



# Airspace Technology Demonstration 2 (ATD-2)

TFDM Terminal Publication Service (TTP)

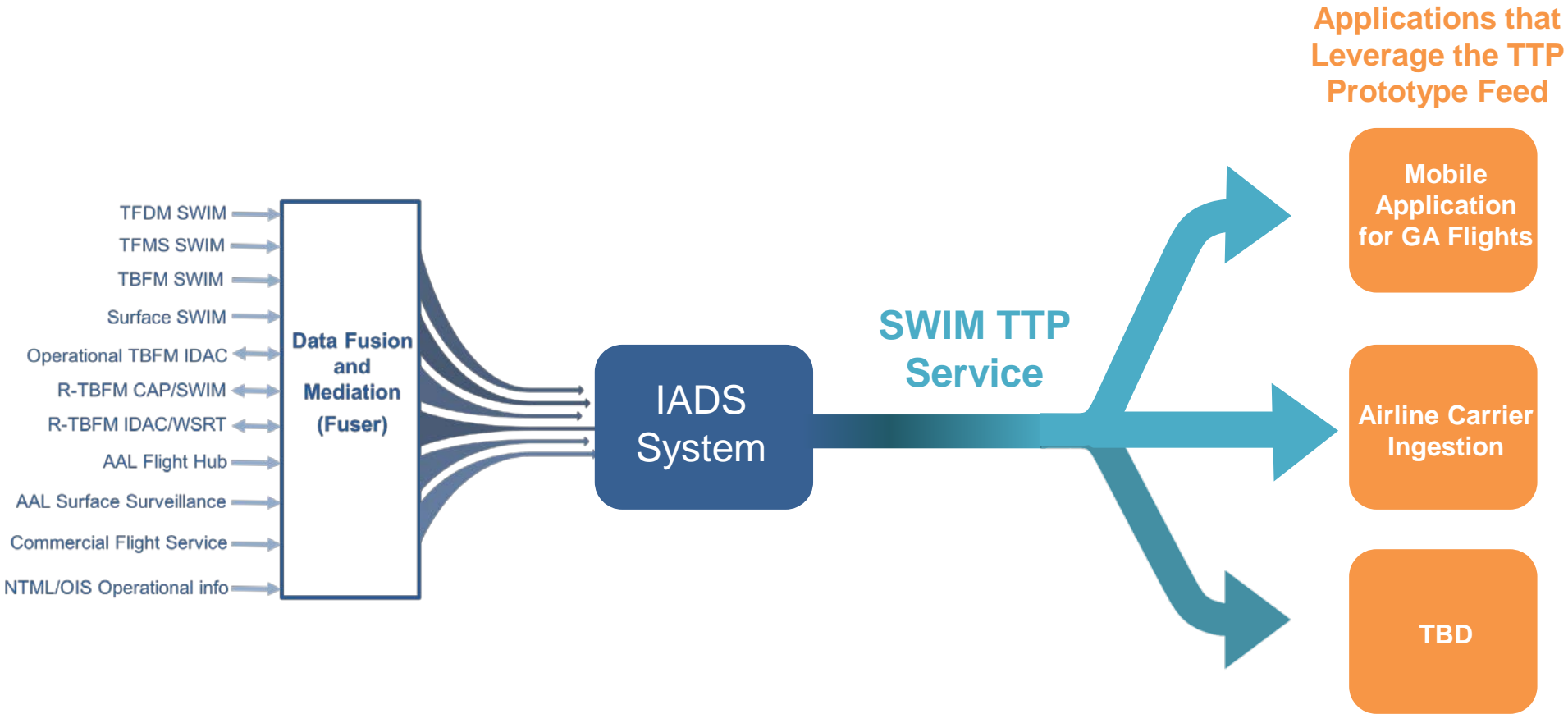
May 22, 2019



- TFDM data feed publishing Flight and Flow data to consumers
- Will provide data exchange between TFDM and NAS Systems and the National Airspace System (NAS) users (airlines, air carriers, air freight, military or general aviation/business aviation operators).
- Accessible via the National Airspace (NAS) Enterprise Messaging Service (NEMS).
- Uses the publish-subscribe (pub-sub) Message Exchange Pattern (MEP).
- XML data format, using FIXM standard for Flight Data
- Airport Information and Traffic Management Restrictions use a schema defined by the TFDM team



