

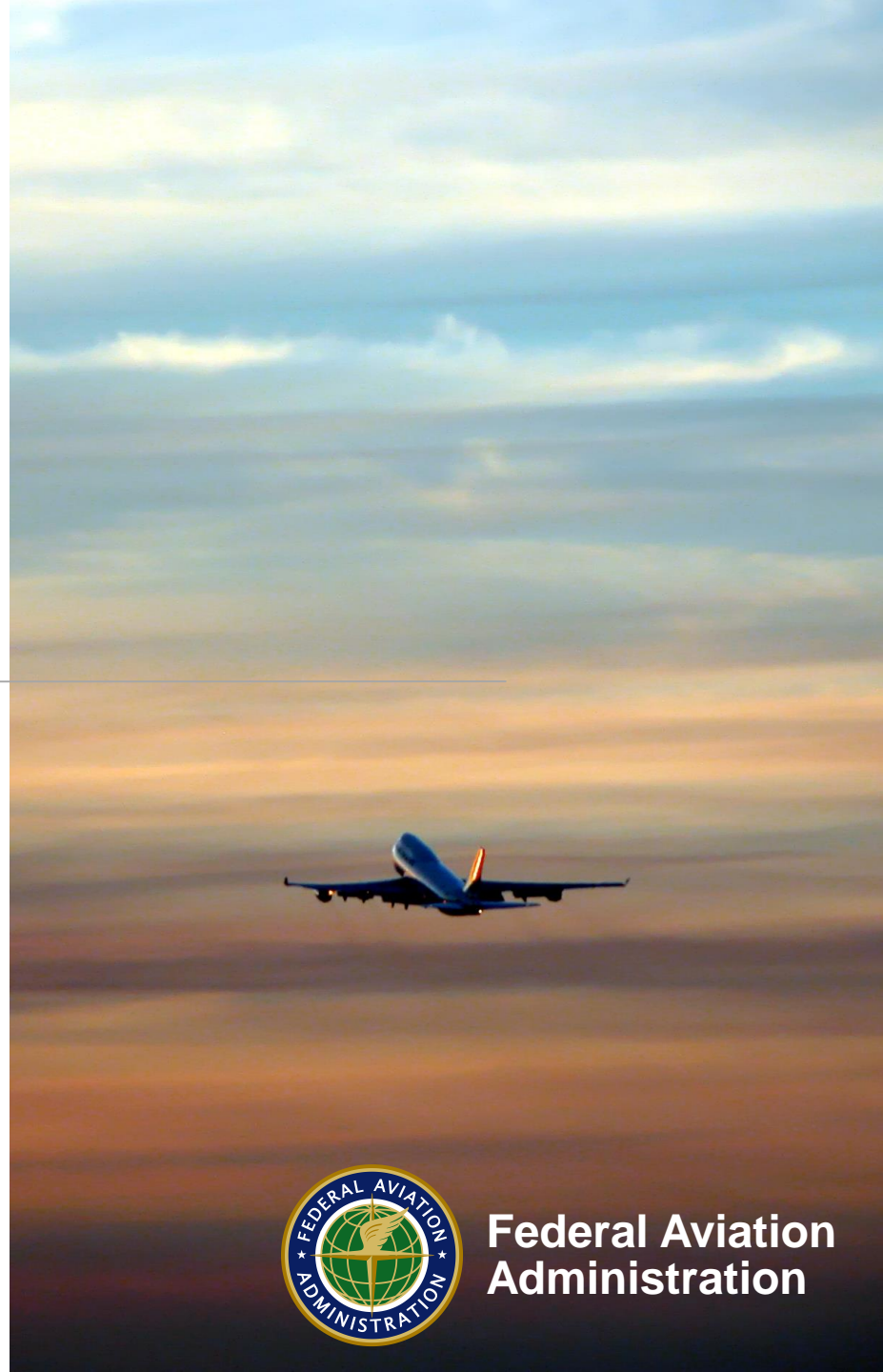
# Terminal Flight Data Manager (TFDM): Program Status Update

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Presented to: CDM General Session  
Presented By: Douglas Swol, TFDM Deputy  
PM, AJM-224  
Date: April 13, 2022



**Federal Aviation  
Administration**



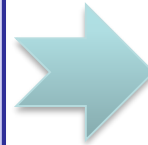
# TFDM Program Overview

TFDM is the **surface management solution** for NextGen and iTBO.

