

# Collaborative Air Traffic Management

## Active Increments

### Portfolio Overview

Collaborative Air Traffic Management (CATM) coordinates flight and flow decision-making by flight planners and FAA traffic managers to improve overall efficiency, provide greater flexibility to flight planners, and make the best use of available airspace and airport capacity. The overall philosophy driving the delivery of CATM services is to accommodate user preferences to the maximum extent possible. Traffic managers impose Traffic Management Initiatives (TMIs) to account for congestion, weather, special activity airspace, or other constraints. TMIs are the means by which traffic managers manage constraints. These initiatives can alter users' flight plans. The impact of TMIs can be reduced by tailoring flow management actions to specific flights. This can be done through a combination of increased information on the users' preferred alternative routes; enhanced tools for assessing the impact of rerouting decisions; and improved communications and display of instructions to the controllers who must implement the initiatives. The Operational Improvements (OIs) in this portfolio contain incremental steps to achieve these goals. CATM focuses on providing traffic managers with improved Decision-Support Tools (DSTs) to better predict, identify, and resolve imbalances between traffic demands and NAS capacity. The primary function of Traffic Flow Management (TFM) is to safely manage flows of air traffic to assure efficient throughput in the NAS. This is a collaborative effort between NAS users and TFM service providers to share plans and provide information to enable timely actions to adjust to traffic and environmental dynamics over time. TFM is conducted from a national level to areas as small as a single airport, and from days in advance of a flight to real-time airborne adjustments. The need for strategic and tactical situational awareness, planning, and action requires timely and accurate information as well as timely and efficient collaboration and coordination between decision-makers. Automated tools that enable meeting these demands across all levels of the traffic management team are critical to maintaining both the safety and efficiency of NAS operations. Benefits resulting from the increments will include increased system efficiency, flexibility, and predictability.

Note: The dates and timelines included in the NAS Segment Implementation Plan (NSIP) are for planning purposes only. All capability schedules are tentative until their supporting programs are officially baselined.

# Collaborative Air Traffic Management

## Portfolio Content Summary Statistics

		Increment Status				
Segment	Total by Segment	Planned	Concept Exploration & Maturation	Development	Initial Operational Availability	Completed
*Alpha (2010 - 2015)	5	0	0	0	0	5
*Bravo (2016 - 2020)	4	0	0	0	0	4
Charlie (2021 - 2025)	0	0	0	0	0	0
Delta (2026 - 2030)	8	1	5	2	0	0
Echo (2031 - 2035)	8	3	5	0	0	0
Foxtrot (2036 - 2040)	0	0	0	0	0	0
TOTAL	25	4	10	2	0	9
Segment	% by Segment	% by Segment/Increment Status				
*Alpha (2010 - 2015)	20 %	0 %	0 %	0 %	0 %	100 %
*Bravo (2016 - 2020)	16 %	0 %	0 %	0 %	0 %	100 %
Charlie (2021 - 2025)	0 %	0 %	0 %	0 %	0 %	0 %
Delta (2026 - 2030)	32 %	13 %	63 %	25 %	0 %	0 %
Echo (2031 - 2035)	32 %	38 %	63 %	0 %	0 %	0 %
Foxtrot (2036 - 2040)	0 %	0 %	0 %	0 %	0 %	0 %
TOTAL	100%	16 %	40 %	8 %	0 %	36 %

\* Please see Appendix A and B for information about Alpha and Bravo Increments, respectively.

# Collaborative Air Traffic Management

## Operational Improvements/Current Operations & Increments

## Benefits

### OI: [101103] Provide Flight Plan Evaluation and Feedback in all Phases of Flight (2018 - 2030)

**D** [101103-32] Aircraft Access to Advanced Flight Planning Information (2026 - 2030)



### OI: [105303] Enhanced Flight Day Evaluation (2030 - 2037)

**D** [105303-24] Enhanced Post Operations (2030 - 2035)



**E** [105303-29] Automated Post Operations Analysis (2033 - 2037)



### OI: [105209] Improved Airborne Reroutes (2031 - 2037)

**E** [105209-01] Advanced Flight-Specific Trajectories (2033 - 2037)



**E** [105209-02] Airborne Trajectory Negotiation (2031 - 2035)



### OI: [105210] Improved Traffic Management Initiatives with Integrated Data (2028 - 2035)

**D** [105210-01] Improve Demand Predictions (2028 - 2030)



**D** [105210-02] Integrate TMI Modeling (2030 - 2035)



**D** [105210-03] Improved Integration of Traffic Flow Management Operations (2028 - 2030)



**D** [105210-04] Aircraft Equipage Eligibility During TMIs (2030 - 2035)



### OI: [105211] Automated Analysis of Flow Strategies (2028 - 2037)

**D** [105211-01] Integrated Departure Route Planning (2028 - 2030)



**E** [105211-02] Probabilistic Constraint Prediction (2033 - 2037)



**E** [105211-03] Improve SAA-Based Flow Predictions (2033 - 2037)



**E** [105211-04] Airport Acceptance Rate Decision Support (2033 - 2037)



**E** [105211-05] Access to Airborne Reroute Evaluation, Feedback, and Synchronization (2033 - 2037)



### OI: [108218] Improved Management of Airspace for Space Missions (2025 - 2039)

**D** [108218-21] Improved Coordination of Airspace for Space Missions (2025 - 2029)



**E** [108218-22] Dynamic Management of Airspace for Space Missions (2034 - 2039)



External Commitment   Primary Benefit   Secondary Benefit   Operationally Available   Complete

Access & Equity   Capacity   Flexibility   Efficiency   Environment   Predictability   Safety   **C** Charlie   **D** Delta   **E** Echo   **F** Foxtrot



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## Collaborative Air Traffic Management

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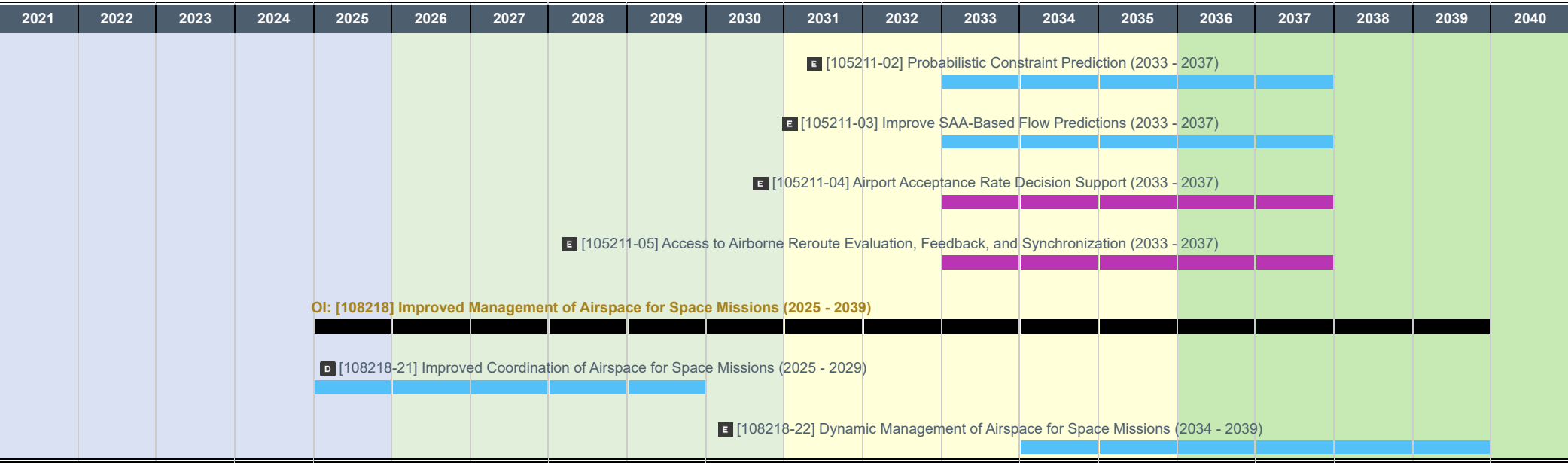

 Planned
  CO
  Concept Exploration & Maturation
  COE/CBTE
  Charlie
  Delta
  Echo
  Foxrot
  Initial Operation Available
  Complete
  External Commitment

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Collaborative Air Traffic Management



# Collaborative Air Traffic Management

## OI: [101103] Provide Flight Plan Evaluation and Feedback in all Phases of Flight (2018 - 2030)

Flight planning activities are accomplished from the flight deck as readily as any location. Airborne and ground automation provide the capability to exchange flight planning information and negotiate flight trajectory agreement amendments in near real-time. It provides the ability for all parties (i.e., the flight deck, flight operations centers, and traffic managers) to update and evaluate constraint and trajectory information and ensures that all parties have the same information for airborne reroute decision making.

Through this process, the user will work with the system to quickly assess reroute options. Automation will notify stakeholders of the status change and allow it to be selected as a proposed revised clearance for operators (i.e., controllers and pilots) to approve. ATC will execute the clearance using new flight data management improvements.

### OI Benefit

Flexibility (P): Users will have an increased flexibility to assess flight plan segments against constraints which enable them to more easily assess options. In addition, users will be able to file the flight plan from anywhere which increases flexibility in altering the flight plan as conditions change.

Efficiency (S): User preferences for the chosen route around a constraint will be the most optimum and efficient route based on their business objective.

### Increments

Delta  
(2026 - 2030)

1

## D [101103-32] Aircraft Access to Advanced Flight Planning Information (2026 - 2030) (Planned)

# Collaborative Air Traffic Management

## Increments/Enabling Activities

**D** [101103-32] Aircraft Access to Advanced Flight Planning Information (2026 - 2030)

### Increment Overview

Users, including all NAS participants, will have improved airborne access to more advanced NAS planning information that is consistent with international flight planning standards and include all relevant flight constraint information. This improvement will further enhance the ability of users to collaborate with the FAA from the aircraft, resulting in improved flow management and efficient use of resources. As part of the total system-wide information management environment, participants will have access to more detailed consistent and continuously updated information regarding expected constraints in the system. Timely access to such information will enable both operators and service providers to take action (e.g., request a re-route or be offered access) as new information becomes available.

### Increment Status

Planned


### Success Criteria

2029 :    Operationally Available NAS-Wide

### Implementation Approach

Candidate for CSS-FD Development

#### Benefits

-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety

Flexibility (P): Users will have an increased flexibility to assess flight plan segments against constraints which enable them to more easily assess options. In addition, users will be able to file the flight plan from anywhere which increases flexibility in altering the flight plan as conditions change.

Efficiency (S): User preferences for the chosen route around a constraint will be the most optimum and efficient route based on their business objective.

### System Interactions

CSS-FD (P): CSS-FD to provide continuously updated information regarding expected constraints in the system while airborne.

SWIM (T): SWIM to provide access to NAS information for flight planning purposes. Third party external system expected to provide interface to user community.

EFB (A): Electronic Flight Bag provides Airborne Access to SWIM.

 External Commitment

 Primary Benefit

 Secondary Benefit

 Operationally Available

 Complete

 Access & Equity

 Capacity

 Flexibility

 Efficiency

 Environment

 Predictability

 Safety

 Charlie

 Delta

 Echo

 Foxtrot



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# Collaborative Air Traffic Management

## Primary Systems

 CSS-FD: Common Support Services - Flight Data

## Tertiary Systems

 SWIM: System Wide Information Management

## Avionics Systems

 EFB: Electronic Flight Bag

# Collaborative Air Traffic Management

## OI: [105303] Enhanced Flight Day Evaluation (2030 - 2037)

Air Navigation Service Provider (ANSP) automation traffic management decision-support tools perform a post-operational assessment of National Airspace System performance. This capability includes ANSP automation to collect and support the analysis of airspace, airport, and flight day operational data as part of a comprehensive post-flight day analysis capability applicable to multiple domains and for multiple purposes. Flight day metrics are compared with performance metrics from each element of the system (e.g., aircraft, pilot, controller, airspace). Long-term planning functions will improve due to tools that have increased data store and replay capabilities and data analytics. These tools will be used by decision-makers to better predict and plan operations. This improves the ANSP pre-defined shared plans.

### OI Benefit

- Capacity (P): Airspace capacity and throughput associated with a given constraint is increased by continually assessing the strengths of prior traffic management initiatives and applying lessons learned.
- Efficiency (P): Improved planning will result in more efficient selection of traffic management initiatives that better match demand to available capacity.
- Predictability (S): Improvements in post-operational evaluation of solutions results in improved and more predictable traffic management solutions that result in better adherence to flight schedules.

### Increments

Delta  
(2026 - 2030)  
1

Echo  
(2031 - 2035)  
1

**D** [105303-24] Enhanced Post Operations (2030 - 2035) (Concept Exploration & Maturation)

**E** [105303-29] Automated Post Operations Analysis (2033 - 2037) (Planned)

# Collaborative Air Traffic Management

## Increments/Enabling Activities

**D** [105303-24] Enhanced Post Operations (2030 - 2035)

### Increment Overview

This increment provides a data store and replay capabilities that include the capture of actual and forecasted airport and airspace demand, actual and forecast weather, pre and post analysis results including assessment of demand and capacity accuracy predictions, compliance, and overall effectiveness. This data provides the fidelity needed for a future modeling environment to support evaluation of alternative strategies and the construction of better Traffic Management Initiatives.

### Increment Status

Concept Exploration & Maturation


### Success Criteria

2035 :    Operationally Available NAS-wide.

### Implementation Approach

This capability will be implemented through FMDS Enhancement 1.

#### Benefits

-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety

Efficiency (P): Provides improved efficiency by providing the means for evaluating past events and actions, which may lead to reduced use of conservative actions such as traditional Mile-In-Trail restrictions.

















### System Interactions

FMDS (P): FMDS will provide data storage and replay services. Replay capabilities will take TFM inputs used to reach those decisions.

CSS-FD (S): CSS-FD will provide data on what constraint information was communicated to NAS users. Post ops will use this data to determine what NAS users did with the information and if it was effective.


TFDM (S): TFDM publishes real-time and post-event metrics including surface metering program information, TMI information, real-time and post-operations delay information, airport throughput/efficiency, surface metering program efficiency, data submission accuracy, schedule accuracy, and post-operations flight event information.

