

TFDM Tech Talk: Surface Metering Programs (Part 2)

Presented to: TFDM Industry Stakeholders

By: FAA TFDM Collaborative Site Implementation Team

Date: May 26, 2021



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Introductions

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Agenda

- Terminal Flight Data Manager (TFDM) & Surface Management Programs (SMP) Overview
- SMP Parameters
 - SMP Parameters in TTP
 - SMP Recommendation
 - TMC Action – Affirm/Defer/Reject
 - Delayed or Canceled Flights
 - SMP Adjustments
 - Metering Mode
 - Traffic Management Initiatives (TMIs)
- Next Steps



Terminal Flight Data Manager (TFDM) Overview



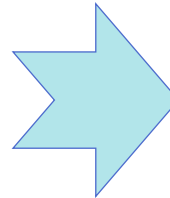
TFDM Program Overview

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

https://www.faa.gov/air_traffic/technology/tfdm/

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

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



Key Benefits:

- Fuel Savings
- Carbon Emission Savings
- Improved Situational Awareness
- Pre-scheduling flights



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TFDM Program Roll-Out Overview

Build 1

Key Site - PHX

- Full hardware development to support the deployment of Build 1 & 2
- Improved Electronic Flight Data Exchange and Electronic Flight Strips
- Runway Assignment Predictions
- Maintenance tools for life cycle support
- B1 TTP Service Offered

- ❖ Initial Operating Capability: ~~June 2020~~
- ❖ In-Service Decision: ~~September 2020~~

Dates being replanned due to COVID-19 Impacts
B1 IOC will not occur before November 2021

Build 2

Key Site - CLT

In addition to the Build 1 capabilities

- Surface Scheduling
- Surface Metering
- Runway Load Balancing
- Metric Reporting & Analysis (MRA)
- B2 TTP and TFCS Services Offered

- ❖ Initial Operating Capability: ~~May 2021~~
- ❖ In-Service Decision: ~~September 2021~~

Dates being replanned due to COVID-19 Impacts
B2 IOC will not occur before November 2022



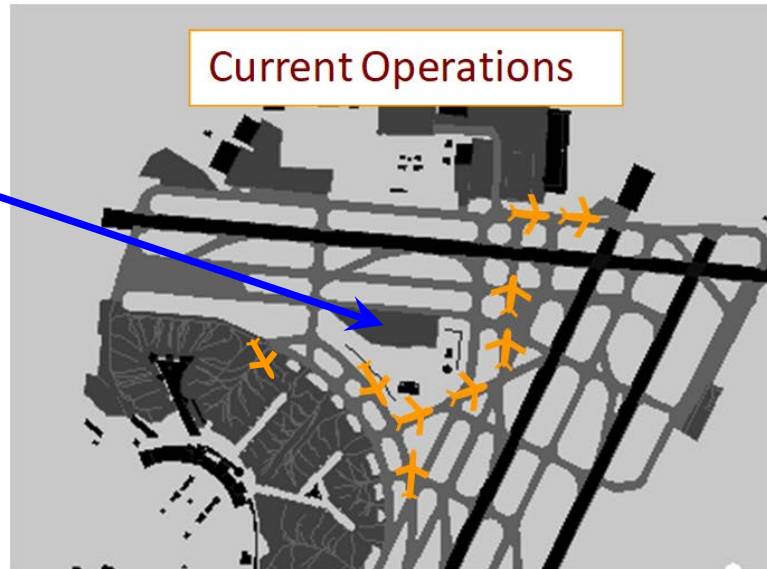
Surface Metering Program (SMP) Overview



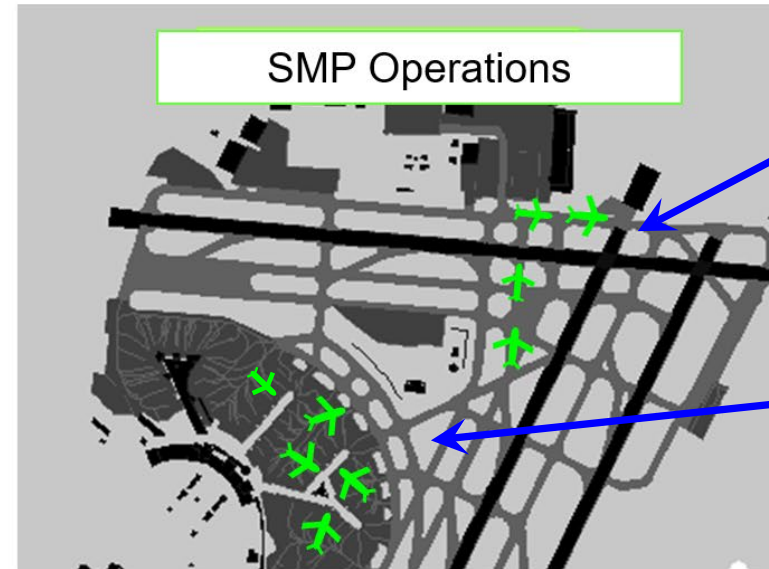
The TFDM SMP Concept

- Departure operations in the NAS are largely managed on a first come, first served basis
- The result is often long departure queues, surface congestion and excess fuel burn
- The goal of SMP operations is to manage the departure queue length by assigning equitable off block times without reducing departure throughput

Long departure queue develops as flights begin taxi as soon as they are ready



SMP Operations



SMP operations result in shorter queues...

...through the control of pushback times



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TFDM's Interface to Industry

- To interact with TFDM, stakeholders will utilize two SWIM interfaces:
 - **TFDM Terminal Publication (TTP)** – Pub/sub service that provides all of TFDM's data across six business functions:
 - Flight Data
 - Airport Information
 - Flight Delay
 - Traffic Management Restrictions
 - Operational Metrics
 - Surface Management Programs
 - **TFDM FOS Collaboration Service (TFCS)** – Request/reply service that allows stakeholders to request substitution during surface metering and indicate ramp closures/gridlock events



SMP Parameters



SMP Parameters Overview

- SMP Parameters are adapted or configured values that TFDM uses to predict surface schedules and meter departures
- SMP Parameters will need to be calibrated at each TFDM site
- SMP Parameters will be discussed as part of the Surface Working Groups at each TFDM site
- The TMC can update configurable SMP Parameters as needed
- SMP Parameter updates are published through TTP



SMP Parameters

Edit SMP Parameters ... Status : Current X

SMP Planning

SMP Lead Time 60 min

Planning Horizon 120 min

Static Time Horizon 30 min

Notification Thresholds

Unscheduled Flights Over UDB 5 flts/hr

Unscheduled Flights Under UDB 5 flts/hr

SMP Exemptions

☒ Exempt Deicing Flights From Metering

☒ Default Exempt CFR Flights From Metering

Reason for Change

SMP Adjustments

☒ Compression Automatic Affirmation

☒ Reassignment Automatic Affirmation

Extension Evaluation Interval 30 min

SMP Deferral Lead Time 15 min

SMP Deferral Timeout 10 min

Average Metering Hold Threshold 25 %

Flights Affected Threshold 25 %

Reclamation Window 480 min

Protection Period 0 min

Flight Suspension Time 30 min

Flight Suspension Warning Time 10 min

TMAT Adjustments

TMAT Compliance Lower Window 5 min

TMAT Compliance Upper Window 10 min

Compression Minimum Time 5 min

Reassignment of TMATs Minimum Time 5 min

Save As Load Reset All Apply Close

NOTE: System under development. Final views subject to change.
Values shown in this image are test values and are subject to change.