[https://www.faa.gov/air\\_traffic/technology/tfdm/](https://www.faa.gov/air_traffic/technology/tfdm/)

- **TFDM** will provide an integrated tower flight data automation system, which **will improve controllers' common situational awareness.**
- **TFDM will improve efficiencies** on the airport surface and terminal airspace by providing:

- Electronic Flight Strips in the Tower
- Traffic Flow Management Integration
- Collaborative Decision Making for the Surface
- Systems Consolidation



## Key Benefits:

- Fuel Savings: 313M Gal.
- Carbon Emission Savings: 3M Metric Tons
- Improved Data Exchange
- Schedule Predictability



# TFDM Capabilities

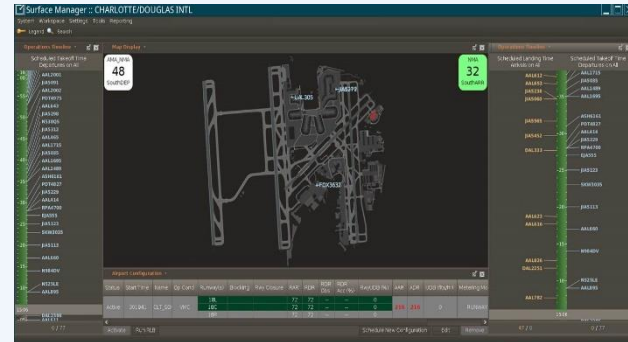
## Electronic Flight Data (EFD)

TFDM will provide an improved Electronic Flight Data (EFD) exchange and Electronic Flight Strips (EFS) in the tower to replace printed flight strips. This functionality will be integrated with Flight Plans for automatic updating.



## Collaborative Decision Making for the Surface (S-CDM)

TFDM will provide a departure scheduler with live data provided by Air Traffic systems/controllers and Flight Service Providers. The system will provide a departure metering capability, runway balancing and other surface management tools, improving surface traffic flow management.



## Traffic Flow Management (TFM)

TFDM will enhance the traffic flow management data integration with Time Based Flow Management (TBFM) and Traffic Flow Management System (TFMS) to enable airlines, controllers and airports to share and exchange real-time data. This will result in improved surface traffic management as well as improve the products produced by TFMS and TBFM.

## Systems Consolidation

TFDM will replace multiple unsupported systems in the National Airspace System through integration of their functionality into TFDM. This achieves technology modernization, improved data sharing and lower maintenance costs. The systems to be consolidated include ARMT, DSP, EFSTS, AEFS, and SMA.



# TFDM Electronic Flight Strips

The screenshot displays a TFDM (Traffic Flow Management) Electronic Flight Strip interface. The main strip shown is for flight **JBU136**, with a departure time of 0854 and arrival at 0856. The route is **F/A321/L** with a weight of 7L. The strip includes various status fields such as H/S, INHIBIT, ODO, REQ-CFR, APREQ, SWAP, STOP, GS, NRA, FRC, EMERG, PRIORITY, RESUME, DEICE, ABORT, RTN, PUSH, GH, and FDLY. The route information is **KPHX + .BROAK1.MAXXD..ACH+ .FORPE1.ABQ..ACH..KA33Y..PWA..KK36E..RZC..BWG..BKW..ASBUR..DENNY..MOL..J24.HCM..SAWED.J121.SIE.CAMRN4.KJFK/0402**.