TBFM (S): TBFM will provide the configuration of metering flows, facilities and schedules to constraint points along with the parameters used in the spacing matrix. Any changes to configuration, schedules or parameters will also be provided. Information on departure scheduling for airports where this is implemented will be included.


-  External Commitment
-  Primary Benefit
-  Secondary Benefit
-  Operationally Available
-  Complete
-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety
-  Charlie
-  Delta
-  Echo
-  Foxtrot


# Collaborative Air Traffic Management


## Primary Systems

 FMDS: Flow Management Data & Services


## Secondary Systems

 ERAM: En Route Automation Modernization

 TFDM: Terminal Flight Data Manager

 TBFM: Time Based Flow Management

## Tertiary Systems

 SWIM: System Wide Information Management

# Collaborative Air Traffic Management

## Increments/Enabling Activities

**E** [105303-29] Automated Post Operations Analysis (2033 - 2037)

### Increment Overview

This increment uses advanced software capabilities and modeling tools necessary to develop and evaluate more effective operational strategies that make better use of historical information to define future strategic flow management actions. Data analytics use actual and forecasted airport and airspace demand, actual and forecast weather, pre and post analysis results including assessment of demand and capacity accuracy predictions, compliance, and overall effectiveness, and flow management actions taken for similar past events. The modeling environment supports evaluation of alternative strategies and the construction of better Traffic Management Initiatives, and can make recommendations based on past experience.

### Increment Status

Planned



### Success Criteria

2037 :    Operationally available NAS-wide

### Implementation Approach

FMDS post ops service will be updated and enhanced to perform automated post ops, collect necessary data, analyze historical actions, and identify strategic and tactical cause and effect issues. This capability is a candidate for a future FMDS enhancement.

#### Benefits

-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety

### System Interactions

Initial system dependencies have been identified for this capability. As this capability is further defined, further updates will be mad to the associated system interaction text.

















FMDS (P): To be determined.

CSS-FD (S): To be determined.

SWIM (T): To be determined.

#### Primary Systems

 FMDS: Flow Management Data & Services

-  External Commitment
-  Primary Benefit
-  Secondary Benefit
-  Operationally Available
-  Complete
-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety
-  Charlie
-  Delta
-  Echo
-  Foxtrot



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# Collaborative Air Traffic Management

## OI: [105209] Improved Airborne Reroutes (2031 - 2037)

Air traffic managers, pilots, and flight operations centers have access to automation tools that assist with analysis and generation of optimal airborne reroutes given the likelihood of constraints along the route, such as convective weather, as well as transitions back to a more preferred route once a constraint dissipates or evolves differently than predicted. These tools will continue to resolve air traffic flow problems to allow tailoring to reduce delays and unnecessary flying time.

Pilots and dispatcher will have access to tools that use a rich information environment to assess flow alternatives against their business objectives in order to determine their operational preferences. Traffic managers will have flight-specific trajectory advisory functions that assess flows against a wide range of input factors such as weather impacts and operator preferences, and automatically generate revised clearances based on the selected route changes.

### OI Benefit

- Efficiency (P): The automated assessment and execution of trajectory changes required due to system constraints results in more efficient and timely execution of route options.
- Capacity (P): With automation tool support for the assessment of routes against constraints and automatic generation of revised clearances, air traffic control will be able to defer constraint solving actions closer to the predicted impact and allow flights to more fully utilize the available airspace capacity.
- Flexibility (S): Tailored selection of reroute options provides increased opportunities for users to select the option that best meets their business objectives.

### Increments

Echo  
(2031 - 2035)

2

## E [105209-01] Advanced Flight-Specific Trajectories (2033 - 2037) (Concept Exploration & Maturation)

## E [105209-02] Airborne Trajectory Negotiation (2031 - 2035) (Concept Exploration & Maturation)

# Collaborative Air Traffic Management

## Increments/Enabling Activities

**E** [105209-01] Advanced Flight-Specific Trajectories (2033 - 2037)

### Increment Overview

Traffic managers and controllers are provided with integrated automation tools to resolve constraints with advanced flight-specific trajectory changes that are generated by automation. These capabilities enhance capacity and flight efficiency. In addition, automation will automatically evaluate opportunities to improve trajectories and reduce delay when constraints diminish or evolve differently than predicted. Traffic managers will resolve constraint problems for both airborne and pre-departure flights from 20-90 minutes prior to flights encountering the constraint and send revised trajectories to the appropriate sector controller to deliver to the cockpit via data comm. Revised trajectories may be complex and developed based on a wide range of input factors, such as weather, sector capacity, special activity airspace (SAA), NAS equipment outages, operator preferences, and metering time assignment. The trajectory modifications will include reroutes, altitude changes, and ground delays.

### Increment Status

Concept Exploration & Maturation


### Success Criteria

2033 :    Operationally available NAS-wide

### Implementation Approach

Candidate for future FMDS enhancement

#### Benefits

-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety

Capacity (P): Provide efficient management of resources and better utilization of capacity. AFST will defer constraint solving actions closer to the predicted impact, and allow flights to fly with the flight plans to utilize the airspace capacity which would have been blocked by the current conservative strategic TMI implementation.

Flexibility (S): New dynamic rerouting concepts provide traffic managers, controllers, pilots, and flight operators with more choices when negotiating dynamic reroutes for active aircraft.

Efficiency (P): Provision of dynamic, automated rerouting capabilities decreases the use of large static reroutes, resulting in more efficient revised trajectories.

### System Interactions

 External Commitment

 Primary Benefit

 Secondary Benefit

 Operationally Available

 Complete

 Access & Equity

 Capacity

 Flexibility

 Efficiency

 Environment

 Predictability

 Safety

 Charlie

 Delta

 Echo

 Foxtrot



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# Collaborative Air Traffic Management

- FMDS (P): FMDS provides integrated tool and utilizes updated aeronautical and weather information to provide solutions to constraints.
- SWIM (T): Provides the conduit for aeronautical information.
- ACS (S): Aeronautical updates are needed for predictions and updates when conditions diminish.
- Data Comm Avionics (A): Revised trajectories are delivered to the cockpit via Data Comm for appropriately equipped aircraft.
- CSS-Wx (S): Will directly input SUA/SAA and Weather Constraint information respectively into FMDS

### Primary Systems

- FMDS: Flow Management Data & Services

### Secondary Systems

- CSS-Wx: Common Support Services - Weather
- ACS: Aeronautical Common Service

### Tertiary Systems

- SWIM: System Wide Information Management

### Avionics Systems

- Data Comm Avionics: Data Communication Avionics

# Collaborative Air Traffic Management

## Increments/Enabling Activities

**E** [105209-02] Airborne Trajectory Negotiation (2031 - 2035)

### Increment Overview

The ability of Flight Operations Centers (FOCs) and flight crews to provide preferences for airborne reroutes enables the users to choose the reroute that best meets their business objectives. This can be a two or three-party negotiation, as appropriate, involving the flight planner and/or the flight crew and traffic manager working the tactical flow contingency plans. For performing real-time trajectory negotiation for trial planning, coordinating, issuing, and accepting or rejecting trajectory changes (reroutes) in real-time FOC involvement in airborne reroutes will vary depending on the complexity of the constraint and temporal conditions. Automation tools will enable traffic managers and FOCs/Pilots to negotiate these trajectories. The accepted trajectory will be sent to the R-controller in the form of a proposed revised route clearance to send to the aircraft via data communications or can be sent as a reroute request directly from the aircraft.

### Increment Status

Concept Exploration & Maturation


### Success Criteria

2032 :    Operationally available NAS-wide

### Implementation Approach

This capability is a candidate for CSS-FD. This increment is identified to have an International harmonization dependency.

#### Benefits

-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety

Flexibility (P): User route flexibility is increased through negotiated trajectories for congestion resolutions. Collaborative Airspace Constraint Resolution (CACR) may apply these user-furnished options when adjusting the routing or delays assigned to flights, thus providing some added flexibility to the operator when fleet planning.

### System Interactions

Initial system dependencies have been identified for this capability. As this capability is further defined future updates will include the associated system interaction text.

CSS-FD (P): CSS-FD for constraint situational awareness.

FANS 1/A (A): FANS 1/A to provide data communications capability.

 External Commitment

 Primary Benefit

 Secondary Benefit

 Operational Available

 Complete

 Access & Equity

 Capacity

 Flexibility

 Efficiency

 Environment

 Predictability

 Safety

 Charlie

 Delta

 Echo

 Foxtrot



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# Collaborative Air Traffic Management

## OI: [105210] Improved Traffic Management Initiatives with Integrated Data (2028 - 2035)

Traffic managers will have more integrated strategic traffic management tools and information to use to assess demand-capacity imbalances enabling them to formulate solutions that improve the overall flow of traffic and make better use of available capacity. Traffic management automation will ingest information from other data sources, such as surface information regarding flight readiness, to improve overall demand predictions. Strategic traffic management tools that model different types of traffic management initiatives will be better integrated to enable traffic managers to make more informed decisions that improve overall demand-capacity balancing strategies. These tools will also have more information, such as aircraft and crew eligibility for flying certain routes, to assess the ability of flights to fly alternative flow strategies.

### OI Benefit

- Capacity (P): The ability to improve the assessment of demand-capacity imbalances will increase airspace capacity and throughput associated with a given constraint.
- Efficiency (P): The improved integration of strategic traffic management tools results in more efficient and timely execution of route options.
- Predictability (S): Through improved evaluation of demand against system constraints, system throughput will increase resulting in better adherence to flight schedules.

### Increments

Delta  
(2026 - 2030)

4

- D** [105210-01] Improve Demand Predictions (2028 - 2030) (Development)
- D** [105210-02] Integrate TMI Modeling (2030 - 2035) (Concept Exploration & Maturation)
- D** [105210-03] Improved Integration of Traffic Flow Management Operations (2028 - 2030) (Concept Exploration & Maturation)
- D** [105210-04] Aircraft Equipage Eligibility During TMIs (2030 - 2035) (Concept Exploration & Maturation)

# Collaborative Air Traffic Management

## Increments/Enabling Activities

**D** [105210-01] Improve Demand Predictions (2028 - 2030)

### Increment Overview

This increment incorporates surface information to extend the active flight status to demand. It provides traffic managers with more accurate aggregate demand predictions to identify potential issues for National Airspace System resources such as for routes, fixes, sectors, and arrival airport surface demand information. This capability includes the Integration of information to include predictions of surface activities, time-out delay, planned flight speeds and altitudes, and Traffic Management Initiatives from modeling currently in effect.

### Increment Status

Development


### Success Criteria

2030 :    Operationally Available NAS-wide

### Implementation Approach

This capability will be implemented through the development of FMDS.

#### Benefits

-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety

Capacity (S): More accurate aggregate demand predictions will result in fewer sector demand false positive and negative alerts, leading to more appropriate traffic management actions. More appropriate traffic management actions will result in reducing unnecessary delay.


Efficiency (P): Higher demand prediction accuracy will lead to less overly conservative traffic management practices. That is, more accurate demand will lead to better decisions associated with traffic management initiatives. Better decisions will result in better use of available capacity, thereby reducing unnecessary delay.

### System Interactions


- FMDS (P): FMDS will interface with SWIM to pull in TBFM and STDDS data.
- TBFM (S): TBFM will provide STA and ETA data to FMDS and STDDS will provide surface event data.
- STDDS (T): Provides surface event data to SWIM.
- SWIM (T): SWIM provides data from TBFM and STDDS to FMDS.


# Collaborative Air Traffic Management

## Primary Systems

 FMDS: Flow Management Data & Services

## Tertiary Systems

 SWIM: System Wide Information Management

 STDDS: SWIM Terminal Data Distribution System

# Collaborative Air Traffic Management

## Increments/Enabling Activities

**D** [105210-02] Integrate TMI Modeling (2030 - 2035)

### Increment Overview

The Integrated TMI Modeling increment will provide traffic managers with an authoritative decision support tool for performing an iterative, comprehensive, integrated assessment of a proposed TMI, taking into account all other TMIs currently in the system. The results of the tools will show impacts to monitored NAS resources and will allow results to be shared with impacted facilities and flight operators. This increment will also provide a Miles In Trail (MIT) modeling capability capable of calculating required pass-back MIT initiatives required to meet a downstream MIT initiative.

### Increment Status

Concept Exploration & Maturation





### Success Criteria

2035 :    Operationally available NAS-wide

### Implementation Approach

This capability will be implemented through FMDS Enhancement 1.

#### Benefits

-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety


Efficiency (P): Minimize unnecessary aircraft delay by improving demand/capacity predictions and the ability to improve system impact assessment before imposing Traffic Management Initiatives (TMIs).

Predictability (S): Improve integration across TMIs and decision-support tools to minimize potential effects of "double penalties" from being included in multiple TMIs.

### System Interactions

FMDS (P):FMDS provides the required TMI data for this capability.

#### Primary Systems

-  FMDS: Flow Management Data & Services



# Collaborative Air Traffic Management

## Increments/Enabling Activities

**D** [105210-03] Improved Integration of Traffic Flow Management Operations (2028 - 2030)

### Increment Overview

Improved integration of traffic flow management operations will result in improved efficiency and ensure that available National Airspace System (NAS) capacity is used to meet demand. The integration of strategic traffic management capabilities that model different traffic management initiatives will improve the overall flow of traffic in the presence of NAS constraints. Traffic managers will be able to spend less time integrating information from multiple capabilities giving them more time to assess solutions that best address demand-capacity imbalances.

### Increment Status

Concept Exploration & Maturation

### Success Criteria

2030 :    Operationally available NAS-wide

### Implementation Approach

This capability will be implemented through the development of FMDS.

#### Benefits

-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety

Capacity (P): Airspace capacity and throughput associated with a given constraint is increased through improved integration of traffic management tools which provides more accurate demand information.

Efficiency (S): Integration of traffic management tools will result in improved scheduling and increase utilization of available airspace and airport capacity.


### System Interactions

FMDS (P): FMDS provides the flight and TMI data required for this capability.

















TBFM (T): TBFM continues to provide the TMI data it provides today.

