

SWIM Interactive Developer Workshop 2016

TFM Introduction and Schema Exploration

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Federal Aviation
Administration

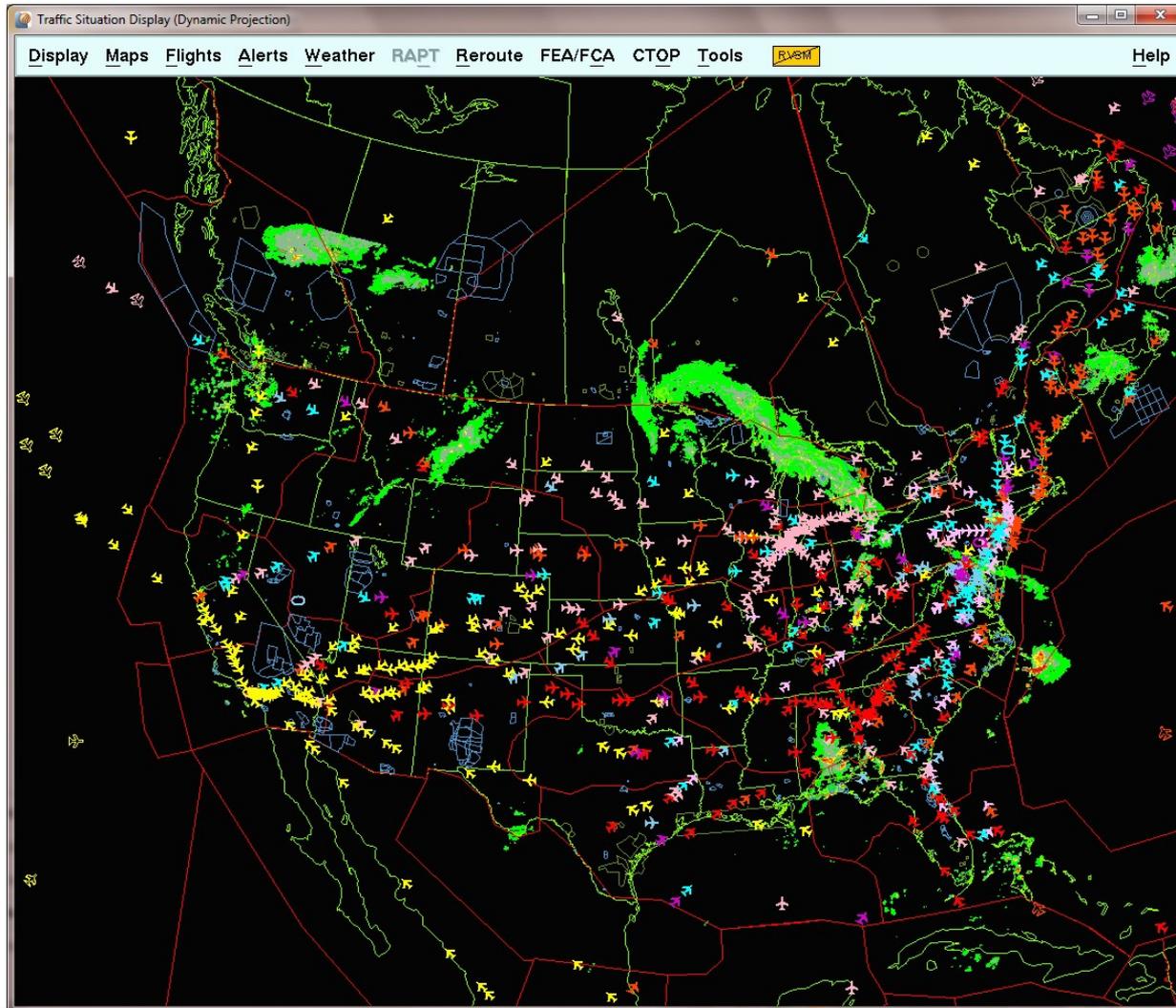
SWIM
Interactive Developer
Workshop 2016



Agenda

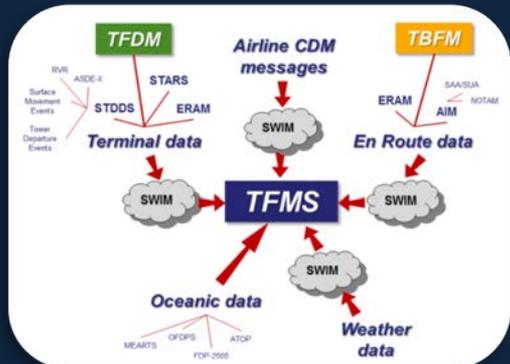
- TFMS (Traffic Flow Management System) Overview
- TFMDData Overview
- TFMDData Schema
- TFMDData – Flight Data
- TFMDData – Flow Information
- For more information
- Backup Slides – how to download schemas

TFMS (Traffic Flow Management System)

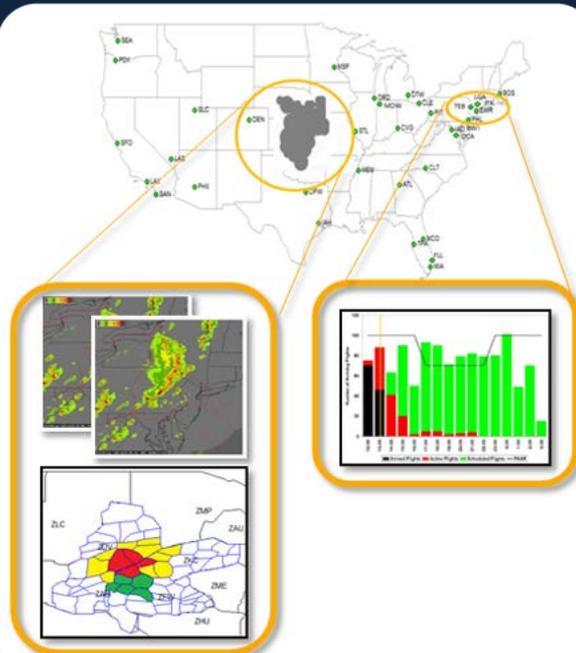


TFMS: *Focusing on efficiently improving the “greater NAS”*

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

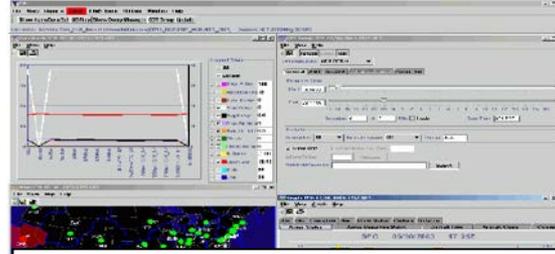
TFMS Overview

TFMS (Traffic Flow Management System) is a Decision Support System (DSS) which provides information processing support for FAA traffic management personnel as they coordinate the use of the NAS (National Airspace System) and respond to conditions of excess demand. TFMS receives information on planned and active flights, generates forecasts of demand from current time to several hours ahead, presents this information to traffic management personnel, and provides automation support for the TMs to resolve or improve congestion. TFMS provides information to other FAA NAS automation systems, Collaborative Decision Making (CDM) users, Flight Operations Centers (FOCs), Airline Operations Centers (AOC), and other consumers of Traffic Flow Management (TFM) data. TFMS supports advanced planning for anticipated adverse or restrictive conditions. It supports post-event analysis and evaluation of actions taken. TFMS archives the information it receives and generates, making it available for researchers and developers. It collects and distributes metrics on the use of the NAS and the contribution of the ATO (Air Traffic Organization) to air traffic efficiency and effectiveness.