Other visible strips include:

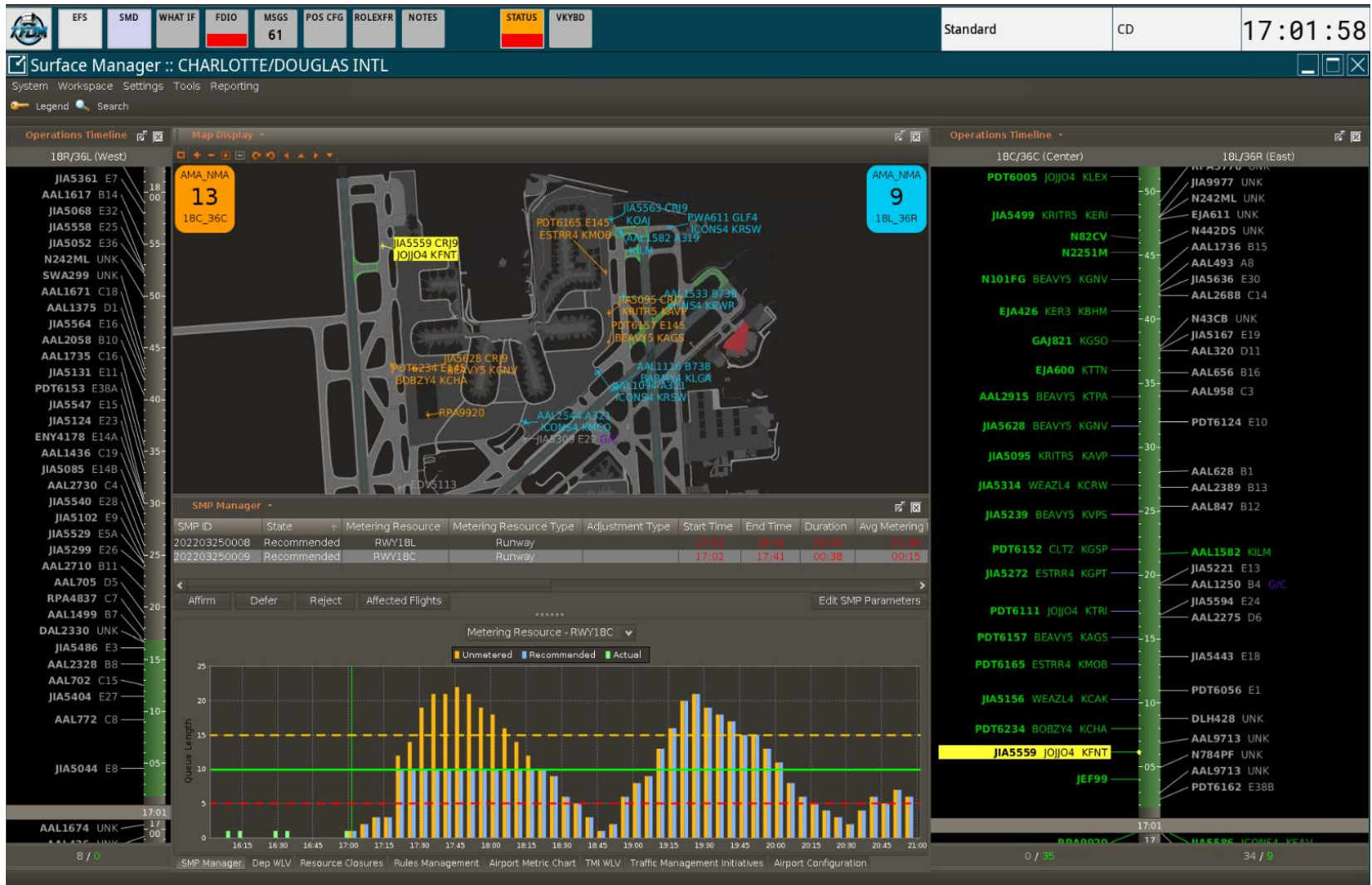
- N193CS**: E/P/KR1/L, 7L, KONA FORPE SLN LAYERS KX00
- SWA2500**: F/B737/L, 7L, KX00
- JBU136** (highlighted): F/A321/L, 7L, KPHX + .BROAK1.MAXXD..ACH+ .FORPE1.ABQ..ACH..KA33Y..PWA..KK36E..RZC..BWG..BKW..ASBUR..DENNY..MOL..J24.HCM..SAWED.J121.SIE.CAMRN4.KJFK/0402

The interface also shows a top navigation bar with 'MULTI', 'ALL', 'FLIP', and 'NON-PDC/CARGO' buttons, and a bottom status bar with 'DEFAULT' and 'ACID' options.