TFDM (T): TFDM provides relevant surface flight and TMI data.

#### Primary Systems

-  FMDS: Flow Management Data & Services

#### Tertiary Systems

-  External Commitment
-  Primary Benefit
-  Secondary Benefit
-  Operationally Available
-  Complete
-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety
-  Charlie
-  Delta
-  Echo
-  Foxtrot



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# Collaborative Air Traffic Management

## Increments/Enabling Activities

**D** [105210-04] Aircraft Equipage Eligibility During TMLs (2030 - 2035)

### Increment Overview

This increment provides Traffic Managers the ability to create capability-aware traffic management initiatives (TMLs) based on aircraft capable (equipage, crew training, procedures, certifications) of conducting PBN. These advanced avionics improve aircraft capabilities and enable the benefits of increased access, enhanced throughput and increased predictability in the National Airspace System (NAS).

NAS users submit their flight capabilities to TFM automation as part of their early intent information exchange and/or submit flight information as part of the CDM information exchange. NAS automation stores, aggregates, and communicates flight capabilities to traffic managers and other stakeholders. Automation algorithms create enhanced demand predictions and subsequent TMLs. These algorithms include substitution, compression, and slot credit substitution, adaptive compression, bridging, and estimated departure clearance time (EDCT) change requests. Known capability aware TMLs allow users to swap aircraft to take advantage of enhanced flight capable slots. TFM automation also supports TML planning tools that allows traffic managers to model and implement capability-aware TMLs.

### Increment Status

Concept Exploration & Maturation

### Success Criteria

2035 :    Operationally available NAS-wide

### Implementation Approach

This capability will be implemented through FMDS Enhancement 1.

#### Benefits

-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety

Efficiency (P): Increased throughput during TMLs.

















### System Interactions

Initial system dependencies have been identified for this capability. As this capability is further defined, future updates will be made to the associated system interaction text.

FMDS (P): FMDS constructs TMLs utilizing PBN procedures and the flight's avionics capabilities.

#### Primary Systems

 FMDS: Flow Management Data & Services

-  External Commitment
-  Primary Benefit
-  Secondary Benefit
-  Operational Available
-  Complete
-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety
-  Charlie
-  Delta
-  Echo
-  Foxtrot



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# Collaborative Air Traffic Management

## OI: [105211] Automated Analysis of Flow Strategies (2028 - 2037)

Automated analysis of flow strategies improves operational efficiency through capabilities that support continuous flight day adjustments to demand-capacity balancing mechanisms and the integration of capabilities across strategic, pre-tactical, and tactical phases. Flow strategies are improved through automation capabilities that estimate alternatives for airborne reroutes or modified traffic management initiatives based on changes to the predicted probability of both airspace and airport capacity.

The FAA and users collaboratively and continuously assess (monitor and evaluate) constraints (e.g., airport, airspace, hazardous weather, sector workload, Navigational Aid (NAVAID) outages, security) and associated traffic management initiative mitigation strategies against flight trajectory predictions. Traffic managers create predictable, multi-hour airport arrival and departure rate forecasts to estimate future airport capacity against demand. The FAA and users use (real-time) constraint information and mitigation strategies to increase operational predictability and throughput. Users are able to reassess and select alternative airborne reroute options in support of traffic management improvements which increase the user's ability to select the reroute that best meets their business objectives.

### OI Benefit

- Flexibility (P): Users ability to update trajectory preferences after departure provides increased opportunities for users to select the option that best meets their business objectives.
- Efficiency (P): The automated assessment and execution of revised flow strategies due to changes in the predicted probability of system constraints results in more efficient and timely execution of route options.
- Capacity (P): Airspace capacity and throughput associated with a given constraint is increased by continually assessing the constraint and adjusting TMI strategies as conditions change.
- Predictability (S): Continual reevaluation of constraints against demand will result in more timely execution of reroute changes in response to changing conditions that will improve schedule integrity.

### Increments

Delta (2026 - 2030)		Echo (2031 - 2035)	
1		4	
D	[105211-01] Integrated Departure Route Planning (2028 - 2030) (Development)		
E	[105211-02] Probabilistic Constraint Prediction (2033 - 2037) (Concept Exploration & Maturation)		
E	[105211-03] Improve SAA-Based Flow Predictions (2033 - 2037) (Concept Exploration & Maturation)		
E	[105211-04] Airport Acceptance Rate Decision Support (2033 - 2037) (Planned)		
E	[105211-05] Access to Airborne Reroute Evaluation, Feedback, and Synchronization (2033 - 2037) (Planned)		

# Collaborative Air Traffic Management

## Increments/Enabling Activities

**D** [105211-01] Integrated Departure Route Planning (2028 - 2030)

### Increment Overview

This increment provides users with shared situational awareness and integrated information that combine state-of-the-art weather forecasts with operational flight data to assist the FAA air traffic managers and commercial airlines users in making proactive and efficient traffic flow management decisions. Departure traffic flow management efficiency and demand shortfalls are addressed during severe weather or during periods when traffic demand is reaching or exceeding the capacity of NAS resources by incorporating integrated departure route planning functions and capabilities into collaborative air traffic flow management tools. This information is provided to traffic flow managers and flight operators for up-to 2 hours in the future.

### Increment Status

Development

### Success Criteria

2030 :    Operationally available at initial key site

### Implementation Approach

This new tool provides traffic managers with forecast of departure route fix and status due to convective weather and traffic volume for specific terminals. FMDS ingestion of weather will be adapted to ingest convective weather information from the new SWIM service, Common Support Services - Weather (CSS-Wx) in conjunction with development of IDRP. A prototype of IDRP is currently operational at New York TRACON (N90) facilities. The N90 prototype will be decommissioned upon successful implementation of IDRP in FMDS. This capability will be implemented through the development of FMDS.

### Benefits

-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety

















Predictability (P): Improved situation awareness across involved facilities.

### System Interactions

FMDS (P): FMDS will undergo change to reduce the need for users to mentally integrate information from multiple sources to make a decision, while also improving situation awareness of airspace and route conditions, supporting proactive decision making, and fostering efficient coordination among FAA facilities and flight operators.


NWP (S): NWP is the weather production system that FMDS will use to make decisions.

CSS-Wx (S): CSS-Wx will distribute the weather data produced by NWP to FMDS.


-  External Commitment
-  Primary Benefit
-  Secondary Benefit
-  Operationally Available
-  Complete
-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety
-  Charlie
-  Delta
-  Echo
-  Foxtrot


# Collaborative Air Traffic Management

## Primary Systems

 FMDS: Flow Management Data & Services

## Secondary Systems

 NWP: NextGen Weather Processor

 CSS-Wx: Common Support Services - Weather

# Collaborative Air Traffic Management

## Increments/Enabling Activities

**E** [105211-02] Probabilistic Constraint Prediction (2033 - 2037)

### Increment Overview

This capability enhances the traffic demand model by accounting for the probability of encountering constraints on the surface and in the air due to uncertainty factors related to aggregate demand, predictions of weather-related impacts to National Airspace System resource capacity, throughput values, and airspace complexity.

### Increment Status

Concept Exploration & Maturation

### Success Criteria

2037 :    Operationally available NAS-wide

### Implementation Approach

Candidate for future FMDS Enhancement.

#### Benefits

-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety

Efficiency (P): Higher predictability enables airlines to improve business processes through reduced costs.


### System Interactions

Initial system dependencies have been identified for this capability. As this capability is further defined, future updates will be made to the associated system interaction text.


FMDS (P): FMDS is expected to provide necessary inputs to host this capability.

ERAM(S): To be defined

#### Primary Systems

-  FMDS: Flow Management Data & Services

#### Secondary Systems

-  ERAM: En Route Automation Modernization

# Collaborative Air Traffic Management

## Increments/Enabling Activities

**E** [105211-03] Improve SAA-Based Flow Predictions (2033 - 2037)

### Increment Overview

This increment expands the incorporation of SAA schedule updates and forecast demand in order for NAS traffic managers to assess the impact on predicted traffic flow constraints and conduct negotiations with flight operators and stakeholders in the NAS. Route impact assessments would account for forecast airspace capacity loss and route blockage and would result in advisories being sent by traffic managers for reroutes as needed.

### Increment Status

Concept Exploration & Maturation






### Success Criteria

2037 :    Operationally Available NAS-wide

### Implementation Approach

Candidate for future FMDS enhancement.

#### Benefits

















-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety

Capacity (P): Incorporation of SAA schedules and forecast demand into route impact assessments enables more timely and effective avoidance of constraints and use of available airspace.

Efficiency (P): Incorporation of SAA schedules and forecast demand into route impact assessments enables more timely and effective execution of reroutes that avoid unnecessary deviations around available SAA which prevents additional flight miles flown due to delayed update notification of SAA status change.

Flexibility (S): New dynamic rerouting concepts provide traffic managers, controllers, pilots, and flight operators with more choices when negotiating dynamic reroutes for active aircraft.

### System Interactions

-  External Commitment
-  Primary Benefit
-  Secondary Benefit
-  Operational Availability
-  Complete
-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety
-  Charlie
-  Delta
-  Echo
-  Foxtrot



# Collaborative Air Traffic Management

Initial system dependencies have been identified for this capability. As this capability is further defined, future updates will be made to the associated system interaction text.

FMDS (P): FMDS will expand the use of SAA data include activation/deactivation messages from ERAM to improve constrain predictions and enhance flow management actions.

ERAM (S): ERAM provides SAA activation/deactivation times as inputs to FMDS constraint predictions

SWIM (T): Provides net-centric messaging services that enable information exchange and enterprise services sharing among NAS applications

Primary Systems

FMDS: Flow Management Data & Services

Secondary Systems

ERAM: En Route Automation Modernization

Tertiary Systems

SWIM: System Wide Information Management



# Collaborative Air Traffic Management

## Increments/Enabling Activities

**E** [105211-04] Airport Acceptance Rate Decision Support (2033 - 2037)

### Increment Overview

This increment enables the creation of multi-hour Airport Acceptance Rate forecasts that improve strategic planning. Forecasts take into account airport configuration options, weather forecasts (3D winds, ceiling and visibility), and fleet mix predictions.

### Increment Status

Planned



### Success Criteria

2037 :    Operationally available at designated key site.

### Implementation Approach

This capability is a candidate for a future FMDS enhancement.

#### Benefits

-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety


Efficiency (P): Reduction of diversions and/or airborne holding during wind-related Ground Delay Programs (GDPs) due to over delivery. Improved collaboration and better customer acceptance of GDP programs.

Capacity (S): Reduction in delays and lost capacity from GDPs when arrival rates are less than the available capacity (GDPs too severe or too long).

### System Interactions

FMDS (P): FMDS will provide forecast airport acceptance rates based on surface winds, winds aloft, ceiling and visibility, airport configuration, arrival demand fleet mix, equipment outages, and flight schedules. This information will provide inputs to TMI developments particularly ground delay programs and ground stops.

#### Primary Systems

-  FMDS: Flow Management Data & Services

# Collaborative Air Traffic Management

## Increments/Enabling Activities

**E** [105211-05] Access to Airborne Reroute Evaluation, Feedback, and Synchronization (2033 - 2037)

### Increment Overview

This increment establishes the airborne component of trajectory evaluation, feedback, and synchronization that provides airspace users the ability to update alternative trajectory options and preferences throughout the flight in response to changing conditions. It provides the ability for all parties (i.e., the flight deck, flight operations centers, and traffic managers) to evaluate constraint and trajectory information and ensures that all parties have the same information for airborne reroute decision making. User flexibility is also improved by allowing the use of flight planning functions while airborne. It enables users to assess and select alternative airborne reroute options in support of traffic management improvements which increase the user's ability to select the reroute that best meets their business objectives.

### Increment Status

Planned








### Success Criteria

2037 :    Operationally Available NAS-Wide

### Implementation Approach

This capability is a candidate for a future FMDS enhancement.

#### Benefits

-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety

Flexibility (P): Users will have an increased flexibility to assess flight plan segments against constraints which enable them to more easily assess options. In addition, users will be able to file the flight plan from anywhere which increases flexibility in altering the flight plan as conditions change.

Efficiency (S): User preferences for the chosen route around a constraint will be the most optimum and efficient route based on their business objective.

### System Interactions

# Collaborative Air Traffic Management

Initial system dependencies have been identified for this capability. As this capability is further defined, future updates will be made to the associated system interaction text.


FMDS (P): FMDS provides trajectory and constraint information.

CSS-FD (S): CSS-FD to provide continuously updated information regarding expected constraints in the system while airborne and airborne component of trajectory evaluation, feedback, and coordination.


EFB (T): EFB enables the use of flight planning functions while airborne.


SWIM (T): SWIM to provide system constraints for use in evaluation of trajectories.

### Primary Systems

 FMDS: Flow Management Data & Services

### Tertiary Systems

 SWIM: System Wide Information Management

 EFB: Electronic Flight Bag

# Collaborative Air Traffic Management

## OI: [108218] Improved Management of Airspace for Space Missions (2025 - 2039)

There are challenges in managing airspace dedicated for space operations due to levels of uncertainty in space vehicle’s readiness to launch and variation in the associated airspace that must be protected for each mission. Operational improvements will help to minimize capacity and efficiency impacts associated with the increased number and variation of space vehicle operations on other NAS users while ensuring that safety is maintained. With support from automation tools, traffic managers and controllers will be able to safely reduce the size, impact, and duration of blocked airspace by being able to both strategically and tactically manage aircraft away from hazardous airspace before and during the space vehicle’s ascent/descent and away from debris field risks during a catastrophic failure.

### OI Benefit

Capacity (P): Capacity will be increased by more precise scheduling and real-time adjustments of Special Activity Airspace (SAA) volumes required for space missions.

Efficiency (P): Improved controller tools for managing airspace access associated with space missions will enable a safe reduction in the size, impact, and duration of blocked airspace resulting in increased system throughput and overall efficiency.

