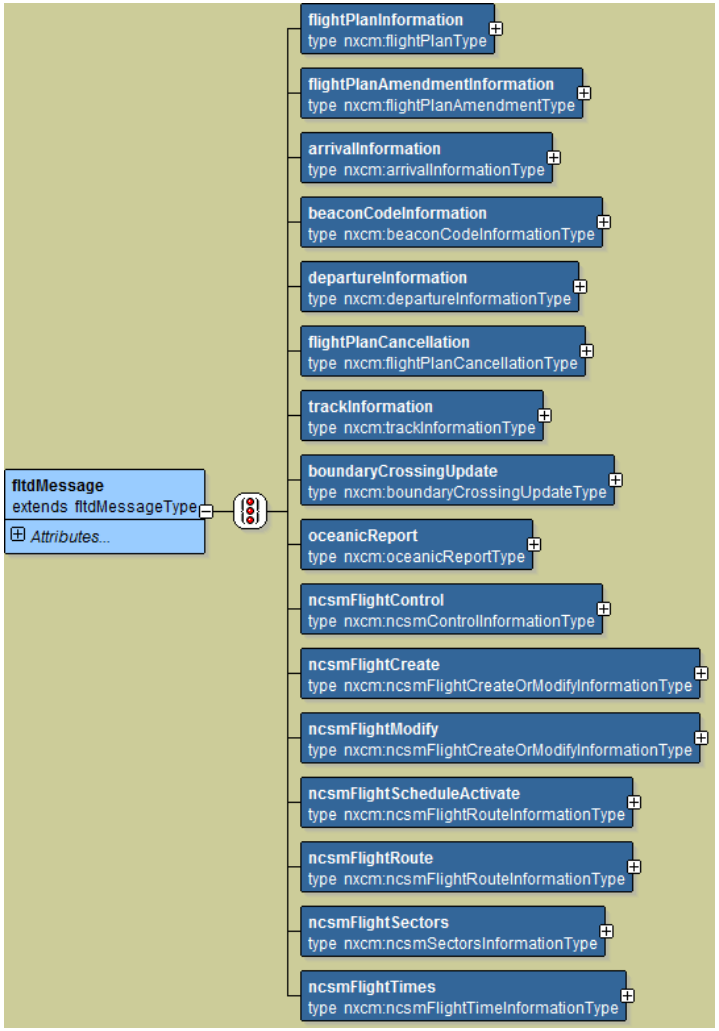
- **Key features of Flight Data (cont.)**
  - Flight Data Messages contain the received message data, plus any computed data triggered by processing the message
    - Example:
      - When a Position Report message is received that causes TFMS to “re-conform” a flight and update the predicted events (fix/sector/center boundary crossings and times)
      - TFMS will publish the position data, plus the newly computed predicted events

TFMS Flight Data in detail

- **Key features of Flight Data (cont.)**
  - Consumers cannot always count on messages to be published to indicate fight state changes
    - Example:
      - TFMS publishes flightPlanInformation for a flight indicating intended flight planning data for a flight, the flight state is **PLANNED**
      - TFMS does not receive a departureInformation message for a flight, but receives and publishes a trackInformation message for the flight, the flight state is now **ACTIVE**
    - **KEY POINT:** Can not depend on always receiving specific messages to indicate state changes

TFMS Flight Data in detail

- **What can be done with the data ????**
  - Build graphical displays with current aircraft positions
  - Reporting Capabilities
  - Compute local demand for areas of interest
    - FIRS, Airport, …
  - Build lists to visualize / summarize
    - Departure / Arrival Lists that are sortable, filterable



2. Flow Information

- **Flow Information messages' flight lists use same rules as Flight Data messages**
  - Any sensitive flight data is tagged as "Restricted", and
  - desensitized version of this message created and tagged as "Desensitized"
  - (transparent to NEMS)
- **Some Flow Information messages can be directed to specific users (one, multiple, or all Flow Information subscribers)**
  - TFMS provides list of users in message, and NEMS sends a copy to each

2. Flow Information (1 of 2)

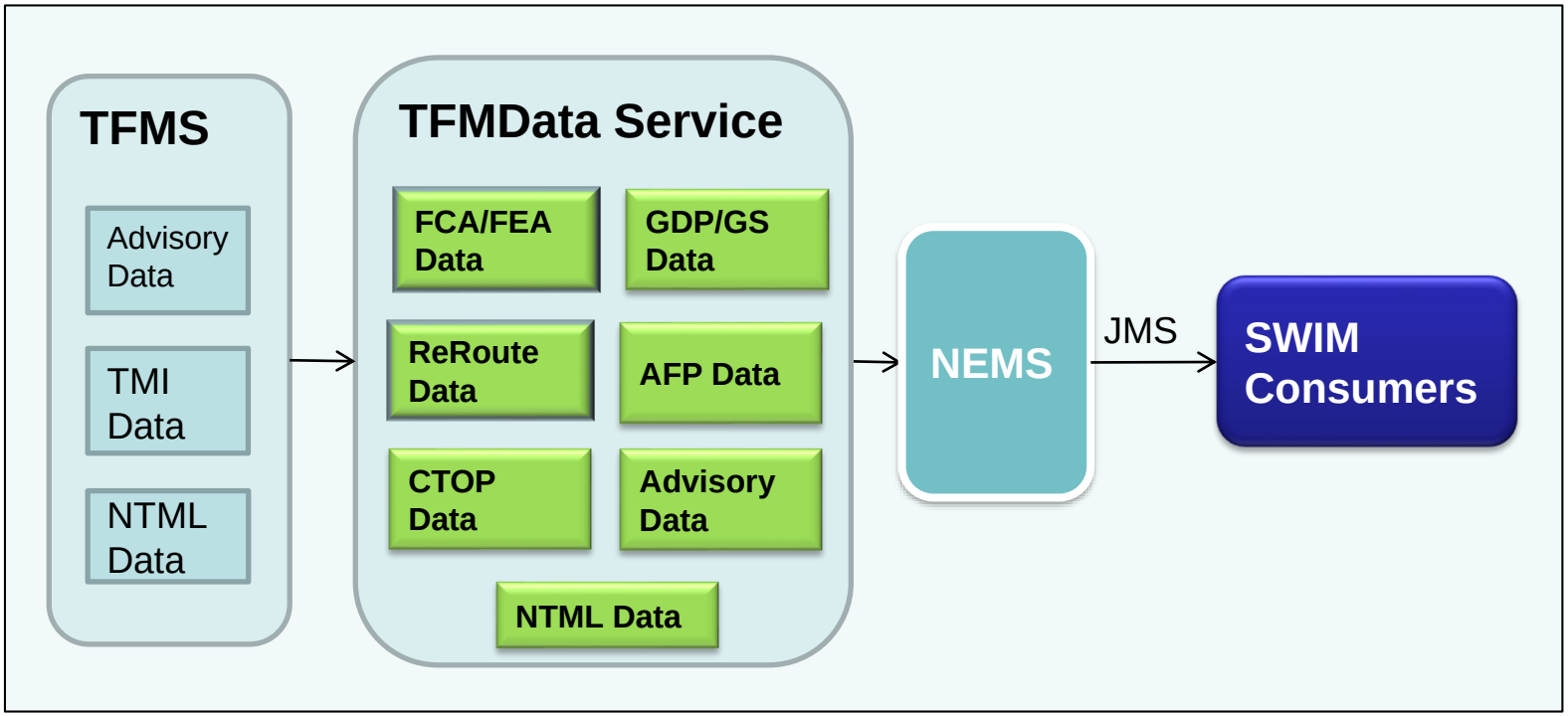
Description	Message Name	Distribution		
		US Govt Consumer	External Consumer	CDM Participant
Air Flow Program Advisory (AFP)	afpAdvisory afpCancel afpCompression	✓	✓ *(if not "R")*	
Ground Delay Program Advisory (GDP)	gdpAdvisory gdpCancel gdpBlanket gdpCompression			
Ground Stop Advisory (GS)	gsAdvisory gsCancel			
CTOP Advisory	ctopDefinition ctopCancel			
Reroute Advisory	reroute			
Parameter Updates	paramAfpGdpUpdt paramGsUpdt paramBlanketUpdt paramComprUpdt paramDelete	✓		
Airport Configuration (APTC)	airportConfigMessage			
Deicing (DICE)	deicingMessage			
Restriction (RSTR)	restrictionMessage			
RAPT Timeline (RAPT)	raptTimelineMessage			
General Advisory (GADV)	generalAdvisory			

2. Flow Information (2 of 2)

Description	Message Name	Distribution		
		US Govt Consumer	External Consumer	CDM Participant
TMI/CDM Update Data	cdmUpdateData	✓ (directed to specific users)	✓ (if not "R") (directed to specific users)	
FOS Update	fosData			
FADT Broadcast (FADT)	fadtBcast			
TMI Flight List	tmiFlightDataList			
Flow Constrained Area / Flow Evaluation Area (FXA)	feaFca	✓ (directed to specific users)	✓ (directed to specific users)	
FXA Secondary Filters (FXASF)	fxaSecFiltersUpd fxaSecFiltersDel			