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SMP Parameters associated with Airport Config

Schedule New Airport Configuration

Scheduled Start: 05/21/2021 17:36

Configuration Parameters

Name: SMP_1_NORTH Predefined Configurations

Operating Condition: IMC Load Default Rates

Airport Arrival Rate: 105 ☐ Sum of Runway Rates ☒ Manual: 105

Airport Departure Rate: 30 ☐ Sum of Runway Rates ☒ Manual: 30

Unscheduled Demand Buffer (flights / hour): 0

Runway Configuration

	Active	RAR	RDR	Blocking	UDB %
5	☐	35	35	☐	0
18C	☐	35	35	☐	0
18L	☐	35	35	☐	0
18R	☐	35	35	☐	0
23	☐	35	35	☐	0
36C	☒	35	50	☐	0
36L	☒	50	0	☐	0
36R	☒	35	30	☐	0

Runway Assignment Rules

Metering Modes

☒ Runway ☐ Airport

Group Set: NorthFlow

Runways	TQL	TQLLT	TQLUT
36C	8	5	10
36L	10	5	15
36R	8	5	10

Resource Queue Percentages

☐ Fixes ☒ Fix Groups ☐ Like Routes

	Queue %
BARMY4	100
KILNS4	100
KNIGHTS2	100
KERMIT3	100
WEAZL4	100

Group Preview

Schedule Save As Custom Predefined Cancel

NOTE: System under development. Final views subject to change.
Values shown in this image are test values and are subject to change.



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SMP Parameters in TFDM Terminal Publication (TTP)



SMP Parameters in TTP SMP Service

Some SMP Parameters are independent of the airport configuration

- surfaceMeteringProgram/smpDataMessage/parameters

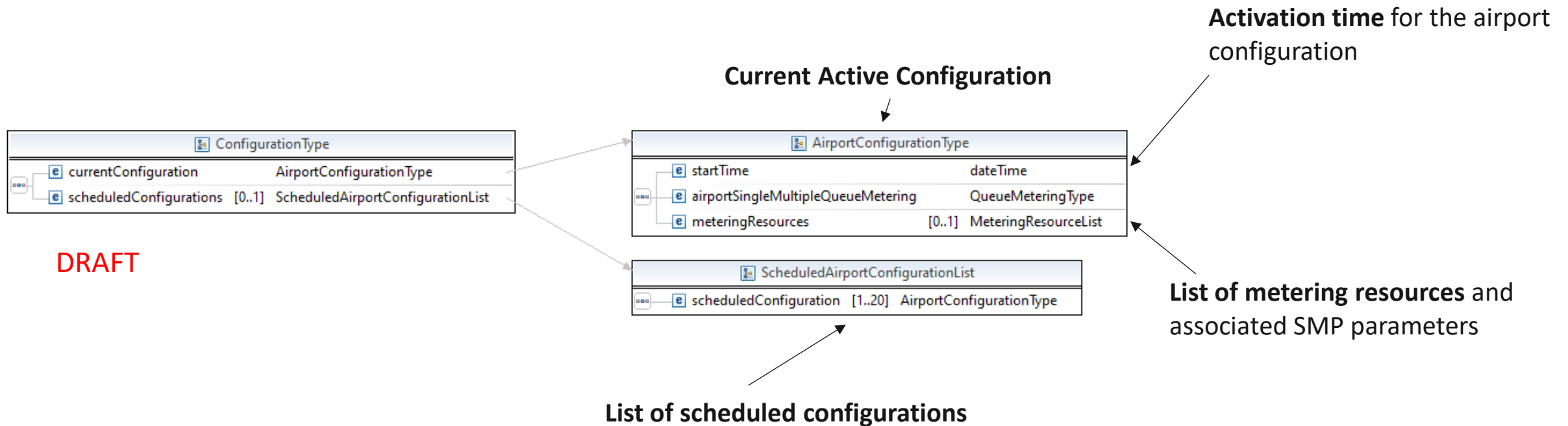
ParametersType		
e cfrMeteringExempt	[0..1] boolean	
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e protectionPeriod	[0..1] duration	
e minimumTMATAdjustmentTime	[0..1] duration	
e reclamationWindow	[0..1] duration	
e staticTimeHorizon	[0..1] duration	
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e tmatComplianceWindow	[0..1] IntegerType	



SMP Parameters in TTP SMP Service

Other SMP parameters are associated with current and scheduled configurations

- surfaceMeteringProgram/smpDataMessage/configuration



SMP Parameters and SMP Recommendations



SMP Parameters: Demand and Capacity Prediction

- Capacity
 - Runway capacity based on wake vortex separation and Runway Arrival Rate (RAR)/Runway Departure Rate (RDR)
 - RAR and RDR can be set by the TMC for a given configuration
 - RAR and RDR are published in the TTP Airport Information Service as part of the active and scheduled configurations list
- Demand
 - Demand primarily based upon flight operator data (EOBTs, flight plans, etc.)
 - Future unscheduled demand can be accounted for by using the Unscheduled Demand Buffer (UDB)
 - Creates placeholder demand to help reduce metering uncertainty
 - UDB is split across runways based on configurable percentages
 - A notification will be sent out TTP if the number of unscheduled flights in an hour is outside set thresholds around the set UDB



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Unscheduled Demand Buffer (UDB)

UDB Notification Lower Threshold

UDB Notification Upper Threshold

UDB Percentage Per Runway



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SMP Parameters: SMP Recommendation

Target Queue Length:

TFDM will assign metering holds to flights during an SMP to maintain the queue at the Target Queue Length

Upper Threshold:

TFDM will detect and demand/capacity imbalance if the predicted queue exceeds the Upper Threshold

SMP Lead Time:

The maximum amount of time in advance of the start of an imbalance that TFDM will recommend an SMP for that imbalance

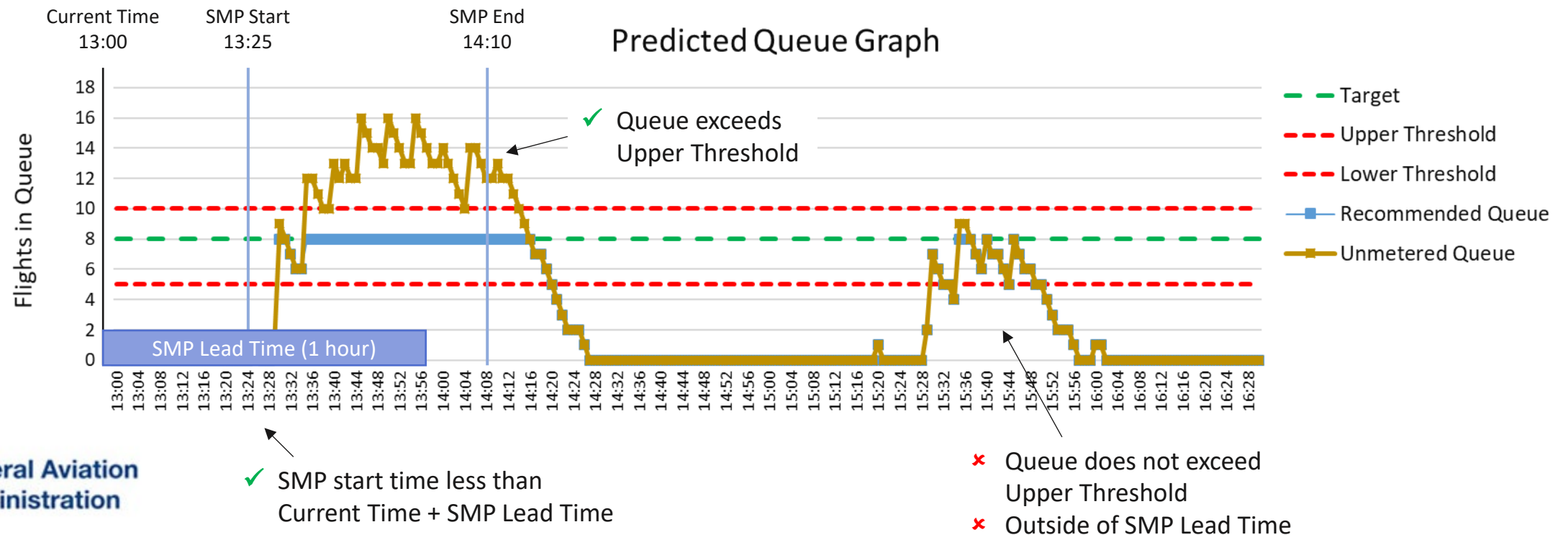
Planning Horizon:

The maximum SMP duration that TFDM will recommend



SMP Parameters: SMP Recommendation

- TFDM recommends the start and end times of the SMP based on the EOBTs of flights that will enter the queue during the imbalance
 - End time cannot be later than (Start Time + Planning Horizon)
 - In this example, Planning Horizon = 2 hours, so end time is limited by imbalance, not by the Planning Horizon



SMP Parameters in TTP SMP Service

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← Planning Horizon

NOTE: SMP Lead Time is not currently published in the TTP B2.1 schema

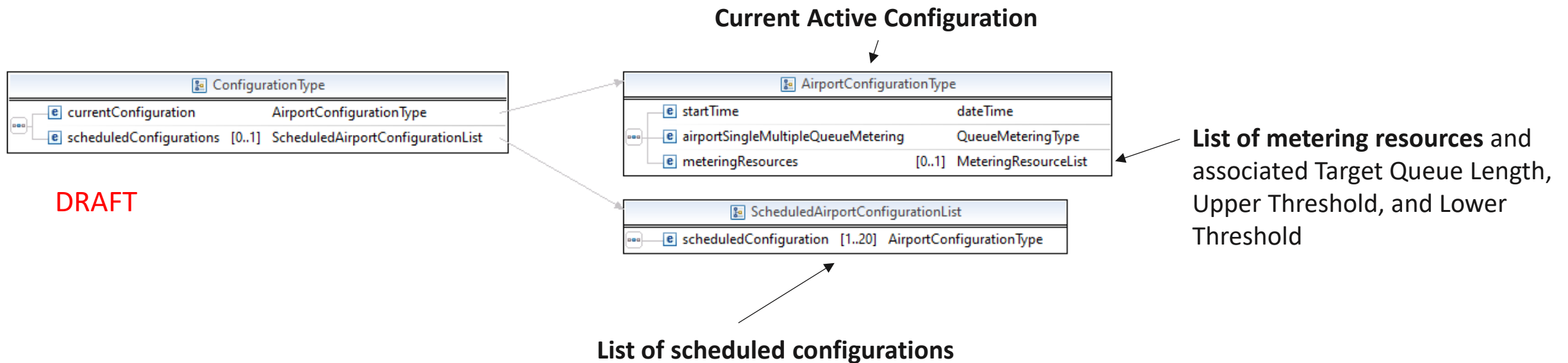


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SMP Parameters in TTP SMP Service

Other SMP parameters are associated with current and scheduled configurations

- surfaceMeteringProgram/smpDataMessage/configuration



TMC Actions



TMC actions

When an SMP is recommended the ATCT TMC can take three actions:

- **Affirm:** TMAFs are assigned
- **Reject:** TMAFs are not assigned
 - The TMC can also reject an affirmed or active SMP which will removed the assigned TMAFs
- **Defer:** Indicate intent to wait to take action
 - The TMC then has the option to later affirm or reject the SMP



TMC Actions and Associated SMP Parameters

- Deferred SMP Parameters
 - **SMP Deferral Timeout:** Time following the deferral of an SMP after which a Deferred SMP is automatically changed back to a Recommended SMP
 - **SMP Deferral Lead Time:** Configurable length of time before a recommended SMP start time within which an SMP can longer be deferred
- Re-recommending a rejected SMP
 - Manually: The TMC can force TFDM to re-recommend a rejected SMP
 - Automatically
 - **Flights Affected Threshold:** If the number of affected flights changes by more than this set percentage, TFDM will automatically re-recommend the SMP
 - **Average Metering Hold Threshold:** If the average metering hold changes by more than this set percentage, TFDM will automatically re-recommend the SMP



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e controlledTimeOfDepartureBuffer	[0..1]	IntegerType	
e tmatComplianceWindow	[0..1]	IntegerType	

Average Metering Hold Threshold

Flights Affected Threshold

SMP Deferral Lead Time

NOTE: SMP Deferral Timeout is not currently published in the TTP B2.1 schema



SMP States

- **Recommended:** TFDM is recommending the SMP and no action has been taken
- **Affirmed:** The TMC has affirmed the SMP
- **Active:** A previously affirmed SMP has now started
- **Completed:** An active SMP has finished
- **Rejected:** The TMC rejected the SMP
- **Deferred:** The TMC deferred a recommended SMP
- **Obsolete:** TFDM recommended an SMP at one point, but is no longer recommending it
- **Expired:** No action was taken on a recommended SMP



Metered Flight Delays and Cancellations



SMP Parameters: Delayed/Canceled Flights

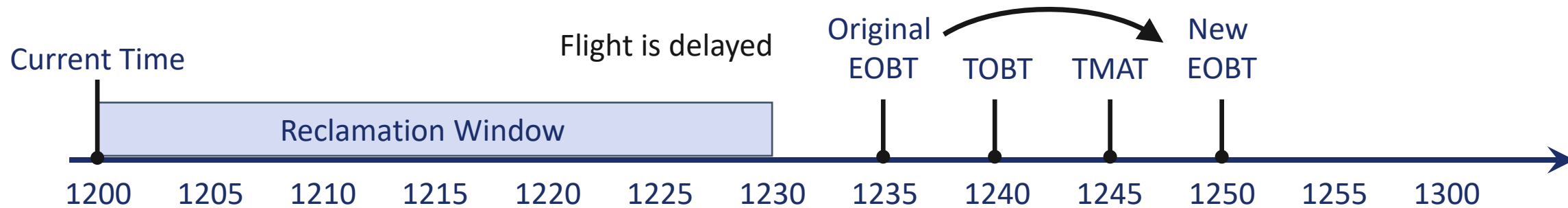
When a flight operator cancels a metered flight or delays a metered flight such that $EOBT > TOBT$, the flight operator has some amount of time to substitute for the metered flight

- If no action is taken,
 - A delayed flight will be assigned a new $TOBT = EOBT$ and $TMAT = EOBT + RTT$
 - A canceled flight will be removed
- This amount of time is controlled by two SMP Parameters
 - **Reclamation Window:** Period of time measured from the current time forward beyond which the TFDM automation will not act on a canceled or delayed flight to reclaim capacity
 - **Protection Period:** Period of time that a flight operator has to substitute a delayed or canceled flight before the TFDM automation can reclaim the allocated capacity