### Increments

Delta  
(2026 - 2030)  
  
1

Echo  
(2031 - 2035)  
  
1

D [108218-21] Improved Coordination of Airspace for Space Missions (2025 - 2029) (Concept Exploration & Maturation)

E [108218-22] Dynamic Management of Airspace for Space Missions (2034 - 2039) (Concept Exploration & Maturation)

# Collaborative Air Traffic Management

## Increments/Enabling Activities

**D** [108218-21] Improved Coordination of Airspace for Space Missions (2025 - 2029)

### Increment Overview

Improved coordination of airspace for space missions will minimize the capacity and efficiency impacts to aircraft of space vehicle operations and ensure that safety is maintained. Automating the coordination of launch status with operators will reduce the time that airspace is segregated for the sole use of space operations. Airspace management tools account for the variety in space vehicle missions (e.g., intended trajectories, locations, number of missions) and help to manipulate the needed special activity airspace (SAA) areas to ensure safety and improve NAS performance. Airspace management improvements will also be supported by automating the display of static SAAs for launch and re-entry operations on controller displays which reduces the coordination steps required for preparing for the mission, increases situational awareness of air traffic management (ATM) personnel, and reduces the potential for human error from manual data entries. En route controllers will have support from the conflict probe to identify potential aircraft-to-hazard area/restricted airspace conflicts to safely segregate aircraft from airspace restricted for space operations.

### Increment Status

Concept Exploration & Maturation

### Success Criteria

- 2025 : Initial Operational Capability (IOC): Deployment of Space Data Integrator (SDI) at the Air Traffic Control System Command Center (ATCSCC)
- 2029 : Initial Operation Capability of NAS Space Integration Capabilities (NSIC) at one facility (e.g., ZMA ARTCC)

### Implementation Approach

















Commercial Space Operators will provide SAA-like planning information which will be processed and made available to NAS automation systems. SAA schedules associated with space vehicle operations will be made available by the Aeronautical Common Service (ACS) so that the information can be made available for NAS automation systems and decision support tools(e.g. TFMS - Traffic Flow Management System).The goal of this interaction is to account for constraints introduced by space vehicle operations in operational activities such as flow planning. Integration of Launch/Re-entry Operators (LRO) operational data with TFMS to allow for situational awareness to support more efficient ATC process and procedures.

### Benefits

-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety

Efficiency (P): NAS automation systems and tools will have access to near-real time SAA information which will increase system throughput and overall efficiency (more efficient use of available airspace based on near-real time SAA status information).

Capacity (P): Capacity will be increased as a result of this capability enabling precise scheduling and situational awareness of SAA

-  External Commitment
-  Primary Benefit
-  Secondary Benefit
-  Operationally Available
-  Complete
-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety
-  Charlie
-  Delta
-  Echo
-  Foxtrot



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# Collaborative Air Traffic Management

ACS (P): The Aeronautical Common Services (ACS) will be developed to provide integrated aeronautical information and may include static and dynamic status information for SAAs for launch and re-entry operations. Until it does, another system must provide that SAA information.

ATOP (S): ATOP will require functional and interface modifications to display of static SAAs and to provide real-time status information for SAAs for launch and re-entry operations

ERAM (S): ERAM will require functional and interface modifications to display of static SAAs and to provide real-time status information for SAAs for launch and re-entry operations

STARS (S): STARS will require functional and interface modifications to display of static SAAs and to provide real-time status information for SAAs for launch and re-entry operations.

SWIM (S): ACS information for SAAs is distributed using SWIM. ACS will be on-ramped to SWIM/NEMS.

TFMS (S): TFMS is a potential consumer of ACS real-time status information for SAAs for launch and re-entry operations. TFMS will take into account SAA information associated with commercial space operations for flow planning.

## Primary Systems

- ACS: Aeronautical Common Service

## Secondary Systems

- TFMS: Traffic Flow Management System
- SWIM: System Wide Information Management
- ERAM: En Route Automation Modernization
- STARS: Standard Terminal Automation Replacement System
- ATOP: Advanced Technologies and Oceanic Procedures

# Collaborative Air Traffic Management

## Increments/Enabling Activities

**E** [108218-22] Dynamic Management of Airspace for Space Missions (2034 - 2039)

### Increment Overview

Airspace management improvements will result in increased situational awareness and efficient management of airspace that supports the safe integration of increased space operations into the NAS. As space launches and reentries increase in numbers and variation of methods, there is a need to dynamically adjust Special Activity Airspace (SAA) to minimize the impacts to other NAS users while ensuring safe segregation of aircraft from airspace restricted for space operations. Improved airspace management will result from the dynamic generation and exchange of aircraft hazard areas related to space vehicle launches and re-entries, and in the event of a catastrophic failure, the debris field. These dynamic SAA areas will be integrated into air traffic management automation to assist traffic managers and controllers to both strategically and tactically manage aircraft flows away from hazard areas. Dynamic SAA area generation tools will help manipulate the needed SAA areas to ensure safety and improve NAS performance. These tools will account for risks to aircraft before and during ascent/descent and for the variability in mission characteristics (e.g., intended trajectories, locations) during nominal and off-nominal events. In addition, the exchange and communication of real-time status and display of real-time dynamically updated hazard areas will result in the further reduction of time that airspace is segregated for the sole use of space operations.

### Increment Status



Concept Exploration & Maturation

### Success Criteria

To Be Defined

### Implementation Approach

#### Benefits

-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety

### System Interactions

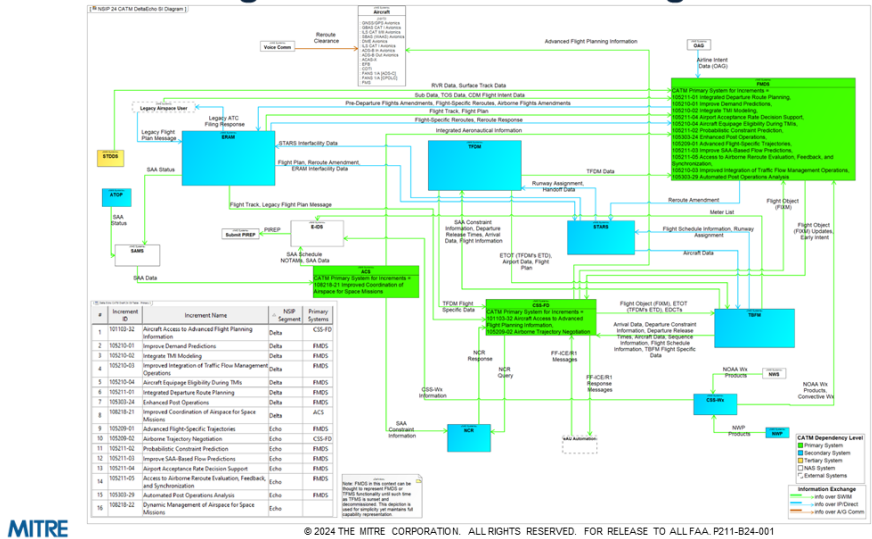
To be determined

# Collaborative Air Traffic Management

## Systems Interactions

Collaborative ATM provides capabilities necessary to manage traffic flow across the NAS. TFMS provides the core processing for strategic and tactical situational awareness, display, and traffic demand management and relies on data and information from other FAA automation systems to deliver TFM solutions. TFMS will be replaced by Flow Management Data and Services (FMDS) delivering increased capacity, reliability, and will accommodate advanced TFM capabilities.

CATM SI Diagram – Delta & Echo Segments





# Collaborative Air Traffic Management

Increment	ACS	ATOP	CSS-FD	CSS-Wx	EFB	ERAM	FMDS	NWP	STARS	STDDS	SWIM	TBFM	TFDM	TFMS
<div><div></div><div>[101103-32] Aircraft Access to Advanced Flight Planning Information</div></div>			P		A						T			
<div><div></div><div>[105210-01] Improve Demand Predictions</div></div>							P			T	T			
<div><div></div><div>[105210-02] Integrate TMI Modeling</div></div>							P							
<div><div></div><div>[105210-03] Improved Integration of Traffic Flow Management Operations</div></div>							P					T	T	
<div><div></div><div>[105210-04] Aircraft Equipage Eligibility During TMIs</div></div>							P							
<div><div></div><div>[105211-01] Integrated Departure Route Planning</div></div>				S			P	S						
<div><div></div><div>[105303-24] Enhanced Post Operations</div></div>						S	P				T	S	S	
<div><div></div><div>[108218-21] Improved Coordination of Airspace for Space Missions</div></div>	P	S				S			S		S			S

Operationally Available

**P** Primary Systems

Complete

**S** Secondary Systems

In Service System

**T** Tertiary Systems

Planned System

**A** Avionics Systems

**D** Delta



# Collaborative Air Traffic Management

## Stakeholders

Specific roles and responsibilities for the implementation of all capabilities in this portfolio are outlined in the RASCI (Responsible, Accountable, Supporting, Consulted, and Informed) matrix below. All stakeholder organizations involved in the delivery of Segment Alpha capabilities are listed across the top. Portfolio capabilities are listed on the left side of the table, organized by OI and increment. AJM-22 is the responsible and accountable office for the development and implementation of the increments within this portfolio. AJM-22 will be assisted by a number of support contractors, as well as government personnel from other FAA offices, on an ongoing, matrixed basis. AJM-22 will periodically seek input and review from various stakeholder groups, as well as subject matter experts in other FAA offices and groups external to the FAA. All programmatic decisions rest ultimately with the AJM-22 organization. Other offices will be engaged early and often as needed to provide insight and concurrence on applicable functionality, documentation, operational testing, implementation, and logistics support. AJR-1 and AJT-2 will provide operational procedure and training support for implementation of rerouting-related changes for the ERAM system. AJM-22 will work closely with AJT-2 to develop and execute any procedure and training changes, as needed. APO will provide support in developing policies for information sharing and incentivizing operators. AIR-130, AOV, and AFS-400 will be consulted regarding the official definition of flight plan filing. Finally, AJM-22 will regularly consult with ANG-C7 regarding the overall implementation of these capabilities. AJM-22 will solicit input from external organizations such as MITRE, Volpe, Metron Aviation, and others as needed. This input may include such efforts as concept engineering, functionality and design review, prototyping, test planning and support, and input to implementation and logistics support. For the increment Route Availability Planning, AJM-22 is accountable and responsible for development aspects and integration. AJT-2 and AJM-1 are among the supporting offices. AOV is consulted. AJV-7 is accountable for Concept Engineering, Operational Requirements, etc.

- A** Accountable for the completion of NextGen capability. The highest level within the RASCI matrix, this office is charged by the FAA to deliver a particular capability. Typically, this designation is provided via an Acquisition Program Baseline. To foster a clear line of accountability, two different offices can never be Accountable for the same increment, and Accountability can never be delegated to another office.
- R** Responsible for the successful completion of NextGen capability or a critical component of the capability. This office is responsible to the Accountable office. The Responsible office is responsible for initiating an actual change to the NAS such as automation changes, and is often also designated as the Accountable office for that increment. However, there are examples in the NSIP where one office is Accountable for an increment while another office (or offices) is actually making a change in the NAS on behalf of the Accountable office.
- A/R** Accountable for the completion of NextGen capability as well as Responsible for its implementation.
- S** Supports the Responsible office in the implementation of NextGen capability. Typically, this support is in the form of subject matter expertise, procedural guidance, or training activities.
- C** Consulted for input during the implementation of NextGen capability. Provides input on a specific aspect in the development and implementation of a capability, such as safety analysis or approval. Input may or may not be used as determined by the Responsible and Accountable offices.
- I** Informed about the progress of implementation.

# Collaborative Air Traffic Management

RASCI Matrix	ANG			AOV	APO	AJR	AJT	AJM		AFS	AJI			AAE	AIR
	B	C5	C7	001	001	1	2	22	31	001	1	2	3	001	001
• <b>D</b> [101103-32] Aircraft Access to Advanced Flight Planning Information (2026 - 2030)	<b>R</b>		<b>A</b>												
• <b>D</b> [105210-01] Improve Demand Predictions (2028 - 2030)			<b>C</b>					<b>A/R</b>							
• <b>D</b> [105210-02] Integrate TMI Modeling (2030 - 2035)			<b>A</b>												
• <b>D</b> [105210-03] Improved Integration of Traffic Flow Management Operations (2028 - 2030)	<b>R</b>		<b>A</b>												
• <b>D</b> [105210-04] Aircraft Equipage Eligibility During TMIs (2030 - 2035)	<b>R</b>		<b>A</b>												
• <b>D</b> [105211-01] Integrated Departure Route Planning (2028 - 2030)			<b>C</b>					<b>A/R</b>							
• <b>D</b> [105303-24] Enhanced Post Operations (2030 - 2035)		<b>R</b>	<b>A</b>												
• <b>D</b> [108218-21] Improved Coordination of Airspace for Space Missions (2025 - 2029)			<b>A</b>												
• <b>E</b> [105209-01] Advanced Flight-Specific Trajectories (2033 - 2037)			<b>A</b>												
• <b>E</b> [105209-02] Airborne Trajectory Negotiation (2031 - 2035)	<b>R</b>		<b>A</b>												
• <b>E</b> [105211-02] Probabilistic Constraint Prediction (2033 - 2037)		<b>R</b>	<b>A</b>												
• <b>E</b> [105211-03] Improve SAA-Based Flow Predictions (2033 - 2037)	<b>R</b>		<b>A</b>												
• <b>E</b> [105211-04] Airport Acceptance Rate Decision Support (2033 - 2037)	<b>R</b>		<b>A</b>												
• <b>E</b> [105211-05] Access to Airborne Reroute Evaluation, Feedback, and Synchronization (2033 - 2037)	<b>R</b>		<b>A</b>												
• <b>E</b> [105303-29] Automated Post Operations Analysis (2033 - 2037)															

✔ Operationally Available

✔ Complete

⚖ External Commitment

**C** Charlie

**D** Delta

**E** Echo

**F** Foxtrot

# Collaborative Air Traffic Management

RASCI Matrix	ANG			AOV	APO	AJR	AJT	AJM		AFS	AJI			AAE	AIR
	B	C5	C7	001	001	1	2	22	31	001	1	2	3	001	001
<ul style="list-style-type: none"><li><b>E</b> [108218-22] Dynamic Management of Airspace for Space Missions (2034 - 2039)</li></ul>															



# Collaborative Air Traffic Management

## Appendix A

### Alpha Increments

#### Portfolio Overview

Collaborative Air Traffic Management (CATM) coordinates flight and flow decision-making by flight planners and FAA traffic managers to improve overall efficiency, provide greater flexibility to flight planners, and make the best use of available airspace and airport capacity. The overall philosophy driving the delivery of CATM services is to accommodate user preferences to the maximum extent possible. Traffic managers impose Traffic Management Initiatives (TMIs) to account for congestion, weather, special activity airspace, or other constraints. TMIs are the means by which traffic managers manage constraints. These initiatives can alter users' flight plans. The impact of TMIs can be reduced by tailoring flow management actions to specific flights. This can be done through a combination of increased information on the users' preferred alternative routes; enhanced tools for assessing the impact of rerouting decisions; and improved communications and display of instructions to the controllers who must implement the initiatives. The Operational Improvements (OIs) in this portfolio contain incremental steps to achieve these goals. CATM focuses on providing traffic managers with improved Decision-Support Tools (DSTs) to better predict, identify, and resolve imbalances between traffic demands and NAS capacity. The primary function of Traffic Flow Management (TFM) is to safely manage flows of air traffic to assure efficient throughput in the NAS. This is a collaborative effort between NAS users and TFM service providers to share plans and provide information to enable timely actions to adjust to traffic and environmental dynamics over time. TFM is conducted from a national level to areas as small as a single airport, and from days in advance of a flight to real-time airborne adjustments. The need for strategic and tactical situational awareness, planning, and action requires timely and accurate information as well as timely and efficient collaboration and coordination between decision-makers. Automated tools that enable meeting these demands across all levels of the traffic management team are critical to maintaining both the safety and efficiency of NAS operations. Benefits resulting from the increments will include increased system efficiency, flexibility, and predictability.