- Registered as “NASA TTP” in NSRR
- Currently available via SWIM R&D Gateway
- Based on TFDM specifications
  - Currently no deviations from TFDM specifications
  - Does not include all information published by TFDM
- Publishing data for:
  - Charlotte Douglas International Airport
  - Dallas/Fort Worth Metroplex
- Planning support of NASA TTP for CLT until TFDM proper installed
- Goal - work invested in integrating with ATD-2 via TTP could be utilized with TFDM



Service	Includes
Flight Data	Individual flight updates containing flight identifiers, targeted times, actual times, runway, parking gate, spot, departure fix (predicted, assigned, actual as appropriate), flight states, and more
Airport Information	Airport configurations, airport and runway rates, ramp closures, runway closures, taxiway closures
Traffic Management Restrictions	Call for Release programs departure MIT/MINIT restrictions, departure stop/ground stop programs. Along with list of impacted flights for each
Flight Delay	Airport and runway delay by arrival, departure, and total
Operational Metrics	Metrics on airport throughput and individual flight metrics
SMP	Data about Surface Metering Programs, affected flights, and metering parameters



Name	Event Driven	Full Update	Implemented in NASA TTP
Flight Data	Yes	Every 15 minutes	Yes
Airport Information	Yes	Every 15 minutes	Yes (subset)
Traffic Management Restrictions	Yes	Every 15 minutes	Yes (subset)
Flight Delay	Yes	Every 15 minutes	Yes (subset)
Operational Metrics	No	Every 1 minute	Yes (subset)
SMP	Yes	Every 15 minutes	Not currently

- We will continue to track and align with TFDM as much as possible
- Implementation details of specific messages can be found on [NASA TTP NSRR](#)

- Share valuable data with other stake holders
- Automate data sharing avoiding manual inputs
- Data doesn't exist in other feeds
- Doesn't naturally fit into any existing feeds







- **Flight Data Fields**

- APREQ Release Time

- Approval Request Release Time / Call for Release Time received from TBFM

- Departure Runway Predicted

- The departure runway predicted by the STBO model

- Departure Runway Actual

- The departure runway the flight departed from

- Arrival Runway Predicted

- The arrival runway predicted by the STBO model

- Arrival Runway Actual

- The departure runway the flight departed from

- Estimated Time of Departure

- The time of departure predicted by the STBO model

- TMI Identifiers

- Contains a comma delimited list of TMI IDs, one per TMI associated with the flight





- **Traffic Management Information**

- Traffic Management Restriction
  - Data elements available for all TMI's
    - Unique ID
    - Start / End times
  - Miles in Trail
    - Spacing (NM)
    - Applicable airport / fix
  - Minutes in Trail
    - Spacing (minutes)
    - Applicable airport / fix
  - Approval Request (APREQ) List
    - Applicable airport / fix
  - Airport Departure Stop
    - Impacted NAS element
    - Reason for stop

- **Airport Information**

- Airport Configuration
  - Arrival Runway
  - Departure Runway
- Runway Configuration
  - Departure Rate
  - Arrival Rate
  - Runway Closure



- **Practice**

- NASA TTP was built against the TFDM TTP design standard
- Using the NASA TTP provides users with a period of time to become familiar with the TTP schema and information provided

- **Integration**

- Data generated by NASA TTP is accurate and will be similar to the data produced by TFDM
- Users are able to begin integration of TFDM TTP data into their internal systems / operations prior to TFDM going operational

- **Feedback**

- Using existing forums (CDM WG, SWIFT, etc.) users are able to ask questions and provide feedback to TFDM prior to its deployment