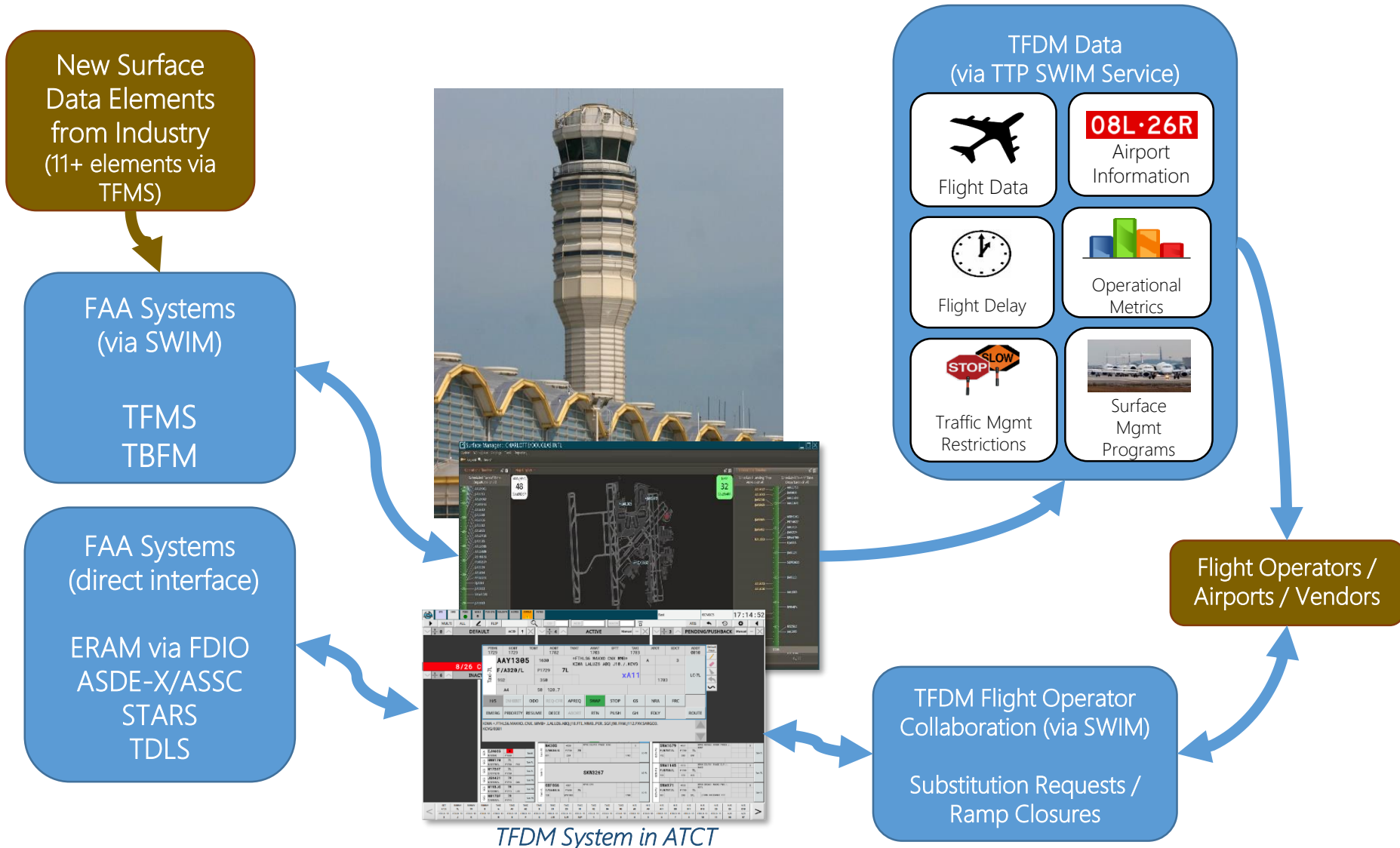




# TFDM Surface Management



# Collaboration and Data Exchange: At the Core of TFDM



# Benefits of TFDM

- **Surface Queue Management – moves queueing delay from taxiway to gate/ramp**
  - Reduces fuel burn and emissions
- **Ability to prioritize flights**
  - Shift delay from higher priority flights to lower priority flights pre-departure
- **Shift Call-For-Release/En-Route delay from taxiway to gate**
  - Reduces fuel burn and emissions
- **Improved Runway Load Balancing**
  - Small increases in throughput by better balancing departure demand across departure runways
- **Improved Schedule Predictability**
  - Metering times available from gate to spot to runway
  - Aligns surface schedule with en route constraints