Note: The dates and timelines included in the NAS Segment Implementation Plan (NSIP) are for planning purposes only. All capability schedules are tentative until their supporting programs are officially baselined.

#### Portfolio Content Summary Statistics

		Increment Status				
Segment	Total by Segment	Planned	Concept Exploration & Maturation	Development	Initial Operational Availability	Completed
*Alpha (2010 - 2015)	5	0	0	0	0	5
TOTAL	5	0	0	0	0	5
Segment	% by Segment	% by Segment/Increment Status				
*Alpha (2010 - 2015)	100%	0 %	0 %	0 %	0 %	100 %
TOTAL	100%	0 %	0 %	0 %	0 %	100 %

# Collaborative Air Traffic Management

## Operational Improvements/Current Operations & Increments

## Benefits

### CO: [105302] Initial Flight Day Evaluation (2011 - 2018)

- [A] [105302-11] Collaborative Airspace Constraint Resolution (2014 - 2014) ✓
- [A] [105302-12] Enhanced Congestion Prediction (2011 - 2011) ✓



### CO: [101102] Increased Automation Support for Planning in Constrained Airspace (2012 - 2014)

- [A] [101102-11] Collaborative Trajectory Operations Program (2012 - 2013) ✓
- [A] [101102-12] Route Availability Planning (2014 - 2014) ✓

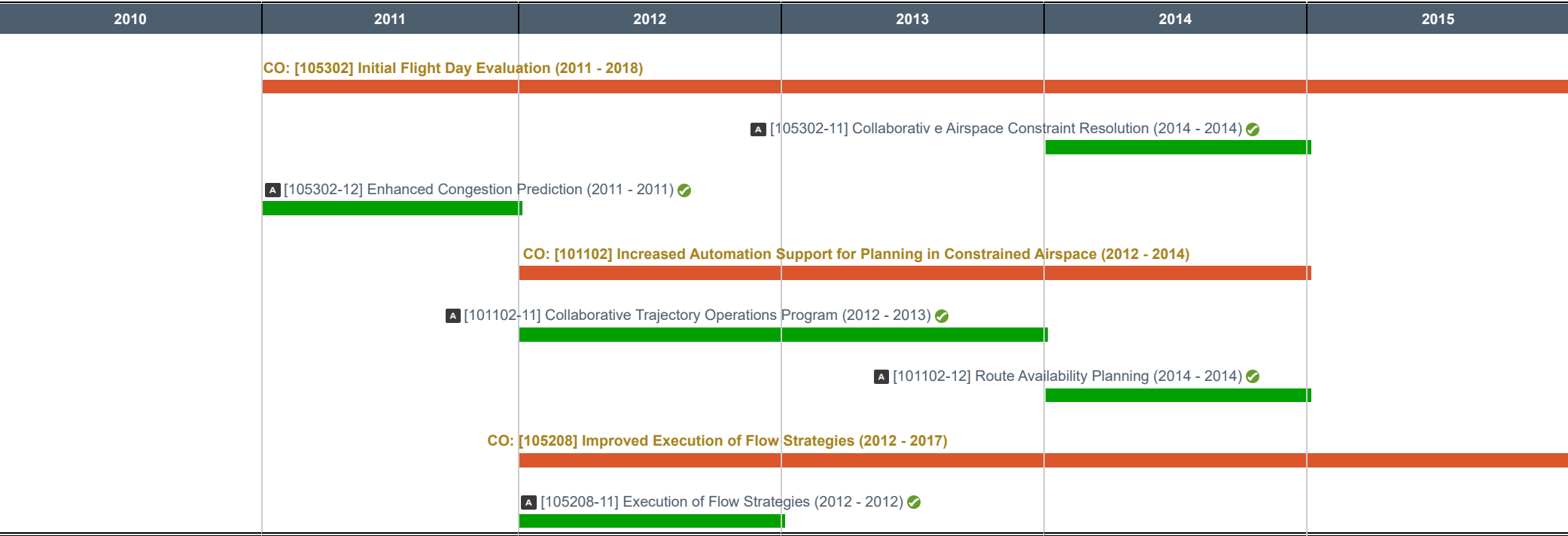


### CO: [105208] Improved Execution of Flow Strategies (2012 - 2017)

- [A] [105208-11] Execution of Flow Strategies (2012 - 2012) ✓



Collaborative Air Traffic Management



# Collaborative Air Traffic Management

## CO: [105302] Initial Flight Day Evaluation (2011 - 2018)

Performance analysis, where throughput is constrained, is the basis for strategic operations planning. Continuous (real-time) constraints are provided to Air Navigation Service Provider (ANSP) traffic management decision-support tools and National Airspace System (NAS) users. Flight day evaluation metrics are complementary and consistent with collateral sets of metrics for airspace, airport, and flight operations. Long-term planning functions will improve due to continuous flight day evaluation. NAS performance will be improved and decision-makers will be able to predict and plan operations based on a validated tool.

ANSPs and users collaboratively and continuously assess (monitor and evaluate) constraints (e.g., airport, airspace, hazardous weather, sector workload, Navigational Aid (NAVAID) outages, security) and associated TMI mitigation strategies. Users and ANSP dynamically adjust both pre-departure and airborne trajectories in response to anticipated and real-time constraints.

ANSP, in collaboration with users, develops mitigation strategies that consider the potential constraints. A pre-defined set of alternatives is developed that maximizes airspace and airport capacity and throughput. ANSP and users use real-time constraint information and these mitigation strategies to increase operational predictability and throughput.

ANSP automation traffic management decision support tools provide traffic managers and users with additional tools to assess the impact of alternative reroute options against a given constraint. In addition, traffic management delays are reduced through improved demand estimates based on user input.

### CO Benefit

Capacity (P): Airspace capacity and throughput associated with a given constraint is increased by continually assessing the constraint as well as improved demand predictions provided by users.

Efficiency (P): Users are able to assess proposed routes against constraints and chose the reroute that best meets their business objectives.

Predictability (S): Through continual reevaluation of constraints against demand, system throughput will increase resulting in better adherence to flight schedules.

Flexibility (S): Users will be able to assess and choose the route the best meets their business objectives.





# Collaborative Air Traffic Management

Increments

Alpha  
(2010 - 2015)

2

- A [105302-11] Collaborative Airspace Constraint Resolution (2014 - 2014)  (Complete)
- A [105302-12] Enhanced Congestion Prediction (2011 - 2011)  (Complete)

# Collaborative Air Traffic Management

## Increments/Enabling Activities

**A** [105302-11] Collaborative Airspace Constraint Resolution (2014 - 2014)

### Increment Overview

Collaborative Airspace Constraint Resolution (CACR) increment provides automated decision support tools that assist traffic planners with formulating solutions for flight-specific TMIs, while taking into account airspace user preferences and options. These automated decision support tools have the capability to evaluate pre-departure reroute solutions. The integration of weather forecast products into the tools also enhances congestion prediction capabilities with existing and enhanced TFM system rerouting capabilities. CACR will allow NAS users whose flights are predicted to encounter en route congestion due to weather or other constraints to submit user preferences for constraint resolution.

### Increment Status

Complete

### Success Criteria

✔ 2014 : Operationally available NAS-wide.

### Implementation Approach















CACR was deployed as part of CATM-T WP2 and TFMS Releases 7-9. Phase 1 deployed in spring of 2012, Phase 2 in spring of 2013, and Phase 3 by the end of 2013.

### Benefits

-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety

Capacity (P): Fewer en route capacity constraints are imposed as congestion is resolved through tailored incremental congestion responses. Automated congestion resolution tools match user preferences to airspace with available capacity. Congestion predictions provide decision-makers with an understanding of ripple effects and improve timing of TMIs to minimize capacity loss. Congestion predictions evaluate the impact of potential reroutes on the NAS resources before implementing them, to understand the potential capacity consequences. Congestion predictions resolve inefficiencies in estimated departure control time assignments with regard to pop-ups and the ration-by-schedule algorithm to avoid traffic initiatives resulting in unused capacity where flights will have been delayed on the ground unnecessarily.

Flexibility (S): These tools provide accurate planning of TMIs to match strategic prediction of congestion and capacity. Congestion predictions improve the demand prediction for nonscheduled users by including them in collaborative planning for congested airspace. Integration of automated weather forecast products into constraint information will determine if a flight will encounter weather problems on its projected departure route and locate departure gaps through impending weather as an alternative to ground delay.

-  External Commitment
-  Primary Benefit
-  Secondary Benefit
-  Operational Availability
-  Complete
- 
-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety
-  Alpha



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# Collaborative Air Traffic Management

## System Interactions

TFMS(P): Evaluates trajectory options and flows to determine which options are assigned to which flights. This information is conveyed back to the FOC/AOC as described in Collaborative Trajectory Options Program (CTOP). TFMS recommends reroutes for flight-specific Traffic Management Initiatives (TMIs). This allows the traffic manager to adjust the target parameters and evaluate the required trajectory adjustments.

FTI (T) - FTI gateway resources are used by Collaborative Decision Making Network (CDMNet) for distribution of Trajectory Option Sets (TOS) to users.

ERAM(S): Receives flight plan changes from the traffic manager for delivery to users.

### Primary Systems

● TFMS: Traffic Flow Management System

### Secondary Systems

● ERAM: En Route Automation Modernization

### Tertiary Systems

● FTI: FAA Telecommunications Infrastructure

# Collaborative Air Traffic Management

## Increments/Enabling Activities

**A** [105302-12] Enhanced Congestion Prediction (2011 - 2011)

### Increment Overview

The Enhanced Congestion Prediction increment provides improved capabilities to assess the impact of a set of reroutes on the level of demand and other performance metrics for a point of interest. The traffic manager can model proposed initiatives by manually selecting a set of flights and route options to evaluate and by developing a set of flight-specific adjustments through a series of “what-if” evaluations.

Operational capability was made available through a combination of WP1 (Impact Assessment and Resolution Suite) and WP2 (Arrival Uncertainty Management with Unified Ground Delay Programs). This increment has achieved its success criteria.

### Increment Status

Complete



### Success Criteria

✔ 2011 :    Operationally available NAS-wide

### Implementation Approach

Operational capability was made available through a combination of WP1 (Impact Assessment and Resolution Suite) and WP2 (Arrival Uncertainty Management with Unified Ground Delay Programs). This increment has achieved its success criteria.

### Benefits

-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety

# Collaborative Air Traffic Management

Capacity (P):

- Fewer en route capacity constraints are imposed as congestion is resolved through tailored incremental congestion responses.
- Automated congestion resolution tools match user preferences to airspace with available capacity.

These tools provide accurate planning of TMIs to match strategic prediction of congestion and capacity.

- Congestion predictions provide decision-makers with an understanding of ripple effects and improve timing of TMIs to minimize capacity loss.
- Congestion predictions improve the demand prediction for nonscheduled users by including them in collaborative planning for congested airspace.
- Congestion predictions evaluate the impact of potential reroutes on the NAS resources before implementing them, to understand the potential capacity consequences.
- Congestion predictions resolve inefficiencies in estimated departure control time assignments with regard to pop-ups and the ration-by-schedule algorithm to avoid traffic initiatives resulting in unused capacity.

## System Interactions

TFMS(P): TFMS employs Reroute Impact Assessment (RRIA) algorithms to model the impact of a reroute before it is issued, showing the impact on sector loading. This is conducted in concert with existing TFMS capabilities. It can be shared with other facilities.

Primary Systems

TFMS: Traffic Flow Management System

# Collaborative Air Traffic Management

## CO: [101102] Increased Automation Support for Planning in Constrained Airspace (2012 - 2014)

New automation capabilities will provide traffic managers and users with better and more-timely information and tools to evaluate constraints and reduce the impact of these constraints on operations. New types of traffic management initiatives will provide users with increased options between their chosen routes and ground delays due to congested airspace. New tools will also result in the more-timely re-opening of departure routes impacted by convective weather, thereby reducing airport departure backlogs.

### CO Benefit

Flexibility (P): Increased flexibility for users to choose the constraint option that best meets their business objective.

Efficiency (S): User preferences for the chosen route around a constraint will be the most optimum and efficient route based on their business objective.