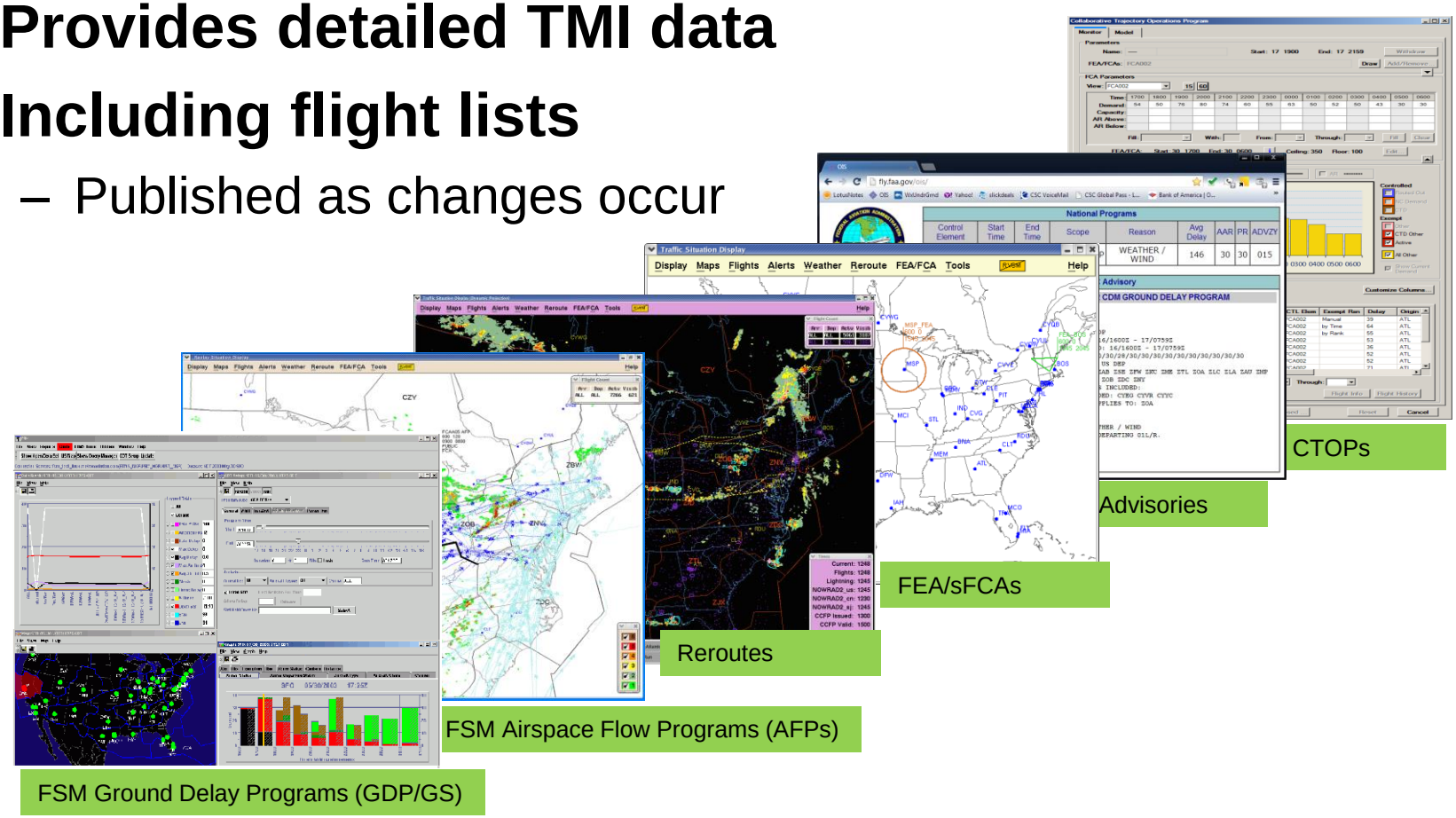
Flow Information Business Function

- **One-way interface for consumers to receive TMI data from TFMS**



Flow Information Business Function

- **Provides detailed TMI data**
- **Including flight lists**
  - Published as changes occur

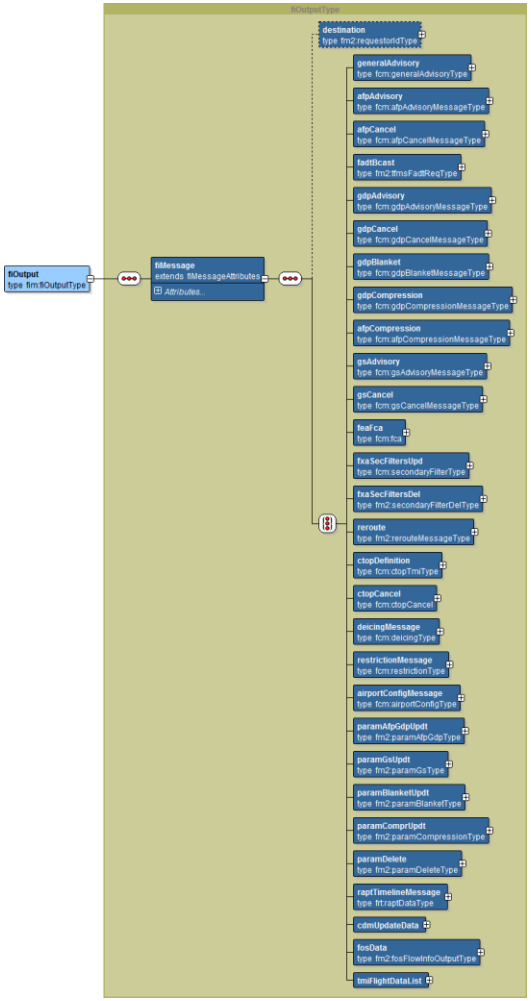


TFMS Flow Information Data in detail

- **Flow Information includes full set of TFMS TMI related data**
  - TMI definitions
  - Restriction data
  - Dynamic flight lists for TMIs and monitored airports
- **Consumers "subscribe" to data using TFMData Request/Reply business function**
- **Data published as it changes**
  - When a TMI is created, updated, deleted
  - When a flight is updated a flight list update is published for the flight

TFMS Flow Information Data in detail

AFPs	GDPs/GSs	Advisories
CTOPs	FCAs/FEAs	Reroutes
Airport Runway Config and rates	Airport Deicing Status	Restrictions
RAPT Timelines	Monitored Airport Lists	TMI Dynamic Flight Lists



3. Terminal Flight Data

- **CDM Participant flag set on all Terminal Flight Data messages**

Flight Data Sessions	Message Name	Distribution		
		US Govt Consumer	External Consumer	CDM Participant

Terminal Flight Data Business Function

- **2-way data exchange interface for terminal flight data**
- **Terminal Flight Data consumed by TFMS**
  - Airlines provide data via Request / Reply Business Function
  - TFDM systems provide TFD data via the Terminal Flight Data Business Function
- **Terminal Flight Data published by TFMS**
  - All data received by TFMS is published via the Terminal Flight Data Business Function for consumers

4. TFM Request Reply

- **Request/Reply requires additional security considerations to ensure Requestor is a trusted entity.**
- **NEMS actions:**
  - NEMS authenticates users for connection to this business function to ensure they access only their own queues and topics
  - NEMS passes Request message of authenticated user to TFMS
- **TFMS actions:**
  - TFMS authorizes (or denies) the request it receives from the user
  - TFMS executes the authorized request and
    - sends Reply message back (via NEMS) to user

4. TFM Request/Reply (1 of 2)

Description	Request Message Name	Response Message Name	Distribution			
			FAA or selected Intl	US Govt Consumer	External Consumer	CDM Participant
General Advisory Request	advisoryRequest	advisoryReply	✓ (reply directed back to requestor)			
Request for a new TMI ID	tmiIdRequest	tmiIdReply				
Request for flight data associated with an airport	arptRequest	responseMessage				
Request to delete parameters for any Fuel Advisory Delay TMI	paramDeleteReq	responseMessage				
Identifies the airports for which arrival and departure fixes are to be provided	airportFixRequest	airportFixReplyData				
Request any of the EDCT commands	edctRequest	edctCheckReport edctListReport edctShowReport edctSListReport edctSubShow edctUnassignedSlotsReport				
AOC Flight Data Requests	flightBlockReqData	responseMessage				
Request to create or update Air Flow Program (AFP) or Ground Delay Program (GDP) TMI	paramAfpGdpUpdtReq	responseMessage	✓ (reply directed back to requestor)			
Request to create or update a Ground Stop Program (GS) TMI	paramGsUpdtReq	responseMessage				
Request to create or update an AFP/GDP Blanket parameters for TMI	paramBlanketUpdtReq	responseMessage				
Request to create or update an AFP/GDP Compression TMI	paramComprUpdtReq	responseMessage				