# TFDM Program Timeline Overview

## FID & Contract Award

- June 2016
- Leidos (Subcontractor SAAB Sensis)

## Implementation Plan

- 89 airports from FY2023 to FY2031
- Two configurations (A & B)
- Two Build development (Builds 1 & 2)
  - Build 1 key site – CLE (FY2023)
  - Build 2 key site – CLT (FY2024)

## Current Phase

- AMS Solution Implementation Phase
- Build 2 System Development
- Build 1 Key Site Testing





# COVID Impacts

- **Almost all program travel stopped from March 2020 through January 2022**
  - Most FAA facilities inaccessible for TFDM activities
- **Activities Impacted**
  - Operational Testing (at WJHTC and field facilities) stopped
  - Training (ATC and Tech Ops)
  - Implementation
    - Site Surveys
    - Hardware Installations
    - Interface Checkouts
  - Impacts to Other FAA Systems
- **Software Development and Testing Continued (remotely)**



# TFDM System Configurations

The 89 Airports chosen for TFDM will receive one of two configurations:

## Configuration A

27 Sites

EFD	Systems Consolidation
TFM	S-CDM

### Full Functionality TFDM

- EFD, including electronic flight strips in towers
- Surface surveillance data integration
- Surface Metering (includes full Decision Support Tool)
- TFM data exchange and integration
- SSA on TFMS TMU displays in the TRACON, ARTCC, and ATCSCC

## Configuration B

62 Sites

EFD	Systems Consolidation
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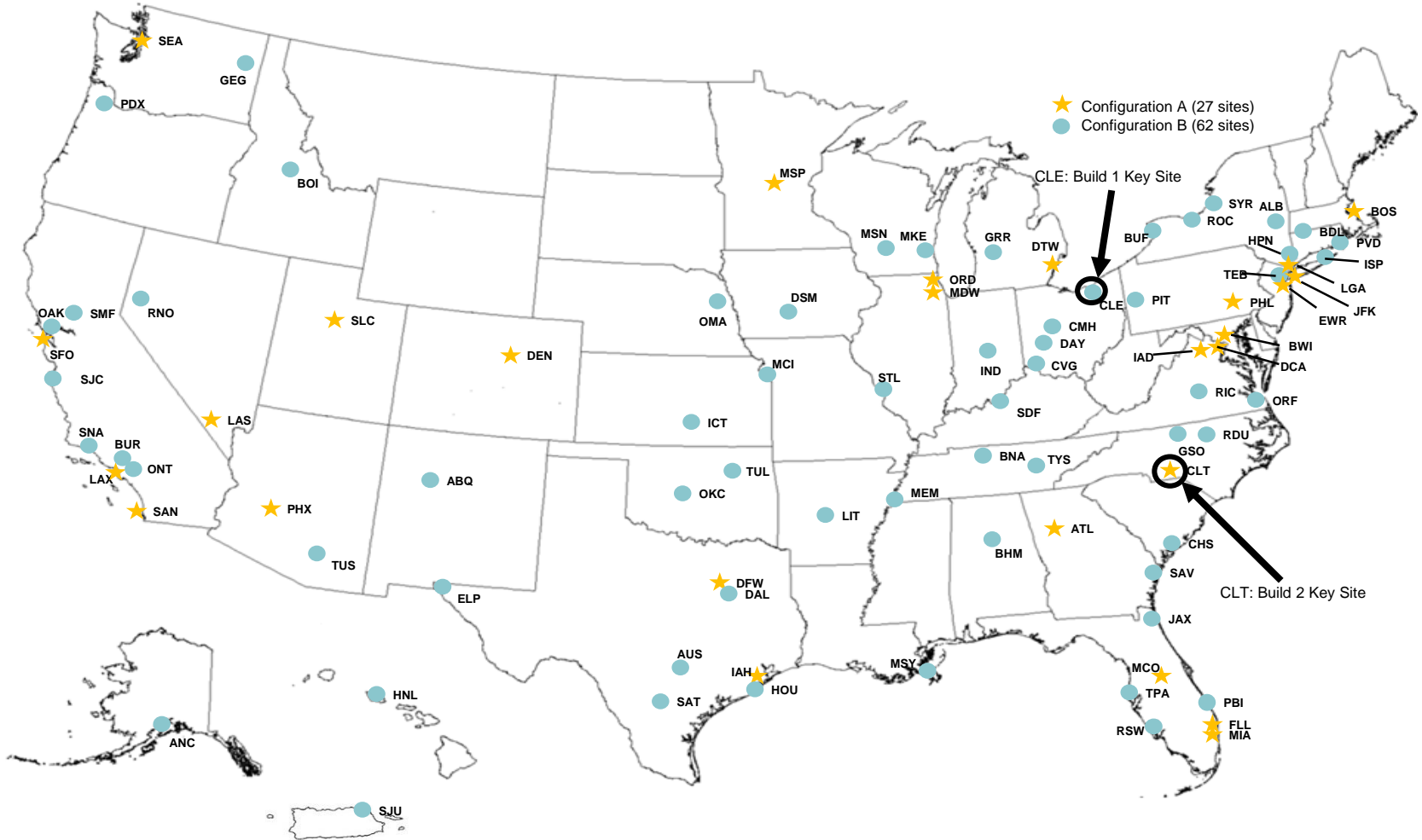
### Improved EFD exchange-only TFDM

