

Terminal Flight Data Manager

Data Operational User Guide

A Handbook for TFDM Data Feeds



Federal Aviation
Administration

Version History

| Version Number | Date | Change Notes |
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| 1.0 | 2/9/2021 | Initial Release |
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1 Quick Start Guide

Document Summary

This user guide provides an overview of the information exchange services used by Terminal Flight Data Manager (TFDM) to automatically collect data necessary for the operation of TFDM from flight operators and distribute that data, as well as a number of computed metrics, to stakeholders. TFDM is the Federal Aviation Administration's (FAA's) future tower-based surface management solution and is scheduled to deploy to 93 Air Traffic Control Towers (ATCTs) at 89 airports across the National Airspace System (NAS). TFDM will be deployed in two configurations. Configuration B is scheduled to deploy to 62 sites and provides limited capabilities: Electronic Flight Data/Electronic Flight Strips (EFS/EFD), traffic flow data, airport resource management and limited surface scheduling. Configuration A, the full operating capability of TFDM, is scheduled to be installed at 27 sites. It adds advanced traffic flow data and airport resource management, full surface scheduling, and surface metering.

Please note: The COVID-19 pandemic has led to schedule adjustments for TFDM deployment. At the time of this printing, the new schedule is not yet available. Please also note that TFDM is still in development, and not all TFDM features of the TFDM data feeds may be available until development is complete.

Document Audience

The intended audience for this user guide includes anyone interested in what data is required to enable the operation of TFDM, or which data TFDM will make available to stakeholders. This includes all of the conventional surface operations stakeholders at each participating TFDM Surface Metering airport, such as: Air Traffic Control Tower (ATCT) facilities, airport operators (often state, county, and municipal airport authorities), flight operators, ramp operators, ramp control (entities charged with the oversight of pushbacks and taxiing within the Non-Movement Areas), and general aviation Fixed-Base Operators (FBOs). Additionally, the intended audience includes off-surface stakeholders who are directly affected by surface operations, such as the Air Traffic Control System Command Center (ATCSCC), Air Route Traffic Control Center (ARTCC) facilities, Terminal Radar Approach CONTROL (TRACON) facilities, and Flight Operations Center (FOC) facilities for each participating airline.

Document Purpose

The purpose of this user guide is to provide stakeholders with information on what data TFDM uses to enable surface metering and other operations, focused specifically on the new and expanded System Wide Information Management (SWIM) services used to support TFDM operation. These services comprise two new services – the TFDM Terminal Publication (TTP) service and the TFDM FOS (Flight Operator System) Collaboration Service (TFCS) – and new data elements in the existing Traffic Flow Management System (TFMS) service. TTP publishes data and computed metrics that might be of interest to these stakeholders, such as airport throughput, fuel burn and emissions, airport configuration/configuration planning, and more. TFCS provides a new interface through which flight operators can request flight substitutions during metering and communicate information about non-movement area closures and gridlock. New terminal data elements have been added to TFMS so that

flight operators can submit important data related to their surface operations which is necessary to enable the effective operation of TFDM's surface metering capability.



Document Navigation

Section 2 of this document covers the new source of terminal and surface data made available by TFDM, TTP.

If you want a high-level overview of the information available over TTP, you should focus on Section 2.2.

If you want to learn the details of the specific data elements that are published over TTP, including information about their data source, frequency of publication, and the calculation methodology (if relevant), you should focus on Section 2.3.

Section 3 of this document covers the data flight operators are asked to submit to support TFDM operations.

If you want a high-level overview of the information that flight operators are asked to submit to support TFDM operations via TFCS, you should focus on Section 3.1.

If you want to learn the details of the specific data elements that operators are asked to submit over TFCS, you should focus on Section 3.1.1 and 3.1.2.

If you want an overview of the information that flight operators are asked to submit to support TFDM operations via the new data elements in TFMS, you should focus on Section 3.2. Section 3.2 details what the new data elements are, how TFDM uses them, and the consequences to TFDM operation if they are not provided.

If you want to learn the technical requirements for the new TFMS data elements, you should focus on section 3.2.1.

If you want to learn about where to find the schemas that provide the requirements for connectivity to TTP, TFCS, and TFMS, please refer to Section 4.

If you want more information about data formatting for certain fields published over TTP, please refer to Section 5.

Document Layout

After the Quick Start Guide/Introduction, Section 2 covers TTP data. Section 2.1 provides a high-level overview of TTP; Section 2.2 provides a summary list of the kinds of data available over TTP; and Section 2.3 provides the details of the TTP data elements. Section 3 covers data that flight operators are asked to submit to support TFDM. Section 3.1 provides information about the operation of TFCS, including an overview of the system and details about the data exchange it enables. Section 3.2 provides information about the new data elements operators are asked to submit via TFMS. Section 4 provides TTP, TFCS, and TFMS connectivity information in the form of references to the locations of the data schemas. Section 5 gives some details on the formatting of certain TTP data fields. Section 6 provides definitions of acronyms and certain other terms.

Executive Summary

Terminal Flight Data Manager (TFDM) is the NextGen surface management solution that will allow efficient strategic and tactical aircraft traffic planning on the airport surface and in the terminal airspace. In addition to modernizing air traffic control tower equipment by improving the exchange of electronic flight data and implementing electronic flight strips in the tower, TFDM will provide, at key sites, departure scheduling and surface metering capability to reduce the time aircraft spend waiting on the tarmac, and therefore conserve fuel.

TFDM will be deployed in two configurations. Configuration B is scheduled to deploy to 62 sites and provides limited capabilities: Electronic Flight Data/Electronic Flight Strips (EFS/EFD), traffic flow data, airport resource management and limited surface scheduling. Configuration A, the full operating capability of TFDM, is scheduled to be installed at 27 sites. It adds advanced traffic flow data and airport resource management, full surface scheduling, and surface metering. More information about the Surface-Collaborative Decision Making (S-CDM) process that TFDM will enable can be found in the TFDM User Guide¹.

The departure scheduling and surface metering capability provided at Configuration A sites requires the TFDM system to ingest and process data about the scheduling and actual operations of aircraft. TFDM will incorporate data from existing systems including the Traffic Flow Management System (TFMS) and Time Based Flow Management (TBFM), as well as integrating new flight operator-submitted data on non-movement-area status and surface metering flight substitution requests enabled by the new TFDM FOS (Flight Operator System) Collaboration Service (TFCS). Realizing the full benefits of TFDM relies on flight operators submitting information, including new data elements that have been added to TFMS and data submitted over TFCS.

In addition to efficiency benefits realized by operators and the FAA through the direct use of TFDM, the data integration performed by TFDM will enable FAA to distribute important operational data about flight operations at TFDM-enabled airports. This is achieved through publishing data over the TFDM Terminal Publication (TTP) service, which will be newly available over the existing System Wide Information Management (SWIM) network.

This Data Operational User Guide (DOUG) is intended to serve as a guide to the new information exchange mechanisms that are integral parts of TFDM. It will be useful to decision-makers at stakeholder organizations, like flight operators, general aviation fixed-base operators, ramp operators, ramp controllers, Air Traffic Control Tower (ATCT) facilities, and airport operators (often state, county, and municipal airport authorities), who are interested in leveraging the wealth of data that will be available over TTP to inform operational decisions at the tactical and strategic level. In addition to surface metering-focused information, TTP publishes data and metrics that might be of interest to these stakeholders, such as airport throughput, fuel burn and emissions, airport configuration/configuration planning, and more. The DOUG also provides information about new data elements the FAA is requesting to those stakeholders, primarily flight operators, whose submission of additional surface- and flight-related data over TFCS and TFMS is necessary to realize the full benefits of TFDM.

¹ The most recent version of the TFDM User Guide, as well as this document, can be found at https://cdm.fly.faa.gov/?page_id=3152,

Please note: The COVID-19 pandemic has led to schedule adjustments for TFDM deployment. At the time of this printing, the new schedule is not yet available.

Please also note that TFDM is still in development, and not all TFDM features of the TFDM data feeds may be available until development is complete.



2 Data TFDM Publishes

2.1 TFDM Terminal Publication Service (TTP) Overview

TTP is a publisher/subscriber service that broadcasts TFDM information to all authorized subscribers. TTP allows National Airspace System (NAS) users (airlines, air carriers, air freight, military, or general aviation/business aviation operators) to access the wealth of information that is made available as part of TFDM operation. TTP is divided into six business functions by general topic, which publish data elements related to:

- **Airport Information:** Airport Information provides a number of metrics describing airport operation and performance, including information about airport configurations, queue lengths, arrival and departure rates, and more.
- **Flight Delay:** Flight Delay publishes information about flights subject to delays, generally because of Traffic Management Initiatives, including delay amounts and reasons.
- **Flight Data:** Flight Data provides a wealth of information about individual flights. Flight information is integrated from a number of other FAA systems (e.g. TFMS and TBFM), combined with data uniquely available through TFDM (e.g. surface metering information), and re-broadcast over the Flight Data business function.
- **Operational Metrics:** Operational Metrics publishes a number of Key Performance Indicators (KPIs) based on flight data, allowing TTP consumers to track pre-computed metrics about the performance of various aspects of TFDM and airport operations generally.
- **Surface Metering Programs:** Unique to TFDM, the Surface Metering Programs business function provides live information about surface metering planned and operating at Configuration A airports, including metering times for individual flights and summary statistics about average holds.
- **Traffic Management Restrictions:** Traffic Management Restrictions provides information about Traffic Management Initiatives affecting flights, including approval requests, miles-in-trail and minutes-in-trail restrictions, and departure stops.

However, this document is divided into operationally relevant groupings rather than grouped by business function. Some data elements related to the same general theme are published in separate business functions. The re-grouping of these elements is intended to make choosing the desired data elements more intuitive to stakeholders. For the technical user, the detailed information in Section 2.3 includes information about the business function publishing each group of elements as well as the frequency of publication (either periodic, or periodic and real-time).

2.2 Summary of Information Available over TTP

2.2.1 Flight Data

2.2.1.1 *Flight Add and Flight Update Messages*

Information about individual flights known to the TFDM system. When a flight is first added to the TFDM database, a “Flight Add” message is published, which contains all information known about a flight at that time. As more information becomes available, or information changes, a “Flight Update” message is published, which contains only the flight matching fields and whatever information has been added or changed for that flight.

2.2.1.1.1 General Flight Information

General information about a flight, like its identifier and airline.

2.2.1.1.2 Gate and Ramp Information

Information about a flight relating to the gate and ramp areas.

2.2.1.1.3 Operator Hold Information

Information about a flight’s intended operator holds.

2.2.1.1.4 Arrival Information

Information about arriving flights like estimated landing time.

2.2.1.1.4.1 Estimated Aircraft Arrival Route Times and Locations

TFDM-estimated information about aircraft surface and terminal routes and times (e.g. estimated time of arrival).

2.2.1.1.4.2 Actual Aircraft Arrival Route Times and Locations

Actually observed information about aircraft surface and terminal routes and times (e.g. actual time of arrival).

2.2.1.1.5 Departure Information

Information about departing flights like estimated time of departure.

2.2.1.1.5.1 Surface Metering Information

Information about surface metering relevant to a flight, such as its assigned Target Movement Area entry Time (TMAT) and estimated and actual hold durations

2.2.1.1.5.2 Estimated Aircraft Departure Route Times and Locations

TFDM-estimated information about aircraft surface and terminal routes and times (e.g. estimated time of departure).

2.2.1.1.5.3 Actual Aircraft Departure Route Times and Locations

Actually observed information about aircraft surface and terminal routes and times (e.g. actual time of departure).

2.2.1.2 *Flight Notification Messages*

Messages sent to notify consumers of important updates to a flight's metering status and are published for departures only.

2.2.1.3 *Flight Delete Messages*

Messages that are published to indicate a flight is no longer "live" in the TFDM system.

2.2.2 Traffic Management Restrictions

Information about any traffic management restrictions (Approval REQuest (APREQ), Miles In Trail (MIT), MINutes In Trail (MINIT), and Departure Stops) that will affect or are currently affecting an airport.

2.2.3 Flight Delays

Information about reportable departure delays affecting individual flights out of airports where TFDM is in use.

2.2.4 Surface Metering Program Information

2.2.4.1 *Proposed / Active / Deleted Metering Program Information*

A list of parameters for proposed or active SMPs (Surface Metering Programs), like start and end times, status of the SMP, number and list of affected flights, and gate conflicts. Also provides information about SMPs no longer live in TFDM that were deleted.

2.2.4.2 *SMP Configuration*

Information about the configuration of metering resources for the local airport. Provides information about the current configuration as well as any scheduled configurations.

2.2.4.3 *SMP Parameters*

Information about the SMP parameters (inputs into S-CDM that affect the metering assignments to Flight Operators). These configurable parameters will generally be locally adaptable and managed by ATC to accommodate the variation in operations at U.S. airports.

2.2.4.4 *SMP Notifications*

A list of notifications and warnings about SMPs, such as rejections and adjustments. Notifications occur whenever a TFDM SMP parameter, configuration, or piece of data is updated or whenever a flight list for an SMP changes.

2.2.4.4.1 *General Information about SMPs*

Notifications providing general information about SMPs.

2.2.4.4.2 *SMP Parameter Changes*

Notifications providing information about SMP parameter changes.

2.2.4.4.3 *Information and Warnings about Metering of Specific Flights*

Notifications providing information and warnings about the metering of specific flights.

2.2.4.4.5 *SMP Flight List Updates*

Provides information, as necessary, for SMP-affected flights that have updated TMATs.

2.2.4.6 *Queue Information*

2.2.4.6.1 *Actual and Predicted Queue Lengths*

Information about actual and predicted queue lengths for an airport, its runways, and airspace elements at a given point in time.

2.2.4.6.2 *SMP Impacts on Departure Queues*

Information about departure queues at a particular airport and the impact of a proposed or active SMP on queue lengths and queue times.

2.2.4.6.3 *Queue Length Accuracy*

Queue length accuracy information (i.e. actual length compared to target) for each runway covering the reporting interval.

2.2.4.7 *SMP Flight List Updates*

Provides information, as necessary, for SMP-affected flights that have updated TMATs.

2.2.4.8 *Metering Hold Information*

2.2.4.8.1 *Metering Hold KPI*

A flight list that contains the metering hold time for each flight that matured during the reporting interval.

2.2.4.8.2 *Proposed / Active SMP Metering Hold Information*

Information about the average and maximum metering holds assigned to aircraft as part of a particular proposed or active SMP.

2.2.4.9 *Metering Ready Time Compliance*

Information about the metering ready time compliance of flights that matured during the reporting interval. Metering Ready Time Compliance is determined by comparing the time a departure arrived at the metering control point with its TMAT.

2.2.4.10 *Metering Time Compliance*

Information about the metering time compliance of flights that matured during the reporting interval. Metering Time Compliance is determined by comparing the time a departure actually entered the movement area with its TMAT.

2.2.4.11 *SMP Number of Changes*

Running count conveying information about the number of Affirmed SMP Adjustments for each SMP.

2.2.4.12 *Rejected SMPs*

A list of the SMPs that were rejected during the reporting interval, and the number of times they were rejected during that reporting interval.

2.2.5 General Information about Airport Operations

2.2.5.1 *Airport Throughput KPI*

Provides the airport and runway throughput for the reporting interval.

2.2.5.2 *Airport Demand*

Predicted airport arrival and departure demand for the airport as a whole and its individual runways.

2.2.5.3 *Airport Cancelled Departure Demand KPI*

The number of departures that were canceled during the reporting interval.

2.2.5.4 *Calculated Fuel Burn KPI*

An estimate of the amount of surface fuel burn for aircraft that matured during the reporting interval.

2.2.5.5 *Emissions KPI*

An estimate of the amount of emissions produced by all aircraft operating on the airport surface.

2.2.5.6 *Configuration*

Information about the current airport configuration and any scheduled configuration changes.

2.2.5.7 *Delays, Gridlock, and Closures*

Airport-specific information on delays, gridlock in the NMA (Non-Movement Area) or AMA (Aircraft Movement Area), and any AMA or NMA closures on the airport surface.

2.2.5.8 *Notifications*

Notifications sent to inform users of important airport status updates and airport-related TFDM parameter changes.

2.2.6 Operation of TFDM

2.2.6.1 *Runway Departure Rate Accuracy*

Information about the difference between a runway's observed RDR (Runway Departure Rate) and the facility's called RDR during the reporting interval.

The Runway Departure Rate is the number of departures per hour from a single departure runway and the time period each rate will be in effect, assuming no "heavy" aircraft or other aircraft with special separation requirements are included. Each departure runway in a given configuration can have a different runway departure rate.

2.2.6.2 *Stability of Metering Times*

Information about TMAT changes on a per flight basis.

2.2.6.3 *Actual vs. Predicted Flight Times*

A flight list that contains the differences between actual and TFDM-predicted flight times for each flight that matured during the reporting interval.

TFDM calculates various predicted times for flights based on adaptable "look-ahead times," which are times prior to the flight's departure. For a flight with a departure at 1430 local time from a facility with adapted look-ahead time parameter setting of (60 minutes, 30 minutes), TFDM would make predictions of various flight event times at 1330 local (corresponding to the look-ahead time of 60 minutes) and again at 1400 local (corresponding to the look-ahead time

of 30 minutes). This flight list would then contain comparisons of the predicted times generated at 1330 and 1400 local by TFDM to the actual times reported by the flight.

2.2.6.4 Missed Departure Opportunities

Information about missed departure opportunities. Measurement depends on whether the airport is monitoring this metric at the airport level or the runway level.

2.2.6.5 Flight Data Quality

System-assigned points awarded for the quality of submitted flight data. This KPI consists only of information on a per-flight basis.

2.2.6.6 Phase of Taxi Operations

Information on a per flight basis about taxi times at various stages in a flight's departure/arrival, for flights that matured during the reporting interval.

2.3 Details of Information Available over TTP

2.3.1 Flight Data

2.3.1.1 Flight Add and Flight Update Messages

Data Description: Information about individual flights known to the TFDM system. When a flight is first added to the TFDM database, a "Flight Add" message is published, which contains all information known about a flight at that time. As more information becomes available, or information changes, a "Flight Update" message is published, which contains only the flight matching fields and whatever information has been added or changed for that flight.