4. TFM Request/Reply (2 of 2)

Description	Request Message Name	Response Message Name	Distribution		
			US Govt Consumer	External Consumer	CDM Participant
Oceanic Position Report	oceanicPositionReport	responseMessage	✓ (reply directed back to requestor)		
Schedule Management Requests	flightScheduleRequest	responseMessage			
FCA or FEA Request	fxaRequest	responseMessage			
Reroute TIM request	rerouteRequest	responseMessage mergeReplyData previewAmendmentReply waypointReply			
Request historical Popup data	histPopupRequest	histPopupData			
Reroute Model Request	rrModelRequest	responseMessage rerouteModelReply reroutePreviewReply fxaRRModelReply tmiListReply			
Simplified Substitution (SS) Request	subBlockReq	substitutionResponseData			
Resync TMI Identifications	tmiResyncRequest	resyncMessage			
Request CTOP TMI	ctopRequest	ctopReplyData	✓ (reply directed back to requestor)	✓ (if not “R”) (reply directed back to requestor)	
Request for Flight Data reconstitution	flightReconRequest	flowFlightData			
Flight Operator System (FOS) Request	fosRequest	responseMessage ctopSubReplyData tosReplyData tosResyncData			
Request to create or update any Fuel Advisory Delay TMI	fadtReq	responseMessage			

Request / Reply Business Function

Request / Reply Business Function				
Flight Data Restoration • Full, partial, and specific flight restorations	**TMI Maintenance** • TMI Resynchronization • Model, Create, Update, Delete or TMIs • Monitor Airports • Request airport and historical pop-up rates	**EDCT Maintenance** • Compression • List • Purge • Remove • Restore • Slist • … • …	**Schedule Maintenance** • Inhibit • Cancel • Activate • Remove • Restore • Update	**CDM Data** • Early intent • Flight Data - Flight create/ modify/ cancel • Simplified Subs • FOS – TOS Messages / Requests, Trajectory Options Requests, CTOP Subs

Access to each Request / Reply capabilities based on Facility, IDP Identity, Airline
FAA Data Release Board makes determination

TFMS Request/Reply Data in detail

- **Provide access to TFM data and services**
  - Provide TFMS CDM and FOS interface capabilities
  - Provide historical pop-up data
    - Supports TMI processing
  - Model, create, modify, cancel TMIs
    - GDP/AFP/GS/CTOP/Reroute
  - Provide schedule data changes into TFMS
  - Request EDCT updates and reports
  - Request Flight data and TMI reconstitutions
- **User based access controls to individual capabilities**
  - FAA international office and data release governs access to services

TFMS Request/Reply Data in detail

- **Some example data integrations and exchanges**
  - Create and Monitor a FEA
  - Monitor a Reroute
  - TMI Resynch
  - Monitor Airport Demand
- **Shows relationship between Request/Reply and FlowInformation business function**

5. International Data Partner (IDP)

- **Access by International consumers not considered for approval by NAS DRB until after FAA International has created MOA for that consumer**
- **IDP users receive Flight Data only for flights that intersect their airspace**
- **TFMS will direct IDP flight data to more than one IDP user if the flight traverses multiple IDP airspaces**
- **No Restricted Data sent to IDP users (by design), so all msgs available to all approved consumers (provided flights intersect their airspace)**

Description	Message Name	Distribution			
		US Govt Consumer	External Consumer	CDM Participant	International Consumer
All International Data is sent and received in one FIXM message – Flight. Includes: • Flight Plan Information (FPL) • Flight Plan Amendment (CHG • Arrival Information (ARR) • Departure Information (DEP) • Flight Plan Cancellation (CNL) • Flight Delay Information (DLA) • Track Information (TIZ) • Oceanic Report (TIO) • Data Close Information (CLS)	intdOutput->flight	✓ *(directed to specific users)*			✓ *(directed to specific users)*

TFMS IDP Data in detail

- **JMSDD Appendix B Table 11 TFM International Flight Data provides the detailed information about each individual message**
- **IDP does not provide data reconstitution if to allow a consumer to recover lost data**
- **IDP providers must provide a unique flight reference for each message**
  - Needs to be unique for the specific IDP
  - Also provided on the outbound messages back to IDPs

6. TFMS Status

- **Reports status of all TFMS consumer and producer services which directly impact publication of data to NEMS**
- **Status sent to all subscribers**

Description	Message Name	Distribution		
		US Govt Consumer	External Consumer	CDM Participant
TFMS Status of all consumer services and TFM producer services. Includes: • TBFM Flight Data • STDDS RVR, Surface Movement Events, and Tower Departure Events • AIM SAA Schedule Events • TFMData - Flight Data • TFMData - Flow Information • TFMData - Terminal Flight Data (Input & Output) • TFMData - International (IDP) (Input & Output) • TFMData - TFM Request/Reply	tfmsStatusOutput->status	✓		

TFMS Status Business Function

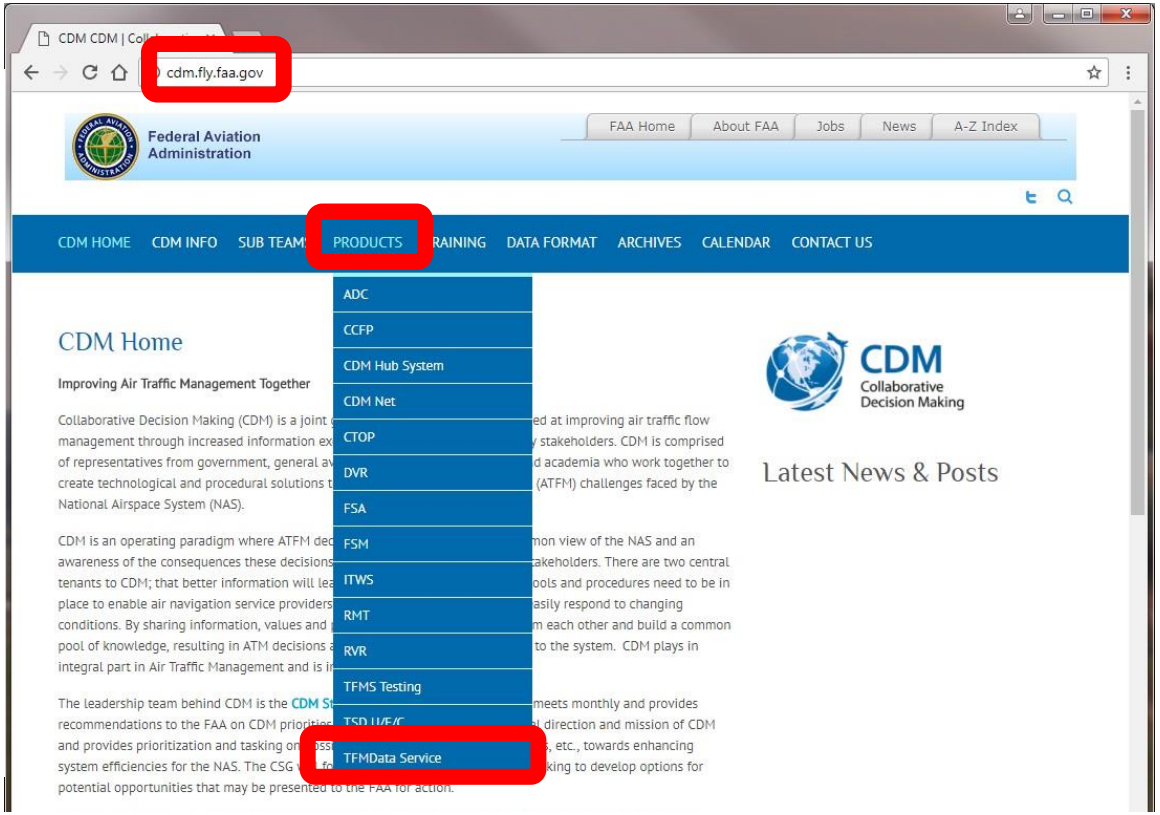
- **Reports the TFMS status of any source of data that directly impacts the publication of data to NEMS**
  - NAS Flight Data
  - TBFM Flight Data
  - SWIM Terminal Data Distribution System (STDDS) Runway Visual Range (RVR), Surface Movement Events, and Tower Departure Events
  - Aeronautical Information Management (AIM) Special Activity Airspace (SAA) Schedule Events
  - International Data Providers Input and Output
  - Terminal Data Input and Output
  - TFMData Request and Replies
  - TFMData Flight Data
  - TFMData Flow Information
- **Status reported every 30 seconds**

TFMS Status Business Function

- **Status Reported**
  - service – identifies the service that is that provides the data e.g. STDSS
  - businessFunc – identifies the business function within the service e.g. RVR
  - facility – identifies the facility that is the origin of the data e.g. PHL
  - direction – identifies the direction of the flow relative to the TFMData service
  - state – identifies if a particular flow is ENABLED or DISABLED within TFMS
  - time – the last time a message was received or transmitted
  - numberMsgs – number of message received or transmitted since the session (JMS) initiation

TFMData FAQ – How to Access

- **Go to http://cdm.fly.faa.gov and under "PRODUCTS", select "TFMData Service"**



TFMS Technical Webinar Schedule

Every Second Thursday of the month.