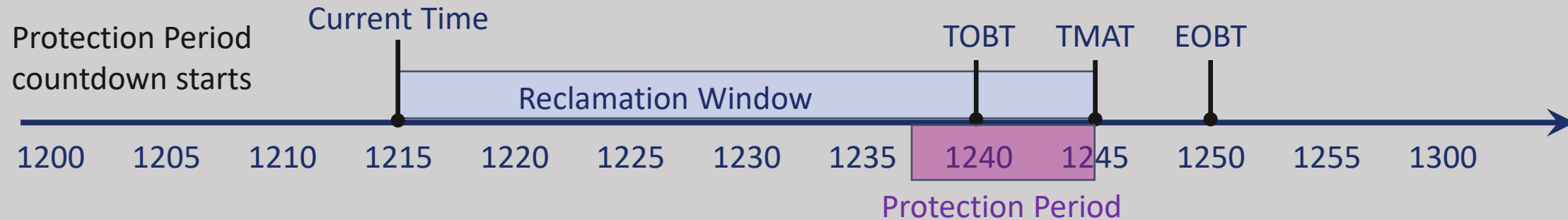


Delayed Flight Reclamation Example

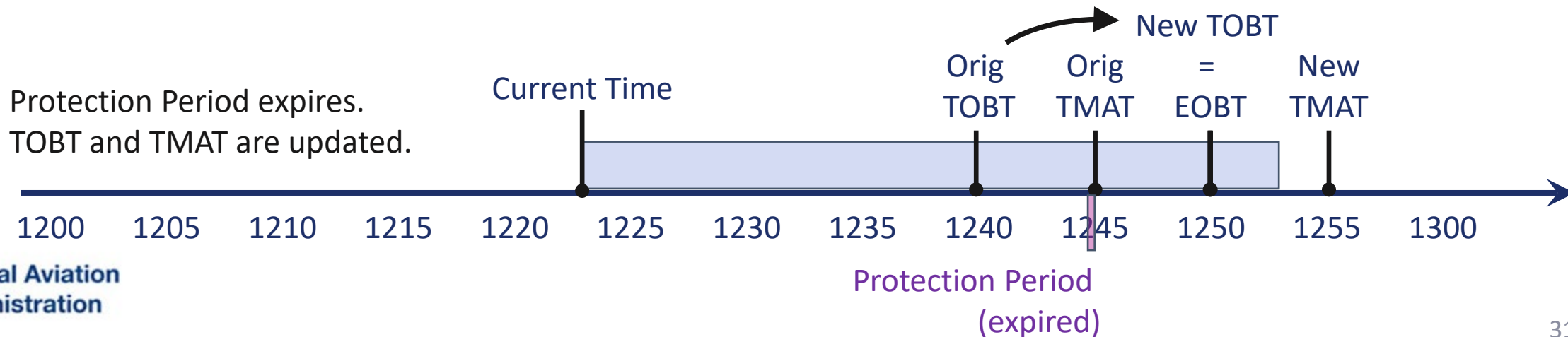
Part 1



Part 2

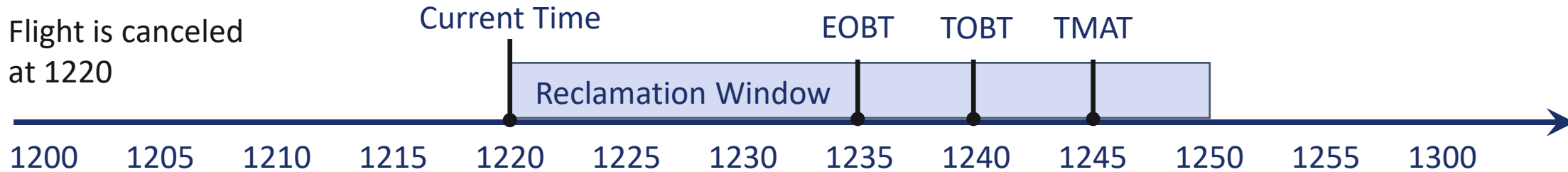


Part 3

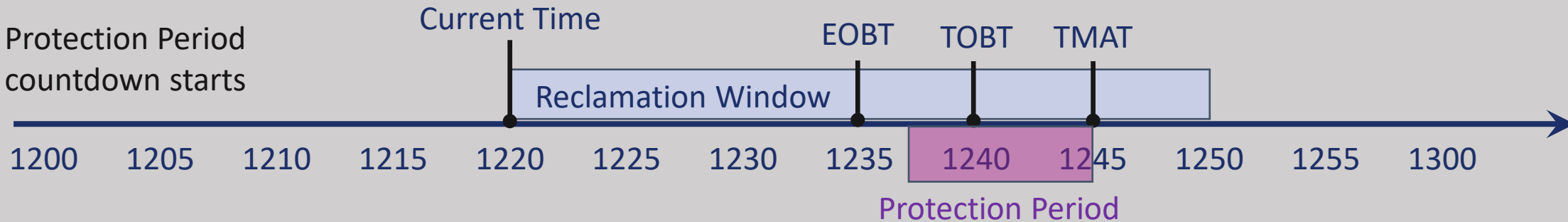


Canceled Flight Reclamation Example

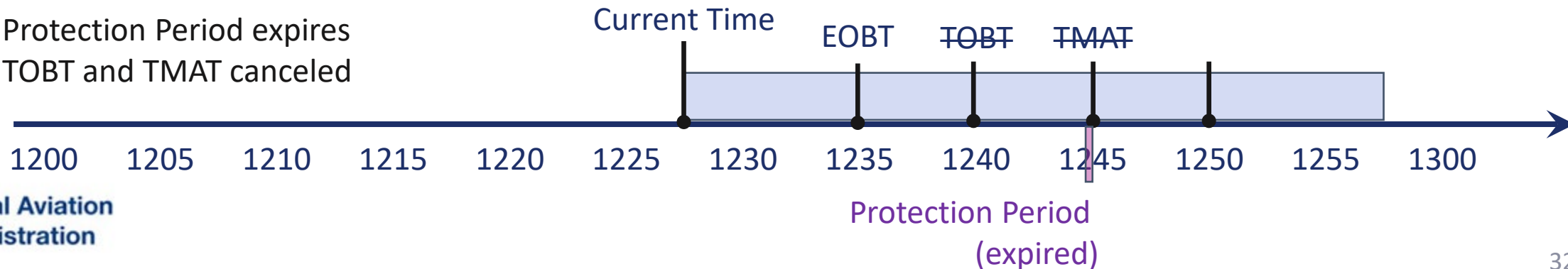
Part 1



Part 2



Part 3



Reclamation of Delayed and Canceled Flights

- The reclamation process can be short-circuited by the flight operator
 - Setting the flight's "TMAT relinquish" flag to TRUE via TFCS
 - Updating the EOBT such that $EOBT < TOBT$
 - Substituting the flight with another flight such that the new TMAT is outside the Reclamation Window
- See Tech Talk on Substitution: <https://cdm.fly.faa.gov/wp-content/uploads/Tech-Talks-Substitution-FINAL.pdf>
- If flight operators at a TFDM do not intend to make use of the reclamation process,
 - The Reclamation Window should be set to a large value and the Protection Period should be set to 0
 - This setting will immediately reclaim flights' TMATs and allow TFDM to compress the SMP if need be



SMP Parameters in TTP SMP Service

Some SMP Parameters are independent of the airport configuration

- surfaceMeteringProgram/smpDataMessage/parameters

ParametersType			DRAFT
e	cfrMeteringExempt	[0..1] boolean	
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e	deferralLeadTime	[0..1] duration	
e	extensionEvaluationInterval	[0..1] duration	
e	flightSuspensionTime	[0..1] duration	
e	flightSuspensionWarningTime	[0..1] duration	
e	planningHorizon	[0..1] duration	← Protection Period
e	protectionPeriod	[0..1] duration	
e	minimumTMATAdjustmentTime	[0..1] duration	
e	reclamationWindow	[0..1] duration	← Reclamation Window
e	staticTimeHorizon	[0..1] duration	
e	unscheduledDemandBuffer	IntegerType	
e	unscheduledFlightsLowerThreshold	IntegerType	
e	unscheduledFlightsUpperThreshold	IntegerType	
e	udbPercentageList	UnscheduledDemandBufferPercentageListType	
e	controlledTimeOfDepartureBuffer	[0..1] IntegerType	
e	tmatComplianceWindow	[0..1] IntegerType	



SMP Parameters: TMA Compliance and Missed TMA

- Compliance is measured based on the TMA
 - **TMA Compliance Window:** Agreed upon window around the TMA (in minutes) within which flights are considered compliant
 - TMA Compliance Window has both an upper and lower parameter
- If a flight misses its TMA, the flight has a period of time to either update its EOB or comply with the TMA
 - **Flight Suspension Warning Time**
 - Configurable length of time after the initial missed TMA notification indicating that if no action is taken by a specified time, the TMA will be removed and the flight will be removed from the demand list.
 - **Flight Suspension Time**
 - Configurable length of time after the flight suspension warning notification indicating that if no action is taken, the TMA will be removed and the flight will be removed from the demand list.