Information Available:

2.3.1.1.1 General Flight Information

| | |
|---|---|
| Fields for Flight Matching: (see Section 5.1 below for a list of these fields) | |
| FlightCreationDateTime: The time the flight was created in the TFDM system, as a timestamp. | |
| AircraftRegistrationMark: The aircraft tail number, as filed in the flight plan or received from TFMS. | |
| Airline: Three-letter identifier of the airline operating the aircraft. Listed as "XXX" if the flight is not associated with an airline, such as GA flights. | |
| MajorCarrierIdentifier: The flight's major carrier identifier. This field is only populated if the airline operating the flight is a contracted carrier operating a route for a major carrier. | |
| TfdmIdOfFlightPlanUsedForSurfaceManagement: Presence of this element indicates that TFDM is not metering this flight. TFDM considers this flight to be a duplicate of another flight, where the other flight is being metered. This field provides the tfdmId of the flight that is being metered. | |
| TFM_ID: The unique identifier used for this flight in TFMS. | |
| ATCFlightState: Current aircraft flight state as set by ATC via an EFS bay movement. | For departures, one of: CD (Clearance Delivery), CD Clearance, GC (Ground Control) Pending, GC, Hold, LC (Local Control), LUAW (Line Up and Wait), Cleared for Take Off, Departed, Archive |
| | For arrivals, one of: LC Pending, LC, Cleared to Land, GC, Hold, Archive |
| FlightState: Current aircraft flight state as used by TFDM. | For departures, one of: Scheduled, Filed, At Stand, Stand Metering Hold, Ramp Taxi Out, At Spot Out, Airport Movement Area (AMA) Holding, AMA Taxi Out, In Departure Queue, Stand Return, LUAW, Take Off Roll, Take Off Roll Abort, Departed |

| | |
|--|--|
| | <p>For arrivals, one of: En route, Arrival, On Final, Missed Approach, On Runway, AMA Taxi In, AMA Holding, Ramp Taxi In, At Stand</p> |
| <p>Typical FlightState Sequence for Departures: Flight states for departures generally follow this sequence</p> | <p>1. Scheduled: A flight’s scheduled or estimated time of departure is received.</p> |
| | <p>2. Filed: A flight plan is received and the flight is with Clearance Delivery.</p> |
| | <p>3. At Stand: The flight is physically at the stand, and is within a certain time (adaptable parameter) of its SOBT or EOBT.</p> |
| | <p>4. Stand Metering Hold: The flight has a TMAT, is still at stand (has no AOBT), and the current time is after the flight’s EOBT, the flight’s TOBT is after the current time, or the ATC flight state has been set to ATC Hold.</p> |
| | <p>5. Ramp Taxi Out: The flight has entered the ramp (surveillance detects it on the ramp, or it has received a pushback clearance, or it is after the flight’s AOBT).</p> |
| | <p>6. At Spot Out: Surveillance detects that the flight has entered the spot or the ATC flight state is “ground controller pending.”</p> |
| | <p>7. AMA Taxi Out: The flight has entered the movement area and its ATC flight state is GC, LC, LUAW, or Cleared For Take Off.</p> |
| | <p>8. AMA Holding: Surveillance detects that the flight has entered a MA hold region and it has been in the region for more than the transit time established for that region and ATC has not indicated that taxiing has resumed, or ATC has set the flight state to ATC hold and ATC has not indicated that taxiing has resumed.</p> |
| | <p>9. In Departure Queue: Surveillance detects that the flight has entered the departure queue.</p> |
| | <p>10. Stand Return (a state only reached if a flight needs to return to stand): EFS action indicates that the flight is returning to gate.</p> |
| | <p>11. LUAW: Surveillance detects that the flight is in the runway region and the flight is not moving quickly enough to indicate it is actively taking off, or ATC has set the flight state to LUAW clearance.</p> |
| | <p>12. Take Off Roll: The flight has entered its assigned departure runway and is moving quickly enough to indicate it is actively taking off, or ATC has set the flight state to takeoff clearance.</p> |
| | <p>13. Take Off Roll Abort: The flight was previously moving quickly enough to qualify as being on its takeoff roll, but its speed is decreasing over time for a long enough period, or ATC has indicated on the EFS that the flight has aborted takeoff.</p> |
| | <p>14. Departed: The aircraft has exceeded its minimum takeoff speed, or an ATOT has been received that is after the current time, or ATC has indicated on the EFS that the flight has departed.</p> |

| | |
|---|--|
| <p>Typical FlightState Sequence for Arrivals Flight states for arrivals generally follow this sequence</p> | 1. En route: A flight’s filed flight plan or schedule indicates that the plane should be en route. |
| | 2. Arrival: The inbound flight has entered the Terminal Control Area, or the ATC flight state has transitioned to LC. |
| | 3. On Final: The inbound flight has entered the approach corridor and its velocity and altitude are appropriate for landing, or ATC has entered that the flight has been cleared to land. |
| | 4. Missed Approach (a state only reached if the flight is conducting a missed approach): ATC has indicated that the flight is on a Missed Approach. |
| | 5. On Runway: Surveillance indicates that the flight has entered a runway region and its velocity is less than the maximum in-air velocity for landings, or the flight has an actual landing time reported that is before the current time. |
| | 6. AMA Taxi In: Surveillance indicates that the flight has entered a movement area and its velocity is lower than the maximum high-speed taxi velocity for an aircraft on the ground, or the ATC flight state has moved to LC. |
| | 7. AMA Holding: Surveillance detects that the flight has entered a MA hold region and either it has been in the region for more than the transit time established for that region, or ATC has set the flight state to ATC hold. |
| | 8. Ramp Taxi In: Surveillance data indicates that the flight has entered the ramp area. |
| | 9. At Stand: Surveillance indicates that the flight has entered its stand, or the flight has a reported AIBT that is before the current time. |
| DiversionRecoveryStatus: An indicator of whether a flight is currently in diversion recovery status. | |
| ClearanceDeliveryTime: The flight’s clearance delivery time, as a timestamp. | |

Publication: The Flight Data business function publishes this data in the Flight Add or Flight Update message.

Message Type and Frequency: Periodic and real-time. This data is published at regular intervals as well as when an update triggers a new message. Frequency of publication for the periodic messages is nominally every 15 minutes. For periodic messages, information for each flight that is live in the TFDM system is published as a “Flight Add” message. A flight nominally remains in the TFDM system for 12 hours after takeoff. Real-time messages are triggered when a new flight is created (Flight Add message) or a flight’s information is updated (Flight Update message).

2.3.1.1.2 Gate and Ramp Information

DepartureStandDesignator: The flight’s departure stand designator. **Note:** The flight operator provides this information through TFMDData, the TFMS SWIM service, and the information is transmitted to

TFDM and republished. If no information is provided, this will be set to a (locally adapted) default stand assignment.

ArrivalStandDesignator: The flight's arrival stand designator. **Note:** The flight operator provides this information through TFMDData, the TFMS SWIM service, and the information is transmitted to TFDM and republished. If no information is provided, this will be set to a (locally adapted) default stand assignment.

ArrivalStandAvailability: Whether the flight's specified or predicted stand assignment will be available when the flight arrives at the gate. **Note:** The flight operator provides this information through TFMDData, the TFMS SWIM service, and the information is transmitted to TFDM and republished.

GateReturnIntent: A flag indicating that a departure intends to return to the gate. **Note:** The flight operator provides this information through TFMDData, the TFMS SWIM service, and the information is transmitted to TFDM and republished.

EarliestOffBlockTime: The flight's current EOBT, as a timestamp. Includes provenance information. **Note:** The flight operator provides this information through TFMDData, the TFMS SWIM service, and the information is transmitted to TFDM and republished. If a true EOBT is not provided by the flight operator, TFDM will calculate an estimated EOBT based on other available times (e.g. scheduled time).

ActualOffBlockTime: The flight's AOBT, as a timestamp. Includes provenance information. **Note:** The flight operator provides this information through TFMDData, the TFMS SWIM service, and the information is transmitted to TFDM and republished.

ActualInBlockTime: The flight's AIBT, as a timestamp. Includes provenance information. **Note:** The flight operator provides this information through TFMDData, the TFMS SWIM service, and the information is transmitted to TFDM and republished.

ExpectedDeicingLocation: If a flight is expected to deice, the location where the deicing is expected to occur (e.g. gate, ramp, or movement area). **Note:** The flight operator provides this information through TFMDData, the TFMS SWIM service, and the information is transmitted to TFDM and republished.

Publication: The Flight Data business function publishes this data in the Flight Add or Flight Update message.

Message Type and Frequency: Periodic and real-time. This data is published at regular intervals as well as when an update triggers a new message. Frequency of publication for the periodic messages is nominally every 15 minutes. For periodic messages, information for each flight that is live in the TFDM system is published as a "Flight Add" message. A flight nominally remains in the TFDM system for 12 hours after takeoff. Real-time messages are triggered when a new flight is created (Flight Add message) or a flight's information is updated (Flight Update message).

2.3.1.1.3 Traffic Management Initiative Information

ApprovalRequestReleaseTime: The runway time assigned to an Approval Request (APREQ) flight.

TmIdentifiers: A comma-delimited list of the TMI identifiers affecting this flight. A TMI identifier is a unique numeric (int32) identifier plus the ICAO code for the charge-to airport. **Note:** These TMI identifiers can be used to link this flight to specific TMIs, the details of which are published in the Traffic Management Restrictions business function of TTP.

Publication: The Flight Data business function publishes this data in the Flight Add or Flight Update message.

Message Type and Frequency: Periodic and real-time. This data is published at regular intervals as well as when an update triggers a new message. Frequency of publication for the periodic messages is nominally every 15 minutes. For periodic messages, information for each flight that is live in the TFDM system is published as a “Flight Add” message. A flight nominally remains in the TFDM system for 12 hours after takeoff. Real-time messages are triggered when a new flight is created (Flight Add message) or a flight’s information is updated (Flight Update message).

2.3.1.1.4 Operator Hold Information

MovementAreaDepartureHoldIntent: Indicates whether a departing flight intends to hold in the AMA. Value is “HOLD” if a hold is intended and “NO_HOLD” otherwise. **Note:** The flight operator provides this information through TFMDData, the TFMS SWIM service, and the information is transmitted to TFDM and republished.

MovementAreaArrivalHoldIntent: Indicates whether an arriving flight intends to hold in the airport movement area due to e.g. unavailability of a parking stand or ramp access. Value is “HOLD” if a hold is intended and “NO_HOLD” otherwise. **Note:** The flight operator provides this information through TFMDData, the TFMS SWIM service, and the information is transmitted to TFDM and republished.

EstimatedAirportMovementAreaDepartureHoldingStartTime: The estimated start time of the intended AMA hold. **Note:** The flight operator provides this information through TFMDData, the TFMS SWIM service, and the information is transmitted to TFDM and republished.

EstimatedAirportMovementAreaDepartureHoldingEndTime: The estimated end time of the intended AMA hold. **Note:** The flight operator provides this information through TFMDData, the TFMS SWIM service, and the information is transmitted to TFDM and republished.

EstimatedAirportMovementAreaArrivalHoldingStartTime: The estimated start time of the intended AMA hold. **Note:** The flight operator provides this information through TFMDData, the TFMS SWIM service, and the information is transmitted to TFDM and republished.

EstimatedAirportMovementAreaArrivalHoldingEndTime: The estimated end time of the intended AMA hold. **Note:** The flight operator provides this information through TFMDData, the TFMS SWIM service, and the information is transmitted to TFDM and republished.

Publication: The Flight Data business function publishes this data in the Flight Add or Flight Update message.

Message Type and Frequency: Periodic and real-time. This data is published at regular intervals as well as when an update triggers a new message. Frequency of publication for the periodic messages is nominally every 15 minutes. For periodic messages, information for each flight that is live in the TFDM system is published as a “Flight Add” message. A flight nominally remains in the TFDM system for 12 hours after takeoff. Real-time messages are triggered when a new flight is created (Flight Add message) or a flight’s information is updated (Flight Update message).

2.3.1.1.5 Arrival Information

2.3.1.1.5.1 Estimated Aircraft Arrival Route Times and Locations

EstimatedTimeOfArrival: The flight’s estimated time of arrival. Can be entered manually or derived from other data sources (e.g. TBFM). For flights estimated to arrive within the TFDM Prediction Horizon, the Estimated Time of Arrival is adjusted to fit the RAR and wake vortex separations. Includes provenance information.

TotalEstimatedTaxiInTime: The flight’s total estimated taxi-in time, as a period of time. TFDM estimates taxi times by using estimated landing times, assigned runways, predicted taxi routes, and the historical average taxi times associated with those aircraft movements.

EstimatedArrivalRampTransitTime: The estimated ramp transit time, as a period of time.

EstimatedArrivalMovementAreaTransitTime: The estimated movement area taxi time, as a period of time.

ExpectedArrivalHoldingLocation: The expected region where the aircraft will be asked to hold. Provides the region ID, the timestamp, and the source.

PredictedArrivalSpot: The spot where TFDM predicts an arrival will cross from the AMA to the NMA. TFDM predicts spot locations based on runway and gate assignments.

PredictedArrivalGateConflict: Whether TFDM predicts an arrival will be subject to a gate conflict. If TFDM predicts a gate conflict, this element will be populated with “PREDICTED_GATE_CONFLICT”.

ArrivalRunwayAssigned: The arrival runway assigned to an aircraft. If no runway has been assigned to an aircraft within the prediction horizon, TFDM assigns a runway based on airport configuration (current, rather than scheduled) and active closures and locally adaptable rules on runway assignment based on that configuration.

ArrivalRunwayPredicted: The runway on which TFDM predicts the aircraft will land. Runway assignment is based on scheduled airport configurations at the estimated landing time. If TFDM has an actual runway assignment from an external source (e.g. user input, STARS, or TBFM), this field is populated with the actual assigned runway.

Publication: The Flight Data business function publishes this data in the Flight Add or Flight Update message.

Message Type and Frequency: Periodic and real-time. This data is published at regular intervals as well as when an update triggers a new message. Frequency of publication for the periodic messages is nominally every 15 minutes. For periodic messages, information for each flight that is live in the TFDM system is published as a “Flight Add” message. A flight nominally remains in the TFDM system for 12 hours after takeoff. Real-time messages are triggered when a new flight is created (Flight Add message) or a flight’s information is updated (Flight Update message).

2.3.1.1.5.2 Actual Aircraft Arrival Route Times and Locations

AerodromeArrivalFix: The flight’s aerodrome arrival fix; the point at which ATC responsibility is transferred from the Center to the TRACON. Determined by TFMS based on the route of flight.

ArrivalRunwayActual: The runway on which the aircraft actually landed, as determined using surveillance data or the assigned runway if surveillance is unavailable.

| |
|--|
| ActualLandingTime: The flight’s actual landing time, as a timestamp. Includes provenance information. |
| ActualAirportMovementAreaArrivalHoldingStartTime: For arrivals held in the AMA, the actual start time of the AMA hold, as a timestamp. |
| ActualAirportMovementAreaArrivalHoldingEndTime: For arrivals held in the AMA, the actual end time of the AMA hold, as a timestamp. |
| ActualMovementAreaExitTime: The flight’s AMET, as a timestamp. This is the time after touchdown and taxi that the flight exits the AMA. |
| ActualArrivalSpot: The spot where the arrival actually crossed from the AMA to the NMA. |
| ArrivalRampArea: An adaptable name listing the ramp area assigned to an arriving flight. |
| ElapsedArrivalTaxiTime: The elapsed taxi time for an arrival aircraft, from touchdown to crossing the spot and exiting the movement area. This value is published with 1-minute resolution. |

Publication: The Flight Data business function publishes this data in the Flight Add or Flight Update message.

Message Type and Frequency: Periodic and real-time. This data is published at regular intervals as well as when an update triggers a new message. Frequency of publication for the periodic messages is nominally every 15 minutes. For periodic messages, information for each flight that is live in the TFDM system is published as a “Flight Add” message. A flight nominally remains in the TFDM system for 12 hours after takeoff. Real-time messages are triggered when a new flight is created (Flight Add message) or a flight’s information is updated (Flight Update message).

2.3.1.1.6 Departure Information

2.3.1.1.6.1 Surface Metering Information

| |
|--|
| TargetMovementAreaEntryTime: The flight’s assigned TMAT, as a timestamp, as well as provenance information. Target Movement Area Entry Time is set during surface metering, and is the time that TFDM recommends the flight enter the movement area to maintain the proper departure queue. |
| TargetMovementAreaEntryTimeStatus: The status of the flight’s TMAT (i.e. recommended or affirmed). |
| SurfaceMeteringProgramExemptionStatus: Whether the flight is exempt from metering or not. |
| ReasonForSurfaceMeteringProgramExemption: If the flight is exempt from metering, the reason why (e.g. CFR or EDCT). |
| TargetOffBlockTime: The flight’s TOBT, as a timestamp, as well as provenance information. Target Off-Block Time is set for flights during surface metering, and is the time that TFDM recommends a flight depart from its gate to ensure it arrives at its spot in time to hit its TMAT. |
| TargetTakeOffTime: The flight’s TTOT, as a timestamp, as well as provenance information. Target Take-Off Time is set for flights during surface metering, and is the estimated time the flight will take off if the surface metering program works as intended. |
| ExpectedDepartureHoldingLocation: The expected region where the aircraft will be asked to hold. Provides the region ID, the timestamp, and the source. |
| ActualAirportMovementAreaDepartureHoldingStartTime: The actual time the flight began an AMA hold, as determined by surveillance (due to an aircraft entering an AMA hold region) or via the EFS transition to AMA hold status. Provided as a timestamp. |

ActualAirportMovementAreaDepartureHoldingEndTime: The actual time the flight began an AMA hold, as determined by surveillance (due to an aircraft entering an AMA hold region) or via the EFS transition to AMA hold status. Provided as a timestamp.

ActualDepartureSpot: The spot where the flight actually crossed from the NMA to the AMA.

Publication: The Flight Data business function publishes this data in the Flight Add or Flight Update message.

Message Type and Frequency: Periodic and real-time. This data is published at regular intervals as well as when an update triggers a new message. Frequency of publication for the periodic messages is nominally every 15 minutes. For periodic messages, information for each flight that is live in the TFDM system is published as a “Flight Add” message. A flight nominally remains in the TFDM system for 12 hours after takeoff. Real-time messages are triggered when a new flight is created (Flight Add message) or a flight’s information is updated (Flight Update message).

2.3.1.1.6.2 Estimated Aircraft Departure Route Times and Locations

EarliestFeasibleTakeoffTime: The earliest time an aircraft could feasibly take off from its assigned runway for purposes of requesting a release time. Calculated by summing the estimations of the taxi start time, the taxi time from gate to spot, and the taxi time from spot to runway (including queueing time, if applicable).

- **Note:** This calculation is performed differently based on whether a flight is a priority flight and, if it is a priority flight, what the “blocking” setting is for the departure runway. “Blocking” indicates whether ATC is willing to arrange taxi times and routes to get a priority flight to the front of the queue immediately (non-blocking) or whether it must wait in queue (blocking).
- A priority flight on a blocking runway has queue time included, just as any other flight.
- For a priority flight on a non-blocking runway, EFTT is calculated by finding the flight’s estimated time independent of sequencing (which is essentially the earliest feasible queue entry time), and does not include any time spent in queue. The only delay between queue entry time and takeoff time is the required separation with the last aircraft whose estimated takeoff time is just before this flight.

PredictedDepartureDelay: The difference between the sum of the flight's Earliest Off-Block Time, Ramp Transit Time, and Unimpeded Taxi Time, and the flight's Estimated Take-Off Time, as a period of time.

EstimatedTimeOfDeparture: The estimated time the aircraft will depart the runway, as a timestamp. Estimated by TFDM based on EOBT or TOBT (if relevant), predicted taxi and queue times, etc.

TotalEstimatedTaxiOutTime: The flight’s total estimated taxi-out time, as a period of time.

EstimatedDepartureRampTransitTime: The estimated ramp transit time, as a period of time.

EstimatedSpotToQueueTaxiOutTime: The estimated time for the taxi from the metering control point to the queue, as a period of time.

EstimatedDepartureQueueWaitingTime: The flight’s estimated departure queue waiting time, as a period of time. TFDM calculates estimated queue waiting time based on scheduling, taxi times, hold times, etc.

PredictedDepartureSpot: The spot where TFDM predicts a departure will cross from the NMA to the AMA. TFDM predicts spot locations based on runway and gate assignments.

DepartureRunwayPredicted: The runway from which TFDM predicts the aircraft will depart. Runway assignment is based on scheduled airport configurations and the list of acceptable/unacceptable departure runways at the estimated departure time. If TFDM has an actual runway assignment from an external source (e.g. user input), this field is populated with the actual assigned runway.

DepartureRunwayAssigned: The departure runway assigned to an aircraft. If no runway has been assigned to an aircraft within the prediction horizon, TFDM assigns a runway based on current (rather than scheduled) airport configuration, acceptable/unacceptable departure runways, and active closures and locally adaptable rules on runway assignment based on that configuration.

Publication: The Flight Data business function publishes this data in the Flight Add or Flight Update message.

Message Type and Frequency: Periodic and real-time. This data is published at regular intervals as well as when an update triggers a new message. Frequency of publication for the periodic messages is nominally every 15 minutes. For periodic messages, information for each flight that is live in the TFDM system is published as a “Flight Add” message. A flight nominally remains in the TFDM system for 12 hours after takeoff. Real-time messages are triggered when a new flight is created (Flight Add message) or a flight’s information is updated (Flight Update message).

2.3.1.1.6.3 Actual Aircraft Departure Route Times and Locations

ElapsedDepartureTaxiTime: The elapsed taxi time for a departure aircraft. Starts when the flight enters the airport movement area and continues from there.

CurrentDepartureDelay: Running accumulation of delay for the departure flight until take off time is recorded, as a period of time. Departure delay is calculated by comparing the current time to the EOBT plus the ramp transit time and unimpeded taxi time. Once this time has passed but the flight has yet to take off, it begins accumulating departure delay.

CurrentReportableDepartureDelay: Running accumulation of Reportable Delay, for departure flight until take off time is recorded. Only delays exceeding or equal to the adaptable threshold (e.g., 15 min) are reported.

ActualDepartureDelay: The actual departure delay for the flight, as a period of time; calculated after takeoff.

DepartureRampArea: Flight specific ramp area assignment for a departure.

ActualMovementAreaEntryTime: The flight’s AMAT, as a timestamp. This data element is based on an operational flight state transition (see FlightState above) triggered by an EFS bay movement, not surveillance.

ActualRunwayQueueEntryTime: The flight’s actual entry time to the departure queue, as a timestamp. The location of the departure queue is dynamically derived from surface surveillance.