TFMS: Collection of Systems & Interfaces



Traffic Situation Display



Flight Schedule Monitor



National Traffic Management Log



Enhanced Status Info System



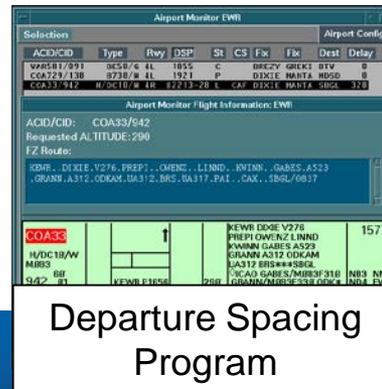
Operational Info System



fly.faa.gov



Playbook



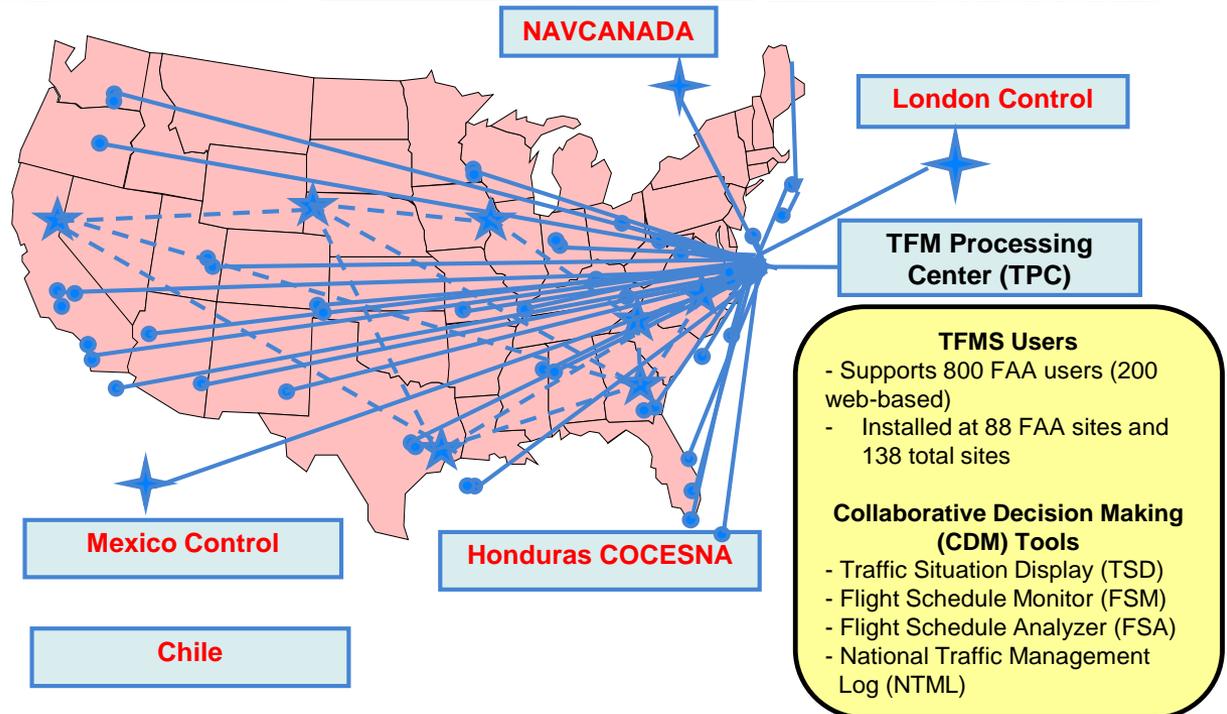
Departure Spacing Program

30+ user/data interfaces

TFMS Infrastructure



- TFMS Operational Locations and Service Delivery Points**
- ATCSCC – Vint Hill, VA
 - TFM TPC – Technical Center – FAA
 - Disaster Recovery Center (DRC)
 - FAA HQ and Academy
 - Contractor Sites (1)
 - R&D (4)
 - Traffic Management Units at:
 - ARTCCs (21)
 - TRACONs (35)
 - CERAPs (3)
 - Regional Offices (5)
 - Towers (19)
 - Airlines (24) & AOCs
 - Military (9)
 - International Sites (17)
 - U.S. Government Locations (7)



TFMData SWIM Interfaces

- **In TFMS Release 10 (Nov 2014), TFMData included:**
 - 1) Flight Data
 - 2) Flow Information
- **Additional TFMData services added in TFMS R13 (May 2016):**
 - 3) Terminal Flight Data
 - 4) TFM Request/Reply
 - 5) International
 - 6) TFMS Status
- Available to SWIM consumers via NEMS (NAS Enterprise Messaging Service)
- Mediators (translators) support user transition from R10-formatted interface to R13-formatted interface (for Flight Data & Flow Info)

No new data being sent out. Just change in distribution mechanism.

TFMData: 1) Flight Data

- Flight Data is the TFM SWIM replacement for the Legacy ASDI Feed
- Flight Data includes additional information over ASDI and reflects the data used by TFMS

It is not raw data resent as TFMS receives it (which is what was provided with ASDI). Received data is validated and only the data TFMS uses is actually sent.