Next TELCON June 13th, 2019 1:00ET

- Register ahead of time to receive the bridge number and passcode
- Send questions or advance TELCON topics

Chris.Burdick@faa.gov and/or
Thomas.ctr.Paccione@faa.gov

Special Topic: SWIM International and Global Strategy

Content

- Challenges and Background
- Global Activities
  - ICAO-SWIM: GANP, Information Management Panel (IMP)
  - ICAO-Information Services: METP, IMP and ATMRPP
- Regional Activities
  - Collaborations: SWIM and Information Management
    - Demonstrations/Validations
      - NextGen Mini Global Demonstration, ASEAN SWIM Demonstration
    - Implementations
      - APAC SWIM Task Force, CADENA

SWIM Global Challenges

- **No global framework**
  - There is no established guidelines for the global SWIM provision
- **Too many point to point connections**
  - Countries establish individual connections with each other.
- **Not Cost effective**
  - Maintaining/establishing individual VPN connections for different ANSPs and Airspace Users is not cost effective

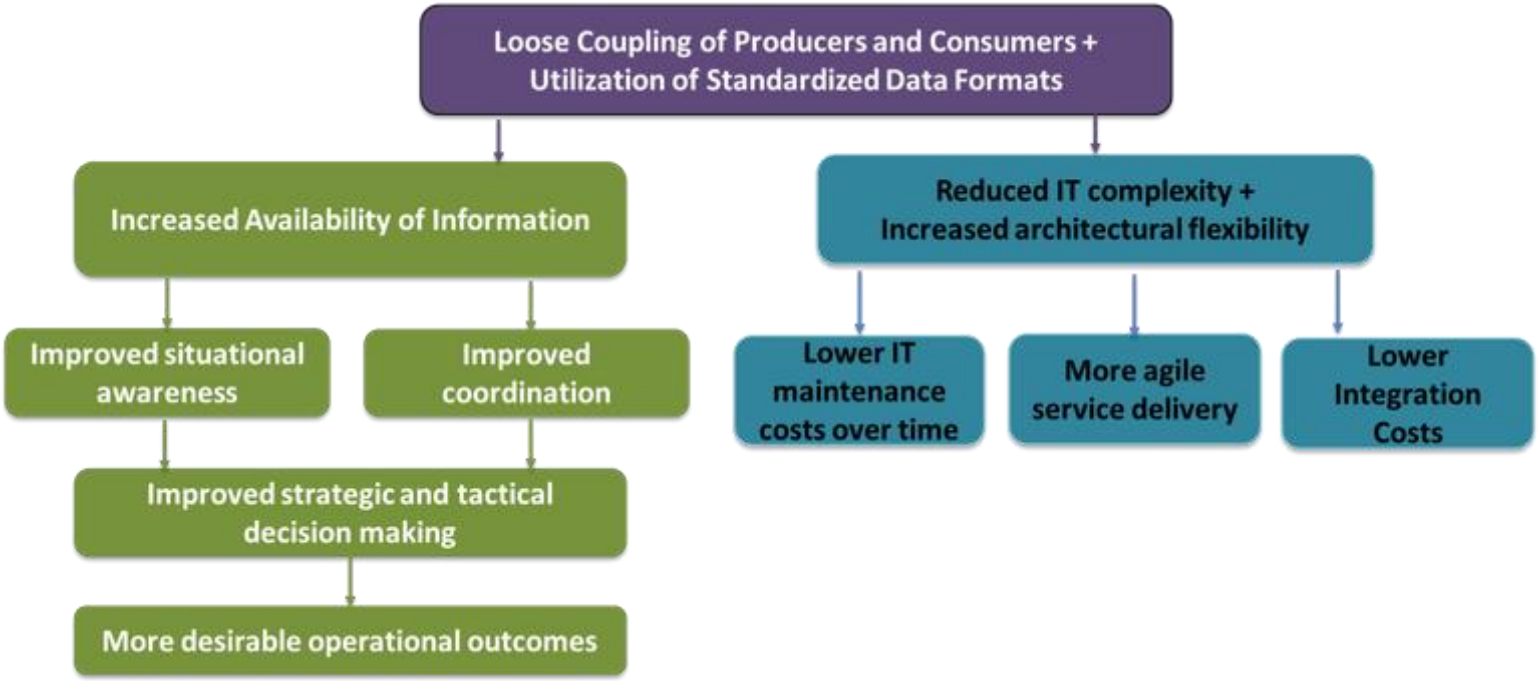
SWIM Objective

SWIM is the Digital data-sharing backbone of ATM with the capability to provide a data collection and single portal to access data/information to support ANSPs and users to access information to support decision making from flight planning, to traffic flow management to situational awareness.

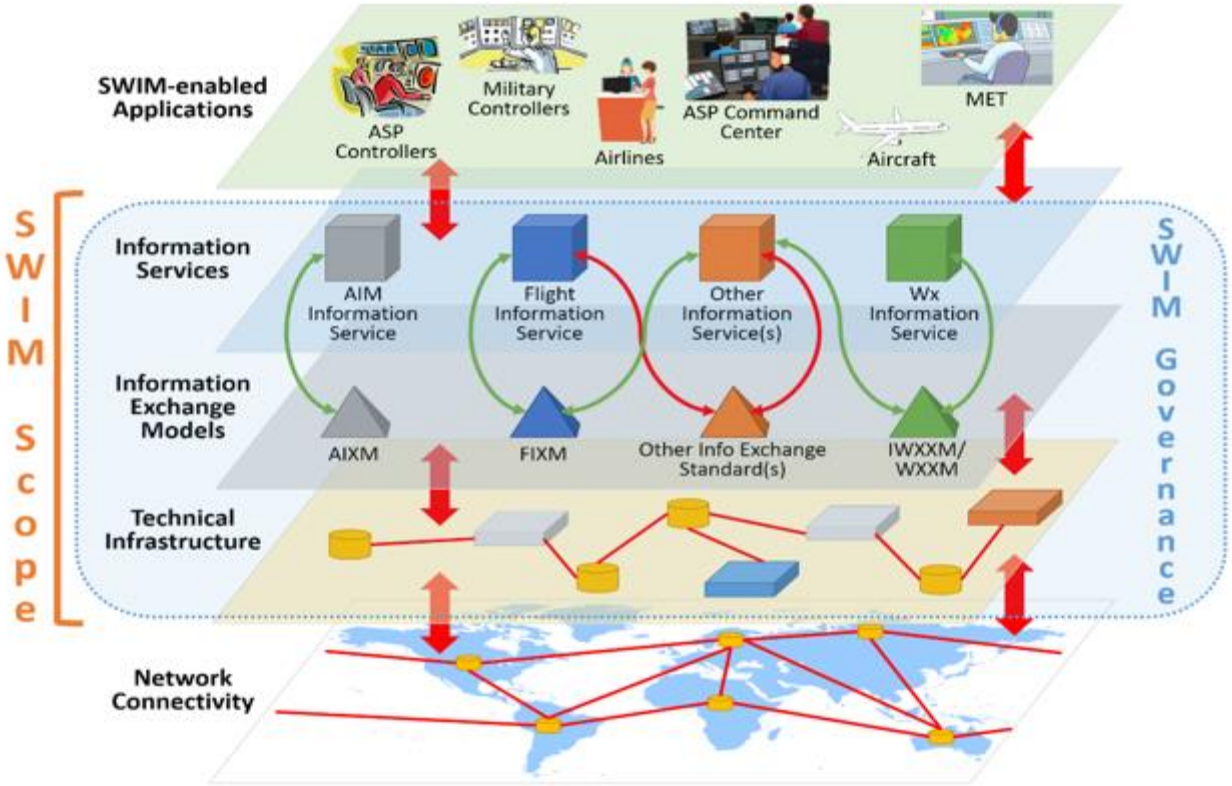
- Global SWIM objective - SWIM consists of standards, infrastructure and governance enabling the management of ATM related information and its exchange between qualified parties via interoperable services

Benefits

- *SWIM Benefits – efficient movement of data at a lower cost and the operational benefits enabled by data sharing*



SWIM Global Information Framework



- *Strategy – establish standards/requirements to ensure interoperability vs. being flexible for implementations*
- *Information services are also needed to make global SWIM operational*

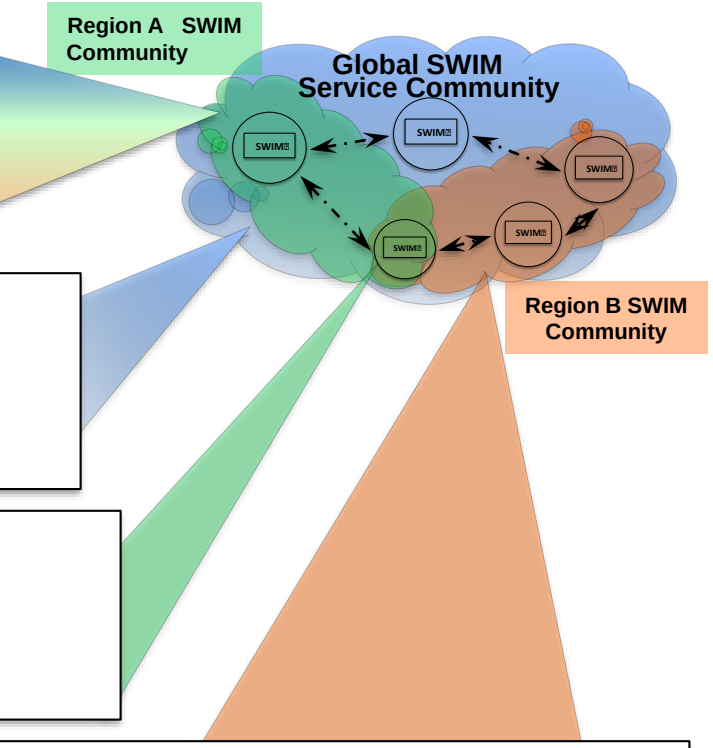
Core Services View

Within context of a highly federated environment

Service Security
- Authentication
- Authorization
- Encryption
- Non-repudiation

Interface Management
- Service Agreements
- On-Ramping Processes/Procedures
- Interoperability Standards
- Service Registry