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Flight Suspension Time

Flight Suspension Warning Time

TMAT Compliance Window

NOTE: TMAT compliance window is currently only the upper half of the window in the TTP B2.1 schema



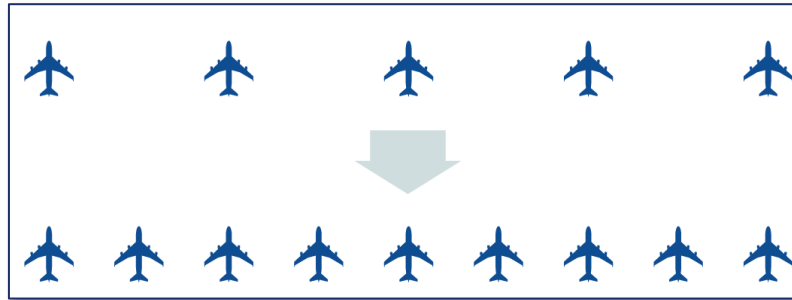
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SMP Adjustments

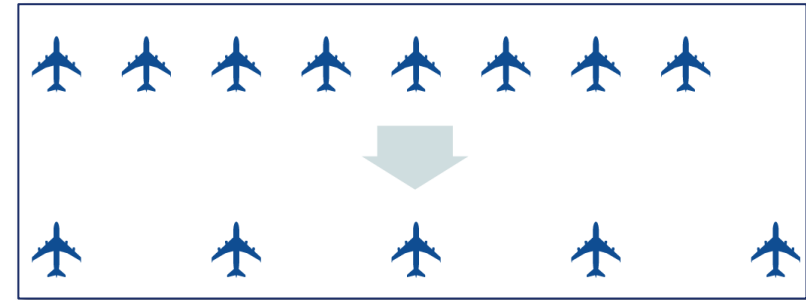


SMP Adjustment Types

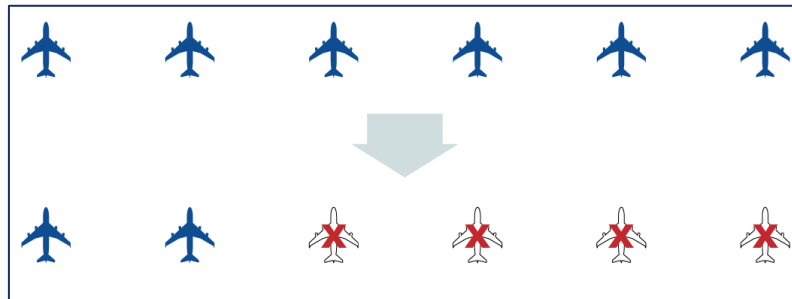
Compression



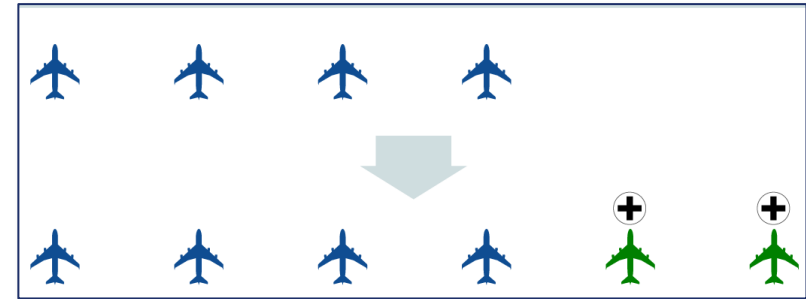
Reassignment of TMA/Ts



Termination



Extension



Cumulative adjustments are a combination of two or more of the above types into a single SMP adjustment

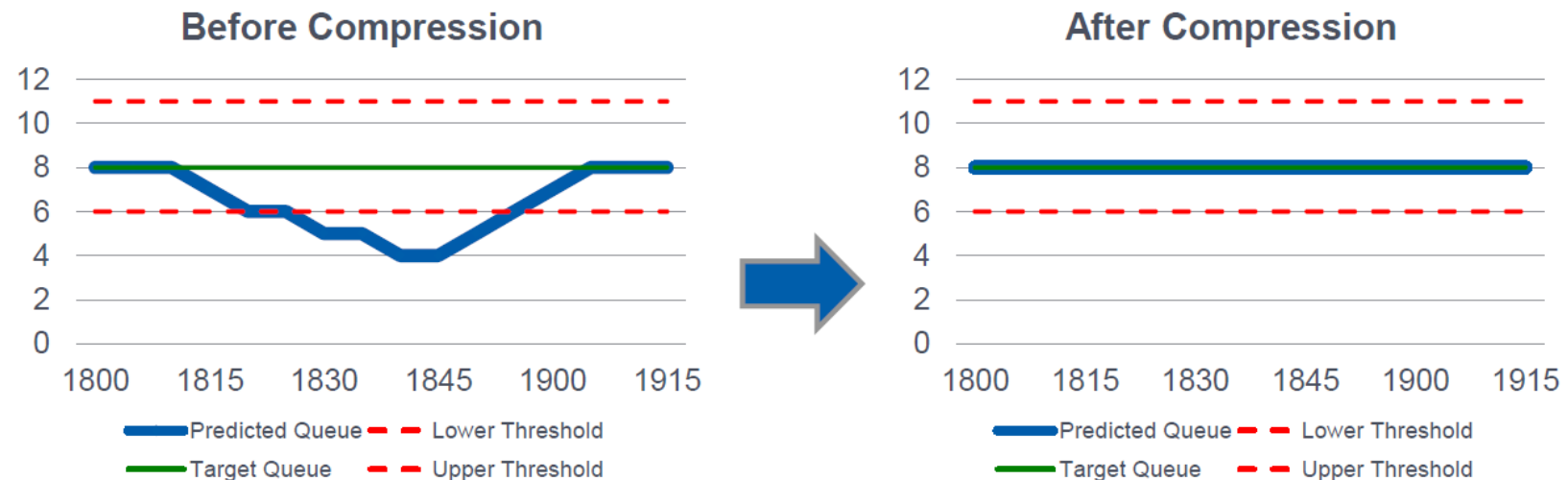
SMP Adjustment TMC Actions

- Similar to SMPs, TFDM will recommend an SMP adjustment when it detects the need
- The TMC can take one of three actions
 - **Affirm:** TMAFs will be updated
 - Compression and Reassignment Adjustments can be auto-affirmed
 - **Reject:** TMAFs will not be updated
 - **Defer:** Indicates TMC's intention to wait to take action



Compression Adjustments

- TFDM will recommend an SMP Compression if the predicted metered queue drops below the **Lower Threshold** during an affirmed/active SMP
- If affirmed, TFDM will reduce metering holds on flights to increase the number of flights in queue
- A flight's TOBT and TMAAT cannot be compressed earlier than the flight's EOBT
- A flight's TOBT and TMAAT will only change if they will be moved earlier by more than the **Compression Minimum TMAAT Adjustment Time**



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e flightSuspensionWarningTime	[0..1]	duration	
e planningHorizon	[0..1]	duration	
e protectionPeriod	[0..1]	duration	
e minimumTMATAdjustmentTime	[0..1]	duration	
e reclamationWindow	[0..1]	duration	
e staticTimeHorizon	[0..1]	duration	
e unscheduledDemandBuffer		IntegerType	
e unscheduledFlightsLowerThreshold		IntegerType	
e unscheduledFlightsUpperThreshold		IntegerType	
e udbPercentageList		UnscheduledDemandBufferPercentageListType	
e controlledTimeOfDepartureBuffer	[0..1]	IntegerType	
e tmatComplianceWindow	[0..1]	IntegerType	

← Compression Auto Affirmation

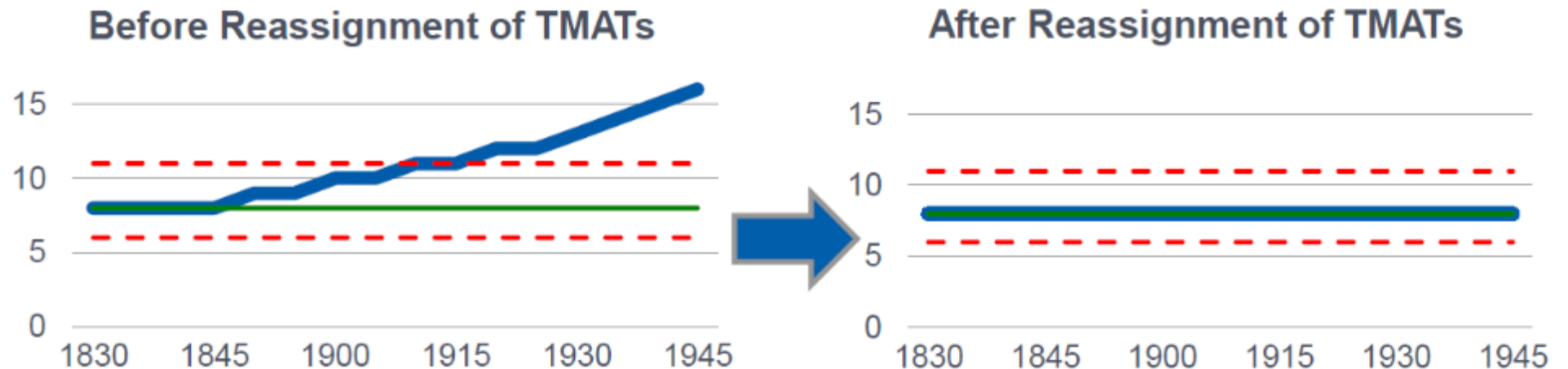
← Compression Minimum TMAT Adjustment Time