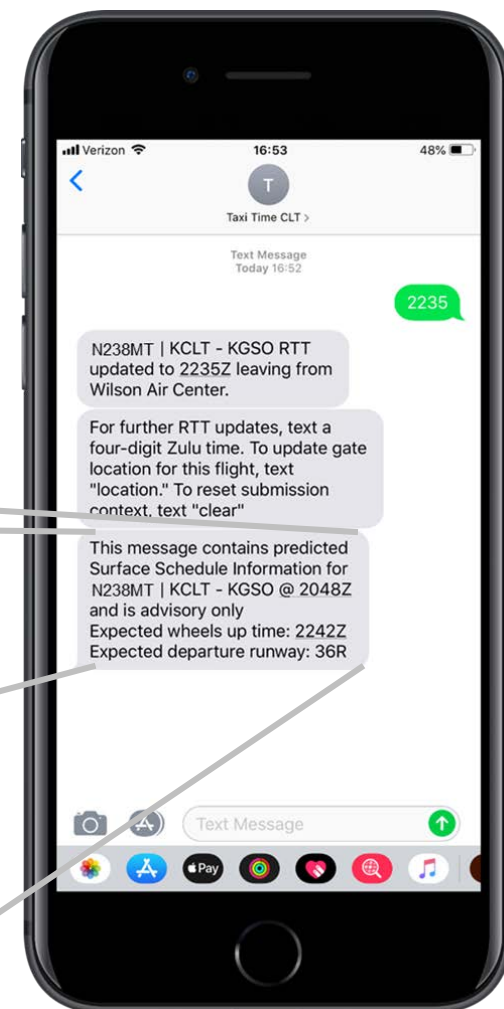
- **TMI Flight Lists**

- Each TMI is published with a unique ID
  - CFR
  - Departure MIT/MINIT restrictions
  - Departure Stop
- Flight messages published for flights impacted by a TMI(s) have the impacting TMI ID(s) included in their Flight Messages
- Provides information needed to determine which flights are impacted by a specific TMI

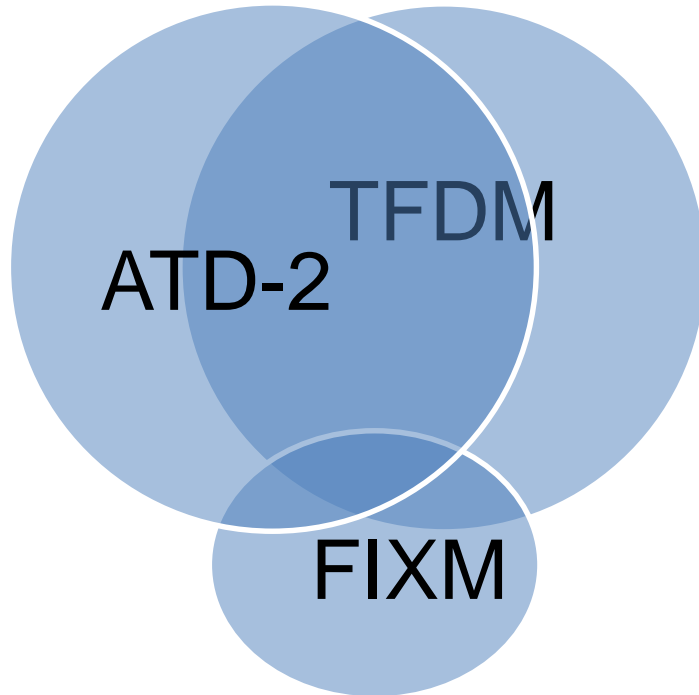
- **Airport Configuration**

- Predicted Departure Runway
  - Flight messages published for each flight providing a predicted departure runway
  - Prediction generated by STBO model
- Estimated Time of Departure
  - Flight messages published for each flight providing a predicted time of departure
  - Prediction generated by STBO model

## MITRE Prototype using TTP data @ CLT



This message contains predicted Surface Schedule Information for N238MT | KCLT - KGSO @ 2048Z and is advisory only  
 Expected wheels up time: 2242Z  
 Expected departure runway: 36R



- **Program intersection limitation**
  - NASA ATD-2 has data that is not in the TFDM requirements
  - NASA ATD-2 does not have all the data to fill the TFDM requirements.
  - TFDM is expected to produce all flight data in FIXM format
  - FIXM does not currently support everything TFDM will need to publish
- **Not a one stop shop**
  - TTP generally not intended to include data that is found in other feeds



- Work with SWIM to establish a connection to SWIM R&D if you don't already have a connection
  - If you already have a connection getting access to TTP will be pretty straight forward.
- Subscribe to SWIM R&D TTP feed via a new queue that will be established for each stake holder
- Work with ATD-2 team on how to utilize the information
  - See TTP Resources slide for links to documentation



- **Links to FAA TFDM resources**

- **Concept Overview:**

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

- **SWIM On-Ramping:**

- [https://www.faa.gov/air\\_traffic/technology/swim/products/get\\_connected/](https://www.faa.gov/air_traffic/technology/swim/products/get_connected/)

- **Implementation Roadmap:**

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

- **Links to ATD-2 TFDM / NASA TTP Resources**

- **NSRR:**

- <https://nsrr.faa.gov/services/nasa-ttp/profile>

- **NASA Website:**

- <https://www.aviationsystemsdivision.arc.nasa.gov/research/atd2/index.shtml>