ActualRunwayEntryTime: The time an aircraft actually entered the runway, as a timestamp. Determined by surveillance or a flight state transition.

ActualTakeOffTime: The flight’s actual takeoff time, as a timestamp.

AerodromeDepartureFix: The flight’s departure fix; the point at which ATC responsibility is transferred from the TRACON to the Center. Determined by TFMS based on the route of flight.

AcceptableDepartureRunways: The flight’s acceptable departure runways. **Note:** The flight operator must provide this information for the information to be present in a TTP message.

UnacceptableDepartureRunways: The flight’s unacceptable departure runways. **Note:** The flight operator must provide this information for the information to be present in a TTP message.

DepartureReadyStatus: Whether the flight is ready to depart. **Note:** The flight operator must provide this information for the information to be present in a TTP message.

DepartureRunwayActual: The runway from which the aircraft actually took off, as determined using surveillance data or the assigned runway if surveillance is unavailable.

Publication: The Flight Data business function publishes this data in the Flight Add or Flight Update message.

Message Type and Frequency: Periodic and real-time. This data is published at regular intervals as well as when an update triggers a new message. Frequency of publication for the periodic messages is nominally every 15 minutes. For periodic messages, information for each flight that is live in the TFDM system is published as a “Flight Add” message. A flight nominally remains in the TFDM system for 12 hours after takeoff. Real-time messages are triggered when a new flight is created (Flight Add message) or a flight’s information is updated (Flight Update message).

2.3.1.2 Flight Notification Messages

Data Description: Flight Notifications messages are sent to notify consumers of important updates to a flight’s metering status and are published for departures only.

Information Available:

Fields for Flight Matching: (see Section 5.1 below for a list of these fields)

FlightRemovedFromSmpDemand: A notification triggered if a flight has been removed from the SMP demand list (i.e. no longer has a metering time).

FlightRemovedReason: The reason for a flight’s removal from the SMP demand list (e.g. CURRENT TIME GREATER THAN EOBT)

FlightSuspensionWarningNotification: If a flight has missed its TMAT, after a configurable length of time, this warning is sent to notify a user that if no action is taken, its TMAT will be reclaimed and the flight will be removed from the demand list.

MissedTobtNotification: A notification sent if a flight has missed its TOBT (the TOBT window has expired without the flight reporting pushback).

MissedTmatNotification: A notification sent if a flight has missed its TMAT (the TMAT window has expired without the flight entering the AMA).

Publication: The Flight Data business function publishes this data in the Flight Notification message.

Message Type and Frequency: Real-time. This data is published when a Flight Notification is triggered.

2.3.1.3 Flight Delete Messages

Data Description: Flight Delete messages are published to indicate a flight is no longer “live” in the TFDM system.

Information Available:

Fields for Flight Matching: (see Section 5.1 below for a list of these fields)

Publication: The Flight Data business function publishes this data in the Flight Delete message.

Message Type and Frequency: Real-time. This data is published when a flight is deleted from TFDM.

2.3.2 Flight Delays

Data Description: Information about reportable departure delays affecting individual flights out of airports where TFDM is in use.

Information Available:

Data about individual flights and applicable delays. Each message contains the following information about a particular flight:

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|--|
| Fields for Flight Matching: (see Section 5.1 below for a list of these fields) |
| FlightClass: The type of flight. AIRCARRIER or AIRTAXI or GA or MILITARY. |
| AircraftDepartureDelayStartTime: The time when the reportable departure delay, as defined in JO 7210.55, began. Reported as a timestamp. |
| AircraftDepartureDelayEndTime: The time when the reportable departure delay ended. Equal to the ATOT for flights with a non-zero reportable delay. |
| ActualAircraftDepartureDelay: The actual reportable delay experienced by the aircraft, in minutes. |
| TMIType: If this flight is/was affected by a TMI, this contains its TMI type (e.g. MIT or MINIT). |
| ImpactingCondition: The reason for the delay, in the format PrimaryReason:SecondaryReason:Remarks. Example: "Weather:Rain:HeavyFog." |
| PrimaryReason: - Weather, Equipment, Runway, Taxiway, Volume, or other. |
| SecondaryReason: - The Impacting Condition, a list of which is found in JO 7210.55. |
| Remarks: - Free text. |
| ChargeTo: If this flight is/was affected by a TMI, the originating facility for the TMI which bears responsibility for the delay. |
| Airline: Three-character identifier of the airline associated with the flight. A value of "XXX" indicates a flight is not associated with an airline (e.g. GA flights). |

Publication: The Flight Delay business function publishes this information.

Message Type and Frequency: Periodic and real-time. This data is published at regular intervals as well as when an update triggers a new message. Frequency of publication for the periodic messages is nominally every 15 minutes. For periodic messages, information for each departure that has delay information is published. A flight nominally remains in the TFDM system for 12 hours after takeoff. Real-time messages are triggered when a flight's reportable departure delay is determined after takeoff.

2.3.3 Traffic Management Restrictions

Data Description: Information about any traffic management restrictions (APREQ, MIT, MINIT, and Departure Stops) that will affect or are currently affecting an airport.

Information Available:

| | |
|--|---|
| aerodrome: The source aerodrome for the message. | |
| approvalRequestList: A list of Approval Request TMRs that are active, scheduled, or being updated. Each entry in the list includes: | originalTimestamp: The time this TMR was originally created, as a timestamp. |
| | originalProducer: The original source of this TMR (TFDM, TFMS, or TBFM). |
| | lastTimestamp: The time this TMR was last modified, as a timestamp. |
| | lastProducer: The system that last modified this TMR (TFDM, TFMS, or TBFM). |
| | tfdmTmild: An identifier for this TMR, which includes: |
| | aerodrome: The TFDM source facility for this message. |
| | identification: An identification number local to the TFDM instance issuing this message. |
| | tmrAction: The action being taken for this TMR (ADD, UPDATE, or DELETE). |
| | nasElement: (If applicable) The NAS element being controlled by the TMR, as a comma- or slash- (‘/’) separated list. This can include fixes, NAVAIDS, facilities, airways, and airspace sectors. Used for TMRs that can control any NAS element, like MITs, MINITs, etc. |
| | controlledElement: (if applicable) The airport or list of airports being controlled by the TMR as a comma- or slash- (‘/’) separated list. Used for TMRs that control airports, like Ground Stops. |
| startTime: The scheduled or actual start time for the TMR, as a timestamp. | |
| endTime: The scheduled or actual end time for the TMR, as a timestamp. | |
| milesInTrailList: A list of Miles In Trail (MIT) TMRs. Each entry in the list includes: | The same elements as approvalRequestList . |
| | milesInTrailSpacing: The MIT spacing, in nautical miles (NM). |
| minutesInTrailList: A list of MINutes In Trail (MINIT) TMRs. Each entry in the list includes: | The same elements as approvalRequestList . |
| | minutesInTrailSpacing: The MINIT spacing, in minutes. |
| airportDepartureStopList: A list of Departure Stop TMRs. Each entry in the list includes: | The same elements as approvalRequestList . |
| | departureStopReason: A string providing the reason for the departure stop. |

Publication: The Traffic Management Restrictions business function publishes this KPI.

Message Type and Frequency: Periodic and real time. This data is published at regular intervals as well as when a TMR change occurs. Frequency of publication for the periodic messages is an adaptable parameter. Can be published every 5, 10, 15, 30, or 60 minutes. For periodic messages, all current information is published, with all active TMRs published with their tmrAction as “ADD.” Real-time messages are triggered when there are changes in TMRs, and have the appropriate tmrAction to reflect the TMR change.

2.3.4 Surface Metering Program Information

2.3.4.1 Proposed / Active / Deleted Metering Program Information

Data Description: A list of parameters for proposed or active SMPs, like start and end times, status of the SMP, number and list of affected flights, and gate conflicts. Also provides information about SMPs no longer live in TFDM that have been deleted.

Information Available:

| | | | | |
|---|--|--|---|--|
| <p>smpData: A list of proposed or active SMPs, each entry in which contains:</p> | <p>smpIdentifier: A data type that identifies the particular SMP to which this data applies, which contains:</p> | | <p>identification: A numeric identifier for the SMP.</p> | |
| | <p>Aerodrome: The airport’s ICAO airport identifier.</p> | | | |
| | <p>smpStartTime: The time the SMP is scheduled to begin, or the time it began, as a timestamp.</p> | | | |
| | <p>smpEndTime: The time the SMP is scheduled to end, or the time it ended, as a timestamp.</p> | | | |
| | <p>smpConstraint: The constraint to which the SMP is being applied.</p> | | | |
| | <p>smpConstraintType: The type of constraint to which the SMP is being applied. The constraint type can be “Airport,” “Runway,” “Airspace,” or “Group.”</p> | | | |
| | <p>smpReason: The reason for the SMP.</p> | | | |
| | <p>smpStatus: The status of the SMP. An SMP can be “Recommended,” “Deferred,” “Rejected,” “Expired,” “Obsolete,” “Affirmed,” “Active,” or “Completed.”</p> | | | |
| | <p>flightList: A list of the flights affected by the SMP, which contains:</p> | | <p>flightListTimeStamp: The time when the flight list was created.</p> | |
| | <p>flightData: One instance for each flight affected by the SMP. The flight</p> | | <p>Fields for Flight Matching (see Section 5.1 below for a list of these fields)</p> | |

| | | | |
|--|---|---|---|
| | | <p>data for each affected flight includes:</p> | <p>TargetMovementAreaEntryTime: The TMAP assigned to this flight by TFDM as part of the SMP.</p> |
| | <p>numberOfFlightsAffected: The number of flights affected by the SMP (either forecast for SMPs that have not been completed or actual for SMPs that have been completed).</p> | | |
| | <p>gateConflictsWithSMP: The TFDM-estimated number of gate conflicts during the SMP period if the SMP is or was approved.</p> | | |
| | <p>gateConflictsWithoutSMP: The TFDM-estimated number of gate conflicts during the SMP period if the SMP is or was not approved.</p> | | |
| | <p>probabilityOfExtension: The TFDM-estimated probability that the SMP will be extended. TFDM uses the predicted unmet queue and the SMP thresholds to evaluate the probability. Assigns “High” probability if the unmet queue is greater than the SMP upper threshold during the entire extension evaluation interval. Assigns “Medium” probability if the unmet queue is greater than the target threshold during the entire extension evaluation interval and the unmet queue is less than the upper threshold for at least one point during the extension evaluation interval. Assigns “Low” probability if the unmet queue is less than the target threshold for at least one point during the extension evaluation interval.</p> | | |
| <p>smpAdjustmentData: A list of active or proposed SMP Adjustments, each entry in which contains:</p> | <p>smpIdentifier: The TFDM identifier for the SMP to which this Adjustment is proposed, which contains:</p> | <p>The same data as in smpData’s smpIdentifier.</p> | |
| | <p>smpStartTime, smpEndTime, smpConstraint, smpConstraintType, smpReason, smpStatus, flightList, numberOfFlightsAffected, gateConflictsWithSMP, gateConflictsWithoutSMP, probabilityOfExtension</p> | <p>All with the same meaning as in smpData except that they apply to the SMP Adjustment.</p> | |
| | <p>smpAdjustmentType: The type of the SMP Adjustment (Compression, Reassignment, Termination, Extension, or Cumulative).</p> | | |
| | <p>smpAdjustmentStatus: The status of the SMP Adjustment being discussed. An SMP Adjustment can be “Recommended,” “Deferred,” “Rejected,” “Expired,” “Obsolete,” “Affirmed,” “Active,” or “Completed.”</p> | | |

| | | |
|--|---|--|
| <p>smpDeletionData: A list of SMP identifiers which have been deleted from the TFDM system, each entry in which includes:</p> | <p>smpIdentifier: The TFDM identifier for the SMP that has been deleted, which contains:</p> | <p>The same data as in smpData’s smpIdentifier.</p> |
|--|---|--|

Publication: The SMP business function publishes this data in the SMP portion of the SMP Data message.

Message Type and Frequency: Real-time and resync. This data is published in real time as new SMPs are proposed, as well as during resync flows that allow a user to get data for all live SMPs. The frequency of resync flows is an adaptable parameter.

2.3.4.2 *SMP Configuration*

Data Description: Information about the configuration of metering resources for the local airport. Provides information about the current configuration as well as any scheduled configurations.

Information Available:

| | | |
|---|---|--|
| <p>currentConfiguration: The current configuration of metering resources for the local airport, which contains:</p> | <p>startTime: The start time of the current configuration, as a timestamp.</p> | |
| | <p>airportSingleMultipleQueueMetering: A parameter that indicates whether the current configuration is single airport queue or multiple runway metering.</p> | |
| | <p>meteringResources: The list of configured metering resources. Each entry in the list contains:</p> | <p>constraint: The configured metering resource. departureTargetQueueLengthData: The number of departures in the departure queue that is considered optimal for the local airport for this metering resource. TFDM assigns metering times in an attempt to maintain this queue length. departureTargetQueueLengthLowerThresholdData: If TFDM predicts the queue length to this resource will fall below this threshold, the system will generate a recommendation that the SMP be compressed or terminated. departureTargetQueueLengthUpperThresholdData: If TFDM predicts the queue length to this resource will rise above this threshold, the system will generate a recommendation for a new SMP, or for reassignment of TMATs or extension of an already-proposed SMP.</p> |
| <p>scheduledConfigurations: A list of scheduled configurations of metering resources for the local airport. Each entry in the list contains:</p> | <p>scheduledConfiguration: The scheduled configuration of metering resources for the local airport, which contains:</p> | <p>The same data as contained in currentConfiguration.</p> |

Publication: The SMP business function publishes this data in the Configuration portion of the SMP Data message.

Message Type and Frequency: Real-time and resync. This data is published in real time as new SMPs are proposed, as well as during resync flows that allow a user to get data for all live SMPs. The frequency of resync flows is an adaptable parameter.

2.3.4.3 SMP Parameters

Data Description: Information about the SMP parameters (inputs into S-CDM that affect the metering assignments to Flight Operators). These configurable parameters will generally be locally adaptable and managed by ATC to accommodate the variation in operations at U.S. airports.

Information Available:

| | |
|---|--|
| cfrMeteringExempt: <i>(Boolean)</i> Indicates that CFR (Call For Release) flights without a time will be exempt from surface metering. | |
| averageMeteringHoldThreshold: <i>(Percentage)</i> If a proposed SMP is rejected, and upon reassessment, the TFDM system determines that if the increase of the average metering hold associated with the SMP exceeds the Average Metering Hold Threshold, the TFDM system will re-recommend the rejected SMP. | |
| compressionAutomaticAffirmation: <i>(Boolean)</i> Configurable option to allow for automatic affirmation of a recommended compression. An SMP compression adjustment is made to maintain queue length in the event of a sudden drop in demand (e.g. if a baggage system serving several gates breaks down and new EOBTs are submitted to reflect the associated delay). | |
| reassignmentAutomaticAffirmation: <i>(Boolean)</i> Configurable option to allow for automatic affirmation of a reassignment. An SMP reassignment adjustment is a reassignment of TMATs to prevent queue length from rising over the upper tolerance threshold in the event of a sudden increase in demand (e.g. due to unscheduled flights). | |
| departureFixQueuePercentageList: A list of the Departure Fix Queue percentages for the configured departure fixes. The Departure Fix Queue Percentage is a configurable SMP parameter that ensures the number of flights in a metered departure queue over the same departure fix, fix group, or Like Routes does not exceed this percentage of the queue when flights from other departure fixes are available. Each entry in the list contains: | fix: The name of the departure fix. departureFixQueuePercentage: <i>(Percentage)</i> The departure fix queue percentage for this fix. |
| flightsAffectedThreshold: <i>(Percentage)</i> If a proposed SMP is rejected, and upon reassessment, the TFDM system determines that the increase of the Number of Flights Affected exceeds the Flights Affected Threshold, which is a configurable percentage, the TFDM system will re-recommend the rejected SMP. | |
| compressionMinimumTMATAdjustmentTime: Configurable value set by the TMC and applicable to all Flight Operators that is used to increase the stability of TMATs during compression. In order to prevent multiple small adjustments to a flight's TMAT, a TMAT change that is smaller than this minimum TMAT adjustment time will not be applied and the flight's TMAT will be left unchanged. | |

| | | |
|---|--|--|
| deferralLeadTime: The Deferral Lead Time is the length of time before a proposed SMP within which an SMP can no longer be deferred. | | |
| extensionEvaluationInterval: Interval of time after the end time of an SMP that is considered by TFDM in evaluating whether an SMP needs to be extended. | | |
| flightSuspensionTime: Configurable length of time after the Flight Suspension Warning notification indicating that if no action is taken the TMAT will be reclaimed and the flight will be removed from the demand list. | | |
| flightSuspensionWarningTime: Configurable length of time after the initial Missed TMAT notification indicating that if no action is taken by a specified time the TMAT will be reclaimed and the flight will be removed from the demand list. | | |
| planningHorizon: Configurable amount of time within which flights expected to depart could be assigned metering times. | | |
| protectionPeriod: The Protection Period is the amount of time TFDM will wait after the TMAT of a canceled or delayed flight enters the Reclamation Window before the system will act on the flight to reclaim capacity. | | |
| minimumTMATAdjustmentTime: The minimum amount of TMAT time reduction that Flight Operators prefer during a reassignment of TMATs. | | |
| reclamationWindow: The Reclamation Window is a period of time, measured from the current time forward, beyond which the TFDM system will not act on a canceled or delayed flight to reclaim capacity, regardless of whether it is marked for substitution or not. | | |
| staticTimeHorizon: The Static Time Horizon is a time window that extends forward from the current time. Any TMAT that falls within the Static Time Horizon will not change except in a few special cases caused by externally imposed restrictions. The Static Time Horizon does not restrict a flight operator’s ability to substitute flights. | | |
| unscheduledDemandBuffer: The Unscheduled Demand Buffer (UDB) is the number of unscheduled flights expected to depart the airport per hour. The Unscheduled Demand Buffer allows TFDM to provisionally reserve capacity for flights that are currently unknown to the system but are predicted to operate. | | |
| unscheduledFlightsLowerThreshold: If the number of unscheduled flights is smaller than the UDB minus the Unscheduled Flights Lower Threshold, a notification is triggered to inform stakeholders. | | |
| unscheduledFlightsUpperThreshold: If the number of unscheduled flights is larger than the UDB plus the Unscheduled Flights Upper Threshold, a notification is triggered to inform stakeholders. | | |
| udbPercentageList: A list of the Unscheduled Demand Buffer allocation to the active runways, each entry in which contains: | udbPercentage: A per-runway UDB allocation, which contains: | runway: The runway designator. percentage: Unscheduled Demand Buffer for this active runway as a percentage of overall Unscheduled Demand Buffer. |
| controlledTimeOfDepartureBuffer: The Controlled Time of Departure Buffer is a configurable SMP Parameter that may be applied to flights with EDCTs and assigned CFR times to provide additional time to account for the uncertainty that exists in surface operations and reduce the risk of missing the EDCT or CFR. | | |
| tmataComplianceWindow: Compliance window in minutes for the Target Movement Area Entry Time (TMAT). | | |

Publication: The SMP business function publishes this data in the SMP Parameters section of the SMP Data message.

Message Type and Frequency: Real-time and resync. This data is published in real time as new SMPs are proposed, as well as during resync flows that allow a user to get data for all live SMPs. The frequency of resync flows is an adaptable parameter.

2.3.4.4 SMP Notifications

Data Description: A list of notifications and warnings about SMPs, such as rejections and adjustments. Notifications occur whenever a TFDM SMP parameter, configuration, or piece of data is updated or whenever a flight list for an SMP changes.