### Increments

Alpha  
(2010 - 2015)

2

A [101102-11] Collaborative Trajectory Operations Program (2012 - 2013)  (Complete)

A [101102-12] Route Availability Planning (2014 - 2014)  (Complete)

# Collaborative Air Traffic Management

## Increments/Enabling Activities

**A** [101102-11] Collaborative Trajectory Operations Program (2012 - 2013)

### Increment Overview

The Collaborative Trajectory Options Program (CTOP) increment provides flight planners with information about congestion along their intended routes and allows the system to accept user preferences as part of constraint resolution. This is a two-way exchange that gives the flight planner the choice of delaying a flight or choosing alternate routes. This initial phase of CTOP is limited to the period before a flight plan is filed.

Operational capability was made available with the introduction of CTOP in TFMS Release 7. This increment has achieved its success criteria.

### Increment Status

Complete



### Success Criteria

✔ 2011 : Operationally available NAS-wide.

### Implementation Approach

Operational capability was made available with the introduction of CTOP in TFMS Release 7. This increment has achieved its success criteria.

#### Benefits

-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety

#### Flexibility (P):

- User route flexibility is increased through negotiated trajectories for congestion resolutions.
- Users provide trajectory objectives and preferences that reflect their operational needs.
- Users may resolve many potential congestion situations by indicating, when they file their flight plans, their preferences for avoiding congested areas.
- Electronic negotiations provide a resolution that considers user-submitted preferences to the extent possible.
- Knowledge of user priorities reduces the possibility of traffic flow imposing large non-linear cost factors (e.g. diversion) on specific flights.

### System Interactions

 External Commitment

 Primary Benefit

 Secondary Benefit

 Operationally Available

 Complete

 Access & Equity

 Capacity

 Flexibility

 Efficiency

 Environment

 Predictability

 Safety

 Alpha



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# Collaborative Air Traffic Management

TFMS (P): AOC/FOC systems to interface with TFMS to provide users with flight delay and alternative route assignment options based upon operator preferences.

## Primary Systems

- TFMS: Traffic Flow Management System



# Collaborative Air Traffic Management

## Increments/Enabling Activities

**A** [101102-12] Route Availability Planning (2014 - 2014)

### Increment Overview

This increment supports a flow management interactive capability to iteratively plan flight departures that takes into account potential constraints of convective weather and congestion. This increment provides support tools for controllers to recognize, plan and communicate information on effected flights.

Departure routes are assessed for the effects of weather on departure routes. The associated flights will be made known to traffic management coordinators and supervisors to improve efficiencies and predictability while smoothing departure flow operations. This increment will be implemented via the Route Availability Planning Tool (RAPT) and eventually incorporated into TFMS and made available and adapted at only four sites N90, C90, PCT, and PHL.

### Increment Status

Complete




### Success Criteria

- ✔ 2013 : Operationally available at C90.
- ✔ 2014 : Operationally available at N90, PCT, PHL.

### Implementation Approach

This increment will be implemented via the Route Availability Planning Tool (RAPT)and eventually incorporated into TFMS and made available and adapted at only four sites N90, C90, PCT, and PHL.

### Benefits

-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety

Capacity (P): User route flexibility is increased through negotiated trajectories for congestion resolutions.

Efficiency (P):Users provide trajectory objectives and preferences that reflect their operational needs. Electronic negotiations provide a resolution that considers user-submitted preferences to the extent possible.

Predictability (P):Users may resolve many potential congestion situations by indicating, when they file their flight plans, their preferences for avoiding congested areas. Knowledge of user priorities reduces the possibility of traffic flow imposing large non-linear cost factors (e.g., diversion) on specific flights.

# Collaborative Air Traffic Management

## System Interactions

TFMS (P): TFMS provides assessment of weather impact on departure routes and associated flights to tower traffic management coordinators (TMC) and supervisors to improve departure operations.

### Primary Systems

- TFMS: Traffic Flow Management System

# Collaborative Air Traffic Management

## CO: [105208] Improved Execution of Flow Strategies (2012 - 2017)

Individual flight-specific trajectory changes resulting from Traffic Management Initiatives (TMIs) will be disseminated to the appropriate Air Navigation Service Provider (ANSP) automation for tactical approval and execution. This capability will increase the agility of the National Airspace System to adjust and respond to dynamically changing conditions such as bad weather, congestion, and system outages. Traffic Flow Management automation prepares TMIs appropriate to the situation at the flight-specific level. After ANSP approval, changes/amendments are electronically delivered to the controller as a proposed trajectory. Controllers assess the proposal and if acceptable, provide the reroute to the flight crew via voice communication. Once accepted by the flight crew, the proposed trajectory becomes the new cleared trajectory in the automation.

### CO Benefit

- Capacity (P): Automated support for the execution of traffic flow changes between traffic management and air traffic controllers will provide for more route options that can be adjusted in response to changing conditions more rapidly, thereby increasing capacity when there are system constraints.
- Efficiency (P): The automated assessment and execution of trajectory changes required due to system constraints results in more efficient and timely execution of route options.
- Predictability (S): Faster adjustment of reroute changes in response to changing conditions will improve schedule integrity.

### Increments

Alpha  
(2010 - 2015)

1

A [105208-11] Execution of Flow Strategies (2012 - 2012) (Complete)

# Collaborative Air Traffic Management

## Increments/Enabling Activities

**A** [105208-11] Execution of Flow Strategies (2012 - 2012)

### Increment Overview

Integration of Execution of Flow Strategies into automation systems provides for improved strategic capability based on dynamic information flows as opposed to static processes by providing tailored reroutes and movement from large scale SWAP routes to providing tailored trajectories to aircraft. Airspace operators benefit from improved collaborative decision-support tools, which better assess the potential impacts of decisions, reducing the likelihood of unintended consequences. Under this increment, better decision support also increases the ability to maintain capacity in the presence of uncertainty.

Improvements of the en route ATC en route automation include automatic identification of aircraft affected by the Traffic Management Initiative (TMI), electronic communication of the TMI information in a timely manner to the relevant ATC operational positions, and information that suggest controller actions to achieve the flow strategy. This capability is the means by which the Traffic Flow Management System (TFMS)-generated reroutes are defined and transmitted via System-Wide Information Management (SWIM).

### Increment Status

Complete








### Success Criteria

✔ 2012 :    Operationally available NAS-wide.

### Implementation Approach

Capability developed under CATM-T WP2. SWIM connectivity between TFMS and ERAM has been tested and completed. This capability will be exploited via Airborne Rerouting, which requires ERAM to be operational at all ARTCCs before being made operationally available.

### Benefits

-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety

# Collaborative Air Traffic Management

Flexibility (P):Flight-specific changes can be made incrementally, with opportunity to observe the effect before taking additional action.

Efficiency (P):Aggregate flight efficiency is increased by factoring individual flight trajectories into the congestion solution. Providing automated communication of reroute resolutions that include user preferences allows incremental implementation.The reroute provides controllers with the trajectory changes required, protecting a flight plan from getting any additional reroutes and protecting negotiated trajectories.Fewer en route capacity constraints are imposed as congestion is resolved through tailored incremental congestion responses. Flight-specific adjustments better match the specific congestion problem and minimize the loss of capacity. Integrated resolutions identify the flights to maneuver, when to maneuver them, and which maneuvers to assign to minimize the number of affected flights.

## System Interactions

TFMS (P): TFMS provides traffic managers access to playbook routes and enhanced congestion prediction tools to help assess utility of the proposed reroutes. TFMS allows the traffic manager to select basic reroutes and forward the pre-departure reroutes via the Reroute Data Exchange to ERAM.

ERAM (S): ERAM receives pre-departure reroutes via the reroute data exchange from TFMS and checks reroutes for conflicts.

CSS-Wx (S): CSS-Wx will provide integrated weather products used by TFMS to perform route evaluation and provide feedback to the aircraft operators on which trajectory option is available.

FTI (T): FTI IP network provides the transport mechanism for SWIM Segment 1 Reroute Data exchange.

### Primary Systems

- TFMS: Traffic Flow Management System

### Secondary Systems

- CSS-Wx: Common Support Services - Weather
- ERAM: En Route Automation Modernization

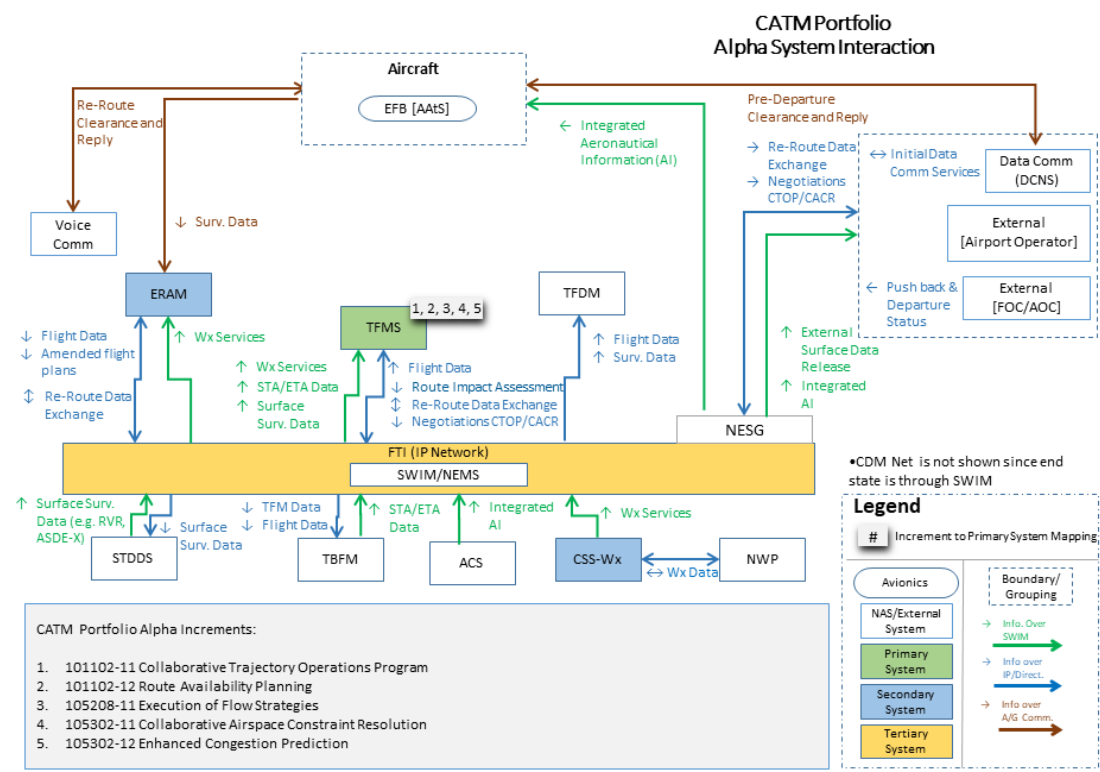
### Tertiary Systems

- FTI: FAA Telecommunications Infrastructure

# Collaborative Air Traffic Management

## Systems Interactions

Collaborative ATM provides capabilities necessary to manage traffic flow across the NAS. TFMS provides the core processing for strategic and tactical situational awareness, display, and traffic demand management and relies on data and information from other FAA automation systems to deliver TFM solutions. TFMS will be replaced by Flow Management Data and Services (FMDS) delivering increased capacity, reliability, and will accommodate advanced TFM capabilities.



# Collaborative Air Traffic Management

Increment	CSS-Wx	ERAM	FTI	TFMS
A [101102-11] Collaborative Trajectory Operations Program ✓				P
A [101102-12] Route Availability Planning ✓				P
A [105208-11] Execution of Flow Strategies ✓	S	S	T	P
A [105302-11] Collaborative Airspace Constraint Resolution ✓		S	T	P
A [105302-12] Enhanced Congestion Prediction ✓				P

✓ Operationally Available

P Primary Systems

✓ Complete

S Secondary Systems

● In Service System

T Tertiary Systems

● Planned System

A Avionics Systems

A Alpha

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# Collaborative Air Traffic Management

## Stakeholders

Specific roles and responsibilities for the implementation of all capabilities in this portfolio are outlined in the RASCI (Responsible, Accountable, Supporting, Consulted, and Informed) matrix below. All stakeholder organizations involved in the delivery of Segment Alpha capabilities are listed across the top. Portfolio capabilities are listed on the left side of the table, organized by OI and increment. AJM-22 is the responsible and accountable office for the development and implementation of the increments within this portfolio. AJM-22 will be assisted by a number of support contractors, as well as government personnel from other FAA offices, on an ongoing, matrixed basis. AJM-22 will periodically seek input and review from various stakeholder groups, as well as subject matter experts in other FAA offices and groups external to the FAA. All programmatic decisions rest ultimately with the AJM-22 organization. Other offices will be engaged early and often as needed to provide insight and concurrence on applicable functionality, documentation, operational testing, implementation, and logistics support. AJR-1 and AJT-2 will provide operational procedure and training support for implementation of rerouting-related changes for the ERAM system. AJM-22 will work closely with AJT-2 to develop and execute any procedure and training changes, as needed. APO will provide support in developing policies for information sharing and incentivizing operators. AIR-130, AOV, and AFS-400 will be consulted regarding the official definition of flight plan filing. Finally, AJM-22 will regularly consult with ANG-C7 regarding the overall implementation of these capabilities. AJM-22 will solicit input from external organizations such as MITRE, Volpe, Metron Aviation, and others as needed. This input may include such efforts as concept engineering, functionality and design review, prototyping, test planning and support, and input to implementation and logistics support. For the increment Route Availability Planning, AJM-22 is accountable and responsible for development aspects and integration. AJT-2 and AJM-1 are among the supporting offices. AOV is consulted. AJV-7 is accountable for Concept Engineering, Operational Requirements, etc.

- A** Accountable for the completion of NextGen capability. The highest level within the RASCI matrix, this office is charged by the FAA to deliver a particular capability. Typically, this designation is provided via an Acquisition Program Baseline. To foster a clear line of accountability, two different offices can never be Accountable for the same increment, and Accountability can never be delegated to another office.
- R** Responsible for the successful completion of NextGen capability or a critical component of the capability. This office is responsible to the Accountable office. The Responsible office is responsible for initiating an actual change to the NAS such as automation changes, and is often also designated as the Accountable office for that increment. However, there are examples in the NSIP where one office is Accountable for an increment while another office (or offices) is actually making a change in the NAS on behalf of the Accountable office.
- A/R** Accountable for the completion of NextGen capability as well as Responsible for its implementation.
- S** Supports the Responsible office in the implementation of NextGen capability. Typically, this support is in the form of subject matter expertise, procedural guidance, or training activities.
- C** Consulted for input during the implementation of NextGen capability. Provides input on a specific aspect in the development and implementation of a capability, such as safety analysis or approval. Input may or may not be used as determined by the Responsible and Accountable offices.
- I** Informed about the progress of implementation.