(See “ASDI vs TFMData Comparison” paper on <http://FAAindustryforum.org>)

- Flight Data includes:
 - Flight Plans
 - Flight Plan Amendments
 - Flight Plan Cancellation
 - Departure Time notifications
 - Arrival Time notifications
 - Track Position Reports
 - Oceanic Position Reports
 - Boundary Crossings
 - Flight Management Information
 - *and more....*

(Data available near real time)

TFMData: 2) Flow Information

- Flow Info is the TFM SWIM replacement for the Legacy TFMDI Feed
- Flow Information includes all TMI data
(TFMDI had included only public Reroutes and FCAs)
- Flow Information includes:
 - All TMI definitions
 - Reroutes, Ground Stops, Ground Delay Programs (GDP), Airspace Flow Programs (AFP), Collaborative Trajectory Options Program (CTOP)
 - Flow Evaluation Area (FEA) / Flow Constrained Area (FCA) definitions
 - Command Center advisories
 - Restrictions
 - Airport Runway configuration & rates
 - Airport Deicing status
 - Route Availability Planning Tool (RAPT) timeline forecast data
 - *and more....*

(15 minute Data Refresh)

TFMData: 3) Terminal Flight Data

- Includes Terminal and Surface Data:
 - AOBT (Actual Off-Block Time)
 - ATOT (Actual Takeoff Time)
 - ALDT (Actual Landing Time)
 - AIBT (Actual In-Block Time)
 - EOBT (Earliest Off-Block Time)
 - ERTD (Earliest Runway Time of Departure)
 - IOBT (Initial Off-Block Time)
 - *and more....*
- Data in FIXM (Flight Information Exchange Model) format
- For FAA and CDM (Collaborative Decision Making) Participants only

TFMData: Remaining Business Functions

4) TFM Request/Reply:

- Provides access to all TFMS Services for
 - Data Requests
 - TMI creation and management
- For FAA and CDM Participants only

5) International:

- Allows 2-way exchange of international flight data (*in FIXM format*)
- For FAA and International Data Providers (IDP) only

6) TFMS Status:

- Reports status of all TFMS consumer feeds and producer services:
 - TFMData - Flight Data
 - TFMData - Flow Information
 - TFMData - Terminal Flight Data (Input & Output)
 - TFMData - TFM Request/Reply
 - TFMData - International (Input & Output)
 - TBFM Flight Data
 - STDDS RVR, Surface Movement Events, and Tower Departure Events (*future*)
 - AIM SAA Schedule Events

TFMData Design Documents

- **TFMS Release 13:**

- **TFMData:**

- XSD v2.0.5 (XML Schema Definition)
 - JMSDD v2.0.5 (Java Messaging Service Description Document)
 - Download from NSRR (*see backup slides for details*)
 - For required TFMdata versions, refer to http://cdm.fly.faa.gov/?page_id=237

- **FIXM:**

- FIXM Core release 3.0
 - FIXM US (NAS) extension release 3.1
 - Includes FIXM schema and data dictionary
 - Download from www.FIXM.aero (*see backup slides for details*)
 - For required FIXM versions, refer to TFMData JMSDD

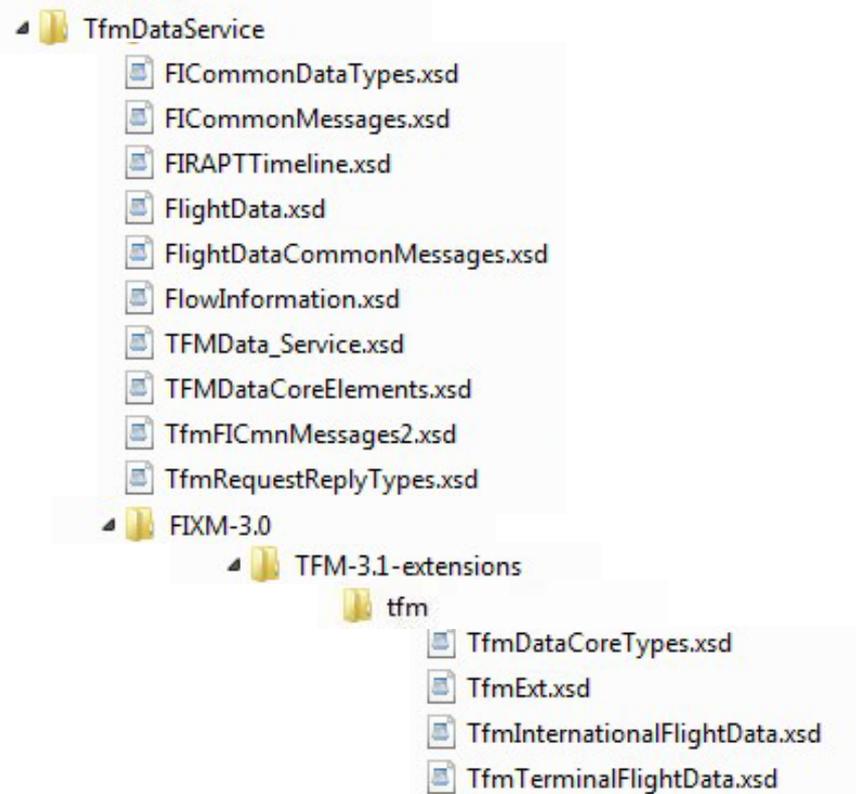
- **TFMS Release 10:**

- **TFMData:**

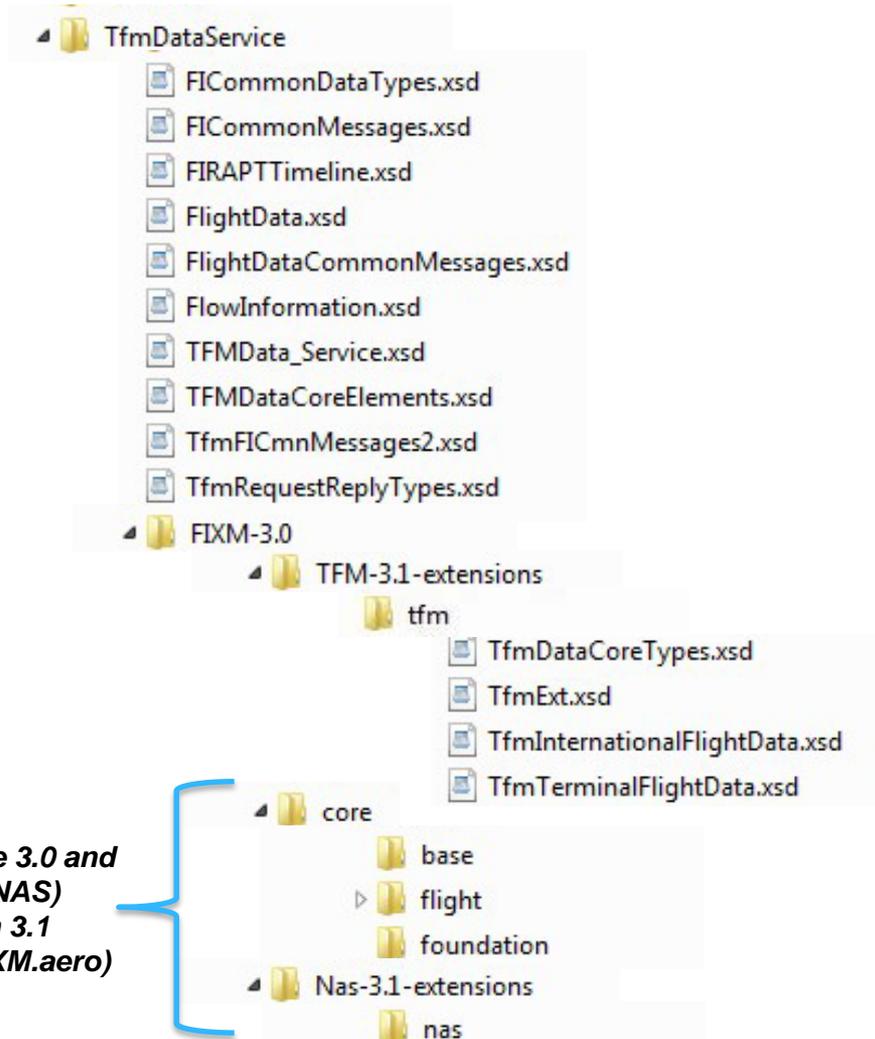
- XSD v1.7
 - WSDD v1.9 (Web Service Description Document)