Information Available:

2.3.4.4.1 General Information about SMPs:

| |
|--|
| smpStart: A notification published when an SMP starts. |
| smpDeferral: A notification published when an SMP is deferred. |
| smpRejection: A notification published when an SMP is rejected. |
| smpAdjustmentRecommended: A notification published when an SMP adjustment is recommended. |
| smpAdjustmentAffirmation: A notification published when an SMP adjustment is affirmed. |
| smpAdjustmentDeferral: A notification published when an SMP adjustment is deferred. |
| smpAdjustmentRejection: A notification published when an SMP adjustment is rejected. |
| extendedTaxiDelay: A notification published when taxi delays exceed the parameter set. |

2.3.4.4.2 SMP Parameter Changes:

| |
|---|
| cfmMeteringExemptParameterChange: A notification published when the default treatment of CFR (Call For Release) flights with regard to surface metering changes. |
| compressionAutomaticAffirmationChange: A notification published when a facility changes the automatic affirmation setting on SMP compression adjustments. |
| reassignmentAutomaticAffirmationChange: A notification published when a facility changes the automatic affirmation setting on SMP reassignment adjustments. |
| targetQueueLengthChange: A notification of the change of the Target Queue Length for a designated metered resource. |
| targetQueueLengthLowerThresholdChange: A notification of the change of the Target Queue Length lower threshold for a designated metered resource. |
| targetQueueLengthUpperThresholdChange: A notification of the change of the Target Queue Length upper threshold for a designated metered resource. |
| smpLeadTimeChange: A notification of the change of the SMP lead time parameter. |
| planningHorizonChange: A notification published when the Planning Horizon parameter is changed. |
| protectionPeriodChange: A notification published when the Protection Period parameter is changed. |
| reclamationWindowChange: A notification published when the Reclamation Window parameter is changed. |
| staticTimeHorizonChange: A notification published when the Static Time Horizon parameter is changed. |
| smpDeferralLeadTimeChange: A notification published when the SMP Deferral Lead time parameter is changed. |
| unscheduledDemandBufferChange: A notification published when the Unscheduled Demand Buffer parameter is changed. |
| unscheduledFlightsUpperThresholdChange: A notification published when the Unscheduled Flights Upper Threshold parameter is changed. |
| unscheduledFlightsLowerThresholdChange: A notification published when the Unscheduled Flights Lower Threshold parameter is changed. |

| |
|---|
| controlledTimeOfDepartureBufferChange: A notification published when the Controlled Time of Departure Buffer parameter is changed. |
| averageMeteringHoldThresholdChange: A notification published when the Average Metering Hold Threshold parameter is changed. |
| departureFixQueuePercentageChange: A notification published when the Departure Fix Queue Percentage parameter is changed. |
| flightsAffectedThreshold: A notification published when the Flights Affected Threshold parameter is changed. |

2.3.4.4.3 Information and Warnings about Metering of Specific Flights

| |
|--|
| meteringTimeReclamationWarning: A warning notification when the TMAT for a flight is about to be reclaimed. |
| meteringTimeReclamation: A notification published when the TMAT for a flight has been reclaimed. |
| meteringTimeReached: A notification that a flight exceeded its TMAT while holding in the AMA. |

Publication: The SMP business function publishes this data in the Notifications section of the SMP Data message.

Message Type and Frequency: Real-time and resync. This data is published in real time as new SMPs are proposed, as well as during resync flows that allow a user to get data for all live SMPs. The frequency of resync flows is an adaptable parameter.

2.3.4.5 SMP Flight List Updates

Data Description: Provides information, as necessary, for SMP-affected flights that have updated TMATs.

Information Available:

| | | | |
|--|--|--|---|
| smpUpdateList: A collection of updated flight lists for a list of individual SMPs or SMP Adjustments. Each entry in the list is an smpUpdate data element, which contains information about the SMP whose Flight List is being updated, as well as the actual updated | If the SMP being discussed is a basic SMP or SMP Adjustment (appears for un-adjusted SMPs as well as providing the underlying SMP information to which an SMP Adjustment will be applied): | smplidentifier: A data type that identifies the particular SMP that is the subject of the message, which contains: | Aerodrome: The airport's ICAO airport identifier. |
| | | flightList: The list of SMP-affected flights that are being updated, which contains: | identification: A numeric identifier for the SMP. |
| | | flightListTimeStamp: The time when the list was created, as a timestamp. | flightData: The flight data for each relevant flight, which contains: |
| | | flightData: The flight data for each relevant flight, which contains: | <ul style="list-style-type: none"> - Fields for Flight Matching (see Section 5.1 below for a list of these fields) - TargetMovementAreaEntryTime: The flight's assigned TMAT. |

| | | | |
|---|--|--|--|
| flight list. Each smpUpdate element contains: | | | |
| | If the SMP being discussed is an SMP Adjustment: | smpAdjustmentIdentifier: A data type that identifies the SMP Adjustment that is the subject of the message, which contains the same information as in smplIdentifier, as it pertains to the SMP Adjustment. | |

Publication: The SMP business function publishes this data in the SMP Flight List Update message.

Message Type and Frequency: Real-time and resync. This data is published in real time as new SMPs are proposed, as well as during resync flows that allow a user to get data for all live SMPs. The frequency of resync flows is an adaptable parameter.

2.3.4.6 Queue Information

2.3.4.6.1 Actual and Predicted Queue Lengths

Data Description: Information about actual and predicted queue lengths for an airport, its runways, and airspace elements at a given point in time.

Information Available:

| | | | |
|--|---|--|---|
| actualQueueLengths: The actual queue lengths for the airport, runways, and airspace elements at a given point in time, which includes: | actualDeparture QueueLengths: The actual departure queue lengths for the airport, runways, and airspace elements, which includes: | queueLengthTime: The time at which the queue length calculations were performed. | |
| | | departureAirportQueueLength: The airport departure queue length. | runwayDesignator: The runway or runway group designator. |
| | | departureRunwayQueueLengths: A list of the queues to each airport runway or group of runways, each entry in which includes: | departureRunwayQueueLength: The length of the departure queue to the runway or group of runways. |
| | | departureAirspaceElementsQueueLengths: If there are queues to airspace elements (e.g. caused by a TMI such as a MIT or MINIT), a list of the queues to each airspace element, each entry in which includes: | tmIdentifier: The identifier of the TMI corresponding to the airspace element, which includes: - identification: The identification number of the TMI local to the TFDM instance. - aerodrome: The source facility of the TMI. |
| | | departureAirspaceElementsQueueLength: The queue length for the airspace element. | |

| | | |
|--|---|--|
| predictedQueueLengthList: A list of the maximum predicted queue lengths for an airport, runways, and airspace elements during a particular future time period, each entry in which includes: | startTime: The beginning of the interval to which the queue length applies, as a timestamp. | |
| | endTime: The end of the interval to which the queue length applies, as a timestamp. | |
| | predictedDepartureQueueLengths: The predicted maximum departure queue lengths during the prediction time interval for the airport, runways, and airspace elements, which includes: | The same elements as contained in actualDepartureQueueLengths . |

Publication: The Airport Information business function publishes this data.

Message Type and Frequency: Periodic. This data is published at regular intervals. Frequency of publication is an adaptable parameter. Can be published every 5, 10, 15, 30, or 60 minutes. For queue predictions, both the look-ahead times (i.e. how far into the future the queues are predicted) and the prediction interval (i.e. how much time each prediction spans) are adaptable parameters.

2.3.4.6.2 SMP Impacts on Departure Queues

Data Description: Information about departure queues at a particular airport and the impact of a proposed or active SMP or SMP Adjustment on queue lengths and queue times.

Information Available:

For an SMP:

| | |
|---|--|
| averageTimeInQueueWithSMP: The predicted or actual average of the time spent in queue for all flights affected by the SMP, as a period of time. | |
| averageTimeInQueueWithoutSMP: The predicted or actual average of the time spent in queue for all flights affected by the SMP if surface metering were not or had not been applied, as a period of time. | |
| meteredPredictedQueueLengthList: A list of predicted maximum queue lengths to various departure metering elements during configurable prediction queue length intervals. These predicted queue lengths are generated by assuming the proposed or active SMP will not be or is not active. If a completely new SMP is proposed, the queue lengths listed here will be the predicted lengths without surface metering. | predictedQueueLength: A data type which provides predicted maximum queue length for a resource, which contains: |
| | startTime: The start time for the interval for which the predicted maximum queue length applies. |
| | endTime: The end time for the interval for which the predicted maximum queue length applies. |
| | predictedDepartureQueueLengths: The predicted maximum queue length for the resource, which contains: |
| | - departureAirportQueueLength: The predicted maximum queue length for the airport. |
| | - departureRunwayQueueLength: The predicted maximum departure |

| | | | |
|---|---|--|---|
| | | | <p>queue length to the runway or group of runways</p> <p>-</p> <p><i>If the metered resource is an airspace element:</i></p> <ul style="list-style-type: none"> - departureAirspaceElementsQueueLength: A list of predicted maximum queue lengths for an airspace element or group of airspace elements, each element of which contains: <ul style="list-style-type: none"> o identification: A unique identification number for the SMP o Aerodrome: The ICAO designator for the airport where the SMP is proposed or active. - departureAirspaceElementsQueueLength: The predicted maximum departure queue length to the airspace element or group of airspace elements. |
| <p>proposedPredictedQueueLengthList: A list of predicted maximum queue lengths to various departure metering elements during configurable queue length prediction intervals. These predicted queue lengths are generated by assuming the proposed or active SMP will be active. If a completely new SMP is proposed, the queue lengths listed here will be</p> | <p>The same information as in meteredPredictedQueueLengthList.</p> | | |

| | |
|---|--|
| the predicted lengths with surface metering. Each element of the list contains: | |
|---|--|

For an SMP Adjustment:

| |
|---|
| The same information as for an SMP as it corresponds to the SMP Adjustment. |
|---|

Publication: The SMP business function publishes this data in the SMP portion of the SMP Data message.

Message Type and Frequency: Real-time and resync. This data is published in real time as new SMPs are proposed, as well as during resync flows that allow a user to get data for all live SMPs. The frequency of resync flows is an adaptable parameter.

2.3.4.6.3 Queue Length Accuracy KPI

KPI Description: Queue length accuracy information (i.e. actual length compared to target) for each runway, covering the reporting interval.

Information in this KPI:

| | |
|--|---|
| queueLengthAccuracy: A list of runways and their queue length accuracy statistics, each element of which contains: | runwayDesignator: The runway designator for the runway being characterized. |
| | queueMaintenanceErrorAverage: Mean value of Queue Maintenance Error (defined as actual queue length at AQET minus target queue length at AQET for each aircraft), measured in number of aircraft. Note: this average is a signed average. |
| | queueMaintenanceErrorRootMeanSquare: Root Mean Square value of Queue Maintenance Error, measured in number of aircraft. |
| | queueMaintenanceErrorMinimum²: Minimum value of Queue Maintenance Error, measured in number of aircraft. |

Publication: The Operational Metrics business function publishes this KPI in the Operational Metrics message.

Message Type and Frequency: Periodic. This KPI is published at regular intervals. Frequency of publication is an adaptable parameter. Can be published every 5, 10, 15, 30, or 60 minutes.

2.3.4.7 Metering Hold Information

2.3.4.7.1 Metering Hold KPI

KPI Description: A flight list that contains the metering hold time for each flight that matured during the reporting interval.

Information in this KPI:

² The variable name is given as it is specified in the schema. “Minimum” is misspelled as it is in the schema.

| | | |
|---|---|---|
| flightList: A list that contains metering hold information for each flight that matured during the reporting interval, which contains: | flightListTimeStamp: The time when the flight list was created. | Fields for Flight Matching (see Section 5.1 below for a list of these fields) |
| | flightData: One instance per departure. The flight data for each departure includes: | MeteringHoldLength: Specified hold duration for an aircraft for surface metering, as a period of time (see Section 5.3 for formatting rules). MeteringHoldLength = TOBT – EOBT. |

Publication: The Operational Metrics business function publishes this KPI in the Operational Metrics message.

Message Type and Frequency: Periodic. This KPI is published at regular intervals. Frequency of publication is an adaptable parameter. Can be published every 5, 10, 15, 30, or 60 minutes.

2.3.4.7.2 Proposed / Active SMP Metering Hold Information

Data Description: Information about the average and maximum metering holds assigned to aircraft as part of a particular proposed or active SMP or SMP Adjustment.

Information Available:

| |
|--|
| averageMeteringHoldWithSMP: The average metering hold with the SMP, as a period of time. This is a signed average. |
| averageMeteringHoldWithoutSMP: The average metering hold without the SMP, as a period of time. This is a signed average. Note that unless this is an SMP recommended as a replacement for an existing SMP, the average metering hold without SMP will be “0.” |
| maximumMeteringHoldWithSMP: The maximum metering hold with the SMP, as a period of time. |
| maximumMeteringHoldWithoutSMP: The maximum metering hold without the SMP, as a period of time. Note that unless this is an SMP recommended as a replacement for an existing SMP, the maximum metering hold without SMP will be “0.” |

Publication: The SMP business function publishes this data in the SMP portion of the SMP Data message.

Message Type and Frequency: Real-time and resync. This data is published in real time as new SMPs are proposed, as well as during resync flows that allow a user to get data for all live SMPs. The frequency of resync flows is an adaptable parameter.

2.3.4.8 Metering Ready Time Compliance

KPI Description: Information about the metering ready time compliance of flights that matured during the reporting interval. Metering Ready Time Compliance is determined by comparing the time a departure arrived at the metering control point with its TMAT.

Information in this KPI:

| |
|---|
| numberOfDepartures: The number of departures that matured during the reporting interval. |
| numberOfDeparturesWithinComplianceWindow: The number of departures included in the KPI that were compliant with their TMAT, i.e. began their final taxi for departure within the TMAT compliance window. |

| | |
|---|--|
| <p>numberOfDeparturesMarkedAsExemptions: The number of departures marked as exempt from resource rationing. These departures were not subject to the metering program.</p> | |
| <p>meanMeteringReadyTimeCompliance: Average of the “metering ready compliance” values for all flights included in the KPI, as a period of time (see Section 5.3 for formatting rules).</p> <ul style="list-style-type: none"> - “Metering ready compliance” is the difference between a flight’s arrival at the metering control point and its TMAT, in minutes. - Note that the average here is the <u>signed</u> average, rather than the average of the absolute values. For example, for a KPI reporting period containing only two flights, with “metering ready compliance” values of +2 minutes (arrival at metering control point was 2 minutes after TMAT) and -2 minutes (arrival at metering control point was 2 minutes before TMAT), the meanMeteringReadyTimeCompliance value would be reported as 0 minutes rather than 2 minutes. | |
| <p>meteringReadyTimeComplianceParameter: The percentage of flights that matured during the reporting interval whose arrival at the metering control point was compliant with their TMAT. This only includes flights that were subject to metering.</p> | |
| <p>flightList: A list that contains metering time compliance information for each flight that matured during the reporting interval, which contains:</p> | <p>flightListTimeStamp: The time when the flight list was created.</p> |
| | <p>Fields for Flight Matching (see Section 5.1 below for a list of these fields)</p> |
| | <p>TargetMovementAreaEntryTime: The flight’s assigned TMAT at the time it actually entered the movement area.</p> |
| | <p>ActualMeteringControlArrivalTime: The time the flight arrived at the metering control point, or spot (a transition point from the NMA to the AMA), as a timestamp.</p> |
| <p>flightData: One instance per departure. The flight data for each departure includes:</p> | <p>MeteringReadyTimeCompliance: Whether the flight’s actual metering control arrival time was within the TMAT compliance window. Compliant or not compliant.</p> |

2.3.4.9 Metering Time Compliance

KPI Description: Information about the metering time compliance of flights that matured during the reporting interval. Metering Time Compliance is determined by comparing the time a departure actually entered the movement area with its TMAT.

Information in this KPI:

| |
|---|
| <p>numberOfDepartures: The number of departures that matured during the reporting interval.</p> |
| <p>numberOfDeparturesWithinComplianceWindow: The number of departures included in the KPI that were compliant with their TMAT, i.e. began their final taxi for departure within the TMAT compliance window.</p> |
| <p>meanMeteringTimeCompliance: Average of the “metering compliance time” values for all flights included in the KPI, as a period of time (see Section 5.3 for formatting rules).</p> <ul style="list-style-type: none"> - “Metering compliance time” is the difference between a flight’s AMAT and its TMAT, in minutes. - Note that the average here is the <u>signed</u> average, rather than the average of the absolute values. For example, for a KPI reporting period containing only two flights, with “metering compliance time” values of +2 minutes (AMAT was 2 minutes after TMAT) and -2 minutes (AMAT was 2 |

| | |
|--|---|
| minutes before TMAT), the meanMeteringTimeCompliance value would be reported as 0 minutes rather than 2 minutes. | |
| flightList: A list that contains metering time compliance information for each flight that matured during the reporting interval, which contains: | flightListTimeStamp: The time when the flight list was created. |
| | Fields for Flight Matching (see Section 5.1 below for a list of these fields) |
| | TargetMovementAreaEntryTime: The flight’s assigned TMAT at the time it actually entered the movement area. |
| | ActualMovementAreaEntryClearedTime: The time the flight was cleared to enter the movement area. |
| flightData: One instance per departure. The flight data for each departure includes: | MeteringTimeCompliance: Whether the flight’s AMAT was within the TMAT compliance window. Compliant or not compliant. |

Publication: The Operational Metrics business function publishes this KPI in the Operational Metrics message.

Message Type and Frequency: Periodic. This KPI is published at regular intervals. Frequency of publication is an adaptable parameter. It can be published every 5, 10, 15, 30, or 60 minutes.

2.3.4.10 SMP Number of Changes KPI

KPI Description: A running count that conveys information about the total number of Affirmed SMP Adjustments for each SMP.

Information in this KPI:

| | | |
|--|---|---|
| kpiSMPNumberOfChanges: A list of SMPs active during the reporting interval, each entry in which contains: | smpIdentifier: An identifier for an SMP, which includes: | aerodrome: The airport’s ICAO airport identifier. |
| | | identification: SMP identification number local to the facility TFDM instance. |
| | SMPNumberOfAdjustmentsAffirmedType A list of the different types of affirmed SMP Adjustments and the running count of affirmed adjustments for each, which contains: | smpNumberOfCompressionAdjustmentsAffirmed: The total number of SMP Compression Adjustments affirmed for this SMP. |
| | | smpNumberOfTMATReassignmentAdjustmentsAffirmed³: The total number of SMP TMAT Reassignment Adjustments affirmed for this SMP. |
| | | smpNumberOfExtensionAdjustmentsAffirmed: The total number of SMP Extension Adjustments affirmed for this SMP. |

³ The variable name is given as it is specified in the schema. “Reassignment” is misspelled as it is in the schema.

| | | |
|--|--|--|
| | | <p>smpNumberOfTerminationAdjustments Affirmed: The total number of SMP Termination Adjustments affirmed for this SMP.</p> |
| | | <p>smpNumberOfCumulativeAdjustments Affirmed: The total number of SMP Cumulative Adjustments affirmed for this SMP.</p> |

Publication: The Operational Metrics business function publishes this KPI in the Operational Metrics message.

Message Type and Frequency: Periodic. This KPI is published at regular intervals. Frequency of publication is an adaptable parameter. It can be published every 5, 10, 15, 30, or 60 minutes.

2.3.4.11 *Rejected SMPs KPI*

KPI Description: A list of the SMPs that were live during the reporting interval that were rejected at some point, and the number of times they were rejected.

Information in this KPI:

| | | |
|---|---|--|
| <p>rejectedSMPListType: A list of SMPs that were live during the reporting interval, each entry in which includes:</p> | <p>smpIdentification: An identifier for a rejected SMP, which contains:</p> | <p>identification: SMP identification number local to the facility TFDM instance.</p> |
| | <p>rejectedCount: The number of times this SMP was rejected during its lifetime.</p> | <p>aerodrome: The airport’s ICAO airport identifier.</p> |

Publication: Operational Metrics business function publishes this KPI in the Operational Metrics message.

Message Type and Frequency: Periodic. This KPI is published at regular intervals. Frequency of publication is an adaptable parameter. It can be published every 5, 10, 15, 30, or 60 minutes.

2.3.5 General Information about Airport Operations

2.3.5.1 *Airport Throughput KPI*

KPI Description: Provides the airport and runway throughput for the reporting interval.

Information in this KPI:

| |
|--|
| <p>airportThroughputDepartureCount: The airport departure count for the time interval</p> |
| <p>airportThroughputWeightedDepartureCount: The weighted airport departure count for the time interval.</p> |
| <p>airportThroughputArrivalCount: The airport arrival count for the time interval.</p> |

| | | |
|--|---|---|
| airportThroughputTotalCount: The combined airport departure and airport arrival count for the time interval. | | |
| runwayThroughputList: A list of runway throughputs for the reporting interval, each element of which contains: | runwayThroughput: Runway throughput for the reporting interval for a specific runway, which contains: | runwayDesignator: The runway designator. |
| | | runwayThroughputDepartureCount: The runway departure count for the time interval. |
| | | runwayThroughputWeightedDepartureCount: The weighted runway departure count for the time interval. |
| | | runwayThroughputArrivalCount: The runway arrival count for the time interval. |

Note: “Weighted” counts are generated by applying an adjustment factor to actual operations counts based on aircraft wake category for each individual flight. For example, if the weight adjustment factor for a Heavy aircraft is 2.0, then for the purposes of weighted flight counts, each aircraft that is a Heavy will be counted as 2.0 operations rather than the default 1.0. These weighting factors are an adaptable parameter.