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Reassignment of TMATs Adjustments

- TFDM will recommend an SMP Reassignment of TMATs if the predicted metered queue goes above the **Upper Threshold** during an affirmed/active SMP
- If affirmed, TFDM will increase gate holds to reduce the number of flights in queue
- TFDM will only update TMATs outside of the **Static Time Horizon**
- TFDM will only update a flight's TMAT if the increase in gate hold is more than the **Reassignment of TMATs Minimum TMAT Adjustment Time**



SMP Parameters in TTP SMP Service

Some SMP Parameters are independent of the airport configuration

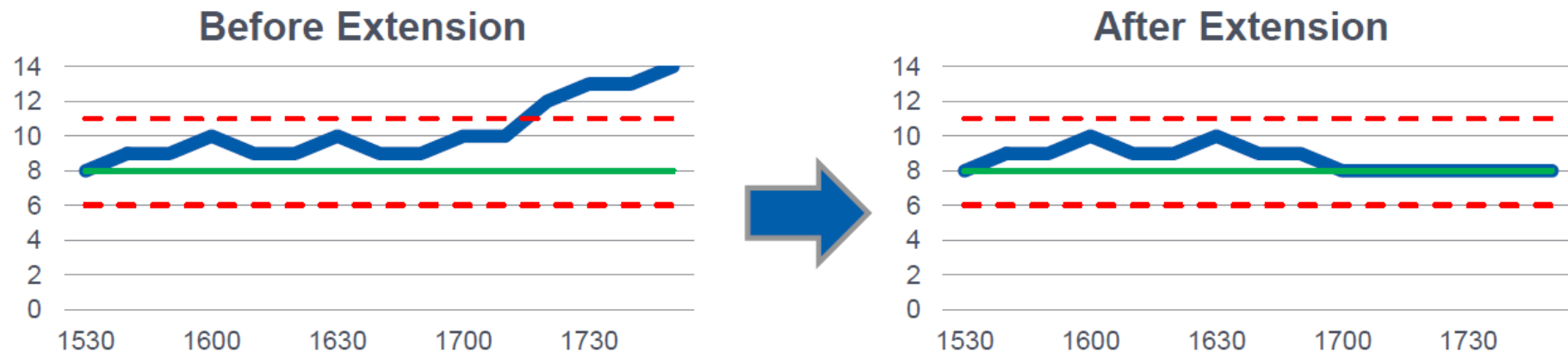
- surfaceMeteringProgram/smpDataMessage/parameters

ParametersType			DRAFT
e cfrMeteringExempt	[0..1]	boolean	
e averageMeteringHoldThreshold	[0..1]	PercentageType	
e compressionAutomaticAffirmation	[0..1]	boolean	
e reassignmentAutomaticAffirmation	[0..1]	boolean	← Reassignment Auto Affirmation
e departureFixQueuePercentageList	[0..1]	DepartureFixQueuePercentageListType	
e flightsAffectedThreshold	[0..1]	PercentageType	
e compressionMinimumTMATAdjustmentTime	[0..1]	duration	
e deferralLeadTime	[0..1]	duration	
e extensionEvaluationInterval	[0..1]	duration	
e flightSuspensionTime	[0..1]	duration	
e flightSuspensionWarningTime	[0..1]	duration	
e planningHorizon	[0..1]	duration	
e protectionPeriod	[0..1]	duration	
e minimumTMATAdjustmentTime	[0..1]	duration	← Reassignment Minimum TMAT Adjustment Time
e reclamationWindow	[0..1]	duration	
e staticTimeHorizon	[0..1]	duration	← Static Time Horizon
e unscheduledDemandBuffer		IntegerType	
e unscheduledFlightsLowerThreshold		IntegerType	
e unscheduledFlightsUpperThreshold		IntegerType	
e udbPercentageList		UnscheduledDemandBufferPercentageListType	
e controlledTimeOfDepartureBuffer	[0..1]	IntegerType	
e tmatComplianceWindow	[0..1]	IntegerType	



Extension Adjustments

- TFDM will recommend an SMP Extension if the predicted metered queue goes above the **Upper Threshold** after an affirmed/active SMP
- If affirmed, the SMP extension will move the SMP end time to the earlier of
 - Current time + **Planning Horizon**
 - Latest EOBT of flights that cause the predicted metered queue to exceed the **Upper Threshold**
- Flights within the new end time will be assigned a TOBT and TMA
- TFDM will evaluate the need for an SMP adjustment at a rate set by the **Extension Evaluation Interval**



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SMP Parameters in TTP SMP Service

Some SMP Parameters are independent of the airport configuration

- surfaceMeteringProgram/smpDataMessage/parameters

ParametersType			DRAFT
e	cfrMeteringExempt	[0..1] boolean	
e	averageMeteringHoldThreshold	[0..1] PercentageType	
e	compressionAutomaticAffirmation	[0..1] boolean	
e	reassignmentAutomaticAffirmation	[0..1] boolean	
e	departureFixQueuePercentageList	[0..1] DepartureFixQueuePercentageListType	
e	flightsAffectedThreshold	[0..1] PercentageType	
e	compressionMinimumTMATAdjustmentTime	[0..1] duration	
e	deferralLeadTime	[0..1] duration	
e	extensionEvaluationInterval	[0..1] duration	
e	flightSuspensionTime	[0..1] duration	
e	flightSuspensionWarningTime	[0..1] duration	
e	planningHorizon	[0..1] duration	
e	protectionPeriod	[0..1] duration	
e	minimumTMATAdjustmentTime	[0..1] duration	
e	reclamationWindow	[0..1] duration	
e	staticTimeHorizon	[0..1] duration	
e	unscheduledDemandBuffer	IntegerType	
e	unscheduledFlightsLowerThreshold	IntegerType	
e	unscheduledFlightsUpperThreshold	IntegerType	
e	udbPercentageList	UnscheduledDemandBufferPercentageListType	
e	controlledTimeOfDepartureBuffer	[0..1] IntegerType	
e	tmatComplianceWindow	[0..1] IntegerType	

← Extension Evaluation Interval

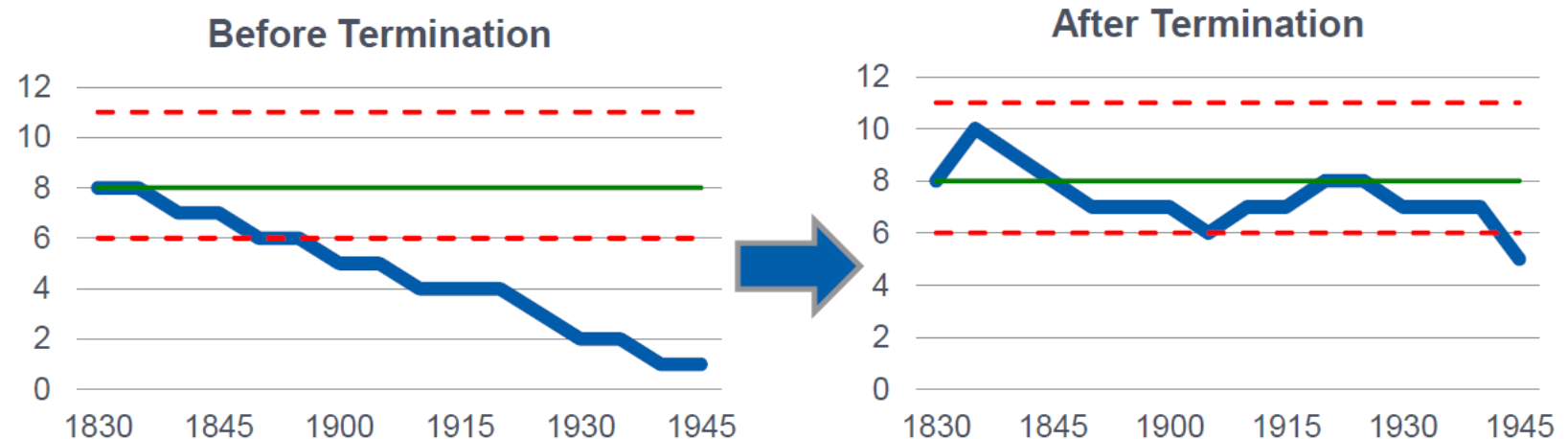
← Planning Horizon



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Early Termination Adjustments