Messaging
- Pub/Sub – AMQP/JMS
- Request/Response – SOAP, REST
- 3rd party cloud commercial messaging



Enterprise Service Management
- Service Monitoring (SLAs, QoS)
- Fault and performance management
- Control and Configuration management

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Security Service View

Centralized Security Management Regiment

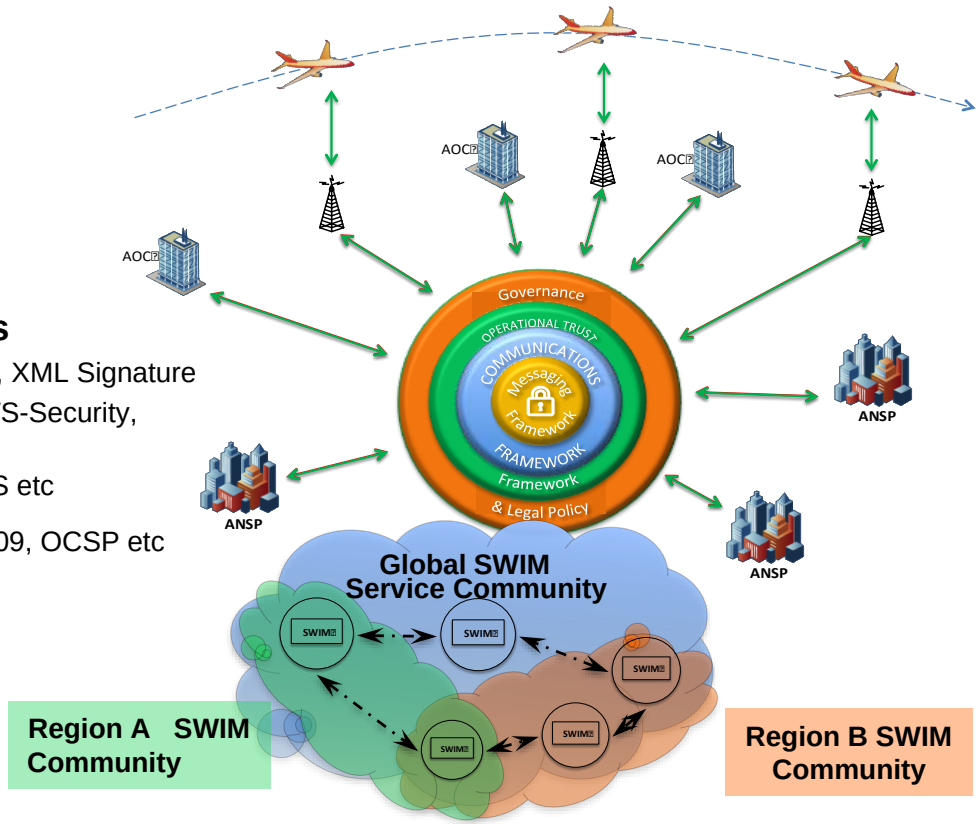
Security Standards

Data Security – XML Encryption, XML Signature

Application Security - Oauth, WS-Security, WS_Trust, SAML etc

Network Security – HTTPS, TLS etc

Public Key Infrastructure – X.509, OCSP etc



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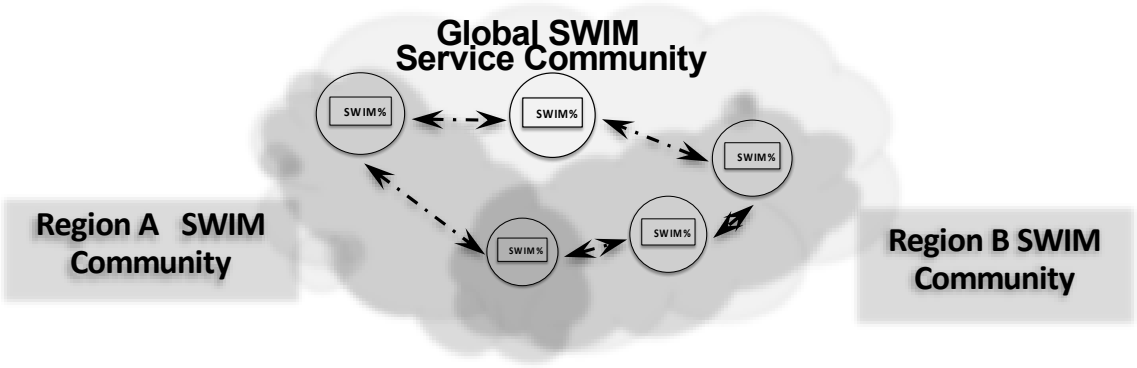
Interface Management Service View:

Standards are the way to ensure interoperability



Interface Standards

- Data: WXXM, FIXM, AIXM
- Message Formats: XML, JSON, etc.
- Message APIs: JMS, SOAP, Rest, .NET etc.
- Messaging Protocols: AMQP, HTTP, etc.
- Network Infrastructure: TCP/IP, DNS, NTP, etc.

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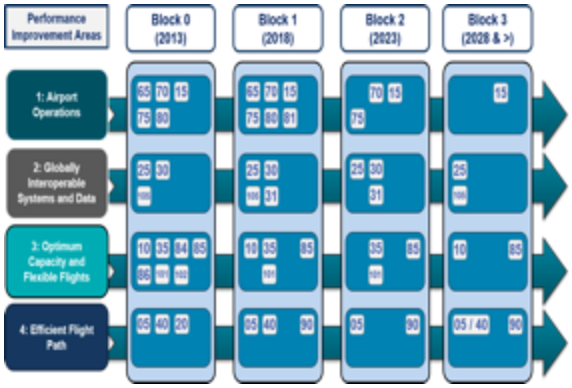
Global Activities – ICAO SWIM

- Active Partnership at ICAO to establish the vision for SWIM
- Global Air Navigation Plan (GANP)
  - Aviation System Block Upgrade (ASBU) - Layouts minimum standards and requirements for SWIM to ensure global interoperability
- Information Management Panel (IMP)
  - Develop provisions:
    - PANS-IM
    - Implementation Guidance Manual
    - Annex 10 - AERONAUTICAL TELECOMUNICATIONS
    - Annex 15 - AERONAUTICAL INFORMATION SERVICES TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION



Global Activities – ICAO Information Services

- ICAO Meteorology Panel (METP)
  - Annex 3 (Meteorological Services) – will leverage SWIM and iWXXM for the exchange of MET information
- ICAO ATM Requirements and Performance Panel (ATMRPP)
  - Annex 11 (Air Traffic Services) – will leverage SWIM and FIXM for future capabilities such as FF-ICE
- ICAO IMP
  - Annex 15 (Aeronautical Information Services) – will leverage SWIM and AIXM for sharing of Aeronautical information

Regional Activities

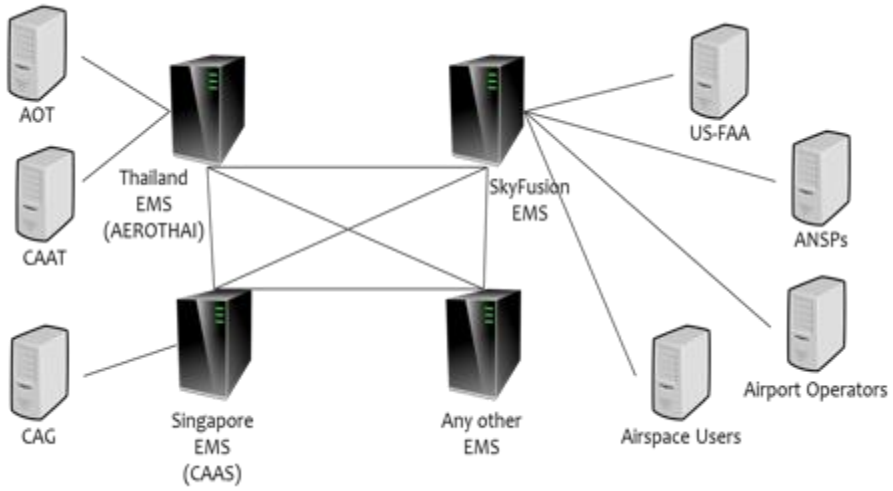
- FAA - NextGen demonstration

- Mini Global (I &II)