 Operationally Available

 Complete

 External Commitment

**A** Alpha





# Collaborative Air Traffic Management

RASCI Matrix	ANG			AOV	APO	AJR	AJT	AJM		AFS	AJI			AAE	AIR
	B	C5	C7	001	001	1	2	22	31	001	1	2	3	001	001
• <b>A</b> [101102-11] Collaborative Trajectory Operations Program (2012 - 2013)			C	C	S		S	A/R	C	R	S	S	S		R
• <b>A</b> [101102-12] Route Availability Planning (2014 - 2014)			C	C			S	A/R		C	S	S	S		C
• <b>A</b> [105208-11] Execution of Flow Strategies (2012 - 2012)			C	C	S		S	A/R	C		S	S	S	S	
• <b>A</b> [105302-11] Collaborative Airspace Constraint Resolution (2014 - 2014)			C	C			S	A/R	C		S	S	S		
• <b>A</b> [105302-12] Enhanced Congestion Prediction (2011 - 2011)			C	C			S	A/R	C		S	S	S		

# Collaborative Air Traffic Management

## Appendix B

### Bravo Increments

#### Portfolio Overview

Collaborative Air Traffic Management (CATM) coordinates flight and flow decision-making by flight planners and FAA traffic managers to improve overall efficiency, provide greater flexibility to flight planners, and make the best use of available airspace and airport capacity. The overall philosophy driving the delivery of CATM services is to accommodate user preferences to the maximum extent possible. Traffic managers impose Traffic Management Initiatives (TMIs) to account for congestion, weather, special activity airspace, or other constraints. TMIs are the means by which traffic managers manage constraints. These initiatives can alter users' flight plans. The impact of TMIs can be reduced by tailoring flow management actions to specific flights. This can be done through a combination of increased information on the users' preferred alternative routes; enhanced tools for assessing the impact of rerouting decisions; and improved communications and display of instructions to the controllers who must implement the initiatives. The Operational Improvements (OIs) in this portfolio contain incremental steps to achieve these goals. CATM focuses on providing traffic managers with improved Decision-Support Tools (DSTs) to better predict, identify, and resolve imbalances between traffic demands and NAS capacity. The primary function of Traffic Flow Management (TFM) is to safely manage flows of air traffic to assure efficient throughput in the NAS. This is a collaborative effort between NAS users and TFM service providers to share plans and provide information to enable timely actions to adjust to traffic and environmental dynamics over time. TFM is conducted from a national level to areas as small as a single airport, and from days in advance of a flight to real-time airborne adjustments. The need for strategic and tactical situational awareness, planning, and action requires timely and accurate information as well as timely and efficient collaboration and coordination between decision-makers. Automated tools that enable meeting these demands across all levels of the traffic management team are critical to maintaining both the safety and efficiency of NAS operations. Benefits resulting from the increments will include increased system efficiency, flexibility, and predictability.

Note: The dates and timelines included in the NAS Segment Implementation Plan (NSIP) are for planning purposes only. All capability schedules are tentative until their supporting programs are officially baselined.

#### Portfolio Content Summary Statistics

		Increment Status				
Segment	Total by Segment	Planned	Concept Exploration & Maturation	Development	Initial Operational Availability	Completed
*Bravo (2016 - 2020)	4	0	0	0	0	4
TOTAL	4	0	0	0	0	4
Segment	% by Segment	% by Segment/Increment Status				
*Bravo (2016 - 2020)	100%	0 %	0 %	0 %	0 %	100 %
TOTAL	100%	0 %	0 %	0 %	0 %	100 %

# Collaborative Air Traffic Management

## Operational Improvements/Current Operations & Increments

## Benefits

CO: [105302] Initial Flight Day Evaluation (2011 - 2018)

B [105302-27] User Input to Improve Departure Predictions (2016 - 2018) ✓



CO: [104208] Enhanced Departure Flow Operations (2016 - 2019)

B [104208-11] Delivery of Pre-Departure Reroutes to Controllers (2016 - 2017) ✓



OI: [101103] Provide Flight Plan Evaluation and Feedback in all Phases of Flight (2018 - 2030)

B [101103-21] Aircraft Access to Flight Planning Information (2018 - 2020) ✓



CO: [105208] Improved Execution of Flow Strategies (2012 - 2017)

B [105208-21] Airborne Rerouting (2016 - 2017) ✓



# Collaborative Air Traffic Management

2016	2017	2018	2019	2020
CO: [105302] Initial Flight Day Evaluation (2011 - 2018)				
B [105302-27] User Input to Improve Departure Predictions (2016 - 2018) ✓				
CO: [104208] Enhanced Departure Flow Operations (2016 - 2019)				
B [104208-11] Delivery of Pre-Departure Reroutes to Controllers (2016 - 2017) ✓				
		OI: [101103] Provide Flight Plan Evaluation and Feedback in all Phases of Flight (2018 - 2030)		
		B [101103-21] Aircraft Access to Flight Planning Information (2018 - 2020) ✓		
CO: [105208] Improved Execution of Flow Strategies (2012 - 2017)				
B [105208-21] Airborne Rerouting (2016 - 2017) ✓				

# Collaborative Air Traffic Management

## CO: [105302] Initial Flight Day Evaluation (2011 - 2018)

Performance analysis, where throughput is constrained, is the basis for strategic operations planning. Continuous (real-time) constraints are provided to Air Navigation Service Provider (ANSP) traffic management decision-support tools and National Airspace System (NAS) users. Flight day evaluation metrics are complementary and consistent with collateral sets of metrics for airspace, airport, and flight operations. Long-term planning functions will improve due to continuous flight day evaluation. NAS performance will be improved and decision-makers will be able to predict and plan operations based on a validated tool.

ANSPs and users collaboratively and continuously assess (monitor and evaluate) constraints (e.g., airport, airspace, hazardous weather, sector workload, Navigational Aid (NAVAID) outages, security) and associated TMI mitigation strategies. Users and ANSP dynamically adjust both pre-departure and airborne trajectories in response to anticipated and real-time constraints.

ANSP, in collaboration with users, develops mitigation strategies that consider the potential constraints. A pre-defined set of alternatives is developed that maximizes airspace and airport capacity and throughput. ANSP and users use real-time constraint information and these mitigation strategies to increase operational predictability and throughput.

ANSP automation traffic management decision support tools provide traffic managers and users with additional tools to assess the impact of alternative reroute options against a given constraint. In addition, traffic management delays are reduced through improved demand estimates based on user input.

### CO Benefit

Capacity (P): Airspace capacity and throughput associated with a given constraint is increased by continually assessing the constraint as well as improved demand predictions provided by users.

Efficiency (P): Users are able to assess proposed routes against constraints and chose the reroute that best meets their business objectives.

Predictability (S): Through continual reevaluation of constraints against demand, system throughput will increase resulting in better adherence to flight schedules.

Flexibility (S): Users will be able to assess and choose the route the best meets their business objectives.

# Collaborative Air Traffic Management

Increments

Bravo  
(2016 - 2020)

1

**B** [105302-27] User Input to Improve Departure Predictions (2016 - 2018)  (Complete)

# Collaborative Air Traffic Management

## Increments/Enabling Activities

**B** [105302-27] User Input to Improve Departure Predictions (2016 - 2018)

### Increment Overview

This capability utilizes continuously updated inputs from the users to improve estimates of departure times in the traffic management system to improve demand predictions so that traffic more closely matches available capacity resulting in delay savings. When constraints in the NAS result in situations where demand exceeds capacity, traffic management initiatives are put in place to ensure safety and efficiency. Departure time predictions frequently are inaccurate and greatly contribute to a large standard error in demand estimates so that too few or too many flights are delayed in an effort to match traffic to available capacity. This leads to either airborne delays, in the case of an underestimate, or ground delays, in the case of an overestimate. Continuously updated departure times from the user community account for factors that are unknown to the NAS and unique to a particular flight, such as timed out crew, equipment change, and late arrival of the airframe. Improved predictions of departure times from the user community will enable air traffic management to more closely balance demand to available capacity thereby minimizing traffic management delays.

### Increment Status

Complete

### Success Criteria

✔ 2016 : Operationally available for AOC/FOC operators to provide inputs to departure time estimates and pre-taxi events.

### Implementation Approach

TFMS to build capability for AOC/FOC operators to enter new data elements in 2015-2016 timeframe. This increment is identified to have an International harmonization dependency.

#### Benefits

 Access & Equity  Capacity  Flexibility  Efficiency  Environment  Predictability  Safety

Efficiency (P): Efficiency is enhanced by ensuring accurate departure time predictions are used to estimate capacity.

Predictability (S): Enhanced predictability by using user input for take-off vs. model take-off times.

### System Interactions

TFMS (P): AOC/FOC inputs via Flight Operator Systems will be made to TFMS to enable improved predictions of departure time estimates and pre-taxi events. CDM policies will enable interface development between systems.

SWIM (T): SWIM will provide the infrastructure that will enable AOC/FOC to share information with TFMS.

 External Commitment

 Primary Benefit

 Secondary Benefit

 Operationally Available

 Complete

 Access & Equity

 Capacity

 Flexibility

 Efficiency

 Environment

 Predictability

 Safety

 Bravo




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# Collaborative Air Traffic Management

## Primary Systems

 TFMS: Traffic Flow Management System

## Tertiary Systems

 SWIM: System Wide Information Management



# Collaborative Air Traffic Management

## CO: [104208] Enhanced Departure Flow Operations (2016 - 2019)

This operational improvement increases efficiencies of departure operations through the improved ability to quickly revise departure clearances in the event that changing weather, winds or system constraints requires amendments to the cleared route pre-departure. This ability will also reduce the risk of airport gridlock that can occur when arrivals continue to land while departures are delayed waiting for revised departure clearances.

Traffic managers will have the ability to create route amendments and send the updated flight data to air traffic controllers for clearance delivery to affected flights. The tower controller will issue the reroute clearance orally to the pilot. With the implementation of data communications, revised departure clearances will be more quickly issued through the ability for air traffic controllers to automatically send revised clearances electronically to equipped aircraft.

### CO Benefit

Efficiency (P): Faster execution of revised departure clearances increases airport efficiency and reduces the risk of airport gridlock when revised departure clearances are needed.

Predictability (P): Faster execution of revised departure clearances results in a decrease in departure delays that result when revised departure clearances need to be issued due to changing conditions.

Safety (S): Automated exchange of revised departure clearances between air traffic control systems and the cockpit eliminates manual entry of reroutes, reduces human errors, and improves communication accuracy (i.e., reduced read/hear back errors, reduced loss of communications events) thereby increasing safety.

### Increments

Bravo  
(2016 - 2020)

1

## B [104208-11] Delivery of Pre-Departure Reroutes to Controllers (2016 - 2017) (Complete)

# Collaborative Air Traffic Management

## Increments/Enabling Activities

**B** [104208-11] Delivery of Pre-Departure Reroutes to Controllers (2016 - 2017)

### Increment Overview

Delivery of pre-departure reroutes enables ATC to more quickly execute revised route clearances needed to accommodate changing winds or weather thereby decreasing delays that occur, due to the need to revise a departure clearance. This increment provides the En Route Automation System with additional capabilities to receive amended routes pre-departure and provide updated flight data to the air traffic controller (Tower, TRACON, En Route) for amended clearance delivery to affected flights. The tower controller will issue reroute clearance orally to the pilot. En Route Automation will also display the protected route segment data to the en route controllers so they can monitor and react to any non-compliance issues with a reroute advisory.

### Increment Status

Complete

### Success Criteria

- ✓ 2017 : Operationally Available at ZDV, ZLC, ZJX, ZMA, ZAB and ZDC
- ✓ 2018 : Operationally Available NAS-wide

### Implementation Approach

Capability developed under CATM-T WP1. ERAM must be operational at all ARTCCs before Airborne Reroutes and Pre-Departure Reroutes will be made operationally available. PDRR and ABRR operational relationship suggests both capabilities are needed simultaneously to be effective in the field. Shared ERAM functionality suggests PDRR and ABRR should be developed concurrently.

### Benefits

-  Access & Equity
-  Capacity
-  Flexibility
-  Efficiency
-  Environment
-  Predictability
-  Safety

Flexibility (P):Flight-specific changes can be made incrementally, with opportunity to observe the effect before taking additional action.

Efficiency (P):Aggregate flight efficiency is increased by factoring individual flight trajectories into the congestion solution. Providing automated communication of reroute resolutions that include user preferences allows incremental implementation. The reroute provides controllers with the trajectory changes required, protecting a flight plan from getting any additional reroutes and protecting negotiated trajectories. Flight-specific adjustments better match the specific congestion problem and minimize the loss of capacity. Integrated resolutions identify the flights to maneuver, when to maneuver them, and which maneuvers to assign to minimize the number of affected flights.

### System Interactions

 External Commitment

 Primary Benefit

 Secondary Benefit

 Operational Availability

 Complete

 Access & Equity

 Capacity

 Flexibility

 Efficiency

 Environment

 Predictability

 Safety

 Bravo



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# Collaborative Air Traffic Management

ERAM (P): ERAM processes reroutes from TFMS to produce flight strips for the tower controller with pre-departure clearance containing the reroute.

TFMS(S): TFMS will undergo change to provide traffic managers with updated flight data for amended clearance delivery to affected flights.

Primary Systems

ERAM: En Route Automation Modernization

Secondary Systems

TFMS: Traffic Flow Management System

# Collaborative Air Traffic Management

## OI: [101103] Provide Flight Plan Evaluation and Feedback in all Phases of Flight (2018 - 2030)

Flight planning activities are accomplished from the flight deck as readily as any location. Airborne and ground automation provide the capability to exchange flight planning information and negotiate flight trajectory agreement amendments in near real-time. It provides the ability for all parties (i.e., the flight deck, flight operations centers, and traffic managers) to update and evaluate constraint and trajectory information and ensures that all parties have the same information for airborne reroute decision making.