- TFDM will recommend an SMP Termination if the predicted metered queue goes below the **Lower Threshold** during an SMP and the predicted unmetered queue drops below the **Upper Threshold**
- If affirmed, TFDM will shorten the SMP and remove the TOBTs and TMATs of flights that are no longer affected by the SMP
- A TFDM termination could end an SMP immediately or it could just reduce the SMP duration



Cumulative Adjustments

- TFDM will recommend an SMP Cumulative Adjustment if two or more of the other types are recommended at the same time
- TFDM will set the state of the other adjustments to “Superseded” in this case
- The SMP parameters that apply to the other types of adjustments apply similarly to Cumulative Adjustments
 - If increasing gate holds, then the Static Time Horizon and Reassignment Minimum TMAT Adjustment Time apply
 - If reducing gate holds, then the Compression Minimum TMAT Adjustment Time applies



SMP Metering Mode



SMP Parameter: Metering Mode

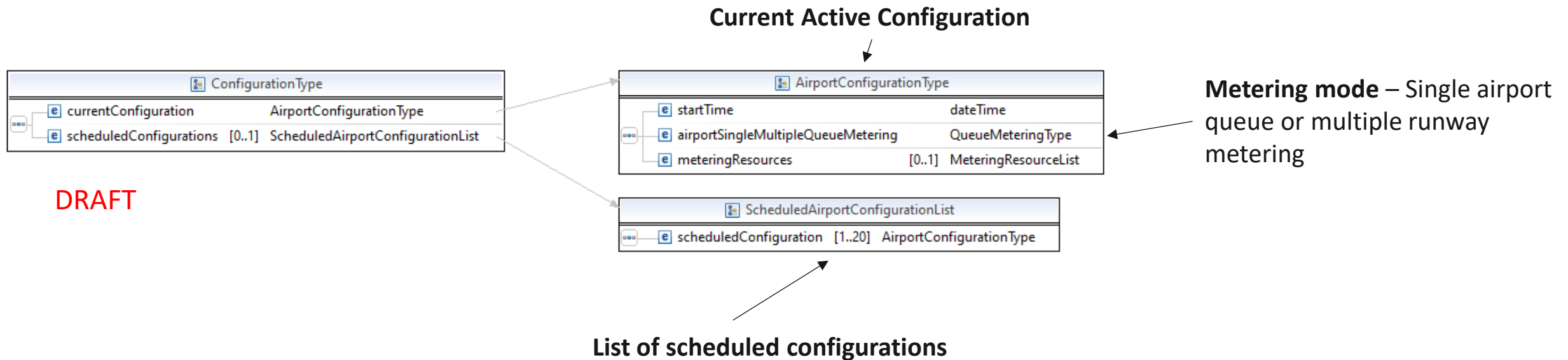
- Airport Metering Model parameter
 - Indicates single-airport queue or multiple-runway queue metering
- Multiple-runway metering
 - TFDM will typically meter to each runway at an airport individually
 - TFDM can be adapted/configured to meter to different groups of runways
- Airport metering
 - All individual runway queues are summed and metered together
 - Useful if runway assignments are uncertain prior to pushback
 - Also useful at airports with only one departure runway active at a time (e.g. LGA). This mode will allow metering to run smoothly through airport configurations



SMP Parameters in TTP SMP Service

Other SMP parameters are associated with current and scheduled configurations

- surfaceMeteringProgram/smpDataMessage/configuration



DRAFT



TMIs in TFDM



Overview of TMIs in TFDM

- TMI sources in TFDM
 - External sources such as TFMS (NTML or FSM) or TBFM
 - Manual entry by the ATCT
- TFDM will identify the set of flights affected by TMIs
- TFDM will publish out TMI information and the flights affected by TMIs
 - For more on TMI in TTP, see TFDM's briefing at SWIFT #12:
[https://www.faa.gov/air_traffic/technology/swim/swift/media/SWIFT%2012%20Presentation 20201119 508Comp.pdf](https://www.faa.gov/air_traffic/technology/swim/swift/media/SWIFT%2012%20Presentation%20201119%20508Comp.pdf)



Types of TMIs in TFDM

- National TMIs
 - Ground Delay Programs (GDPs)
 - Airspace Flow Programs (AFPs)
 - Ground Stops (GSs)
 - Collaborative Trajectory Option Programs (CTOPs)
- Local TMIs
 - Miles in Trail (MITs)
 - Minutes in Trail (MINITs)
 - Approval Request (APREQ) restrictions
 - Departure Stops (STOPs)
 - Severe Weather Avoidance Programs (SWAPs)
 - Departure Spacing Programs (DSP)
 - Time Based Management (TBM)
 - Airport (Used for delay reporting only)



Example APREQ TMI in TFDM

Add/Edit TMI

TMI Name: APR

Initiative Type: APREQ

Time: 05/21/2021 17:10 To: 05/21/2021 20:00

Controlled Element: ATL

NAS Element (via):

Type: All

Altitude: AOA

CFR Criteria

☒ Exempt CFR Flights without time from Metering Hold

☐ Automatically Request Release Times

Call For Release Trigger

Time: 30 min before IOBT

Or strip is at: CLEARANCE DELIVERY

Strip is at: CLEARANCE DELIVERY

Flight is at: DEPARTURE AT STAND

Qualifiers:

Exclusions/Remarks:

Additional Criteria:

Add Edit Remove

Daily Reporting

Charge To:

Reason:

Save Load OK Cancel

NOTE: System under development. Final views subject to change. Values shown in this image are test values and are subject to change.



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Example MIT TMI in TFDM

Add/Edit TMI

TMI Name: BARMY4/KILNS4 10 MIT

Initiative Type: MIT MIT: 10 MINIT: 3

Time: 05/21/2021 17:10 To: 05/21/2021 18:00 Expected Update UFN As One

Controlled Element:

NAS Element (via): BARMY4/KILNS4

Type: All Jet Prop Other Altitude: AOA 0 to

☒ In-Trail Metering Resource

In-Trail SMP Criteria

Target Queue Length: 2

Target Queue Length Upper Threshold: 3

Target Queue Length Lower Threshold: 1

Qualifiers:

Exclusions/Remarks:

Additional Criteria:

Add Edit Remove

Daily Reporting

Charge To:

Reason:

Save Load OK Cancel

NOTE: System under development. Final views subject to change. Values shown in this image are test values and are subject to change.