- EFD, including electronic flight strips in towers
- SSA capability on TFMS TMU displays at sites with existing equipment

The physical TFDM architecture for Configuration A and B is identical; the difference between the configurations is software functionality enabled.



# TFDM Deployment Sites



# TFDM Interdependencies

## *Internal Interfaces*

### Two-Way Interfaces

- Traffic Flow Management System (TFMS)\*
- Time-Based Flow Management (TBFM) including IDAC integration\*
- FDIO\*
- SWIM
- RMLS (Via SWIM)

### One-Way Interfaces

- ASDE-X/ASSC
- STARS/TAMR
- TDLS\* (FTI via Interfacility LAN (IFL))

\*significant software changes to support TFDM

## *External Interfaces*

- Flight Operators (via SWIM)
- Airport Authorities (via SWIM)

## *Facilities Affected*

- Towers (93 at 89 airports)
- TRACONs (58 via TFMS)
- ARTCCs (18 via TFMS)
- ATCSCC (via TFMS)
- WJHTC (Test and 2<sup>nd</sup> Level Engineering)
- MMAC (Academy and Depot)
- SOCC (RMM)
- OCC (RMM)



# TFDM Program Status

## Build 1 Key Site: CLE

- **Accomplishments**
  - New TFDM draft waterfall
  - Build 1.4 software development complete
  - Travel to field facilities PHX, CLE, CLT to install software / interface checkouts
  - Risk Reduction Testing at WJHTC
- **Planned Activities**
  - Formal 1.4 operational testing at the WJHTC March-April 2022
  - Formal 1.4 operational testing at IOC site(s) Summer 2022 (NAC milestone)

## Build 2 Key Site: CLT

- **Accomplishments**
  - Completed Build 2.0 formal software test at the WJHTC in January 2022
  - Build 2.1 Delivered to WJHTC
  - Vendor and flight operator testing on TFDM Testbed
- **Planned Activities**
  - Delivery of Build 2.1 to WJHTC (February 2022)
  - Formal Build 2.1 software testing begins July 2022
  - Build 2.2 (IOC Build) in development
  - Continue onramping and test activities with vendors for the TFDM testbed