Publication: The Operational Metrics business function publishes this KPI in the Operational Metrics message.

Message Type and Frequency: Periodic. This KPI is published at regular intervals. Frequency of publication is an adaptable parameter. It can be published every 5, 10, 15, 30, or 60 minutes.

2.3.5.2 Airport Demand

Data Description: Predicted airport arrival and departure demand for the airport as a whole and its individual runways.

Information Available:

| | | |
|---|--|--|
| demandInformationList: A list of demand (both arrival and departure) predictions for particular future time intervals for the airport and its runways. Each entry in the list contains: | startTime: The start time for the demand prediction interval. | |
| | endTime: The end time for the demand prediction interval. | |
| | airportDemandInformation: The predicted arrival, departure, and weighted departure counts for an airport during the prediction interval, which includes: | arrivalDemandCount: The predicted arrival demand for the time period, in number of aircraft. |
| | | departureDemandCount: The predicted departure demand for the time period, in number of aircraft. |
| | | weightedDepartureDemandCount: The predicted weighted departure demand for the time period, in number of aircraft. |
| | runwayIdentifier: The runway designator. | |

| | | |
|--|--|--|
| | runwayDemands: The predicted arrival, departure, and weighted departure counts for the airport's runways during the prediction interval. Each entry in the list contains: | runwayArrivalDemandCount: The predicted arrival demand for the time period, in number of aircraft. |
| | | runwayDepartureDemandCount: The predicted departure demand for the time period, in number of aircraft. |
| | | weightedRunwayDepartureDemandCount: The predicted weighted departure demand for the time period, in number of aircraft. |

Note: "Weighted" counts are generated by applying an adjustment factor to actual operations counts based on aircraft wake category for each individual flight. For example, if the weight adjustment factor for a Heavy aircraft is 2.0, then for the purposes of weighted flight counts, each aircraft that is a Heavy will be counted as 2.0 operations rather than the default 1.0. These weighting factors are an adaptable parameter.

Publication: The Airport Information business function published this information.

Message Type and Frequency: Periodic. This data is published at regular intervals. Calculation of the demand metrics and frequency of publication for the periodic messages is an adaptable parameter. It can be published every 5, 10, 15, 30, or 60 minutes.

2.3.5.3 *Airport Canceled Departure Demand KPI*

KPI Description: The number of departures that were canceled during the reporting interval.

Information in this KPI:

AircraftCount: The number of canceled departing flights for the reporting interval.

Publication: The Operational Metrics business function publishes this KPI in the Operational Metrics message.

Message Type and Frequency: Periodic. This KPI is published at regular intervals. Frequency of publication is an adaptable parameter. It can be published every 5, 10, 15, 30, or 60 minutes.

2.3.5.4 *Calculated Fuel Burn KPI*

KPI Description: An estimate of the amount of surface fuel burn for aircraft that matured during the reporting interval.

Information in this KPI:

FuelBurn: The total calculated amount of surface fuel burn for aircraft that matured during the reporting interval. Expressed in kilograms.

Publication: The Operational Metrics business function published this KPI in the Operational Metrics message.

Message Type and Frequency: Periodic. This KPI is published at regular intervals. Frequency of publication is an adaptable parameter. Can be published every 5, 10, 15, 30, or 60 minutes.

2.3.5.5 Emissions KPI

KPI Description: An estimate of the amount of emissions produced by all aircraft operating on the airport surface during the reporting interval.

Information in this KPI:

hydrocarbonEmission: Estimate of hydrocarbon emissions by aircraft on the airport surface, based on fuel burn calculations for aircraft that matured during the reporting interval. Expressed in pounds.

carbonMonoxideEmission: Estimate of carbon monoxide emissions by aircraft on the airport surface, based on fuel burn calculations for aircraft that matured during the reporting interval. Expressed in pounds.

oxidesOfNitrogenEmission: Estimate of NOx emissions by aircraft on the airport surface, based on fuel burn calculations for aircraft that matured during the reporting interval. Expressed in pounds.

Publication: This KPI is published by the Operational Metrics business function in the Operational Metrics message.

Message Type and Frequency: Periodic. This KPI is published at regular intervals. Frequency of publication is an adaptable parameter. Can be published every 5, 10, 15, 30, or 60 minutes.

2.3.5.6 Configuration

Data Description: Information about the current airport configuration and any scheduled configuration changes.

Information Available:

| | |
|---|--|
| currentAirportConfiguration: The current airport configuration, including: | originalTimestamp: The timestamp when this configuration was originally created. |
| | producer: The automation that produced this configuration. This should always read "TFDM" |
| | lastTimestamp: The timestamp when this configuration was last modified. |
| | configId: An identifier for the configuration, which incorporates the TFDM source facility and an identification number local to that system. |
| | configName: The user-specified name of the configuration, as saved in the TFDM system. |
| | configAction: The action being performed on this configuration – ADD, UPDATE, or DELETE. |
| | startTime: The timestamp at which the configuration either began, or is scheduled to begin. |
| | airportArrivalRate: The facility-declared aircraft arrival rate per hour for this configuration. |
| airportDepartureRate: The facility-declared aircraft departure rate per hour for this configuration. | |

| | | |
|--|---|---|
| | <p>runwayArrivalRates: The facility-entered arrival rate for each runway in use in this configuration. A list, each entry in which includes:</p> | <p>runway: The runway designator.</p> |
| | <p>runwayDepartureRates: The facility-entered departure rate for each runway in use in this configuration. A list, each entry in which includes:</p> | <p>rate: The rate of aircraft arrivals per hour for this runway.</p> |
| | | <p>runway: The runway designator.</p> |
| | | <p>rate: The rate of aircraft departures per hour for this runway.</p> |
| <p>scheduledAirportConfiguration: A list of scheduled airport configurations, each entry in which includes:</p> | <p>The same configuration information as listed in currentAirportConfiguration.</p> | |

Publication: The Airport Information business function publishes this data.

Message Type and Frequency: Periodic and real-time. This data is published at regular intervals as well as when an update triggers a new message. Frequency of publication for the periodic messages is an adaptable parameter. Can be published every 5, 10, 15, 30, or 60 minutes. For periodic messages, all current and scheduled airport configurations are published with “ADD” as their configAction. Real-time messages are triggered when a configuration is changed (added, updated, or deleted) in the TFDM system.

2.3.5.7 *Delays, Gridlock, and Closures*

Data Description: Airport-specific information on delays, gridlock in the NMA or AMA, and any AMA or NMA closures on the airport surface.

Information Available:

| | | |
|---|--|--|
| <p>delays: Information about the current airport delay and the count of delayed flights on a per-runway basis, which includes:</p> | <p>calculationTime: The time at which the delay calculations occurred.</p> | |
| | <p>airportDepartureDelay: The current departure delay status for the airport (“0” if the airport is not experiencing delays; “1” if it is).</p> | |
| | <p>runwayDepartureDelay: A list of departure runways and delayed flights associated with that runway, each entry in which includes:</p> | <p>runwayDesignator: The runway designator.</p> |
| | | <p>runwayDepartureDelayCount: The number of flights in departure delay status for the specified runway. Departure delay status is whether a particular flight has been subject to a reportable delay.</p> |
| | | |

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|---|--|--|
| <p>airportPredictedGridlock: Information about whether TFDM predicts that there is gridlock on the airport surface. TFDM calculates airport gridlock based on its calculation of AMA and NMA threshold/occupancy and start/end times. The information included is:</p> | <p>aircraftCountThreshold: The number of active flights on the airport surface (both AMA and NMA included) beyond which gridlock is predicted to occur.</p> | |
| | <p>gridlockState: Whether or not there is gridlock (either NO_PREDICTED_GRIDLOCK or GRIDLOCK).</p> | |
| | <p>predictedGridlockCountList: A list of predicted gridlock states with information about timing and maximum aircraft counts, each entry in which includes:</p> | <p>startTime: The start time for the predicted gridlock, as a timestamp.</p> |
| | | <p>endTime: The end time for the predicted gridlock, as a timestamp.</p> |
| <p>predictedMaximumAircraftCount: The maximum number of aircraft predicted to be active on the airport surface during the gridlock timeframe.</p> | | |
| <p>amaPredictedGridlock: Information about whether TFDM predicts that there is gridlock in the AMA. The information included is:</p> | <p>The same information as airportPredictedGridlock, relevant to AMA-specific gridlock.</p> | |
| <p>nmaGridlock: Information about NMA gridlock, as reported by a FOS, containing an indication of any NMA gridlock changes associated with a FOS-generated unique identifier. Note: This NMA gridlock information is pass-through information from TFCS-ADIS submitted NMA gridlock information. This information is not directly related to TFDM’s calculation of AMA/NMA occupancy or AMA/Airport gridlock.</p> <p>The information included is:</p> | <p>gridlockAction: The action for this gridlock state (ADD; UPDATE; or DELETE)</p> | |
| | <p>nmaGridlock: The FOS-reported NMA gridlock information, which includes:</p> | <p>gridlockId: Unique FOS-generated identifier for this gridlock.</p> |
| | | <p>startTime: The start time for the gridlock.</p> |
| | | <p>endTime: The end time for the gridlock.</p> |
| | | <p>gridlockNotes: Any notes for the gridlock, as submitted by the flight operator.</p> |
| | | <p>gridlockIndicator: Whether the gridlock is ACTUAL or PREDICTED.</p> |
| | | <p>aircraftCountThreshold: The number of aircraft beyond which gridlock results in the NMA region.</p> |
| | | <p>maximumAircraftCount: The actual or predicted maximum number of aircraft in the NMA region during the gridlock period.</p> |
| <p>nmaGridlockRegions: The list of regions to which the gridlock applies, specified as pre-arranged NMA region identifiers, which may include:</p> | <p>deiceRegions: A list of the names of deice region segments to which this gridlock applies.</p> | |

| | | |
|---|--|---|
| | | <p>rampRegions: A list of the names of the ramp region segments to which this gridlock applies.</p> <p>gateRegions: A list of the names of the gate region segments to which this gridlock applies.</p> |
| <p>closures: A list of closureData types which contain information about closures, as generated by TFDM (AMA or NMA) or a FOS (NMA). Information included for each closure is:</p> | <p>originalTimestamp: The time when the closure information was originally created, as a timestamp.</p> | |
| | <p>originalProducer: The original source of the closure information (TFDM or TFCS).</p> | |
| | <p>lastTimestamp: The time when the closure information was most recently created or updated, as a timestamp.</p> | |
| | <p>lastProducer: The most recent source of the closure information or update (TFDM or TFCS).</p> | |
| | <p>closureId: An identifier for the closure, which includes:</p> | <p>identification: An identification number local to the TFDM instance.</p> |
| | | <p>aerodrome: The source facility.</p> |
| | <p>closureName: The user-specified name of the closure.</p> | |
| | <p>closureState: The state of the closure (SCHEDULED, ACTIVATED, DEACTIVATED, or REMOVED).</p> | |
| | <p>closureStartTime: The start time for the closure, as a timestamp.</p> | |
| | <p>closureEndTime: The end time for the closure, as a timestamp</p> | |
| | <p>closureNotes: Any user-entered notes about the closure.</p> | |
| | <p>user: The FOS user’s name or TFDM if created by the TFDM system.</p> | |
| | <p>modificationTime: The time the closure was last modified, as a timestamp.</p> | |
| <p>closedRegions: A list of regions closed by this closure, including AMA and NMA regions.</p> | <p>closedRunways: A list of runway designators affected by the closure.</p> | |
| | <p>runwayRegions: A list of runway region segments affected by the closure.</p> | |
| | <p>taxiwayRegions: A list of taxiway region segments affected by the closure.</p> | |
| | <p>deiceRegions: A list of deice region segments affected by the closure.</p> | |

| | | |
|--|----------------------------|--|
| | Region types included are: | rampRegions: A list of ramp region segments affected by the closure. |
| | | gateRegions: A list of gate region segments affected by the closure. |
| | | spotRegions: A list of spot regions affected by the closure. |
| | | surfaceHoldingRegions: A list of surface holding regions affected by the closure. |

Publication: The Airport Information business function publishes this information.

Message Type and Frequency: Periodic and real-time. This data is published at regular intervals as well as when an update triggers a new message. Frequency of publication for the periodic messages is an adaptable parameter. Can be published every 5, 10, 15, 30, or 60 minutes. For periodic messages, all current information is published. Real-time messages are triggered when there are changes in delays, gridlock, or closure status.

2.3.5.8 Notifications

Data Description: Notifications that are sent out to inform users of important airport status updates and airport-related TFDM parameter changes.

Information Available:

| | |
|---|---|
| notifications: Text strings that provide a notification of important updates or changes for the airport. The notifications about airport information are: | airportArrivalRateNotification: A notification issued when a scheduled configuration change that will occur within the next X minutes (X is a configurable parameter) will result in an airport arrival rate change. |
| | airportDepartureRateNotification: A notification issued when a scheduled configuration change that will occur within the next X minutes (X is a configurable parameter) will result in an airport departure rate change. |
| | airportConfigurationChangeNotification: A notification issued when the airport configuration has changed. |
| | surfaceConstraintsChangeNotification: A notification issued when the airport's surface constraints have changed. This notification is sent when a closure including a runway is activated, or if any closure is deactivated. |
| | runwayDepartureRateMismatchNotification: A notification issued when the achieved runway departure rate for a runway is more different than a configurable threshold from the announced runway departure rate. |
| | airportGridlockNotification: A notification issued when the airport is predicted to enter gridlock, which provides the maximum predicted aircraft count and the start and end time of the predicted gridlock. |
| | airportMovementAreaGridlockNotification: A notification issued when the AMA is predicted to enter gridlock, which provides the maximum predicted aircraft count and the start and end time of the predicted gridlock. |
| | airportNonMovementAreaGridlockNotification: A notification issued when an NMA gridlock event is created, updated, or deleted. |
| rampClosureNotification: A notification issued when a ramp closure has occurred. | |

| | |
|--|--|
| | rampReopenNotification: A notification issued when a ramp has reopened. |
| | highLevelOfUnscheduledFlightsNotification: A notification issued when the total number of unscheduled flights over the last hour is greater than a configurable parameter and there is at least one Affirmed or Active SMP with a Start Time before 1 hour prior to the notification. |
| | lowLevelOfUnscheduledFlightsNotification: A notification issued when the total number of unscheduled flights over the last hour is less than a configurable parameter and there is at least one Affirmed or Active SMP with a Start Time before 1 hour prior to the notification. |
| | capacityWarningNotification: A notification issued when the predicted unmeted queue length to a metering resource is greater than the departure target queue length upper threshold (configurable parameter). |

Message Type and Frequency: Real-time. Real-time messages are triggered when any of these notifications are triggered.

2.3.6 Operation of TFDM

2.3.6.1 Runway Departure Rate Accuracy KPI

KPI Description: Information about the difference between a runway’s observed RDR (Runway Departure Rate) and the facility’s called RDR during the reporting interval.

The Runway Departure Rate is the number of departures per hour from a single departure runway and the time period each rate will be in effect, assuming no “heavy” aircraft or other aircraft with special separation requirements are included. Each departure runway in a given configuration can have a different runway departure rate.

Information in this KPI:

| | |
|---|---|
| RunwayDepartureRateAccuracyListType: A list of runway departure rate accuracy with one entry for each runway. Each entry contains: | runwayDesignator: The runway designator for the runway being characterized. |
| | runwayDepartureRateAccuracy: The difference between the Observed Effective Runway Departure Rate and the Facility Entered Runway Departure Rate. |

Publication: The Operational Metrics business function publishes this KPI in the Operational Metrics message.

Message Type and Frequency: Periodic. This KPI is published at regular intervals. Frequency of publication is an adaptable parameter. It can be published every 5, 10, 15, 30, or 60 minutes.

2.3.6.2 Stability of Metering Times

KPI Description: Information on a per flight basis about TMAT changes.

Information in this KPI:

| | | |
|--|--|--|
| <p>flightList: A flight list that contains information about TMAT changes for flights that matured during the reporting interval that contains:</p> | <p>flightListTimeStamp: The time when the flight list was created.</p> | |
| | <p>flightData: One instance per departure. The flight data for each departure includes:</p> | <p>Fields for Flight Matching (see Section 5.1 below for a list of these fields)</p> |
| | | <p>TargetMovementAreaEntryTimeNumberOfChanges: The count of times the TMAT changed for the flight.</p> |
| | | <p>TargetMovementAreaEntryTimeChangesTotalTime: The sum of the absolute value of all TMAT changes for the flight.</p> |
| | | <p>TargetMovementAreaEntryTimePrior: Previous TMAT(s) for the aircraft. If the number of TMAT changes is greater than 1, this is a comma-delimited list of values.</p> |
| | | <p>TargetMovementAreaEntryTimeNew: New TMAT(s). If the number of TMAT changes is greater than 1, this is a comma-delimited list of values.</p> |
| | | <p>Timestamp: Actual time new TMAT was assigned. If the number of TMAT changes is greater than 1, this is a comma-delimited list of values.</p> |
| | | <p>TargetMovementAreaEntryTimeChangeReason: String describing the reason for the TMAT change. If the number of TMAT changes is greater than 1, this is a comma-delimited list of values. Example: "COMPRESSION"</p> |
| <p>TargetMovementAreaEntryTimeDifference: The duration that is the absolute value of the difference between the new TMAT and the old TMAT. If the number of TMAT changes is greater than 1, this is a comma-delimited list of values.</p> | | |

Publication: The Operational Metrics business function publishes this KPI in the Operational Metrics message.

Message Type and Frequency: Periodic. This KPI is published at regular intervals. Frequency of publication is an adaptable parameter. Can be published every 5, 10, 15, 30, or 60 minutes.

2.3.6.3 Actual vs. Predicted Flight Times

KPI Description: A flight list that contains the differences between actual and TFDM-predicted flight times for each flight that matured during the reporting interval.

TFDM calculates various predicted times for flights based on adaptable "look-ahead times", which are times prior to the flight's departure. For a flight with a departure at 1430 local time from a facility with

adapted look-ahead time parameter setting of (60 minutes, 30 minutes), TFDM would make predictions of various flight event times at 1330 local (corresponding to the look-ahead time of 60 minutes) and again at 1400 local (corresponding to the look-ahead time of 30 minutes). This flight list would then contain comparisons of the predicted times generated at 1330 and 1400 local by TFDM to the actual times reported by the flight.

Information in this KPI:

| | |
|--|---|
| <p>flightList: A list that contains actual and predicted flight times for each flight that matured during the reporting interval, which contains:</p> | <p>flightListTimeStamp: The time when the flight list was created.</p> |
| | <p>Fields for Flight Matching (see Section 5.1 below for a list of these fields)</p> |
| | <p>ActualTakeOffTime: Timestamp at which the aircraft became airborne.</p> |
| | <p>NumberOfLookaheadTimes: The number of lookahead times at which the predicted flight times were calculated.</p> <ul style="list-style-type: none"> - If NumberOfLookaheadTimes > 1, each field will be a comma-separated list of values. - The accuracy values are signed. If actual time > estimated time, the value will be positive; if actual time < estimated time, the value will be negative. |
| | <p>LookaheadTime: The lookahead time(s).</p> |
| | <p>QueueWaitingTimeAccuracy: Actual queue waiting time minus estimated queue waiting time for a particular lookahead time. Published as a period of time (see Section 5.3 for formatting rules).</p> |
| | <p>TakeOffTimeAccuracy: ATOT minus ETOT for a particular lookahead time. Published as a period of time (see Section 5.3 for formatting rules).</p> |
| <p>SpotToQueueTaxiTimePredictionAccuracy: Actual time for the aircraft to taxi from spot to queue (AQET minus AMAT) minus estimated time for the aircraft to taxi from spot to queue for a particular lookahead time. Published as a period of time (see Section 5.3 for formatting rules).</p> | |
| <p>flightData: One instance per departure. The flight data for each departure includes:</p> | |

Publication: The Operational Metrics business function this publishes this KPI in the Operational Metrics message.

Message Type and Frequency: Periodic. This KPI is published at regular intervals. Frequency of publication is an adaptable parameter. Can be published every 5, 10, 15, 30, or 60 minutes.