TFMData Schema

*From
TFMData v2.0.5
zip file
(from NSRR)*

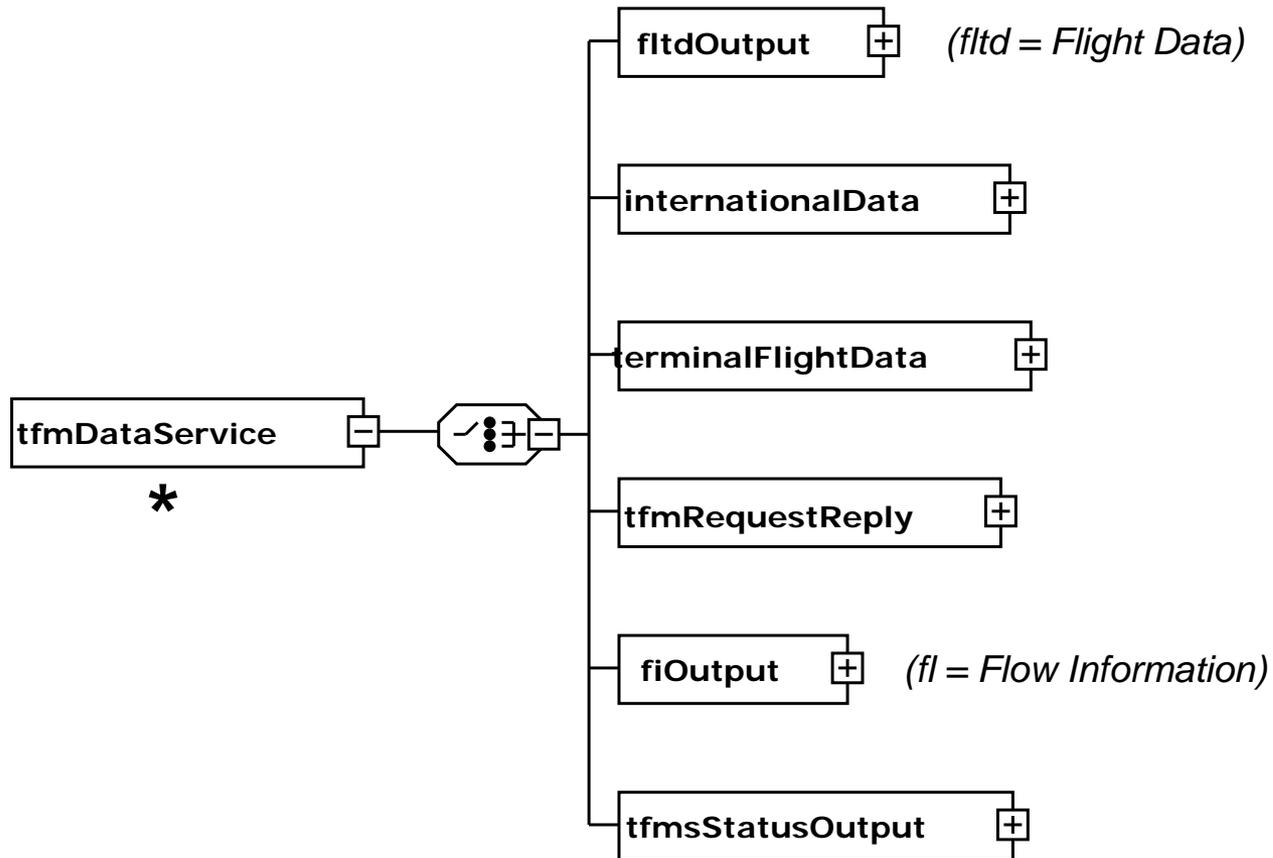


TFMData Schema: Add FIXM Schemas



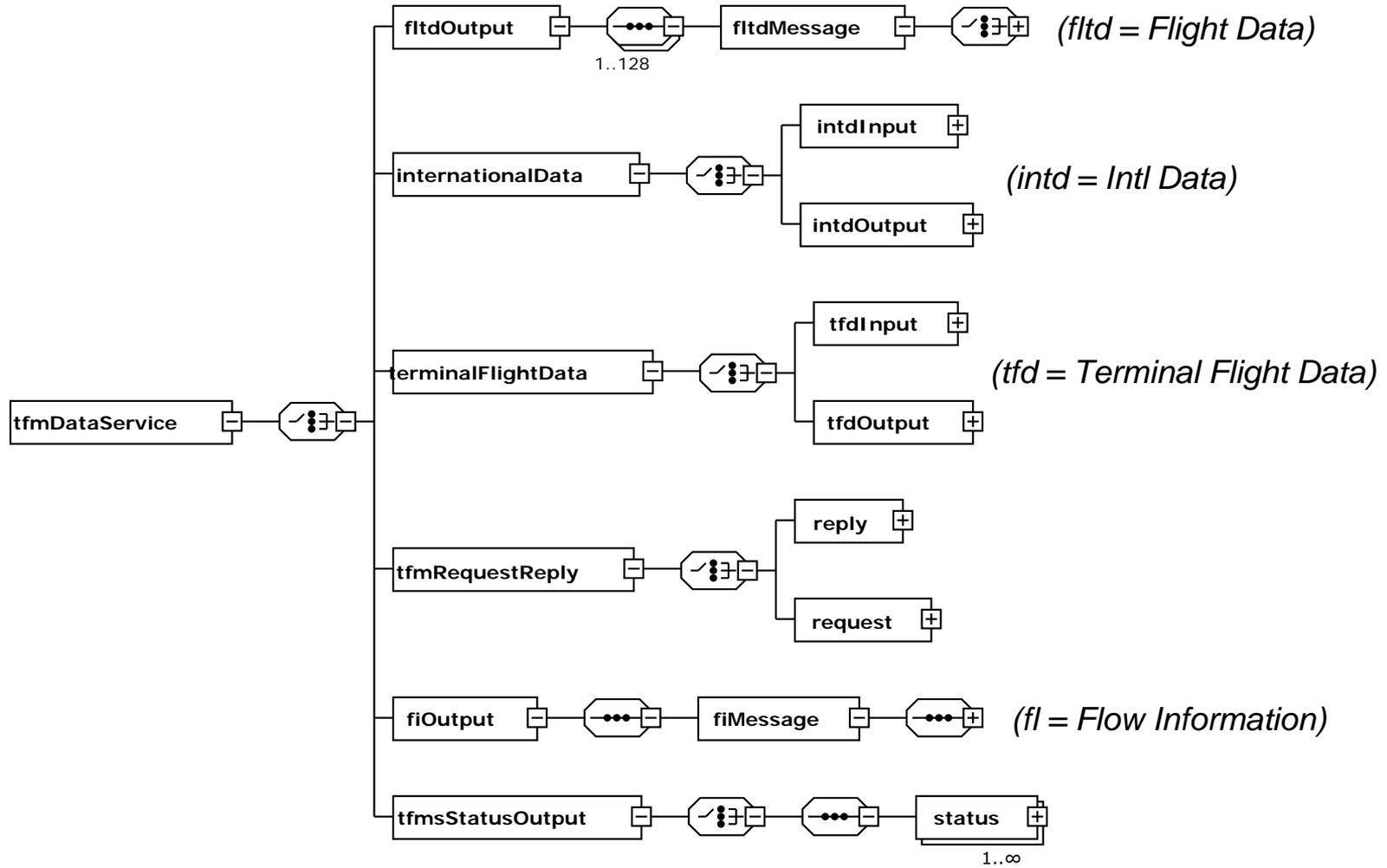
**Add FIXM Core 3.0 and
FIXM US (NAS)
Extension 3.1
(from www.FIXM.aero)**