- Multiple SWIM vendors
- Multiple demonstration partners
  - North and South America

Regional Activities

- **Regional Investment Planning & Stability:**
- While remaining consistent with global standards, each Region can determine the most effective capabilities and enhancements to meet AU and ASP evolving needs.
- FAA in collaboration with Association of Southeast Asian Nations (ASEAN) demonstration – develop the architecture/systems



Participation Level

Level 1 Observer only
- Participate in planning, system interfacing, system test
- Provide lessons learnt
- Active participation

Level 2 Legacy-format data producer and consumer
- Produce data in ATS-message format and provide it in native-SWIM format using data conversion
- Able to consume native-SWIM format data using the viewer

Level 3 Native-SWIM-format data producer and consumer
- Produce and provide native-SWIM-format data using own system
- Able to ingest native-SWIM-format data into own system

Level 4 EMS Developer + Level 3
- Participate in all GEMS discussions and system test
- Provide services using own system

ASEAN Demonstration Partners

- Civil Aviation Authority of Singapore (CAAS),
- Aeronautical Radio of Thailand Limited (AEROTHAI),
- Japan Civil Aviation Bureau (JCAB),
- Hong Kong Civil Aviation Department / Hong Kong Observatory (HKCAD/HKO),
- Civil Aviation Authority of Malaysia (CAAM),
- Viet Nam Air Traffic Management Corp. (VATM),
- Department of Civil Aviation of Lao PDR,
- Cambodia Air Traffic Services (CATS),
- Department of Civil Aviation, Myanmar (DCAM),
- AirNav Indonesia,
- Airways Corporation of New Zealand, and
- Airservices Australia

Implementation – APAC SWIM Task Force

- US FAA chair ICAO ASIA Pacific SWIM Task Force
  - Focus on the implementation of SWIM and information management for the region
  - Collaboration among APAC members on SWIM implementation
    - Develop implementation strategy, roadmap and governance for SWIM
    - Operational needs drive modernization
      - FF-ICE
      - Multi-nodal ATFM
    - Timeframe for SWIM in APAC is targeted for 2020-2025

Collaboration with Central America and Caribbean

CADENA CANSO ATFM Data Exchange Network for Americas

Promote the implementation of ATFM/CDM

- Established in June 2016
- Operational Planning Web Conference since Dec 2016
- CADENA Operational Information System (OIS) since Aug 2017
- TFM Data Exchange with Trinidad & Tobago via FAA SWIM since Oct 2017

ANSPs
- Central America
- Curacao
- Brazil
- Argentina
- Cuba
- USA
- Dominican Republic
- Jamaica
- Mexico
- Trinidad & Tobago
- Columbia

States/Territories
- Costa Rica
- Aruba
- Grand Cayman

International Org
- ACI
- ALTA
- IATA
- ICAO
- NBAA

17 Air Carriers
6 observing states/ANSPs

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SWIM Cloud Distribution Service

Update on SCDS

Felisa White

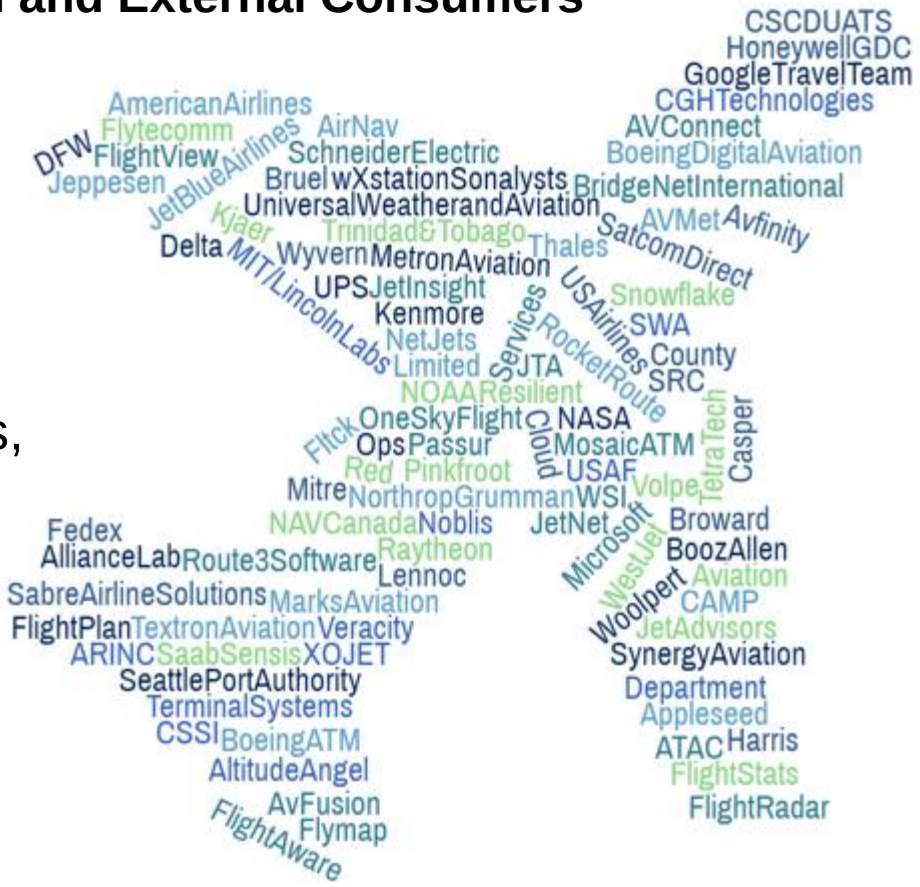
FAA – AJM316

May 21, 2019

SCDS External Consumers

Over 200 Total Internal and External Consumers

- Airlines (11)
- Industry (106)
- Airports, FAA Facilities, & FAA Programs (48)
- Academia & Research (2)
- Non FAA Government Entities (13)



+ over 100 "new" external consumers waiting for access!

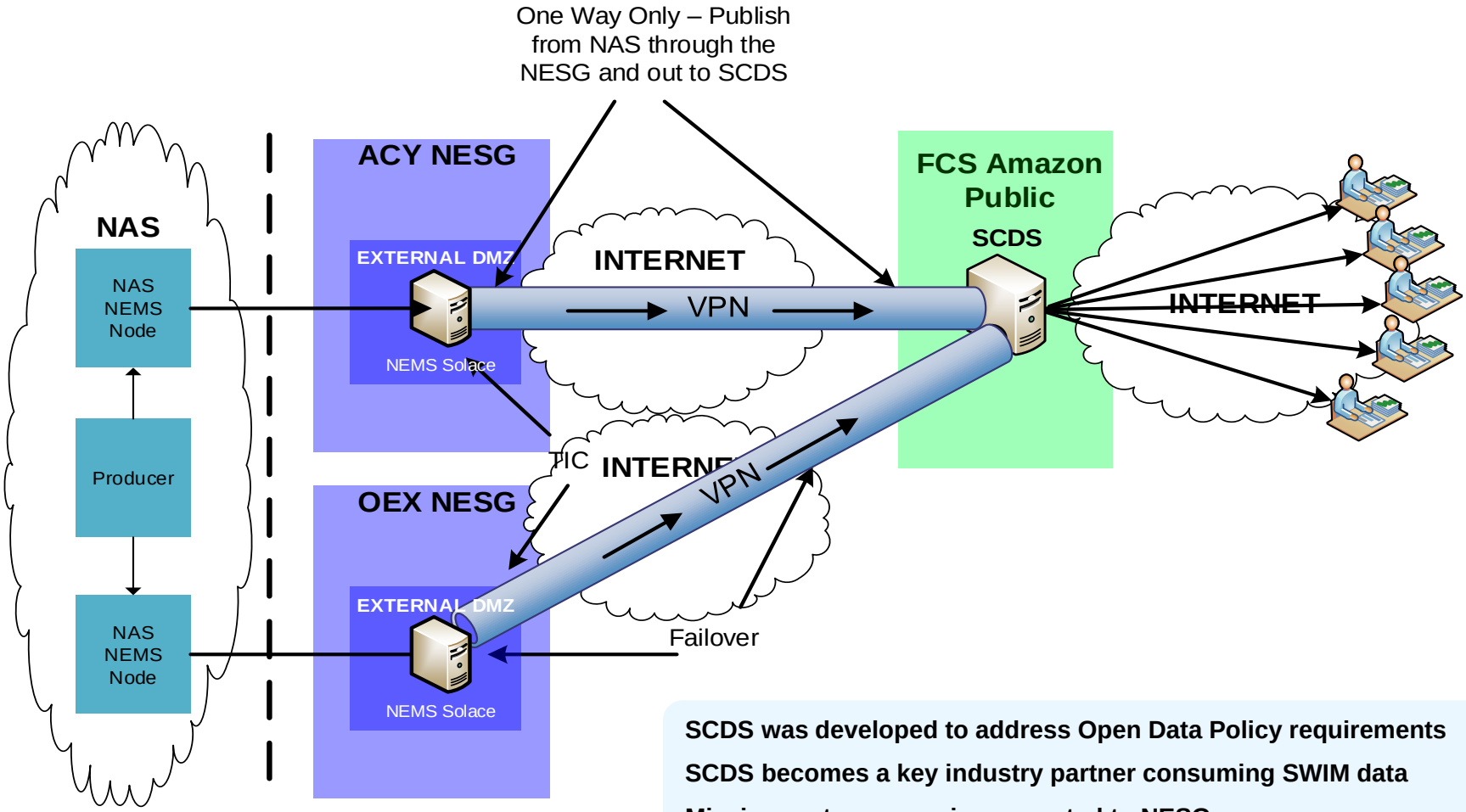
What is SWIM Cloud Distribution Service (SCDS)?