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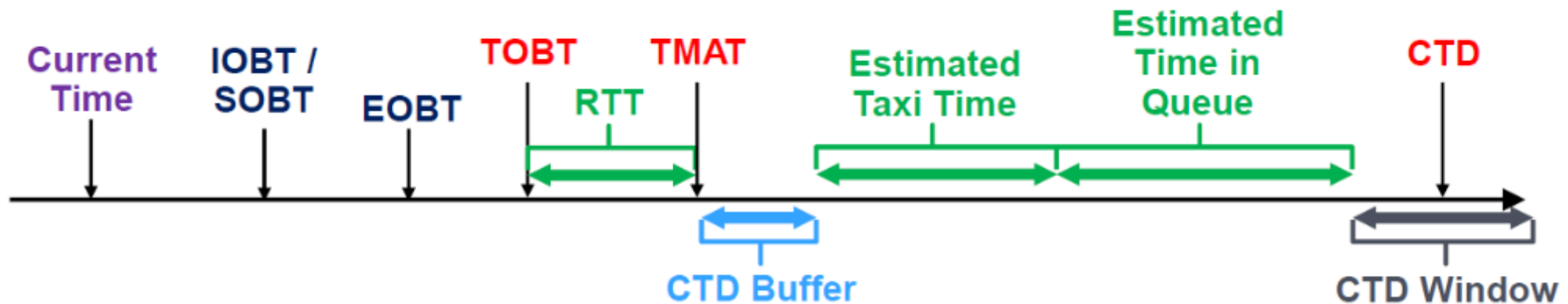
TMIs and TFDM Prediction Updates

- Expect Departure Clearance Times (EDCTs) from a GDP, AFP, or CTOP
 - The flight will be predicted to take off after the start of the EDCT compliance window
- Call for Release (CFR) Time from an APREQ restriction
 - The flight will be predicted to take off after the start of the EDCT compliance window
- MIT/MINIT restrictions
 - The ETOTs of flights in a MIT/MINIT will be spaced out based on the restriction
- GS/STOP restrictions
 - If the GS/STOP has a specified end time, then flights in the GS/STOP will be predicted to depart after the GS end time
 - If the GS/STOP is set to run until further notice (UFN), the flights in the GS/STOP will be removed from the predicted demand



Flights with a Control Time of Departure (CTD)

- Types of CTDs: EDCTs and CFR Times
- CTD Flights will be assigned a TOBT and TMAF based on the CTD
 - The TOBT and TMAF are assigned even if a flight is not part of an SMP
 - The Controlled Time of Departure (CTD) Buffer helps ensure that the flight will get the runway in time to comply with its CTD
 - If part of an SMP, CTD flights cannot be substituted



SMP Parameters in TTP SMP Service

Some SMP Parameters are independent of the airport configuration

- surfaceMeteringProgram/smpDataMessage/parameters

ParametersType			DRAFT
e			
cfrMeteringExempt	[0..1]	boolean	
averageMeteringHoldThreshold	[0..1]	PercentageType	
compressionAutomaticAffirmation	[0..1]	boolean	
reassignmentAutomaticAffirmation	[0..1]	boolean	
departureFixQueuePercentageList	[0..1]	DepartureFixQueuePercentageListType	
flightsAffectedThreshold	[0..1]	PercentageType	
compressionMinimumTMATAAdjustmentTime	[0..1]	duration	
deferralLeadTime	[0..1]	duration	
extensionEvaluationInterval	[0..1]	duration	
flightSuspensionTime	[0..1]	duration	
flightSuspensionWarningTime	[0..1]	duration	
planningHorizon	[0..1]	duration	
protectionPeriod	[0..1]	duration	
minimumTMATAAdjustmentTime	[0..1]	duration	
reclamationWindow	[0..1]	duration	
staticTimeHorizon	[0..1]	duration	
unscheduledDemandBuffer		IntegerType	
unscheduledFlightsLowerThreshold		IntegerType	
unscheduledFlightsUpperThreshold		IntegerType	
udbPercentageList		UnscheduledDemandBufferPercentageListType	
controlledTimeOfDepartureBuffer	[0..1]	IntegerType	
tmatComplianceWindow	[0..1]	IntegerType	

CTD Buffer



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CFR Time Assignment

- TFDM will receive APREQ restrictions directly from TBFM
 - APREQ restrictions can also be manually entered if not being managed by TBFM
- CFR Times can be assigned in the following ways
 - Manual entry into TFDM by the ATCT after coordinating via phone call
 - Electronically requested from IDST display in ATCT
 - Electronically requested from TFDM directly to TBFM
 - The ATCT can make the electronic request manually
 - TFDM can be configured to automatically make the request based on set triggers
- TFDM's Earliest Feasible Takeoff Time (EFTT) Prediction
 - TFDM will predict an EFTT for all flights
 - (EFTT + CTD Buffer) is provided to ATCT as recommended release time to request
 - If TFDM is automatically requesting release times, TFDM will request EFTT + CTD Buffer



APREQ Flights in an SMP

- Once an APREQ flight has a CFR time, the TOBT and TMAAT are based on the CFR time (see previous slide)
- Prior to being assigned a CFR time, an APREQ flight's TOBT and TMAAT assignment depend on the "Exempt APREQ Flights from Metering Hold" parameter
 - A default value can be configured that will apply to all SMP recommendations
 - The parameter can also be set per APREQ restriction
 - If the parameter is set to TRUE for either the SMP or APREQ, then an affected flight will be exempt from rationing
 - If a flight is exempt from rationing, it will be assigned a TOBT and TMAAT with zero metering hold (TOBT = EOBT) and the flight cannot be substituted
 - Otherwise, it will be assigned a TOBT and TMAAT based on the standard metering algorithms and is eligible for substitutions



SMP Parameters in TTP SMP Service

Some SMP Parameters are independent of the airport configuration

- surfaceMeteringProgram/smpDataMessage/parameters

ParametersType			DRAFT
e	cfrMeteringExempt	[0..1] boolean	
e	averageMeteringHoldThreshold	[0..1] PercentageType	
e	compressionAutomaticAffirmation	[0..1] boolean	
e	reassignmentAutomaticAffirmation	[0..1] boolean	
e	departureFixQueuePercentageList	[0..1] DepartureFixQueuePercentageListType	
e	flightsAffectedThreshold	[0..1] PercentageType	
e	compressionMinimumTMATAAdjustmentTime	[0..1] duration	
e	deferralLeadTime	[0..1] duration	
e	extensionEvaluationInterval	[0..1] duration	
e	flightSuspensionTime	[0..1] duration	
e	flightSuspensionWarningTime	[0..1] duration	
e	planningHorizon	[0..1] duration	
e	protectionPeriod	[0..1] duration	
e	minimumTMATAAdjustmentTime	[0..1] duration	
e	reclamationWindow	[0..1] duration	
e	staticTimeHorizon	[0..1] duration	
e	unscheduledDemandBuffer	IntegerType	
e	unscheduledFlightsLowerThreshold	IntegerType	
e	unscheduledFlightsUpperThreshold	IntegerType	
e	udbPercentageList	UnscheduledDemandBufferPercentageListType	
e	controlledTimeOfDepartureBuffer	[0..1] IntegerType	
e	tmatComplianceWindow	[0..1] IntegerType	

Exempt APREQ Flights from
Metering Hold default value for
SMPs



In-Trail SMPs (Airspace Driven)

- MIT/MINIT restrictions can be configured as metering resources with a separate Target Queue Length and Thresholds
- TFDM will recommend SMPs to manage the MIT/MINIT queues
 - If the recommended SMP is affirmed, TFDM will assign TOBTs and TMA Ts to the affected flights
 - Flights assigned a TMA T in an in-trail SMP are exempt in any runway or airport SMPs
 - A flight in an in-trail SMP can be substituted with other flights in the same in-trail SMP
 - A flight in an in-trail SMP cannot be substituted with flights in a runway or airport SMP



Next Steps



TFDM Testbed

- TFDM has set up a testbed to allow airport stakeholders to test connectivity with a test instance of TFDM B2 software
 - Hosted in a Leidos (TFDM prime contractor) lab with simulated SWIM connections
 - Uses recorded data from CLT
- Open to airports, airlines, and 3rd party vendors to test connections to TFDM prior to TFDM B2 being deployed in the field
- If interested, contact Doug Swol (Christopher.D.Swol@faa.gov) or CSIT (csit@faa.gov)



Questions & Upcoming CSIT Events

- Tech Talk #4: Topic to be determined (proposed: Data Submission from non-FAA stakeholders)
 - Wednesday July 28th, 1pm ET
- Previous Tech Talks and other CSIT resources available at: https://cdm.fly.faa.gov/?page_id=3152
- Follow-up questions: csit@faa.gov