TFMData Schema: 6 Business Functions



* Top-level element "tfmDataService" located in TFMData file "TFMData_Service.xsd"

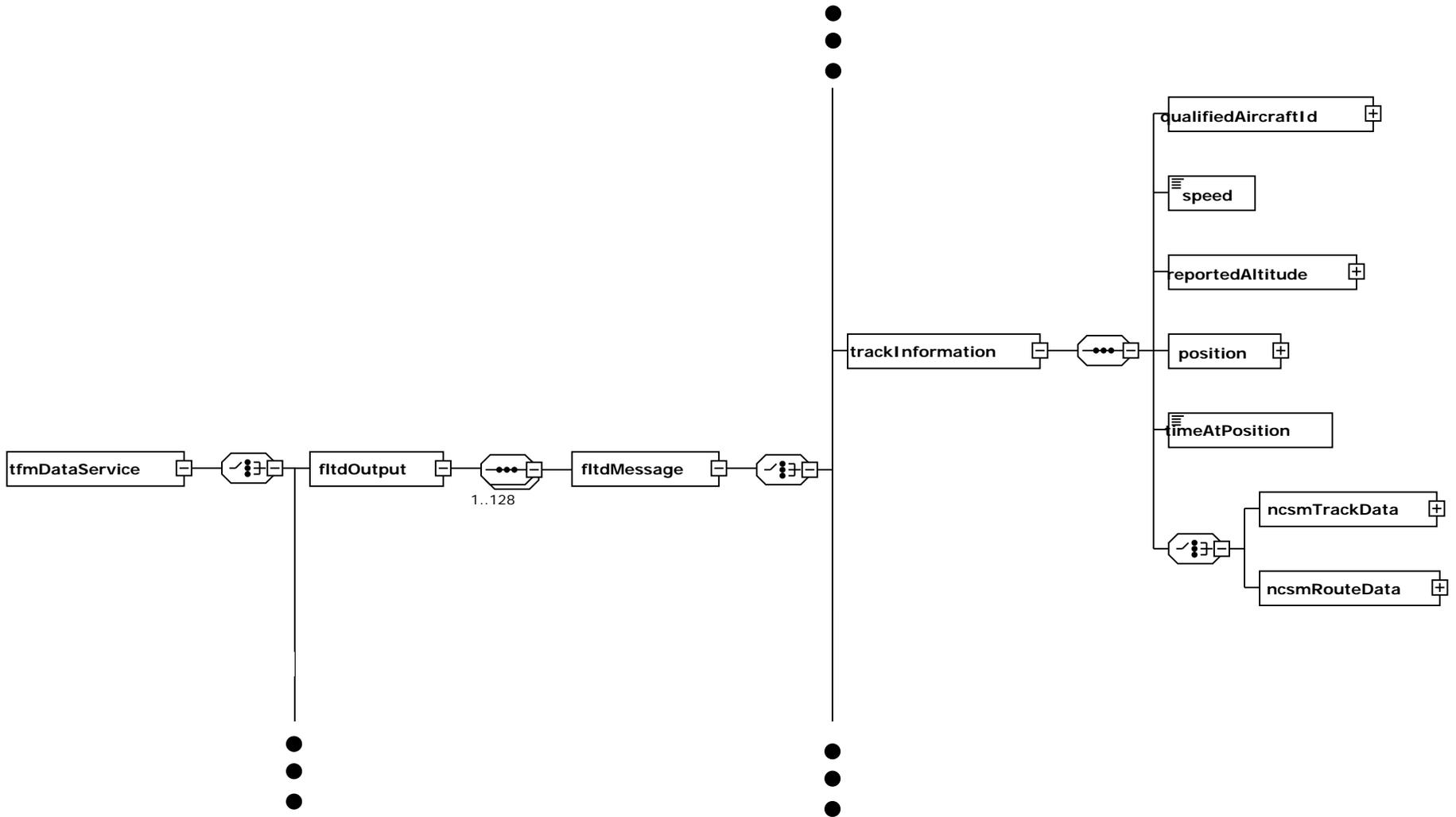
TFMData Schema: 1-way and 2-way Intfcs



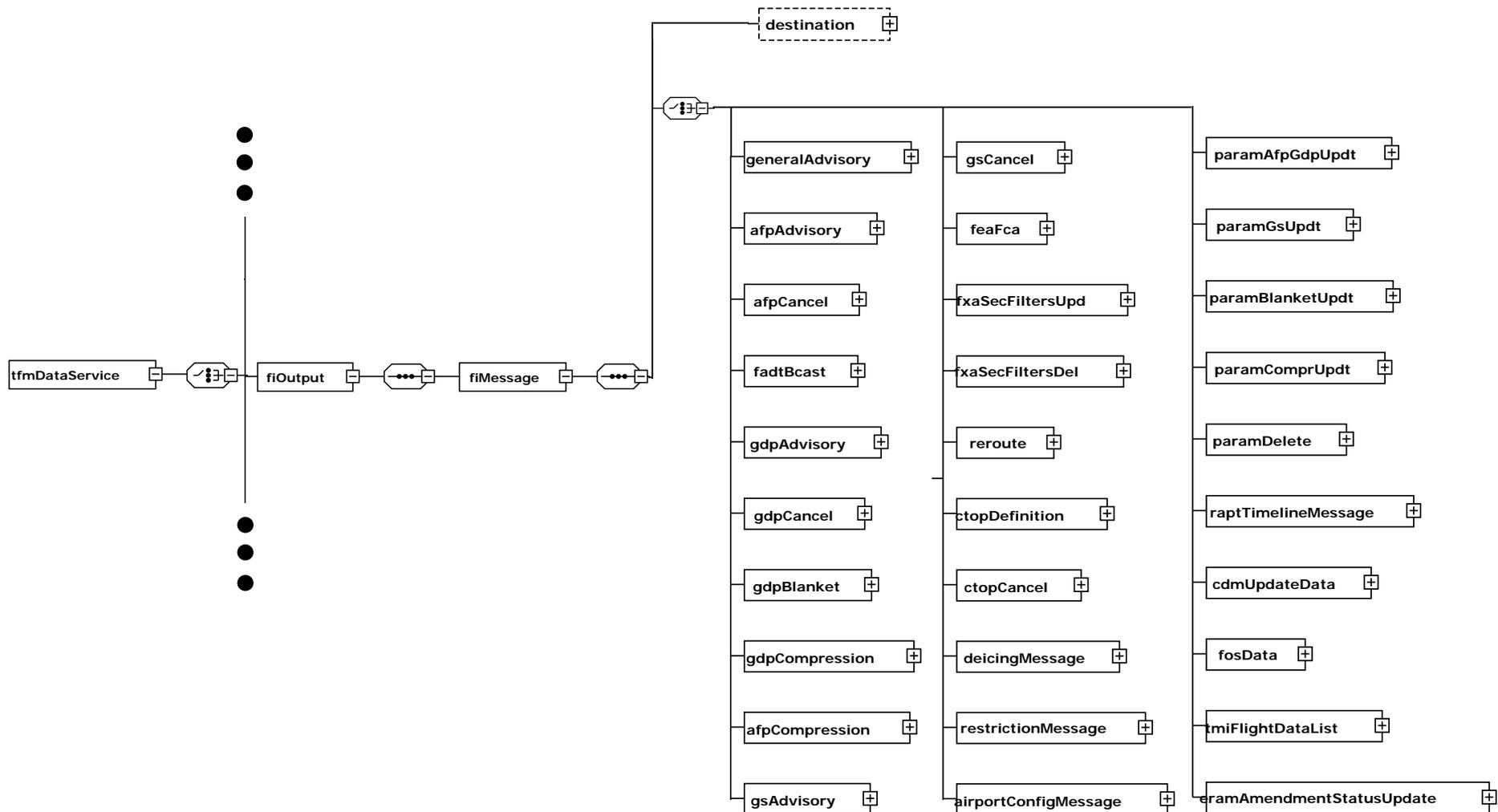
TFMData Schema: 1) Flight Data



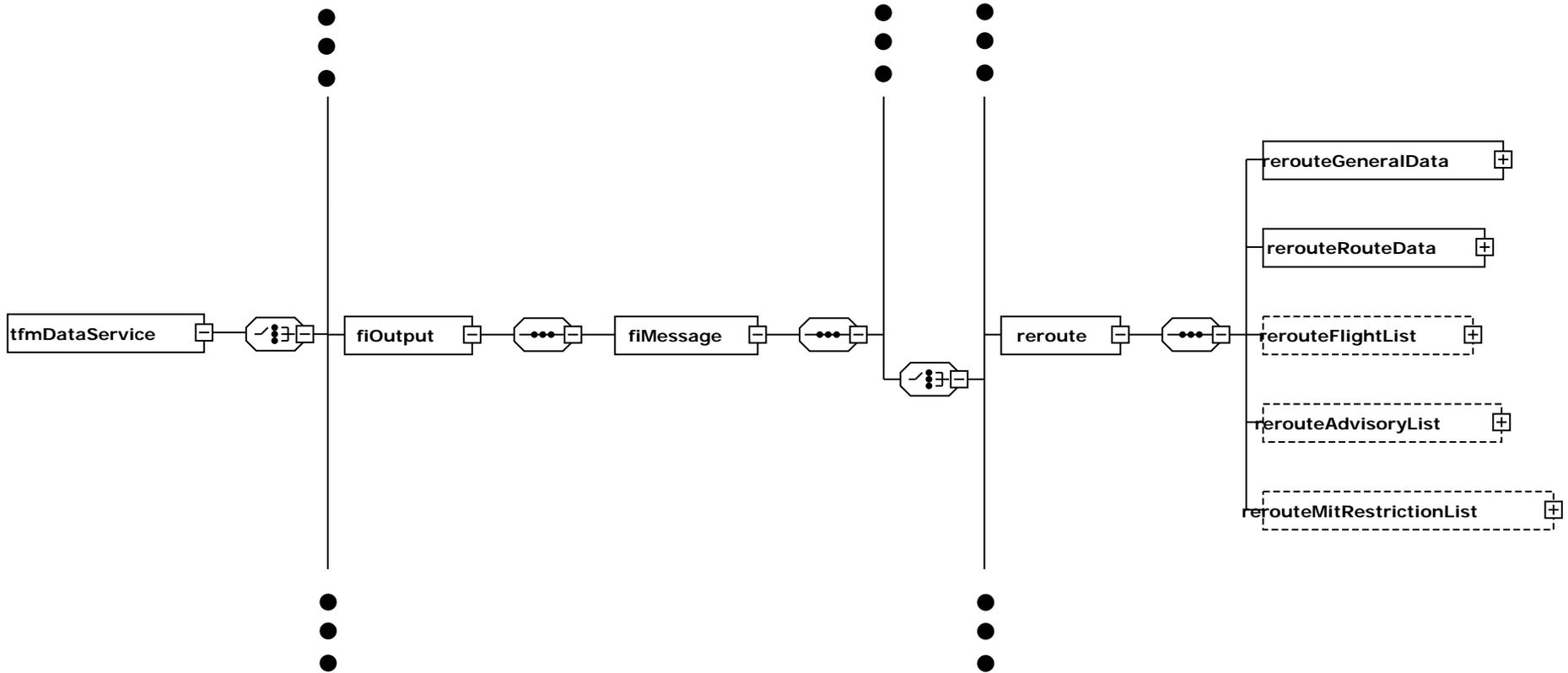
TFMData Schema: 1) Flight Data (*drill down*)



TFMData Schema: 2) Flow Information



TFMData Schema: 2) Flow Info (*drill down*)





For More Information (SWIM)

- General SWIM information (including SWIM Users Forum Webinar)
<http://www.faa.gov/nextgen/programs/swim>
- Instructions to request authorization for FAA data and to onramp to NEMS can be found in FAA External Consumer Brief
<http://www.faa.gov/nextgen/programs/swim/products/getConnected>
- To kickoff SWIM onboarding process for TFMDData, send email to
Data-To-Industry@faa.gov
- NEMS Jumpstart Kit can be downloaded from
<http://www.faa.gov/nextgen/programs/swim/documentation>



For More Information (TFMData)