SCDS is a publicly accessible cloud-based infrastructure dedicated to providing real-time SWIM data to the public via Solace JMS messaging. This service includes access to the same public data that is currently offered via the NAS Enterprise Service Gateway (NESG) SWIM implementation.

SCDS provides data users (a.k.a. consumers) with a simplified, quick method of accessing FAA SWIM data in comparison to the more complex process of connecting to the NESG.

All product(s) provided by SCDS have been pre-approved for public release by the National Data Release Board (NDRB) and are intended for non-National Airspace System (NAS), non-Operational use.

SCDS: Moving the Service Delivery Point



SCDS was developed to address Open Data Policy requirements

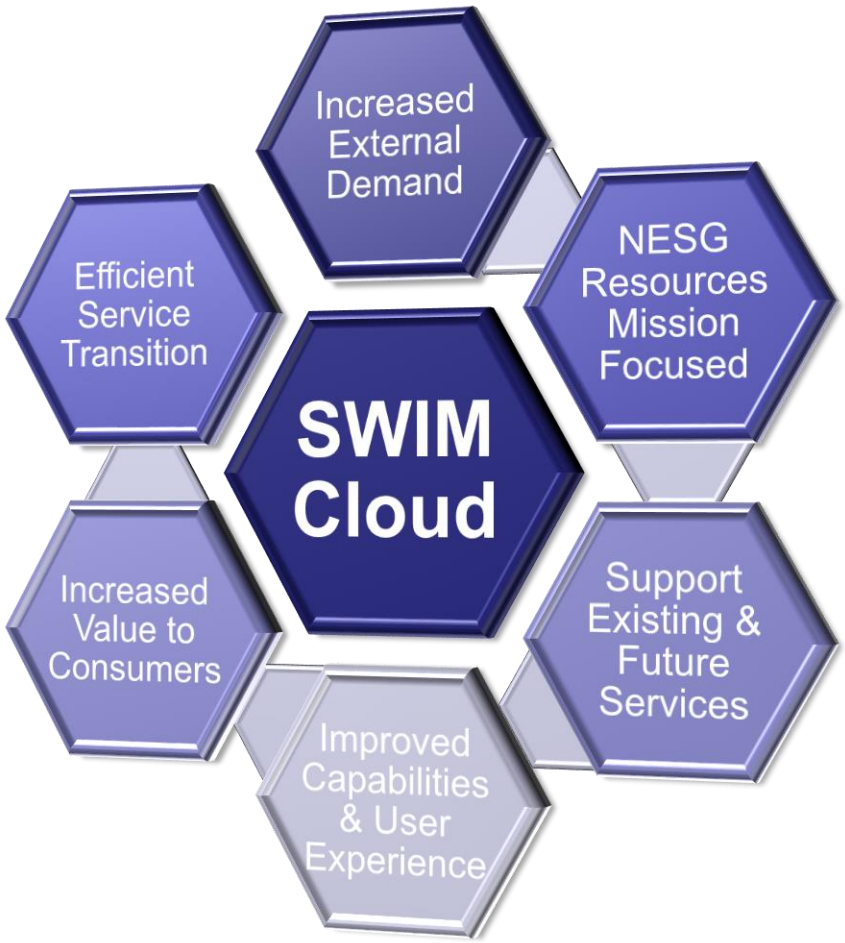
SCDS becomes a key industry partner consuming SWIM data

Mission partners remain connected to NESG

Web Service users remain connected to NESG

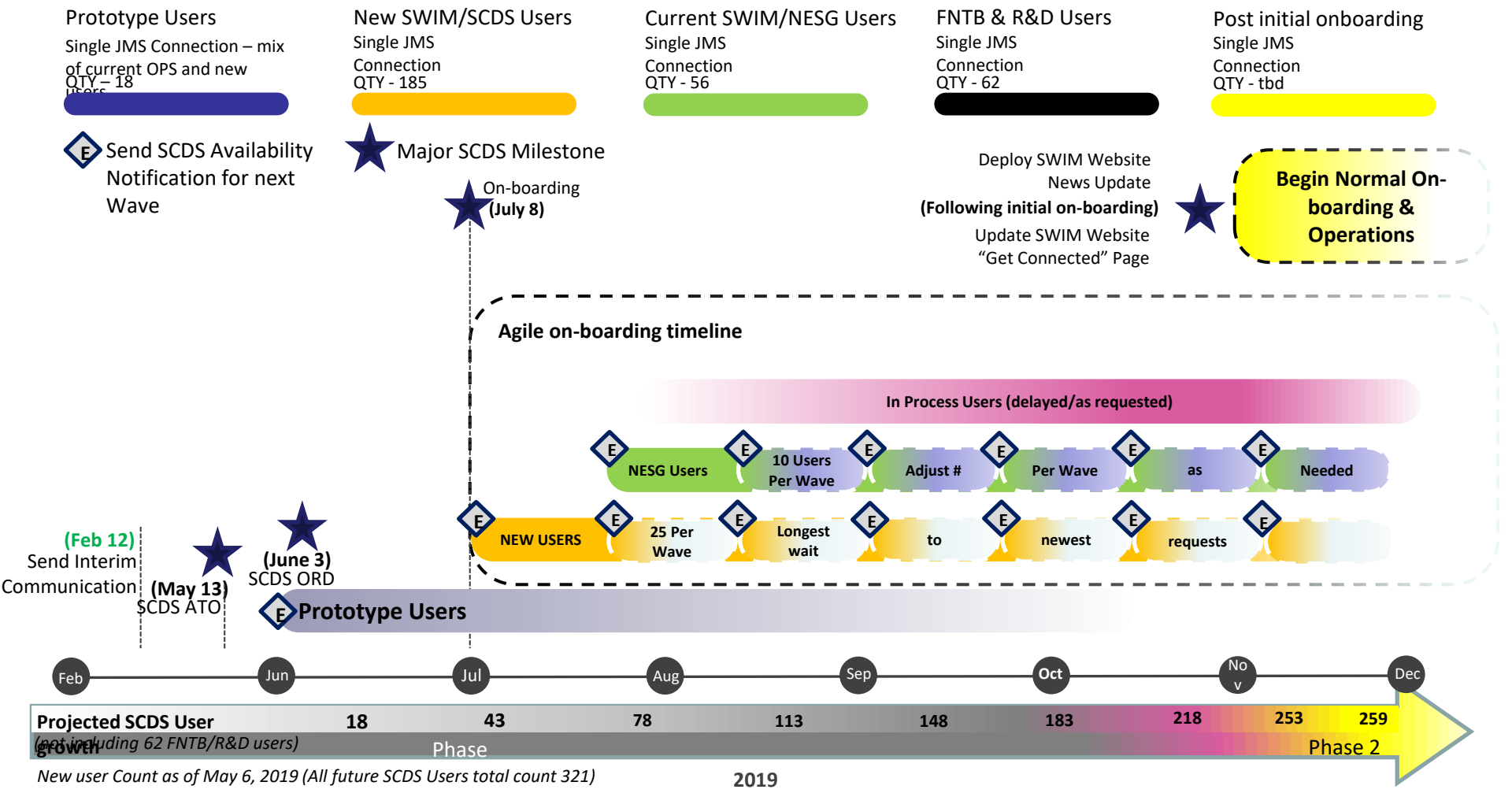
Only non-Industry partners will migrate to SCDS

SCDS Services and Benefits



- Improved user experience
- Streamlined onboarding process
- User “criticality” determines method of data access (NESG vs. SCDS)
- Address increasing external demand, while reducing bandwidth/impact to NESG, NEMS, and TIC
- Limit NESG exposure to external users
- Scalable platform for growth in services

SCDS Migration Plan



New user Count as of May 6, 2019 (All future SCDS Users total count 321)

Special Topic

Enhanced SWIM Cloud – Concepts & Use Cases for Enhanced Services

David Almeida

LS Technologies

May 21, 2019

What if we build a…

- **…"Stronger" and more secure SWIM Cloud?**
- **…"Better" SWIM Cloud, with enhanced features?**
- **Airspace User Operation Functionality**
  - Leverage SCDS consumer on-boarding automation
  - Host Advanced Services for SWIM:
    - NAS Common Reference (NCR)
    - Enhanced Security
- **Identified types of prospective functionality, like:**
  - Web Services, Two way exchange, Mediation, Data persistence
  - Provide same service levels as NESG: Availability, Security Level
- **Enhance R&D Environment**
  - Extend R&D to include SWIM Cloud messaging