2.3.6.4 Missed Departure Opportunities KPI

KPI Description: Information about missed departure opportunities. A missed departure opportunity is defined as a flight which took off from a metering resource during the reporting interval after encountering an empty departure queue. The calculation accounts for required separation between aircraft, and does not count that separation as part of a missed opportunity. If the metering resource is a group of runways (including when metering is implemented for the entire airport as a whole, called

Airport Single Queue mode), missed departure opportunities only occur when all of the runways in the group have empty queues.

Information in this KPI:

If the airport is operating in Airport Single Queue mode:

airportModeMissedDepartureOpportunitiesCount: The number of missed departure opportunities.

airportModeMissedAirprtDepartureOpportunitiesTimeDuration⁴: The total duration of missed departure opportunities, as a period of time. This is the total length of all the periods of time during which a metered aircraft could have departed from the airport (after accounting for required separation) but did not do so because no aircraft was in queue when the departure opportunity first became available.

If the airport is operating in Runway Metering Mode (including metering to groups of runways)

runwayModeMissedDepartureOpportunities:

A list of the airport runways that provides missed departure opportunities for each runway. Each entry in the list contains:

runwayDesignator: The number of missed departure opportunities for this runway.

runwayModeMissedDepartureOpportunitiesCount: The number of missed departure opportunities for this runway.

runwayModeMissedDepartureOpportunitiesTimeDuration: The total duration of missed departure opportunities for this runway. This is the total length of all the periods of time during which a metered aircraft could have departed from the runway (after accounting for required separation) but did not do so because no aircraft was in queue when the departure opportunity first became available.

Publication: The Operational Metrics business function publishes this KPI in the Operational Metrics message.

Message Type and Frequency: Periodic. This KPI is published at regular intervals. Frequency of publication is an adaptable parameter. It can be published every 5, 10, 15, 30, or 60 minutes.

2.3.6.5 *Flight Data Quality*

KPI Description: System-assigned points awarded for the quality of submitted flight data.

For departure flights, the metric is the percentage of total assigned credits for Data Comprehensiveness, Flight Initialization Lead Time, Off-Block Time Accuracy, and Timely Provision of AOBT metrics out of the total possible credits that the flight could have received for these metrics.

For arrival flights, the metric is the fraction of total assigned credits for the Data Comprehensiveness metric out of the total possible credits that the flight could have received for that metric.

This KPI consists only of information on a per-flight basis.

Information in this KPI:

⁴ The variable name is given as it is specified in the schema. "Airport" is misspelled as it is in the schema.

| | |
|---|--|
| <p>flightList: A list that contains flight data quality points for each flight that matured during the reporting interval, which contains:</p> | <p>flightListTimeStamp: The time when the flight list was created.</p> |
| | <p>Fields for Flight Matching (see Section 5.1 below for a list of these fields)</p> |
| | <p>DataQualityPoints: A summary metric to characterize the overall quality of the data provided to the TFDM system by the flight operator.</p> <ul style="list-style-type: none"> - For arrivals, this metric is the ratio of awarded DataComprehensivenessPoints to possible DataComprehensivenessPoints. - For departures, this metric is the ratio of awarded (FlightInitializationLeadTimePoints + OffBlockTimeAccuracy + TimelyProvisionOfActualOffBlockTimeCompliancePoints + DataComprehensivenessPoints) to total possible points. Because untimely provision of certain data can lead to negative points being awarded, this metric may be negative. |
| | <p>FlightInitializationLeadTimePoints: Departures only. Points awarded to a flight based on the comparison between its first entry into the TFDM system and its IOBT. If the creation time was before the flight initialization lead time tolerance (adaptable parameter), award adaptable credits; otherwise, award zero credits.</p> |
| <p>flightData: One instance per flight. The flight data for each flight includes:</p> <p>DataComprehensivenessPoints: Sum of awarded credits to quantify the completeness of aircraft data.</p> <ul style="list-style-type: none"> - For arrivals, credits are awarded based on: <ol style="list-style-type: none"> 1) whether the flight’s aircraft registration mark was provided prior to in-block time, and 2) whether the flight’s stand assignment was provided prior to in-block time. - For departures, credits are awarded based on: <ol style="list-style-type: none"> 1) whether a flight departed without being cancelled, or was marked for cancellation before time of departure, or was marked for cancellation after departure; 2) whether the flight’s aircraft registration mark was provided prior to pushback, and 3) whether a flight operator properly provided a cancellation notice for a flight that never departed. <p><i>Note: The number of credits awarded for the various conditions listed above and therefore the relative importance of each condition to the overall metric is an adaptable parameter.</i></p> | |
| <p>OffBlockTimeAccuracy: Departures only. Points awarded to a flight based on the number of adaptable lookahead time</p> | |

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| | | <p>periods during which the flight’s reported EOBT was within an adaptable tolerance of the eventual AOBT. Note: This metric applies only to unmetered flights without an EDCT, where both the EOBT and AOBT were fully within the control of the operator.</p> |
| | | <p>TimelyProvisionOfActualOffBlockTimeCompliancePoints: Departures only. Points awarded to a flight based on whether the operator provided an AOBT within an adaptable amount of time after pushback.</p> |

Publication: The Operational Metrics business function publishes this KPI in the Operational Metrics message.

Message Type and Frequency: Periodic. This KPI is published at regular intervals. Frequency of publication is an adaptable parameter. Can be published every 5, 10, 15, 30, or 60 minutes.

2.3.6.6 Phase of Taxi Operations KPI

KPI Description: Information on a per flight basis about taxi times at various stages in a flight’s departure/arrival, for flights that matured during the reporting interval.

Information in this KPI:

| | | |
|---|--|--|
| <p>flightList: A list that contains flight data quality points for each flight that matured during the reporting interval, which contains:</p> | <p>flightData: One instance per flight. The flight data for each flight includes:</p> | <p>flightListTimeStamp: The time when the flight list was created.</p> |
| | | <p>Fields for Flight Matching (see Section 5.1 below for a list of these fields)</p> |
| | | <p>StandMeteringHoldTimeDuration: Departures only. The difference between AOBT and EOBT.</p> |
| | | <p>OutboundRampTaxiTimeDuration: Departures only. AMAT – AOBT. If the gate is adjacent to the AMA and the flight blocks out directly to the AMA, the duration is set to NULL.</p> |
| | | <p>OutboundMovementAreaHoldTimeDuration: Departures only. Cumulative duration of time attributed to holds that occur in the movement area. A hold is defined as the time spent in a movement area hold region as detected by surveillance or an ATC hold event. This duration does not include flight operator delays or stand returns.</p> |
| | | <p>OutboundMovementAreaTaxiTimeDuration: Departures only. Actual Line Up and Wait Time – AMAT. If the flight does not LUAW, the duration is set as Actual Takeoff Roll Time – AMAT.</p> |
| | | <p>OutboundMovementAreaQueuingTimeDuration: Departures only. Total amount of time the aircraft was in queue to depart.</p> |
| | | <p>InboundMovementAreaTaxiTimeDuration: Arrivals only. Actual At Spot Time – Actual Runway Exit Time. If</p> |

| | | |
|--|--|--|
| | | <p>there is no spot / the gate is adjacent to the AMA, the duration is Actual In Block Time – Actual Runway Exit Time.</p> |
| | | <p>InboundMovementAreaHoldTimeDuration: Arrivals only. Cumulative duration of time attributed to holds that occur in the movement area. A hold is defined as the time spent in a movement area hold region as detected by surveillance or an ATC hold event. This duration does not include flight operator delays.</p> |
| | | <p>InboundRampTaxiTimeDuration: Arrivals only. Actual Spot Crossing Time – AIBT. If the gate is adjacent to the AMA and the flight blocks in directly from the AMA, the duration is set to NULL.</p> |

Publication: The Operational Metrics business function publishes this KPI in the Operational Metrics message.

Message Type and **Frequency:** Periodic. This KPI is published at regular intervals. Frequency of publication is an adaptable parameter. Can be published every 5, 10, 15, 30, or 60 minutes.

3 Data TFDM Requests from Operators

3.1 Terminal FOS Collaboration Service (TFCS)

Unlike TTP, which is a publisher/subscriber service that simply broadcasts TFDM information to all authorized subscribers, TFCS is a request/reply service that allows for data exchange between TFDM, NAS Systems, and the National Airspace System (NAS) users (airlines, air carriers, air freight, military, or general aviation/business aviation operators). It is vital that flight operators provide timely and accurate information over TFCS in order to enable the smooth operation of surface metering. TFCS provides two business functions to stakeholders:

SMP Flight Substitution Service (SFSS) – Allows consumers to request flight substitutions during SMPs.

Airport Data Information Service (ADIS) – Allows operators to submit non-movement area closure and non-movement area gridlock notifications to TFDM.

3.1.1 SMP Flight Substitution Service

Business Function Description: SFSS is the mechanism through which flight operators request flight substitutions during an active SMP.

Flight Substitution Request:

A flight operator who wishes to perform flight substitutions by directly substituting two or more flights' metering times for each other or who wishes to mark a flight for substitution must submit a flight substitution request.

In the case of marking a flight for substitution, an operator is effectively informing TFDM that, because it is anticipated that the flight will be substituted for another, the flight should be assigned a metering time based on its IOBT priority without consideration of the fact that it could be assigned a metering time that causes the flight's TOBT to be earlier than its EOBT.

A flight operator who wishes to relinquish a TMAAT for use by TFDM must also submit a flight substitution request. A single message can accommodate a single request type (substitution, marked for substitution, or relinquish) for up to 20 flights; however, if a change fails for a single flight, the entire message will be rejected. A flight substitution request contains the following data elements:

| | |
|--|--|
| smpld: The unique identifier for the SMP to which the substitution request applies, which includes: | identification: The SMP's numeric identifier, as assigned by the local TFDM instance. |
| | aerodrome: The TFDM facility where the SMP is occurring. |
| assignmentMode: Optional—the kind of substitution request being made. Either STRICT or PROPOSED, which correspond to exact or inexact substitution. | |
| flightSubstitutions: Data type which provides the requested TMAAT reassignments. A list of up to 20 flights for reassignment, marking for | aircraftId: Optional—the alphanumeric name for the flight. Note that this field is for informational purposes only and is not used as a flight identifier or validated by TFDM. |
| | tfdmFlightUniqueid: The TFDM-assigned unique identifier for the flight |

| | |
|--|--|
| substitution, or relinquishment, each entry in which contains: | targetMovementAreaEntryTime: Optional—used for substitution requests. The TMAT that is requested to be reassigned to this flight from another flight in the request. |
| | targetMovementAreaEntryTimeRelinquished: Optional—used to relinquish a flight’s TMAT. A Boolean indicating that this flight is relinquishing its TMAT. |
| | targetMovementAreaEntryTimeMarkedForSubstitution: Optional—used to mark a flight for substitution. A Boolean indicating that the TMAT for this flight has been marked for use by another flight in a future substitution. |

Flight Substitution Request Replies:

All flight substitution requests will receive a reply to the request message. The reply will be either an error response or a success response. Flight substitution request responses contain the following data:

| | |
|--|--|
| requestStatus: Provides the status of the request as a string; either “ERROR” or “SUCCESS.” | |
| smpId: The unique identifier for the SMP to which the substitution request applies, which includes: | identification: The SMP’s numeric identifier, as assigned by the local TFDM instance. |
| | aerodrome: The TFDM facility where the SMP is occurring. |

| | | |
|--|--|---|
| <p>errorData (Optional—only present if requestStatus is ERROR): An error description message, which contains:</p> | <p>errorCode: The relevant error code, as defined in the TFDM system. Error codes for flight substitution requests are:</p> | |
| | Error Code | Description |
| | INVALID_SCHEMA_VERSION | Provided schema version does not match TFDM schema version. |
| | BAD_MESSAGE_FORMAT | The message has bad formatting. |
| | INTERNAL_ERROR | There was an issue processing the message that does not have to do with an invalid message or bad message format. |
| | INVALID_MESSAGE | The message has invalid data. |
| | UNAUTHORIZED_USER_ERROR | The user is not authorized to make substitutions for the carrier. |
| | TMATS_IN_DIFFERENT_SMPS | The TMATS specified are in different SMPs. |
| | FLIGHT_PASSED_METERING_CONTROL_POINT | The flight passed the metering control point. |
| | FLIGHT_EXEMPT_FROM_RATIONING | The flight is exempt from rationing. |
| INVALID_SUBSTITUTION_TIMES | The substitution times specified are invalid. | |
| <p>errorString: A further description of the error, if available.</p> | | |
| <p>flightsSubstitutionErrors: (Optional—only present if requestStatus is ERROR) A list of specific flights with errors, each entry in which contains:</p> | <p>tfdmFlightUniqueId: The TFDM unique flight identifier.</p> | <p>aircraftId: The alphanumeric name of the flight (e.g. DAL123).</p> |

3.1.2 Airport Data Information Service

Business Function Description: ADIS is the mechanism through which flight operators or other stakeholders submit NMA closure and NMA gridlock data. A flight operator can create, activate, deactivate, remove, or update an NMA closure, and create, update, or remove an NMA gridlock status.

Closure Requests:

A separate closure request message must be sent for every closure creation, activation, deactivation, removal, or update. A closure request message contains the following data elements:

If it is a creation request:

| | | | |
|---|---|---|---|
| <p>createClosure: Which contains:</p> | closureName: The user-generated name of the closure. | | |
| | startTime: The start time for the closure, as a timestamp. | | |
| | endTime: The end time for the closure, as a timestamp. (Optional; if not provided, the closure is until further notice.) | | |
| | closureNotes: Any additional notes to be captured for the closure. | | |
| | <p>closedRegions: The list of non movement area region identifiers affected by the closure. Which contains:</p> | <p>deiceRegions: A list of any deice regions affected by this closure, each entry in which contains:</p> | <p>region: The name of the region and a list of the affected segments of the region. Each segment in the list is identified by a segment name.</p> |
| <p>rampRegions: A list of any ramp regions affected by this closure, each entry in which contains:</p> | | <p>region: The same information as the deice regions.</p> | |
| <p>gateRegions: A list of any gate regions affected by this closure, each entry in which contains:</p> | | <p>region: The same information as the deice regions.</p> | |

If it is an update request:

| | | |
|--|--|---|
| <p>updateClosure: Which contains:</p> | <p>closureId: The unique TFDM-generated identifier for this closure. Which includes:</p> | <p>identification: An identification number for the closure, local to the TFDM instance.</p> |
| | <p>The same closure information fields as a creation request (closureName, startTime, endTime, closureNotes, closedRegions)</p> | <p>aerodrome: The TFDM source facility to which the closure applies.</p> |
| | | |

If it is an activation request:

| | | |
|--|--|--|
| activateClosure: Which contains: | closureId: The unique TFDM-generated identifier for this closure Which includes: | identification: An identification number for the closure, local to the TFDM instance. |
| | | aerodrome: The TFDM source facility to which the closure applies. |

If it is a deactivation request:

| | | |
|---|--|--|
| deactivateClosure Which contains: | closureId: The unique TFDM-generated identifier for this closure. Which includes: | identification: An identification number for the closure, local to the TFDM instance. |
| | | aerodrome: The TFDM source facility to which the closure applies. |

If it is a removal request:

| | |
|--|--|
| closureId: The unique TFDM-generated identifier for this closure, which includes: | identification: An identification number for the closure, local to the TFDM instance. |
| | aerodrome: The TFDM source facility to which the closure applies. |

Closure Request Replies:

All closure requests will receive a reply to the request message. The reply will be either an error response or a success response. Closure request responses contain the following data:

| | |
|--|--|
| requestStatus: Provides the status of the request as a string; either "ERROR" or "SUCCESS." | |
| closureId: (Optional—will not be provided if a create request failed. If there is a failure on an Update, Activate, Deactivate, or Remove request, the closure ID may be provided.) The unique TFDM-generated identifier for this closure, which includes: | identification: An identification number for the closure, local to the TFDM instance. |
| | aerodrome: The TFDM source facility to which the closure applies. |
| errorData: (Optional—only present if requestStatus is ERROR.) An error description message, which contains: | errorCode: The relevant error code, as defined in the TFDM system. |
| | Error codes for closure requests are: |

| Error Code | Description |
|---|---|
| INVALID_SCHEMA_VERSION | Provided schema version does not match TFDM schema version. |
| BAD_MESSAGE_FORMAT | The message has bad formatting. |
| INTERNAL_ERROR | There was an issue processing the message that does not have to do with an invalid message or bad message format. |
| INVALID_MESSAGE | The message has invalid data. |
| UNAUTHORIZED_USER_ERROR | The user is not authorized to submit Non-Movement Area Closure Requests to TFDM. |
| REFERENCE_IDENTIFIER_MATCH_NOT_FOUND | The reference identifier match was not found. |
| REQUEST_NOT_EXECUTED_DUE_TO_CLOSURE_STATE | The request was not executed due to a closure state. |
| errorString: A further description of the error, if available. | |

NMA Gridlock Requests:

A separate gridlock request message must be sent for every gridlock creation, removal, or update. If NMA gridlock is present, or its status needs to be updated, flight operators should provide this gridlock information via TFCS so the system can account for gridlock when assigning metering times. A gridlock request message contains the following data elements:

If it is a creation request:

| |
|---|
| startTime: The start time for the gridlock, as a timestamp. |
| endTime: The end time for the gridlock, as a timestamp. (Optional; if not provided, the gridlock is until further notice.) |
| gridlockIndicator: The status of the gridlock, as a string (either ACTUAL or PREDICTED). |
| gridlockNotes: Any additional notes that the operator desires to be captured for the gridlock. (Optional) |
| aircraftCountThreshold: The threshold number of aircraft used by the operator to determine gridlock status. (Optional) |

| | | |
|---|---|--|
| maximumAircraftCount: The actual or predicted maximum count of aircraft affected by the gridlock. (Optional) | | |
| gridlockRegions: The list of NMA region identifiers to which the gridlock status applies, which contains: | deiceRegions: A list of any deice regions affected by this gridlock, each entry in which contains: | region: The name of the region and a list of the affected segments of the region. Each segment in the list is identified by a segment name. |
| | rampRegions: A list of any ramp regions affected by this gridlock, each entry in which contains: | region: The same information as the deice regions. |
| | gateRegions: A list of any gate regions affected by this gridlock, each entry in which contains: | region: The same information as the deice regions. |

If it is an update request:

| | | |
|---|---|--|
| gridlockId: The unique TFDM-generated identifier for the gridlock. | | |
| startTime: The start time for the gridlock, as a timestamp. | | |
| endTime: The end time for the gridlock, as a timestamp. (Optional; if not provided, the gridlock is until further notice.) | | |
| gridlockIndicator: The status of the gridlock, as a string (either ACTUAL or PREDICTED). | | |
| gridlockNotes: Any additional notes that the operator desires to be captured for the gridlock. (Optional) | | |
| aircraftCountThreshold: The threshold number of aircraft used by the operator to determine gridlock status. (Optional) | | |
| maximumAircraftCount: The actual or predicted maximum count of aircraft affected by the gridlock. (Optional) | | |
| gridlockRegions: The list of NMA region identifiers to which the gridlock status applies, which contains: | deiceRegions: A list of any deice regions affected by this gridlock, each entry in which contains: | region: The name of the region and a list of the affected segments of the region. Each segment in the list is identified by a segment name. |
| | rampRegions: A list of any ramp regions affected by this gridlock, each entry in which contains: | region: The same information as the deice regions. |
| | gateRegions: A list of any gate regions affected by this gridlock, each entry in which contains: | region: The same information as the deice regions. |

If it is a removal request:

| |
|---|
| gridlockId: The unique TFDM-generated identifier for the gridlock. |
| startTime: The start time for the gridlock, as a timestamp. (Optional) |

| | | |
|--|---|--|
| endTime: The end time for the gridlock, as a timestamp. (Optional—if not provided, the gridlock is until further notice.) | | |
| gridlockIndicator: Any additional notes that the operator desires to be captured for the gridlock. (Optional) | | |
| gridlockNotes: Any additional notes that the operator desires to be captured for the gridlock. (Optional) | | |
| aircraftCountThreshold: The threshold number of aircraft used by the operator to determine gridlock status. (Optional) | | |
| maximumAircraftCount: The actual or predicted maximum count of aircraft affected by the gridlock. (Optional) | | |
| gridlockRegions: The list of NMA region identifiers to which the gridlock status applies, which contains: | deiceRegions: A list of any deice regions affected by this gridlock, each entry in which contains: | region: The name of the region and a list of the affected segments of the region. Each segment in the list is identified by a segment name. |
| | rampRegions: A list of any ramp regions affected by this gridlock, each entry in which contains: | region: The same information as the deice regions. |
| | gateRegions: A list of any gate regions affected by this gridlock, each entry in which contains: | region: The same information as the deice regions. |