- TFMData interface documents JMSDD (Java Messaging Service Description Document) and XSD (XML Schema Definition) available for download from FAA's NAS Service Registry and Repository (NSRR)
<https://nsrr.faa.gov> (see details in Backup slides)
- Information on TFMS Release 10 & 13, TFMData, and TFMData Client Starter Kit (from Sept 2015 FAA Industry Forum)
<http://FAAindustryforum.org>
- TFMS data feed information on FAA's CDM (Collaborative Decision Making) website
http://cdm.fly.faa.gov/?page_id=237
- FAA has developed TFMData Client Starter Kit to support consumers in developing applications to ingest TFMS' TFMData from NEMS. Starter Kit includes sample source code, tools for installation and configuration, and user guide. Once approved for TFMData access, request Starter Kit by sending email to
Chris.Burdick@faa.gov
- FAA TFMS Technical Webinar (monthly) for news & announcements. To request invitation, send email to
Chris.Burdick@faa.gov and/or Thomas.CTR.Paccione@faa.gov



For More Information (Misc)

- Oracle Weblogic JMS
 - Current NEMS version is Weblogic JMS Version 11.1.1.5
(verify latest version with SWIM)
 - Oracle Weblogic JMS API documentation
http://docs.oracle.com/cd/E21764_01/web.11111/e13727/toc.htm
- JAXB (Java Architecture for XML Binding)
 - JAXB framework enables developers to unmarshal XML content into a Java representation
<https://jaxb.java.net>
- Weather Data
 - Many TMI's related to weather conditions
 - TFMS uses CDDS Weather products (CIWS) via SWIM
- Adaptation Data
 - Provides airport and fix information, and much more
 - used by TFMS (and other NAS systems)
 - National Flight Data Center (NFDC)
<https://nfdc.faa.gov/xwiki/bin/view/NFDC/WebHome> *(requires an account)*



BACKUP SLIDES



TFMData Schema: How to download from NSRR 2.0



A) Login to NSRR 2.0

Welcome to the NAS Service Registry and Repository (NSRR)

Quick Search

Enter the Service Name or a phrase it contains

Service Name	Lifecycle Stage
Acknowledge Weather Report (WMSCR) This service receives report acknowledgements from clients and stores the information in the database. The acknowledge report service is an optional step that the client may perform after receiving	Verification
... Read More	
Aeronautical Common Services Data Query (ACS-DQ)	Proposed
Aeronautical Common Services Data Subscription (ACS-DS)	Proposed
Aeronautical Common Services Business Process (ACS-BP)	Proposed
Aeronautical Common Services Business Rule (ACS-BR)	Proposed
Aeronautical Common Services Web Feature Service (ACS-WFS)	Proposed
Aeronautical Feature Data NAVLean in R&D	Proposed
... Read More	

User login

E-mail or username *

Password *

Request new account

Change password

Log in

1) Goto NSRR
https://nsrr.faa.gov

2) Login to NSRR

3) If no login,
request account
(NSRR 2.0 requires a new account even if you had an existing NSRR account)



B) Search for Documents

Welcome to the NAS Service Registry and Repository (NSRR)

Quick Search

Enter the Service Name or a phrase it contains

Service Name	Lifecycle Stage
Acknowledge Weather Report (WMSCR) This service receives report acknowledgements from clients and stores the information in the database. The acknowledge report service is an optional step that the client may perform after receiving ... Read More	Verification
Aeronautical Common Services Data Query (ACS-DQ)	Proposed
Aeronautical Common Services Data Subscription (ACS-DS)	Proposed
Aeronautical Common Services Business Process (ACS-BP)	Proposed
Aeronautical Common Services Business Rule (ACS-BR)	Proposed
Aeronautical Common Services Web Feature Service (ACS-WFS)	Proposed
Aeronautical Feature Data NAVLean in R&D ... Read More	Proposed
CDDS WCS Gridded Weather Products (CIWS WCS)	

users and follows the OGC WCS standard and the OASIS

4) In the “SEARCH” pulldown, select “SEARCH DOCUMENTS”



C) Enter Search Terms

Search results | NAS Service x

https://nsrr.faa.gov/search/docs

HOME SERVICES LIFECYCLE MANAGEMENT SEARCH HELP LOG OUT

FEDERAL AVIATION ADMINISTRATION

NAS Service Registry and Repository
Making Services Visible, Discoverable, and Understandable

Document Type

- Other (144)
- XML Schema Definition (XSD) (46)
- Web Service Description Document (WSDD) (34)
- Concept of Operations (ConOps) (26)
- Java Messaging Service
- Description Document (JMSDD) (23)
- Service WSDL (23)
- Web Service
- Requirements Document (WSRD) (22)
- Producer On-ramping Form (15)
- SOA Assessment (9)
- Data Sample for Harris
- Service Verification Lab (HSV) (7)
- Interoperability Test Report (6)
- Data Model (3)
- Data Description (2)
- Security Approval (1)
- Test Plan/Producer

Home » Search Docs

Search results

Enter terms

Search

Content Type

- Service Document (362)

Remove quotes and phrases to match each word individually: "blue drop" will match less than blue drop. You can require or exclude terms using + and -; big +blue drop will require a match on blue while big blue -drop will exclude results that contain drop.

5) Enter Search Terms
+tfmdata
+schema
-outdated

(This will search for all TFMDData documents which include the schema (due to "+" signs). It will also only include the most current documents by excluding (due to "-" sign) the older outdated documents.)

6) Click "Search"