User Community: Airspace User Operations

- **Purpose-built cloud instances for SWIM data**
  - SCDS designed for general commercial community
  - **Enhanced SWIM Cloud** targeted at users, such as airlines, large data brokers, etc. requiring operational decisions using SWIM data
- **Enhanced SWIM Cloud capabilities will improve security and streamline the on-boarding process**
- **Cloud instance connected by partner mission objectives**
- **Advanced Producer services for users**
  - NAS Common Reference (NCR)
    - Enables special data management features for manipulating data
    - Tailors information requests to specific requests by users
    - Leverages web services with industry standard data formats
  - Enhanced Security: Identity Access Management (IAM)
    - Managed user based access control to features and user experience
    - Better supports FAA/partner edge-to-edge “Strong Authentication”

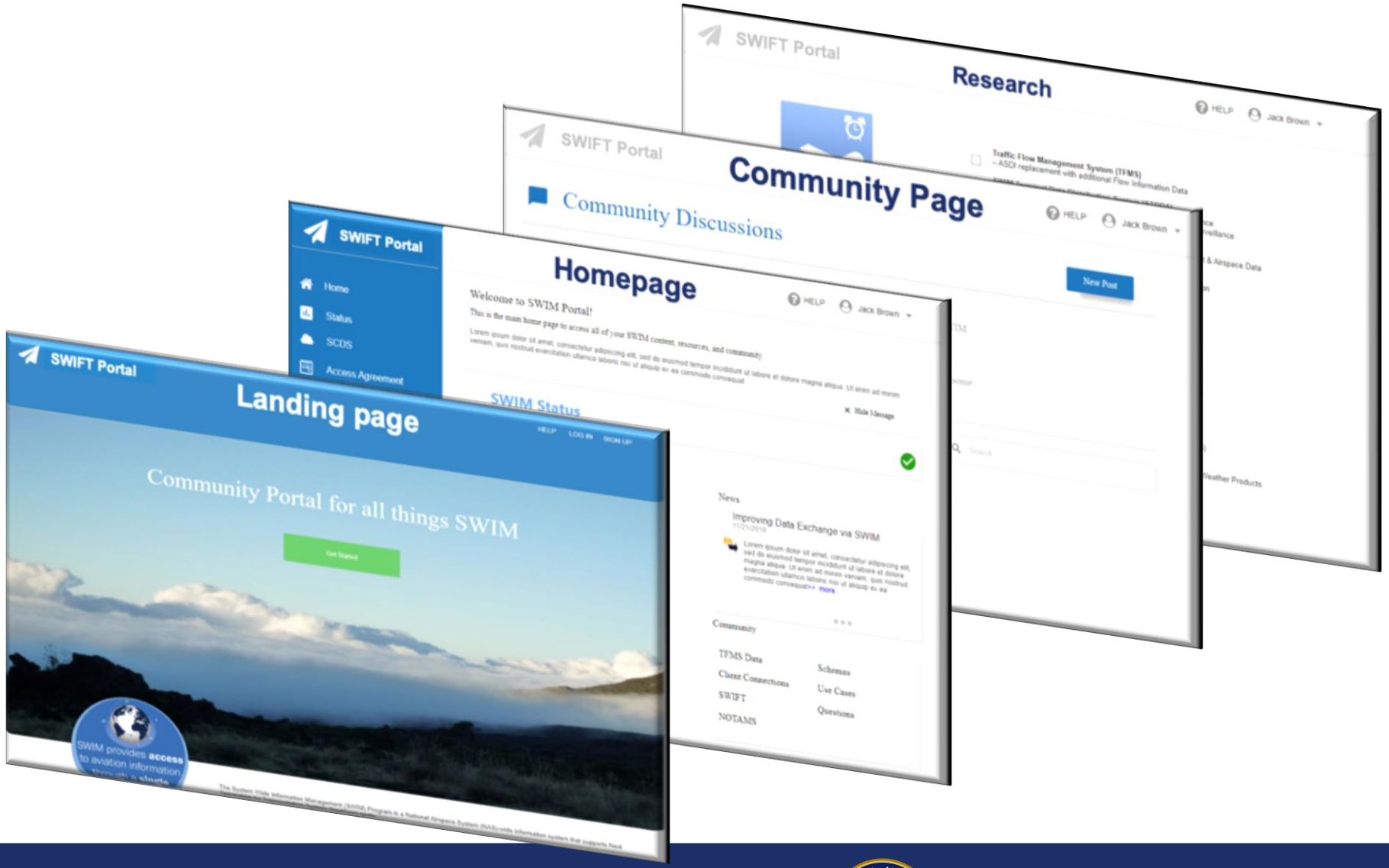
User Capabilities: Prospective Features

- **Notional improvements to support Consumers:**
  - What is the need for the community for Web Service support?
    - Currently JMS-based Publish/Subscribe message pattern only
    - Allow users to make Web Service requests for custom data sets
    - Consumer requests would not have to be routed into NAS
  - What are the needs for Cloud Data Persistence?
    - Enabler for supporting for creating flexibility through web services
    - Access to replicated NAS data, retained for short term periods
  - Increased Availability
    - Higher RMA levels with robust cloud architectures designed by instance
  - Mediation
    - Combined with Self-Provisioning, capability allows users to configure data transformations in real-time, tailoring SWIM products
- **Mixed connection configuration: NESG & Cloud**

Cloud based R&D Environment

- **Instantiate a separated R&D instance of a SWIM Cloud for supporting messaging and advanced services (i.e., web services, NCR, etc.)**
  - Would you use these services for testing and development?
- **Establish a self service rapid provisioning SWIM messaging capability in R&D**
- **Host SWIM Cloud tools for R&D optimization of service development, execution and management**
  - Automation of producer on-ramping, self service portal
- **Additional security models for cloud based services**
  - As applications increasingly move to cloud what additional considerations for are there for enhancing SWIM cloud services

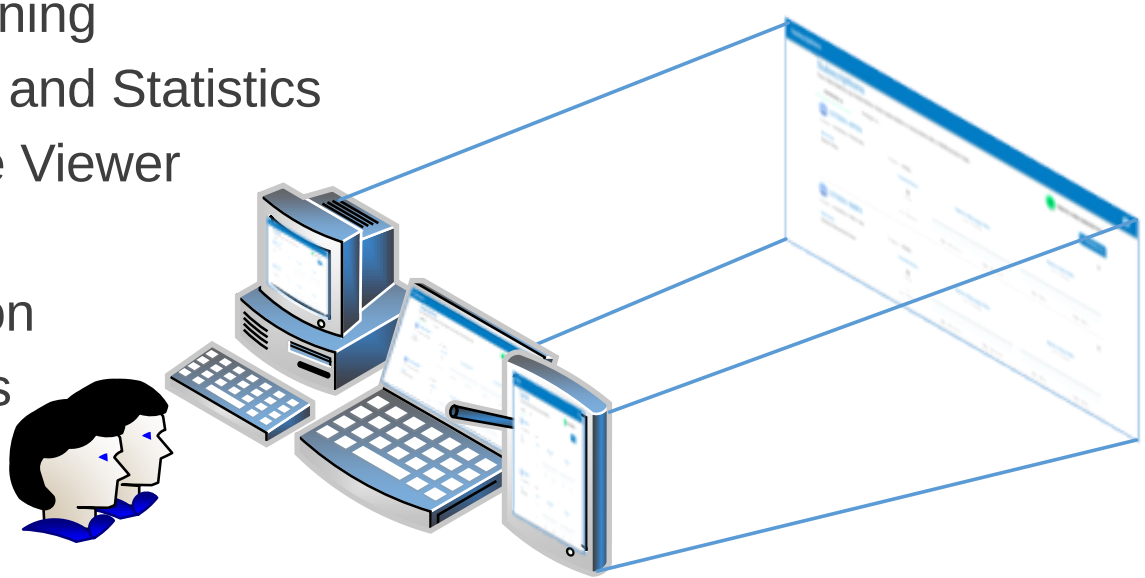
SWIFT Portal: Engaged User Experience



SWIFT Portal: All Access to SWIM

- **User Experience:**
  - Access based on user access profile directs content to user needs
  - Empowered users with self-help features and functions
  - Access from any device, any where

- **Key Features:**
  - Automated Provisioning
  - Subscription Status and Statistics
  - Integrated Message Viewer
  - Jumpstart Kit
  - Seamless Integration
  - Community features



SWIFT Collaborative Workshop #6: Day 2 Agenda

- **Day 2: ATD-2 and TFDM Special Session**
  - Arrive and Sign-in
  - Introduction & Session Kickoff
  - Learn to Swim with ATD-2
  - Break
  - Fuser:
    - Why Everyone Should Have One
    - Fuser Deeper Dive & Mediation Use Cases
    - Fuser Database – How ATD-2 stores all the data
  - Lunch
  - SWIM Data Analysis:
    - Turning SWIM data into consistent reports for analysts and users
    - Use of SWIM Data for ATD-2 Analysis
  - Break
  - TTP – How it fits in
  - Where are we now and where we going?
  - Q&A and Close-out
  - “Extra Innings”