Through this process, the user will work with the system to quickly assess reroute options. Automation will notify stakeholders of the status change and allow it to be selected as a proposed revised clearance for operators (i.e., controllers and pilots) to approve. ATC will execute the clearance using new flight data management improvements.

### OI Benefit

Flexibility (P): Users will have an increased flexibility to assess flight plan segments against constraints which enable them to more easily assess options. In addition, users will be able to file the flight plan from anywhere which increases flexibility in altering the flight plan as conditions change.

Efficiency (S): User preferences for the chosen route around a constraint will be the most optimum and efficient route based on their business objective.

### Increments

Bravo  
(2016 - 2020)

1

**B** [101103-21] Aircraft Access to Flight Planning Information (2018 - 2020)  (Complete)

# Collaborative Air Traffic Management

## Increments/Enabling Activities

**B** [101103-21] Aircraft Access to Flight Planning Information (2018 - 2020)

### Increment Overview

Users will have airborne access to NAS information when planning flights through services that will allow them to collaborate with the FAA, resulting in improved flow management and efficient use of resources. As part of the collaborative system-wide information management environment, participants will have access to consistent and continuously updated information regarding expected constraints in the system. Timely access to such information will enable both operators and service providers to take action (e.g., request a re-route or be offered access) as new information becomes available.

### Increment Status

Complete

### Success Criteria

✔ 2019 : Operationally available NAS-wide

### Implementation Approach

To be determined

#### Benefits

 Access & Equity  Capacity  Flexibility  Efficiency  Environment  Predictability  Safety

Flexibility (P): The increment enables users the flexibility to file their flight plans from any location.

Efficiency (S): Enhances NAS efficiency by enabling IFR flight plans from the surface as well as reducing voice communication to FSS in flight.


### System Interactions

SWIM (P): SWIM to provide access to NAS information for flight planning purposes. Third party external system expected to provide interface to user community.

EFB (A): Electronic Flight Bag provides Airborne Access to SWIM.

# Collaborative Air Traffic Management

## Primary Systems

 SWIM: System Wide Information Management

## Avionics Systems

 EFB: Electronic Flight Bag

# Collaborative Air Traffic Management

## CO: [105208] Improved Execution of Flow Strategies (2012 - 2017)

Individual flight-specific trajectory changes resulting from Traffic Management Initiatives (TMIs) will be disseminated to the appropriate Air Navigation Service Provider (ANSP) automation for tactical approval and execution. This capability will increase the agility of the National Airspace System to adjust and respond to dynamically changing conditions such as bad weather, congestion, and system outages. Traffic Flow Management automation prepares TMIs appropriate to the situation at the flight-specific level. After ANSP approval, changes/amendments are electronically delivered to the controller as a proposed trajectory. Controllers assess the proposal and if acceptable, provide the reroute to the flight crew via voice communication. Once accepted by the flight crew, the proposed trajectory becomes the new cleared trajectory in the automation.

### CO Benefit

- Capacity (P): Automated support for the execution of traffic flow changes between traffic management and air traffic controllers will provide for more route options that can be adjusted in response to changing conditions more rapidly, thereby increasing capacity when there are system constraints.
- Efficiency (P): The automated assessment and execution of trajectory changes required due to system constraints results in more efficient and timely execution of route options.
- Predictability (S): Faster adjustment of reroute changes in response to changing conditions will improve schedule integrity.

### Increments

Bravo  
(2016 - 2020)

1

B [105208-21] Airborne Rerouting (2016 - 2017) ✓ (Complete)

# Collaborative Air Traffic Management

## Increments/Enabling Activities

**B** [105208-21] Airborne Rerouting (2016 - 2017)

### Increment Overview

Allows a traffic manager to propose trajectory modifications to meet flow constraints for an airborne flight to the appropriate sector controller for action. The trajectory adjustments identify to the controller all the constraints on the requested route of flight and the proposed route. The capability allows the controller to amend the intended trajectory for the flight and to deliver the route clearance to the cockpit via voice. This status of the clearance/amendment is tracked to allow the traffic manager to monitor constraints already issued for a flight, and consider the amended trajectory when considering further constraint adjustments for the flight.

### Increment Status

Complete

### Success Criteria

- ✓ 2017 : Operationally Available at ZDV, ZLC, ZJX, ZMA, ZAB and ZDC
- ✓ 2018 : Operationally available NAS-Wide

### Implementation Approach

Capability developed under CATM-T WP2. ERAM must be operational at all ARTCCs before Airborne Reroutes and Pre-Departure Reroutes will be made operationally available. ABRR and PDRR operational relationship suggests both capabilities are needed simultaneously to be effective in the field. Shared ERAM functionality suggests ABRR and PDRR should be developed concurrently.

### Benefits

- Access & Equity
- Capacity
- Flexibility
- Efficiency
- Environment
- Predictability
- Safety

Flexibility (S): Facilitates the ability of local traffic managers to balance workload even on days when there are no major impacts from severe weather.

Efficiency (P): Facilitates the deferral of some pre-departure reroutes for long-haul flights and be more efficient with later airborne reroutes. Allows traffic managers to focus on strategic decision-making instead of planning and coordinating reroutes.

### System Interactions



# Collaborative Air Traffic Management

ERAM (P): ERAM provides functionality needed to electronically coordinate and disseminate flight specific reroutes to en route air traffic controllers' workstations in support of flight plan route amendments.

TFMS (S): TFMS provides traffic managers with updated display of flight lists that make up the demand for each arrival route to monitor demand on impacted routes and to identify specific flights that can/should be moved to alternate routes. They will use existing functionalities to create reroutes.

Primary Systems

ERAM: En Route Automation Modernization

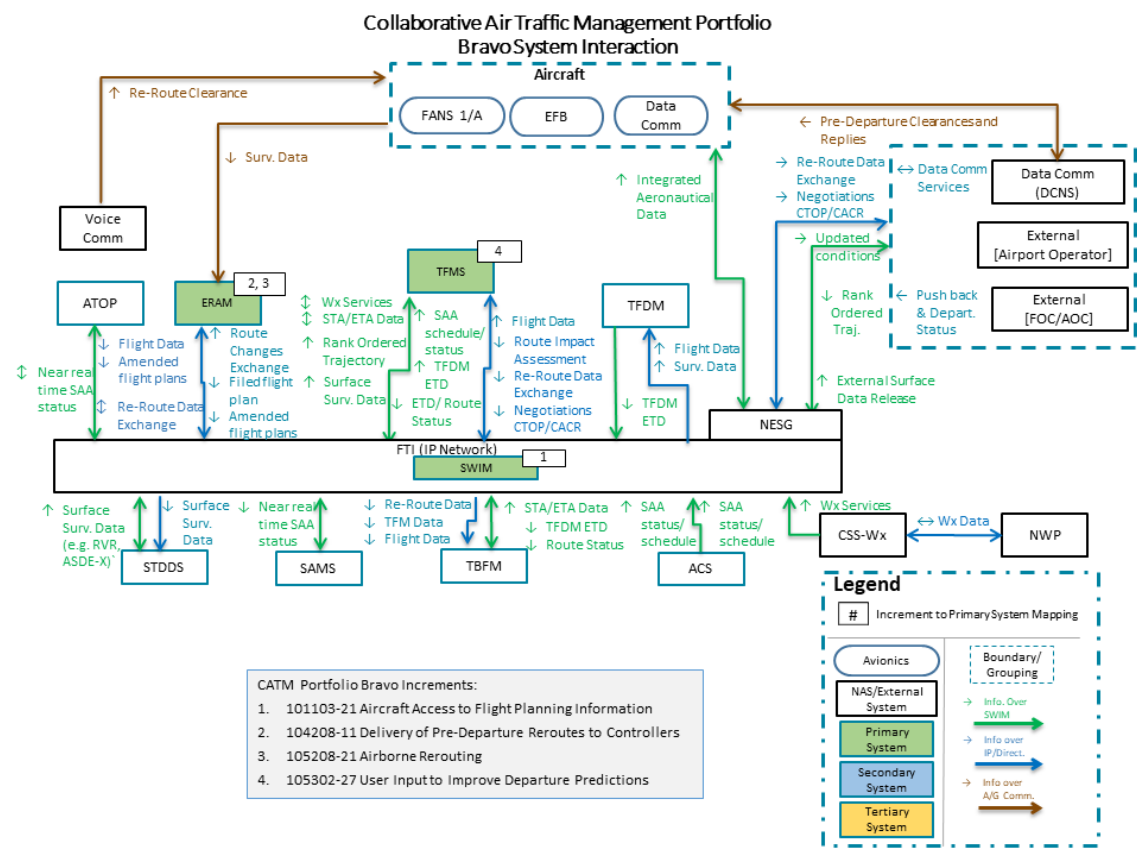
Secondary Systems

TFMS: Traffic Flow Management System

# Collaborative Air Traffic Management

## Systems Interactions

Collaborative ATM provides capabilities necessary to manage traffic flow across the NAS. TFMS provides the core processing for strategic and tactical situational awareness, display, and traffic demand management and relies on data and information from other FAA automation systems to deliver TFM solutions. TFMS will be replaced by Flow Management Data and Services (FMDS) delivering increased capacity, reliability, and will accommodate advanced TFM capabilities.



# Collaborative Air Traffic Management

Increment	EFB	ERAM	SWIM	TFMS
<b>B</b> [101103-21] Aircraft Access to Flight Planning Information	A		P	
<b>B</b> [104208-11] Delivery of Pre-Departure Reroutes to Controllers		P		S
<b>B</b> [105208-21] Airborne Rerouting		P		S
<b>B</b> [105302-27] User Input to Improve Departure Predictions			T	P

Operationally Available

**P** Primary Systems

Complete

**S** Secondary Systems

In Service System

**T** Tertiary Systems

Planned System

**A** Avionics Systems

**B** Bravo



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# Collaborative Air Traffic Management

## Stakeholders

Specific roles and responsibilities for the implementation of all capabilities in this portfolio are outlined in the RASCI (Responsible, Accountable, Supporting, Consulted, and Informed) matrix below. All stakeholder organizations involved in the delivery of Segment Alpha capabilities are listed across the top. Portfolio capabilities are listed on the left side of the table, organized by OI and increment. AJM-22 is the responsible and accountable office for the development and implementation of the increments within this portfolio. AJM-22 will be assisted by a number of support contractors, as well as government personnel from other FAA offices, on an ongoing, matrixed basis. AJM-22 will periodically seek input and review from various stakeholder groups, as well as subject matter experts in other FAA offices and groups external to the FAA. All programmatic decisions rest ultimately with the AJM-22 organization. Other offices will be engaged early and often as needed to provide insight and concurrence on applicable functionality, documentation, operational testing, implementation, and logistics support. AJR-1 and AJT-2 will provide operational procedure and training support for implementation of rerouting-related changes for the ERAM system. AJM-22 will work closely with AJT-2 to develop and execute any procedure and training changes, as needed. APO will provide support in developing policies for information sharing and incentivizing operators. AIR-130, AOV, and AFS-400 will be consulted regarding the official definition of flight plan filing. Finally, AJM-22 will regularly consult with ANG-C7 regarding the overall implementation of these capabilities. AJM-22 will solicit input from external organizations such as MITRE, Volpe, Metron Aviation, and others as needed. This input may include such efforts as concept engineering, functionality and design review, prototyping, test planning and support, and input to implementation and logistics support. For the increment Route Availability Planning, AJM-22 is accountable and responsible for development aspects and integration. AJT-2 and AJM-1 are among the supporting offices. AOV is consulted. AJV-7 is accountable for Concept Engineering, Operational Requirements, etc.

- A** Accountable for the completion of NextGen capability. The highest level within the RASCI matrix, this office is charged by the FAA to deliver a particular capability. Typically, this designation is provided via an Acquisition Program Baseline. To foster a clear line of accountability, two different offices can never be Accountable for the same increment, and Accountability can never be delegated to another office.
- R** Responsible for the successful completion of NextGen capability or a critical component of the capability. This office is responsible to the Accountable office. The Responsible office is responsible for initiating an actual change to the NAS such as automation changes, and is often also designated as the Accountable office for that increment. However, there are examples in the NSIP where one office is Accountable for an increment while another office (or offices) is actually making a change in the NAS on behalf of the Accountable office.
- A/R** Accountable for the completion of NextGen capability as well as Responsible for its implementation.
- S** Supports the Responsible office in the implementation of NextGen capability. Typically, this support is in the form of subject matter expertise, procedural guidance, or training activities.
- C** Consulted for input during the implementation of NextGen capability. Provides input on a specific aspect in the development and implementation of a capability, such as safety analysis or approval. Input may or may not be used as determined by the Responsible and Accountable offices.
- I** Informed about the progress of implementation.

 Operationally Available

 Complete

 External Commitment

**B** Bravo



# Collaborative Air Traffic Management

RASCI Matrix	ANG			AOV	APO	AJR	AJT	AJM		AFS	AJI			AAE	AIR
	B	C5	C7	001	001	1	2	22	31	001	1	2	3	001	001
• <b>B</b> [101103-21] Aircraft Access to Flight Planning Information (2018 - 2020)	<b>R</b>		<b>A</b>												
• <b>B</b> [104208-11] Delivery of Pre-Departure Reroutes to Controllers (2016 - 2017)			<b>C</b>	<b>C</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>A/R</b>	<b>C</b>	<b>C</b>	<b>S</b>	<b>S</b>	<b>S</b>		<b>C</b>
• <b>B</b> [105208-21] Airborne Rerouting (2016 - 2017)			<b>C</b>	<b>C</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>A/R</b>	<b>C</b>	<b>C</b>	<b>S</b>	<b>S</b>	<b>S</b>		<b>C</b>
• <b>B</b> [105302-27] User Input to Improve Departure Predictions (2016 - 2018)			<b>C</b>												

 Operationally Available

 Complete

 External Commitment

**B** Bravo



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