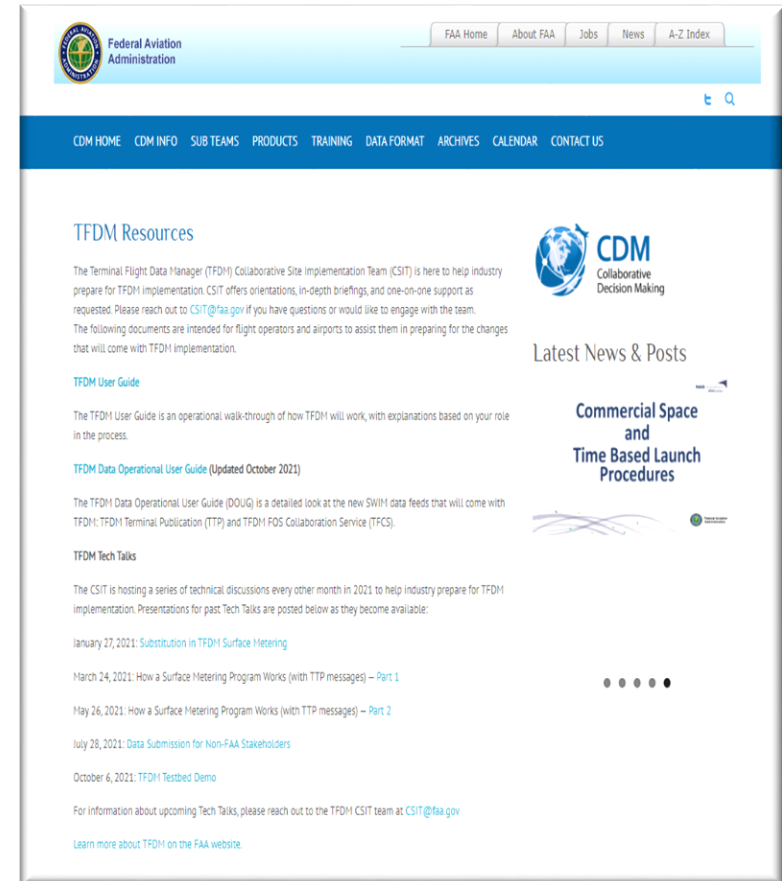
# TFDM New Draft Waterfall

- **Due to COVID, total TFDM waterfall delayed by ~2.5 years**
  - Last site moves from 8/28 IOC to 4/31 IOC
  - Last Configuration A site, 4/28
- **21 sites swapped on TFDM waterfall (overall 89 site waterfall preserved)**
  - Remove 21 sites with Low IFR/High VFR towers better served with Flight Data Transfer System (FDTs) to replace legacy EFSTs
  - Add 21 new sites:
    - 16 are PDC/CPDLC towers for better integration with DataComm
    - Higher volume IFR sites with more traffic to hub airports



# TFDM Outreach and Collaboration

- **Surface NIWG and Surface – CDM Teams**
- **Collaborative Site Implementation Team (CSIT) (led by AJR – Keith Henry)**
  - Establishes surface working group at each Config A site (27 total) to prepare stakeholders for TFDM
  - Provides Surface-CDM users guides, data guides
  - Conducts tech talks to prepare industry
- **TFDM Testbed**
  - Early opportunity for flight operators/vendors to test data connections with TFDM before deployment
- **SWIM Industry-FAA Team (SWIFT)**
  - Engage industry on the use of TFDM data via SWIM



The screenshot displays the Federal Aviation Administration website's TFDM Resources page. The page features a navigation bar with links for FAA Home, About FAA, Jobs, News, and A-Z Index. Below the navigation bar, there is a main menu with links for CDM HOME, CDM INFO, SUB TEAMS, PRODUCTS, TRAINING, DATA FORMAT, ARCHIVES, CALENDAR, and CONTACT US. The main content area is titled "TFDM Resources" and includes a section for "TFDM User Guide" and "TFDM Data Operational User Guide (Updated October 2021)". There is also a section for "TFDM Tech Talks" with a list of recent talks, including "January 27, 2021: Substitution in TFDM Surface Metering" and "March 24, 2021: How a Surface Metering Program Works (with TTP messages) – Part 1". A "Latest News & Posts" section highlights "Commercial Space and Time Based Launch Procedures".



# Moving Forward in 2022

- **Build 1 Cleveland OT – Summer 2022**
- **Build 1 Cleveland IOC – Fall 2022**
- **Additional B1 site deployments in CY2023**
  - IND, PHX, LAS, RDU, CMH, SJC, TPA
- **Testing on B2 System at WJHTC**
- **Continued collaboration with industry!**



# Questions