TFMData: NSRR 2.0 Cheat Sheet

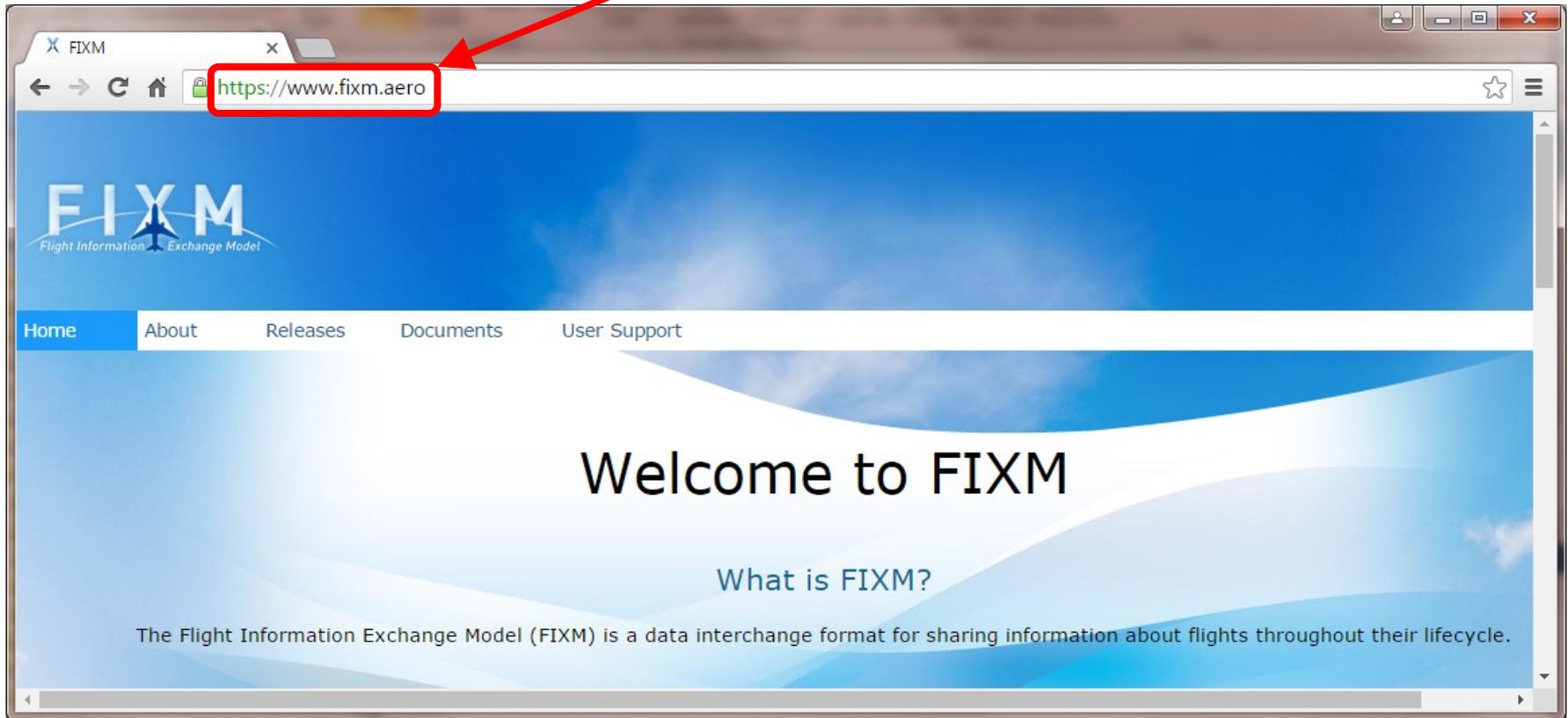
To access the TFMData Service documentation from NSRR 2.0:

- 1) Login to NSRR 2.0 at <https://nsrr.faa.gov>
(If you don't already have NSRR 2.0 access, new account can be requested here)
- 2) In the "SEARCH" pulldown, select "SEARCH DOCUMENTS"
- 3) Enter the following search terms, and then click "Search":
+tfmdata +schema -outdated
- 4) In the Results list, click on the desired document to view or save:
 - For R13: TFMDataService-v2.0.5.zip
 - For R10: TFMDataService-v1.9.zip

Note: The zip file contains all TFMData Service documents (JMSDD/WSDD and XSD)

FIXM Schema: How to download

1) Goto FIXM website www.FIXM.aero

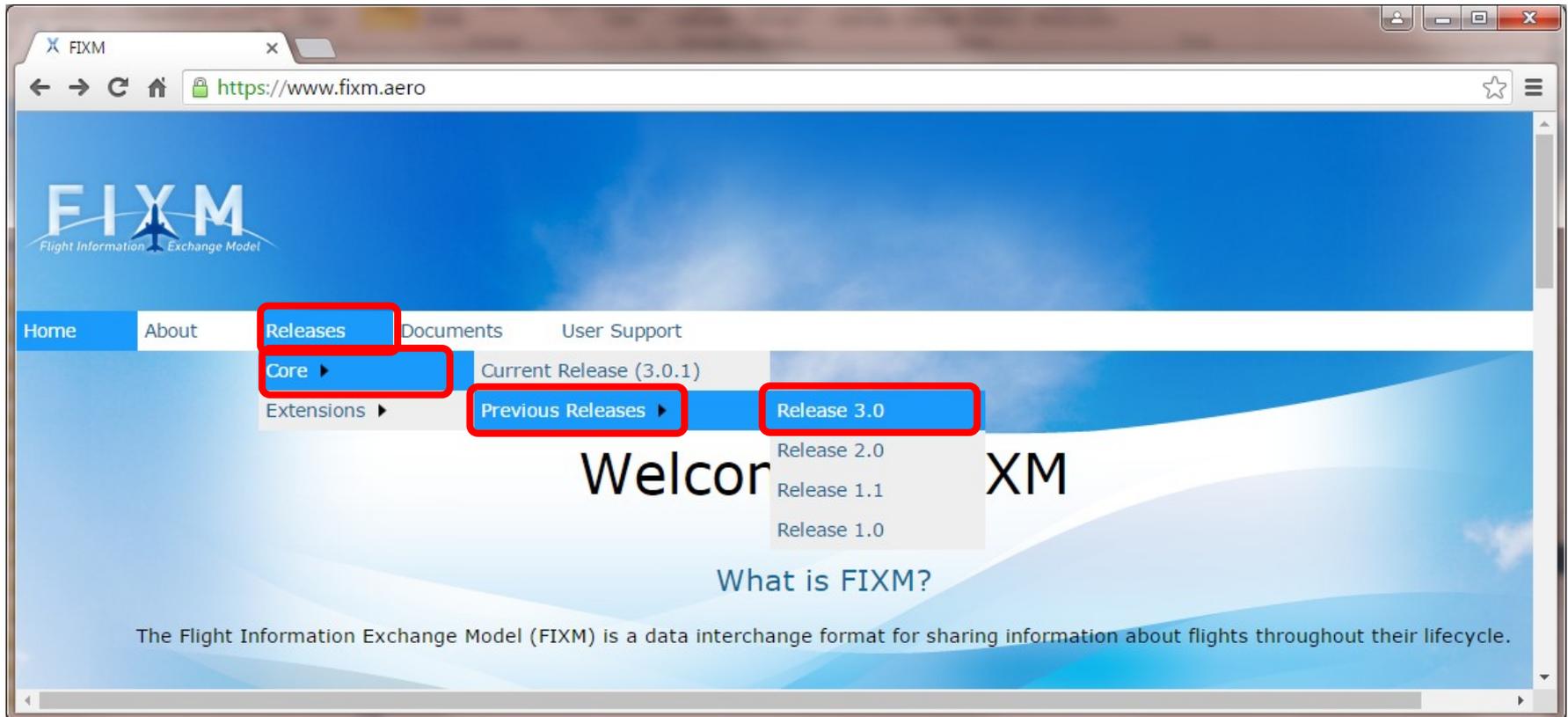


FIXM Schema Core 3.0: How to download

Refer to *TFMData JMSDD* for which *FIXM* versions to use.

For *TFMData v2.0.5*, following *FIXM* versions required:

- *FIXM Core Rel 3.0*
- *FIXM US (NAS) Extension Rel 3.1*



FIXM Schema US Ext 3.1: How to download

Refer to *TFMData JMSDD* for which *FIXM* versions to use.

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