NMA Gridlock Request Replies:

All gridlock requests will receive a reply to the request message. The reply will be either an error response or a success response. Closure request responses contain the following data:

| <p>requestStatus: Provides the status of the request as a string; either “ERROR” or “SUCCESS.”</p> | | | | | | | | | | | | | | | |
|---|---|---|-------------|------------------------|---|--------------------|---------------------------------|----------------|---|-----------------|-------------------------------|-------------------------|---|--------------------------------------|---|
| <p>gridlockId: Optional—Will not be provided if a create request failed. If there is a failure on an Update, or Remove request, the gridlock ID may be provided. The unique TFDM-generated identifier for this gridlock.</p> | | | | | | | | | | | | | | | |
| <p>errorData: Optional—only present if requestStatus is ERROR. An error description message, which contains:</p> | <p>errorCode: The relevant error code, as defined in the TFDM system. Error codes for NMA gridlock requests are:</p> <table border="1"> <thead> <tr> <th>Error Code</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>INVALID_SCHEMA_VERSION</td> <td>Provided schema version does not match TFDM schema version.</td> </tr> <tr> <td>BAD_MESSAGE_FORMAT</td> <td>The message has bad formatting.</td> </tr> <tr> <td>INTERNAL_ERROR</td> <td>There was an issue processing the message that does not have to do with an invalid message or bad message format.</td> </tr> <tr> <td>INVALID_MESSAGE</td> <td>The message has invalid data.</td> </tr> <tr> <td>UNAUTHORIZED_USER_ERROR</td> <td>The user is not authorized to submit Non-Movement Area Gridlock Notification Requests to TFDM</td> </tr> <tr> <td>REFERENCE_IDENTIFIER_MATCH_NOT_FOUND</td> <td>The reference identifier match was not found.</td> </tr> </tbody> </table> | Error Code | Description | INVALID_SCHEMA_VERSION | Provided schema version does not match TFDM schema version. | BAD_MESSAGE_FORMAT | The message has bad formatting. | INTERNAL_ERROR | There was an issue processing the message that does not have to do with an invalid message or bad message format. | INVALID_MESSAGE | The message has invalid data. | UNAUTHORIZED_USER_ERROR | The user is not authorized to submit Non-Movement Area Gridlock Notification Requests to TFDM | REFERENCE_IDENTIFIER_MATCH_NOT_FOUND | The reference identifier match was not found. |
| | Error Code | Description | | | | | | | | | | | | | |
| | INVALID_SCHEMA_VERSION | Provided schema version does not match TFDM schema version. | | | | | | | | | | | | | |
| | BAD_MESSAGE_FORMAT | The message has bad formatting. | | | | | | | | | | | | | |
| | INTERNAL_ERROR | There was an issue processing the message that does not have to do with an invalid message or bad message format. | | | | | | | | | | | | | |
| | INVALID_MESSAGE | The message has invalid data. | | | | | | | | | | | | | |
| | UNAUTHORIZED_USER_ERROR | The user is not authorized to submit Non-Movement Area Gridlock Notification Requests to TFDM | | | | | | | | | | | | | |
| | REFERENCE_IDENTIFIER_MATCH_NOT_FOUND | The reference identifier match was not found. | | | | | | | | | | | | | |
| <p>errorString: A further description of the error, if available.</p> | | | | | | | | | | | | | | | |

3.2 Traffic Flow Management System (TFMS)

The Traffic Flow Management System is a “NAS-Wide system for planning and implementing strategic and tactical traffic flow management initiatives to mitigate demand/capacity imbalances.”⁵ As part of its management and monitoring of national air traffic flow, TFMS provides a number of SWIM data exchange services to share information. TFMS handles data submission from existing airlines’ Air Operations Centers. Once a NAS user files a flight plan, it is transmitted to the En Route Automation Modernization (ERAM) system, which translates it into TFMS flight data that can be accessed by FAA systems, including at the FAA Air Traffic Control System Command Center and the FAA William J. Hughes Technical Center. Various other FAA systems contribute other data sources (e.g. ATC surveillance) which are fused with operator-submitted data to provide the FAA and SWIM data consumers with the ability to monitor the operation of the NAS in real time.

The effective operation of TFDM’s surface management capabilities depends on the submission of new surface-related flight data elements submitted via TFMS. TFMS relays the appropriate information to the TFDM system, which integrates this data submitted by flight operators with other data sources to perform its surface management functions. Most of the surface-related flight data elements that TFDM uses can be submitted by flight operators via the TFMS Request/Reply business function; a few, detailed in Section 3.1 above, are submitted via TFCS. There are 24 airport surface data elements that operators can submit via TFMS. Table 3-1 below lists these data elements, how TFDM uses them, and what TFDM does if operators do not submit these data elements on a timely basis. TFDM applies some data elements both to immediate operational use as well as for the calculation of various metrics. Where both uses are made of an element, operational and metric uses (and consequences for non-submission or late submission) are listed separately.

⁵ FAA. *TFMS NAS Animated Storyboard*.

https://www.faa.gov/about/office_org/headquarters_offices/ang/offices/tc/library/storyboard/detailedwebpages/tfms.html. Accessed September 24, 2021.

Table 3-1: TFMS Surface Flight Data Elements

| Surface Flight Data Element | Description | TFDM Use of This Element | What Happens if Operators do not Submit this Data |
|-----------------------------------|--|---|---|
| Aircraft Registration Mark | The aircraft’s registration mark (N-number for US-registered aircraft) | <p><u>Operational Use:</u> TFDM uses this information for user-friendly flight tracking and to help improve gate conflict predictions.</p> <p><u>Metrics Use:</u> Data Comprehensiveness Points (see the Flight Data Quality KPI) are awarded based on whether the registration mark is provided prior to pushback time (for departures) or in-block time (for arrivals).</p> | <p><u>Operational Consequences:</u> TFDM uses a TFDM Unique Flight Identifier to track flights rather than registration mark, so TFDM can still track the flight. This identifier is generated when a flight plan is entered.</p> <p><u>Metrics Consequences:</u> If the registration mark is not provided prior to pushback time (for departures) or in-block time (for arrivals), fewer Data Comprehensiveness Points will be awarded. The Data Comprehensiveness Points metric for each flight is computed and published to TFDM TTP consumers over the Operational Metrics business function.</p> |

| | | | |
|--|--|---|--|
| <p>Departure Stand Assignment</p> | <p>The gate or parking location that the flight operator has assigned to this aircraft</p> | <p><u>Operational Use:</u> TFDM uses this information to help create an accurate surface schedule. Different departure stands require different taxi routes and therefore contribute to and are affected by surface congestion differently.</p> <p>Note: The value submitted for this field should match a gate name as denoted in TFDM adaptation in order for TFDM to properly predict taxi routes and gate conflicts. If the gate/stand name does not match adaptation, the accuracy of taxi-time prediction for the affected flight will potentially be degraded.</p> <p><u>Metrics Use:</u> Data Comprehensiveness Points (see the Flight Data Quality KPI) are awarded based on whether the stand assignment is provided prior to pushback time for each flight.</p> | <p><u>Operational Consequences:</u> TFDM’s surface scheduler accuracy will be negatively impacted without accurate departure stand information. Assigned metering times will less-accurately reflect expected taxi times and routes, potentially resulting in unexpected surface congestion.</p> <p><u>Metrics Consequences:</u> If a departure stand assignment is not assigned by pushback time, fewer Data Comprehensiveness Points for this flight will be awarded. The Data Comprehensiveness Points metric for each flight is computed and published to TFDM TTP consumers over the Operational Metrics business function.</p> |
|--|--|---|--|

| | | | |
|--------------------------------------|--|--|--|
| <p>Initial Off-Block Time</p> | <p>The flight operator’s planned off-block time in the absence of metering</p> | <p><u>Operational Use:</u> TFDM uses this information to help create an accurate surface schedule and assign priority to flights in the event of surface metering.</p> <p><u>Metrics Use:</u> Flight Initialization Lead Time Points (see the Flight Data Quality KPI) are awarded to a flight based on the comparison between its first entry into the TFDM system (flight creation time) and its IOBT. Points are awarded as long as the flight creation time is sufficiently in advance of its IOBT. The threshold for awarding points is an adaptable parameter.</p> | <p><u>Operational Consequences:</u> TFDM’s surface scheduler accuracy will be negatively impacted without accurate initial off-block time information. TFDM uses IOBT information to predict the need for surface metering and to assign priority for metering times in the presence of metering.</p> <p>Note: TFMS automatically determines an “Initial Gate Time of Departure” (IGTD) based on the gate time of departure provided by the operator when the flight is initially created. If the IOBT value is not provided, this IGTD will be used by TFDM as the IOBT. This data element is duplicative; if it is provided, operators should provide the same value as the flight’s IGTD.</p> <p><u>Metrics Consequences:</u> If an IOBT is not provided far enough in advance, zero Flight Initialization Lead Time Points will be awarded for this flight. The Flight Initialization Lead Time Points metric for each flight is computed and published to TFDM TTP consumers over the Operational Metrics business function.</p> |
|--------------------------------------|--|--|--|

| | | | |
|---------------------------------------|---|--|---|
| <p>Earliest Off-Block Time</p> | <p>Earliest time a flight would be able to push back or taxi from its parking stand for departure, given any business decisions the operator makes (e.g. delaying boarding during surface metering)</p> | <p>TFDM uses this information to help create an accurate surface schedule. An accurate and timely-provided earliest off-block time is critical during the planning for surface metering and during a surface metering program so that TFDM can create and update an optimized, achievable surface schedule.</p> | <p>TFDM’s surface scheduler accuracy will be negatively impacted without accurate earliest off-block time information. TFDM uses EOBT information to perform pre-departure sequencing and assign metering times to optimize surface operations.</p> <p>If no EOBT is submitted by the operator, TFDM will create an estimated EOBT based on any information it may have for the flight(e.g. AirLine Gate Time of Departure (LGTD), Proposed Departure Time (P-Time), IOBT), based on an adaptable hierarchy. However, if this estimated EOBT is substantially different from the operator’s achievable EOBT, the flight might end up either missing its assigned metering time or being held at the gate unnecessarily.</p> |
| <p>Departure Readiness</p> | <p>Flag to indicate whether a flight is ready to push back</p> | <p>TFDM does not currently use the Departure Readiness flag.</p> | <p>TFDM does not currently use the Departure Readiness flag. There will be no effect on TFDM operations if this data is not submitted.</p> |

| | | | |
|-------------------------------------|--|--|---|
| <p>Actual Off-Block Time</p> | <p>The time when an aircraft pushes back from its assigned gate or parking location, or when it commences movement with the intent to taxi for departure</p> | <p><u>Operational Use:</u> TFDM displays flight counts to Traffic Management Coordinators (TMCs) based on AOBTs provided by the operators. TMCs will use these flight counts to inform their decisions as to how best to manage the airport (e.g. runway demand balancing).</p> <p>TFDM uses operator-provided AOBT data to improve surface scheduling and predicted times by maintaining historical databases of taxi times, which inform future predictions.</p> <p>TFDM also uses AOBT, along with other data, to calculate some operational metrics, including various taxi times, estimated fuel burn, and TFDM accuracy metrics.</p> <p><u>Metrics Use:</u> For unmetered, non-EDCT flights only, Data Comprehensiveness Points (see the Flight Data Quality KPI) are awarded based on how well a flight’s AOBT matched its EOBT.</p> <p>For all flights, Timely Provision of Actual Off-Block Time Compliance Points are awarded based on whether a flight operator provided a flight’s AOBT within an adaptable amount of time after the flight pushed back.</p> | <p><u>Operational Consequences:</u> TFDM’s surface scheduler accuracy, several calculated metrics, and historical transit/taxi times used to improve future predictions will be negatively impacted without an accurate actual off-block time.</p> <p>If the operator does not provide an actual off-block time, TFDM can use flight strip bay movements or surveillance to estimate one.</p> <p>Note: If operators choose not to submit AOBT data as part of the terminal data elements, TFDM will access the “OUT” and/or “AGTD” (Actual Gate Time of Departure) fields instead. Flight operators can choose to populate one or more of these fields. If submitting a message with more than one field populated, all fields should be populated with the same value. If the AOBT, OUT, or AGTD values are submitted more than once, TFDM will use the most recent submission.</p> <p><u>Metrics Consequences:</u> For flights not subject to metering or an EDCT, TFDM computes a metric based on how well a flight’s AOBT matched its EOBT, and fewer Data Comprehensiveness Points are awarded for flights where the EOBT and AOBT do not match or do not match for very long. The Data Comprehensiveness Points metric for each flight is computed and published to TFDM TTP consumers over the Operational Metrics business function.</p> <p>For all flights, if the operator does not provide an AOBT on a timely basis after pushback, zero Timely Provision of Actual Off-Block Time Compliance Points will be awarded</p> |
|-------------------------------------|--|--|---|

| | | | |
|-------------------------------------|--|---|---|
| | | | for this flight. The Timely Provision of Actual Off-Block Time Compliance Points metric for each flight is computed and published to TFDM TTP consumers over the Operational Metrics business function. |
| TMAT Marked for Substitution | Flag to indicate that TFDM should assign this delayed/cancelled flight a TMAT based on its IOBT rather than its current EOBT because the TMAT assigned to this flight is or will be the subject of a substitution request via TFCS | TFDM does not use this information if submitted through TFMS. TMAT substitution requests must be made through TFCS. | TFDM does not use marked for substitution information submitted over TFMS. Substitution requests must be made through TFCS. |
| TMAT Relinquish | <p>Flag to indicate that this flight will not be using its originally-assigned TMAT and that the flight operator does not want to make a substitution request.</p> <p>For cancelled flights, this means that TFDM will remove the TMAT. For delayed flights, indicates that the operator is requesting that TFDM assign the delayed flight a new TOBT that matches its EOBT.</p> | TFDM does not use this information if submitted through TFMS. TMAT relinquishment requests must be made through TFCS. | TFDM does not use TMAT Relinquishment information submitted over TFMS. TMAT relinquishment requests must be made through TFCS. |

| | | | |
|---|--|---|--|
| <p>Intent to be Deiced</p> | <p>Flag to indicate whether a flight intends to be deiced before departure</p> | <p>TFDM uses this information to help create an accurate surface schedule and assign TMATs.</p> <p>TFDM will predict a larger taxi time for flights which signal their intent to deice. TFDM uses either operator-provided or default deicing location information to update the surface schedule, including taxi times, location occupancy, etc.</p> <p>Depending on site adaptation, if a flight signals its intent to deice, TFDM may assign a zero metering hold.</p> | <p>TFDM’s surface scheduler accuracy, and assigned metering times, will be negatively impacted if an operator does not provide deicing intent information. If deicing intent information is not submitted and a flight misses its metering time and/or is subject to additional delay, these issues will be attributed to the operator.</p> |
| <p>Intended Deicing Location</p> | <p>Location where the operator intends to deice the flight</p> | <p>TFDM uses this information to help create an accurate surface schedule. If the flight intends to deice on the ramp, TFDM will predict increased ramp taxi time; if the flight intends to deice in the AMA, TFDM will predict increased AMA taxi time.</p> | <p>TFDM’s surface scheduler accuracy, and assigned metering times, will be negatively impacted if an operator does not provide deicing location information.</p> <p>If a flight signals its intent to deice, and the flight operator does not provide a deicing location TFDM uses a default deicing location and associated taxi times. Providing an intended deicing location improves surface scheduling by allowing TFDM to better estimate taxi times to and from the deicing location.</p> |
| <p>Departure Intent to Hold in NMA</p> | <p>Flag to indicate whether a flight intends to hold in the NMA</p> | <p>This flag is used for common situational awareness. ATC can set the EFS gate conflict flight list to display NMA hold intent information.</p> | <p>Common situational awareness will be degraded if an operator does not provide intended NMA hold information.</p> |

| | | | |
|---|--|---|--|
| <p>Intended Departure Spot</p> | <p>The location where the flight intends to cross from the NMA to the AMA</p> | <p>TFDM uses this information to help create an accurate surface schedule. Providing the intended departure spot allows TFDM to more accurately predict taxi times and surface congestion.</p> | <p>TFDM’s surface scheduler accuracy will potentially be negatively impacted if an operator does not provide intended departure spot information.</p> <p>If an operator does not provide an intended departure spot, TFDM will predict a departure spot based on gate information and current or scheduled runway assignment to be used for surface scheduling.</p> |
| <p>Departure Intent to Hold in AMA</p> | <p>Flag to indicate whether a flight intends to hold in the AMA; if flight intends to hold, also includes the estimated time the aircraft will enter the AMA to begin its hold</p> | <p>TFDM uses this information to help create an accurate surface schedule. Based on intent to hold in the AMA or NMA, TFDM will update taxi time predictions accordingly.</p> <p>This flag is also used for common situational awareness.</p> | <p>TFDM’s surface scheduler accuracy will be negatively impacted if an operator does not provide intended departure hold information. If a flight cannot take all of its assigned metering hold on the gate or in the ramp, the flight operator should set this flag to TRUE to inform ATC that the flight will need to hold in the AMA.</p> <p>If an intent to hold is declared without a corresponding hold time, TFDM will use an adaptable default hold time for surface scheduling.</p> |
| <p>Intent to Return to Gate</p> | <p>Flag to indicate whether a flight intends to return to gate</p> | <p>TFDM uses this information to help create an accurate surface schedule and attribute delay components (for operational metrics) to the appropriate entity.</p> <p>This flag is also used for common situational awareness.</p> | <p>TFDM’s surface scheduler accuracy and delay component attribution will be negatively impacted if an operator does not provide return to gate intent information.</p> <p>If an operator does not provide return to gate intent information, TFDM will only recognize that a flight is returning to gate when ATC performs the EFS return to gate action.</p> |
| <p>Acceptable Departure Runways</p> | <p>A list of acceptable departure runways</p> | <p>TFDM does not use this information.</p> | <p>There is no impact if operators do not provide acceptable departure runway information, as TFDM does not use this information.</p> |

| | | | |
|--|---|---|---|
| <p>Unacceptable Departure Runways</p> | <p>A list of unacceptable departure runways</p> | <p>TFDM uses this information to help create an accurate surface schedule and provide the ATCT with situational awareness.</p> <p>TFDM will not predict a flight's departure from an unacceptable runway and will update its predictions based on this information. The fact that TFDM has changed its prediction because of the list of unacceptable runways can be shown to ATC at the TMC position and on EFS. ATC can override TFDM's prediction.</p> | <p>TFDM's surface scheduler accuracy will be negatively impacted if an operator cannot accept particular runways and does not provide unacceptable runway information.</p> <p>If an operator does not provide unacceptable runway information, TFDM will predict a runway assignment based on airport configuration and load balancing and use that predicted runway assignment for surface scheduling.</p> <p>Note: Unacceptable runways should only be submitted on the basis of operational necessity (e.g. required runway length because of weight and balance).</p> |
| <p>Actual Takeoff Time</p> | <p>Time the departing flight becomes airborne</p> | <p>TFDM uses this information to provide common situational awareness and to compute operational metrics.</p> | <p>If an operator does not provide actual takeoff time information, TFDM will assign an actual takeoff time based on surveillance (if available) or an EFS action (if surveillance is not available).</p> <p>Note: If operators choose not to submit ATOT data as part of the terminal data elements, TFDM will access the "OFF" and/or "ARTD" (Actual Runway Time of Departure) fields instead. Flight operators can choose to populate one or more of these fields. If submitting a message with more than one field populated, all fields should be populated with the same value. If the ATOT, OFF, or ARTD values are submitted more than once, TFDM will use the most recent submission.</p> |

| | | | |
|--|--|---|---|
| <p>Actual Landing Time</p> | <p>Time the arriving aircraft actually lands</p> | <p>TFDM uses this information to provide common situational awareness and to compute operational metrics.</p> | <p>If an operator does not provide actual landing time information, TFDM will assign an actual landing time based on surveillance (if available) or an EFS action (if surveillance is not available).</p> <p>Note: If operators choose not to submit ALDT data as part of the terminal data elements, TFDM will access the “ON” and/or “ARTA” (Actual Runway Time of Arrival) fields instead. Flight operators can choose to populate one or more of these fields. If submitting a message with more than one field populated, all fields should be populated with the same value. If the ALDT, ON, or ARTA values are submitted more than once, TFDM will use the most recent submission.</p> |
| <p>Arrival Stand Assignment</p> | <p>The gate or parking location that the flight operator has assigned to this aircraft</p> | <p><u>Operational Use:</u> TFDM uses this information to help create an accurate surface schedule. Different arrival stands require different taxi routes and therefore contribute to and are affected by surface congestion differently. TFDM also uses gate assignment information to predict gate conflicts. The gate assignment from TFDM can be shown on EFS to local and ground controllers to help with common situational awareness.</p> <p><u>Metrics Use:</u> Data Comprehensiveness Points (see the Flight Data Quality KPI) are awarded based on whether the stand assignment is provided prior to in-block time for each flight.</p> | <p><u>Operational Consequences:</u> TFDM’s surface scheduler accuracy will be negatively impacted without accurate arrival stand information. TFDM may not correctly predict taxi times and routes, potentially resulting in unexpected surface congestion. TFDM’s ability to predict gate conflicts will be degraded without accurate gate assignment information. Local and ground controllers will have reduced common situational awareness.</p> <p><u>Metrics Consequences:</u> If an arrival stand assignment is not assigned by in-block time, fewer Data Comprehensiveness Points for this flight will be awarded. The Data Comprehensiveness Points metric for each flight is computed and published to TFDM TTP consumers over the Operational Metrics business function.</p> |

| | | | |
|---|---|---|--|
| <p>Arrival Stand Available</p> | <p>A flag to indicate whether the gate or parking location is available for the arriving aircraft</p> | <p>TFDM does not currently use arrival stand availability directly for surface scheduling. However, the information is used for common situational awareness. The EFS gate conflict flight list can be configured to display this flag to improve ATC situational awareness.</p> | <p>Common situational awareness will be degraded if an operator does not provide arrival stand availability information.</p> |
| <p>Intended Arrival Spot</p> | <p>Intended location where the arriving flight will cross out of the AMA into the NMA</p> | <p>TFDM uses this information to help create an accurate surface schedule. Providing the intended arrival spot allows TFDM to more accurately predict taxi times and surface congestion.</p> | <p>TFDM’s surface scheduler accuracy will potentially be negatively impacted if an operator does not provide intended departure spot information.</p> <p>If an operator does not provide an intended arrival spot, TFDM will predict an arrival spot based on gate information and current or scheduled runway assignment to be used for surface scheduling.</p> |
| <p>Arrival Intent to Hold in AMA</p> | <p>Flag to indicate whether a flight intends to hold in the AMA; if flight intends to hold, also includes the estimated AMA exit time</p> | <p>TFDM uses this information to help create an accurate surface schedule and attribute delay components (for operational metrics) to the appropriate entity.</p> <p>This flag is also used for common situational awareness. ATC can set the EFS gate conflict flight list to display AMA hold intent information.</p> | <p>TFDM’s surface scheduler accuracy and delay component attribution will be negatively impacted if an operator does not provide intended arrival hold information.</p> <p>If an intent to hold is declared without a corresponding hold time, TFDM will use an adaptable default hold time for surface scheduling.</p> |
| <p>Arrival Intent to Hold in NMA</p> | <p>Flag to indicate whether an arrival intends to hold in the NMA</p> | <p>This flag is used for common situational awareness. ATC can set the EFS gate conflict flight list to display NMA hold intent information.</p> | <p>Common situational awareness will be degraded if an operator does not provide NMA hold intent information.</p> |

| | | | |
|------------------------------------|--|--|--|
| <p>Actual In-Block Time</p> | <p>Time a flight has reached its gate or parking stand</p> | <p><u>Operational Use:</u> TFDM uses operator-provided AIBT data to improve surface scheduling and predicted times by maintaining historical databases of taxi times, which inform future predictions. TFDM also uses AIBT, along with other data, to calculate some operational metrics, including various taxi times, estimated fuel burn, and TFDM accuracy metrics.</p> <p><u>Metrics Use:</u> Data Comprehensiveness Points (see the Flight Data Quality KPI) are awarded based on whether the stand assignment is provided prior to in-block time for each flight.</p> | <p><u>Operational Consequences:</u> TFDM’s surface scheduler accuracy and several calculated metrics will be negatively impacted without an accurate in-block time.</p> <p>If the operator does not provide an actual in-block time, TFDM can use flight strip bay movements or surveillance to estimate one.</p> <p>Note: If operators choose not to submit AIBT data as part of the terminal data elements, TFDM will access the “IN” and/or “AGTA” (Actual Gate Time of Arrival) fields instead. Flight operators can choose to populate one or more of these fields. If submitting a message with more than one field populated, all fields should be populated with the same value. If the AIBT, IN, or AGTA values are submitted more than once, TFDM will use the most recent submission.</p> <p><u>Metrics Consequences:</u> For all flights, if the operator does not provide an AOBT on a timely basis after pushback, zero Timely Provision of Actual Off-Block Time Compliance Points will be awarded for this flight. The Timely Provision of Actual Off-Block Time Compliance Points metric for each flight is computed and published to TFDM TTP consumers over the Operational Metrics business function.</p> <p>If an arrival stand assignment is not assigned by in-block time, fewer Data Comprehensiveness Points for this flight will be awarded. The Data Comprehensiveness Points metric for each flight is computed and published to TFDM TTP consumers over the Operational Metrics business function.</p> |
|------------------------------------|--|--|--|

3.2.1 Surface Flight Data Elements – Data Submission Details

As previously mentioned, to enable optimal TFDM operation, operators should submit the new flight data elements through the TFMS Request/Reply service. Flight create and flight modify requests can be used to submit and/or update any of the surface flight data elements, which will be relayed to TFDM via messages over the Terminal Flight Data business function of TFMS.

The TFMS Request/Reply business function allows operators to interact with TFMS to exchange data, including flight data, traffic flow options, TMIs, and other data. Full documentation of the Request/Reply business function is found in the TFMS schema; this section describes the hierarchy of the new surface flight data elements, as listed in the schema, and their data types. While the full schema is impractical to reproduce in this document, this section provides an overview of where the surface flight data elements fall within the schema, and requirements for formatting of the data in order to have it properly processed and used by TFDM.

The full data definitions for the data elements can be found in the TfmRequestReplyTypes schema document. Authoritative definitions are in the schema document.

Flight Create and Flight Modify Requests:

The flight create and flight modify data elements used to submit surface data over TFMS are located in the schema at TfmRequestReplyTypes.requestType.flightBlockReqData.flightCreate.terminalData and TfmRequestReplyTypes.requestType.flightBlockReqData.flightModify.terminalData.

A flight create or flight modify request will include some or all of the following data elements:

| | |
|--|--|
| <p>terminalData, which is an instance of the airlineSurfaceDataType: A complex data type that holds the individual surface data elements, which are:</p> | <p>IOBT: (Initial Off-Block Time) The flight operator’s planned off-block time in the absence of metering. The initial schedule is built around the IOBT.</p> <p>Note: TFMS automatically determines an “Initial Gate Time of Departure” (IGTD) based on the gate time of departure provided by the operator when the flight is initially created. If the IOBT value is not provided, this IGTD will be used by TFDM as the IOBT. This data element is duplicative; if it is provided, operators should provide the same value as the flight’s IGTD.</p> <p>Data Type: dateTime</p> |
| | <p>EOBT: (Earliest Off-Block Time) Earliest time a flight operator would be able to push back or taxi from its parking stand for departure. This time is used to calculate other important values in the TFDM surface schedule, like the TMAT.</p> <p>Data Type: dateTime</p> |
| | <p>depStandAssignment: The gate or parking location that the flight operator has assigned to this aircraft</p> <p>Data Type: restricted string; maximum length of 5 characters</p> |
| | <p>arrStandAssignment: The gate or parking location that the flight operator has assigned to this aircraft</p> <p>Data Type: restricted string; maximum length of 5 characters</p> |

| | |
|--|--|
| | <p>arrStandAvailable: A flag to indicate whether the gate or parking location is available for the arriving aircraft Data Type: boolean</p> |
| | <p>tmatRelinquish: Flag to indicate that this flight will not be using its assigned TMAT and that the flight operator does not want to make a substitution request Note: This flag is not used by TFDM if submitted through TFMS. TMAT relinquish requests must be made via TFCS. Data Type: boolean</p> |
| | <p>tmatMarkedForSub: Flag to indicate that the TMAT assigned to this flight is or will be the subject of a substitution request via TFCS Note: This flag is not used by TFDM if submitted through TFMS. TMAT substitution requests must be made via TFCS. Data Type: boolean</p> |
| | <p>aircraftRegMark: The aircraft's registration mark (N-number for US-registered aircraft) Note: Flight operators should not provide this data element until TFMS Release 14 is operational. There is a bug in the current version of TFMS which means TFMS will not republish data correctly if a tail number/registration mark is provided. Data Type: aircraftRegMarkType (restricted string; accepts 1 – 7 characters in the ranges A-Z or 0-9)</p> |
| | <p>accDepRwy: A list of up to seven acceptable departure runways Note: This data element is not used by TFDM. There is no need to provide this data. Data Type: runwayNameType (restricted string; accepts a runway number between 01 and 36 and optionally L, C, or R)</p> |
| | <p>unaccDepRwy: A list of up to seven unacceptable departure runways Data Type: runwayNameType (restricted string; accepts a runway number between 01 and 36 and optionally L, C, or R)</p> |
| | <p>depReadiness: Flag to indicate whether a flight is ready to push back Note: This data element is not used by TFDM. There is no need to provide this data. Data Type: boolean</p> |
| | <p>depIntentToHoldNonMove: Flag to indicate whether a flight intends to hold in the NMA (Non Movement Area) Data Type: boolean</p> |

| | | |
|--|---|---|
| | <p>arrIntentToHoldNonMove: Flag to indicate whether an arrival intends to hold in the NMA (Non Movement Area) Data Type: boolean</p> | |
| | <p>deplIntentToHoldInMove: Flag to indicate whether the flight intends to hold in the AMA during departure, as well as information about estimated hold time. Data Type: extends boolean with additional attributes holdIntent and estimatedEntryTime</p> | <p>holdIntent: indicates hold intent Data Type: restricted string; accepts "HOLD" or "NO_HOLD"</p> <p>estimatedEntryTime: The time the operator estimates the aircraft will enter the AMA Data Type: dateTime</p> |
| | <p>arrIntentToHoldInMove: Flag to indicate whether the flight intends to hold in the AMA during arrival, as well as information about estimated hold time. Data Type: extends boolean with additional attributes holdIntent and estimatedEntryTime</p> | <p>holdIntent: indicates hold intent Data Type: restricted string; accepts "HOLD" or "NO_HOLD"</p> <p>estimatedEntryTime: The time the operator estimates the aircraft will exit the AMA Data Type: dateTime</p> |
| | <p>intentToBeDeiced: Flag to indicate whether a flight intends to be deiced before departure Data Type: boolean</p> | |
| | <p>intendedDeiceLocation: Location where the flight will be de-iced Data Type: restricted string; maximum length of 5 characters; operators should submit only "RAMP", "AMA", or "GATE". TFDM will not update predicted taxi time if some other string is submitted.</p> | |
| | <p>intendedDepSpot: The location where the flight intends to cross from the NMA to the AMA Data Type: restricted string; maximum length of 5 characters</p> | |
| | <p>intendedArrSpot: Intended location where the arriving flight will cross out of the AMA into the NMA Data Type: restricted string; maximum length of 5 characters</p> | |
| | <p>intentReturnToGate: Flag to indicate whether a flight intends to return to gate Data Type: boolean</p> | |

| | |
|--|---|
| | <p>AOBT: (Actual Off-Block Time) The time when an aircraft pushes back from its assigned gate or parking location, or when it commences movement with the intent to taxi for departure</p> <p>Note: If operators choose not to submit AOBT data as part of the terminal data elements, TFDM will access the “OUT” and/or “AGTD” (Actual Gate Time of Departure) fields instead. Flight operators can choose to populate one or more of these fields. If submitting a message with more than one field populated, all fields should be populated with the same value. If the AOBT, OUT, or AGTD values are submitted more than once, TFDM will use the most recent submission.</p> <p>Data Type: dateTime</p> |
| | <p>AIBT: (Actual In Block Time) Time a flight has reached its gate or parking stand.</p> <p>Note: If operators choose not to submit AIBT data as part of the terminal data elements, TFDM will access the “IN” and/or “AGTA” (Actual Gate Time of Arrival) fields instead. Flight operators can choose to populate one or more of these fields. If submitting a message with more than one field populated, all fields should be populated with the same value. If the AIBT, IN, or AGTA values are submitted more than once, TFDM will use the most recent submission.</p> <p>Data Type: dateTime</p> |
| | <p>ATOT: (Actual Take Off Time) Time the departing flight becomes airborne</p> <p>Note: If operators choose not to submit ATOT data as part of the terminal data elements, TFDM will access the “OFF” and/or “ARTD” (Actual Runway Time of Departure) fields instead. Flight operators can choose to populate one or more of these fields. If submitting a message with more than one field populated, all fields should be populated with the same value. If the ATOT, OFF, or ARTD values are submitted more than once, TFDM will use the most recent submission.</p> <p>Data Type: dateTime</p> |
| | <p>ALDT⁶: (Actual Landing Time) Time the arriving aircraft actually lands</p> <p>Data Type: dateTime</p> |

For data elements that are not built-in data types in XML, a summary of the formatting rules and examples of acceptable data are shown in Table 3-2 below.

⁶ The Actual Landing Time data element was abbreviated as ALTD in the TFMDData v2.0.5 schema. This misspelling has been corrected in the TFMDData v. 3.1 schema.

Table 3-2: TFMS Data Submission Formatting Rules

| Data Element | Formatting Rule | Acceptable Examples | Unacceptable Examples |
|--|--|--|--|
| depStandAssignment, arrStandAssignment, intendedDepSpot, intendedArrSpot | Any string, limited to five characters | B32 A6 1 2 ALPHA BRAVO Note: For TFDM to use this information properly to update taxi times and predict gate conflicts, the values provided should match values in the site adaptation. | Gate B32 32L Pad Scenic Hold Pad |
| intendedDeiceLocation | In order to be processed correctly by TFDM, one of the literal strings "GATE", "RAMP, or "AMA"; however, any string, limited to five characters, will be accepted without an error message Note: This is not case-sensitive. | Gate GATE Ramp ama | Gate 1A Ramp Region 01 |
| aircraftRegMark | Between one and seven characters in the ranges A-Z or 0-9 | N1 N3255 CF224 | n1 n3225 NA359912 |
| accDepRwy, unaccDepRwy | A string beginning with two digits from 01 to 36 and optionally followed by L, C, or R | 23R 04L 18C | 1R 23 Left |
| holdIntent | One of the literal strings "HOLD" or "NO_HOLD" | HOLD NO_HOLD | Hold No hold |

Flight Create or Flight Modify Request Replies:

Flight create and flight modify requests will receive replies from TFMS indicating whether the request was successfully processed. Reply messages to flight create and flight modify requests will contain the following data elements:

| | | |
|---|---|--|
| <p>replyType: The acknowledgment that contains a response to a user request. For flight create and flight modify requests, this will be either an ERROR or SUCCESS message. The replyType contains these data elements:</p> | <p>serviceCode: A string that specifies the service being requested. For flight create and flight modify requests, this should always be a string reading "FDBLOCK".</p> | |
| | <p>requestId: A data type that uniquely identifies the request resulting in this reply, which contains:</p> | <p>requestor: An identifier for the requesting organization, which can contain:</p> |
| | <p>center: Should never be populated. If a center or other FAA facility made a request, this would provide the identifier for that center.</p> | |
| | <p>requestorId: A unique string identifying the user that made the original request. This is supplied to users by the FAA upon initial set-up.</p> | |
| <p>uniqueMsgId: A unique identifier for the original request which was generated by the operator and is repeated by TFMS so the operator can track replies. The unique message ID is a string which must be formatted as 8-4-4-4-12 hex digits, generated in accordance with RFC 4122.</p> | | |
| <p>status: A string identifying the status of the flight create or flight modify request. Either "ERROR" or "SUCCESS".</p> | | |

4 Schema Information

For more information on the logical structure of the various TTP, TFCS, and TFMS messages from the individual business functions, as well as details on expected bandwidth use, consult the schemas. Authoritative versions can be found on the NAS Service Registry and Repository (NSRR) at <https://nsrr.faa.gov/>.

5 Data Formatting in TTP

5.1 Fields for Flight Matching

All of the KPIs that include Flight Lists include a certain set of fields that are intended to be used by data consumers to track data associated with an individual flight across all business functions. These fields for flight matching are:

| | |
|-----------------------------------|--|
| AircraftIdentification | Aircraft callsign. |
| DeparturePoint | Can be an airport, NAS lat/long point, fix, or a fix radial distance. Typically the flight's airport of origin. |
| DestinationPoint | Can be an airport, NAS lat/long point, fix, or a fix radial distance. Typically, the flight's filed destination. |
| InitialGateTimeOfDeparture | First reported time a flight is expected to push back/block out. |
| EramGufi | Identification number used by the ERAM system to uniquely identify a flight. |
| ComputerId | The flight's Computer ID (CID) from ERAM. |
| CidCreatorUnit | The name of the facility that created the ERAM CID. |
| TfdmId | Internal TFDM ID for the flight. Can be used for matching TTP flight data. |
| TfdmIdCreatorAirport | The airport where the TFDM ID was created. |

5.2 Timestamps

Many KPIs publish various timestamps. The formatting is specified in the following form:

yyyy-mm-ddTHH:MM:SS.sssZ

| | |
|-------------|---|
| yyyy | Indicates the year |
| mm | Indicates the month (with leading zero for months before October) |
| dd | Indicates the day (with leading zero for days before 10) |
| T | Indicates the start of the time section |
| HH | Indicates the hour (24 hour format) |
| SS | Indicates the whole seconds (with leading zero for seconds before 10) |
| sss | Indicates the number of milliseconds (with leading zeros as required for milliseconds before 100) |
| Z | Indicates that the timestamp is in Zulu time |

5.3 Periods of Time

Many KPIs publish various metrics that include periods of time. For KPI fields that are a period of time, the time interval is specified in the following form:

PnYnMnDTnHnMnS

| | |
|-----------|---|
| P | Indicates the period (required) |
| nY | Indicates the number of years |
| nM | Indicates the number of months |
| nD | Indicates the number of days |
| T | Indicates the start of a time section (required if you are going to specify hours, minutes, or seconds) |
| nH | Indicates the number of hours |
| nM | Indicates the number of minutes |
| nS | Indicates the number of seconds |

For a period of time that is negative, a leading minus sign (“-”) is added.

6 Definitions / Acronyms

| | |
|--|--|
| ADIS | Airport Data Information Service |
| AIBT | Actual In-Block Time |
| AMA | Aircraft Movement Area |
| AMAT | Actual Movement Area entry Time |
| AOBT | Actual Off Block Time |
| APREQ | Approval Request |
| AQET | Actual Queue Entry Time |
| ATCT | Air Traffic Control Tower |
| ATOT | Actual Take-Off Time |
| CDM | Collaborative Decision Making |
| CFR | Call For Release |
| EOBT | Earliest Off-Block Time |
| ETOT | Estimated Take-Off Time |
| FOS | Flight Operator System |
| KPI | Key Performance Indicator |
| LUAW | Line Up And Wait |
| “Matured during the reporting interval” | For arrivals, the target matures once it is in-block. For departures, the target matures once it is wheels up. |
| MINIT | Minutes In Trail |
| MIT | Miles In Trail |
| NMA | Non Movement Area |
| RDR | Runway Departure Rate |
| S-CDM | Surface-Collaborative Decision Making |
| SFSS | SMP Flight Substitution Service |
| SMP | Surface Metering Program |
| Spot | The location where an aircraft transitions from the NMA to the AMA |
| SWIM | System Wide Information Management |
| TBFM | Time Based Flow Management |
| TFCS | TFDM FOS Collaboration Service |
| TFDM | Terminal Flight Data Manager |
| TFMS | Traffic Flow Management System |
| TMAT | Target Movement Area entry Time |
| TMI | Traffic Management Initiative |
| TMR | Traffic Management Restriction |
| TOBT | Target Off-Block Time |
| TTP | TFDM Terminal Publication |

| | |
|------------|---------------------------|
| UDB | Unscheduled Demand Buffer |
|------------|---------------------------|