

# NEC Apr 2019 – Dec 2021 Candidates

Presented to: NEC NIWG

By: NEC NIWG FAA POCs

Date: April 2018

**DRAFT**



Federal Aviation  
Administration



# Objectives and Agenda

- Objectives: Provide an overview of the Candidate Items in response to Industry's 10 Operational Need Areas and discuss feedback
- Agenda:
  - ✦ Review of Industry Recommendations
  - ✦ Overview of the Candidate Items in Response to the Recommendations
  - ✦ Next Steps

# Industry Requested NEC Initiatives

RTCA "This represents a cohesive plan – all items must be addressed" –Industry

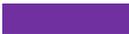
Multiple Airport Deconfliction	<ul style="list-style-type: none"> <li>• RNAV transition to ILS LGA13</li> <li>• Modify LGA/EWR airspace to deconflict EWR29 GPS</li> <li>• Multiple PBN approaches for LGA31</li> <li>• TBFM metering and pre-scheduling</li> <li>• Tools to better manage final approach spacing, TSAS and CRDA</li> </ul>		
Crosscutting Departure Throughput	<ul style="list-style-type: none"> <li>• Implement PDRR with technology and process changes in place</li> <li>• Expanded low altitude and escape route structure</li> <li>• Better management for fix/route closure during irregular ops (SWAP and Volume)</li> <li>• ZDC09 (MAP changes and splitting sector)</li> <li>• Vertical climb escape route/high performance escape route</li> <li>• ACRP and ZNY offshore routes</li> </ul>		
Metro NY Airport Throughput and Efficiency	<b>LaGuardia</b> <ul style="list-style-type: none"> <li>• Dispersal headings (TNNIS, NTHNS, GLDMN)</li> </ul>	<b>Kennedy</b> <ul style="list-style-type: none"> <li>• EoR for 13R</li> <li>• ROBER OPD to 22L</li> </ul>	<b>Teterboro</b> <ul style="list-style-type: none"> <li>• RNAV SID TEB19</li> <li>• RNAV STARs for TEB19 and TEB24</li> </ul>
	<b>Newark</b> <ul style="list-style-type: none"> <li>• 22L &amp; 29 arrivals</li> <li>• 4L visuals</li> </ul> <ul style="list-style-type: none"> <li>• Use of existing tools/investments to increase airport throughput: adapt ATPA for LGA, CRDA for JFK, high-speed turn-offs at EWR</li> </ul>		

# Northeast Corridor Apr 19 – Dec 21

## Candidate Overview

# Northeast Corridor

## Apr 19 – Dec 21 Candidate Items

-  - Pre Implementation
-  - Implementation
-  - Industry
-  - Associated Industry milestone anticipated

Operational Needs/Areas in NEC	Milestone P= pre-implementation IM= Implementation I= Industry	Solution/Candidate	Timeframe	Targeted Benefit Pool	Functional Area
1. Constrained NEC departure routes, during normal ops & during SWAP	IM	Implement ZNY Offshore PBN Routes*	TBD	Increase Throughput: Increase airport capacity	A&P
	IM	Implement PDRR/ABRR Enhancements	TBD	Improve Throughput: Increase use of existing capacity Flight Efficiency: Improved Redistribution of necessary delay	Tools
	IM	Implement DSP Enhancements	TBD	Improve Throughput: Increase use of existing capacity Flight Efficiency: Improved Redistribution of necessary delay	Tools
	I	Use TOSs to communicate departure and arrival trajectory preferences from/to PHL and NY area airports	TBD	Improve Throughput: Increase use of existing capacity Flight Efficiency: Improved Redistribution of necessary delay	Tools

# Northeast Corridor

## Apr 19 – Dec 21 Candidate Items

- Pre Implementation
- Implementation
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- \* - Associated Industry milestone anticipated

Operational Needs/Areas in NEC	Milestone <small>P= pre-implementation IM= Implementation I= Industry</small>	Solution/Candidate	Timeframe	Targeted Benefit Pool	Functional Area
2. Loss of Airport Throughput due to airport/airspace interactions: LGA 13	P	Complete concept assessment to decouple LGA/EWR/TEB when on LGA 13 ILS*	TBD	Increase Throughput: Increase airport capacity	A&P
3. Improvement in Arrival Throughput at EWR and Delay Reduction	P	Complete concept assessment for EWR 22L/29 arrival operations*	TBD	Increase Throughput: Increase airport capacity	A&P
	P	Conduct CRDA feasibility analysis for EWR 4R/29 to Lower Minima	Q4 CY19	Increase Throughput: Increase airport capacity	Tools
	P	Conduct CRDA feasibility analysis for EWR 22L/11 to Lower Minima	Q4 CY19	Increase Throughput: Increase airport capacity	Tools
	P	Conduct Feasibility analysis to assess impact, benefits of applying 7110.308*	TBD	Improve Throughput: Increase airport capacity	Separation Management
	P	Perform feasibility and initial safety analysis for CSPO departure concepts* (multiple airports)	Q3 CY19	Improve Throughput: Increase airport capacity	Separation Management
	IM	Improve Arrival Time-Based Management (TBM) to EWR	Q4 CY21	Flight Efficiency: Improved Redistribution of Necessary Delay Improve Throughput: Increase use of existing Capacity	Tools

# Northeast Corridor

## Apr 19 – Dec 21 Candidate Items

-  - Pre Implementation
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Operational Needs/Areas in NEC	Milestone P= pre-implementation IM= Implementation I= Industry	Solution/Candidate	Timeframe	Targeted Benefit Pool	Functional Area
4. Improve Satellite access to NY area airspace, deconflict satellite operations with the majors where possible	P	Complete concept analysis for TEB RW19 RNAV SID for overnight operations*	TBD		A&P
5. Address conditions favoring LGA 31-deconfliction of JFK/LGA/EWR					
6. Reduced separation and improved access to NEC airports	I	Install Non-Fed GBAS at JFK and LGA	Q4 CY19	Improved Throughput: Increase airport capacity	Airport
	IM	Implement Eastern Seaboard high altitude PBN routes (including SID/STAR connectivity) through ZBW, ZNY and ZDC airspace*	TBD		A&P
	P	Determine viability and model ZDC airspace redesign alternatives to reduce traffic management restrictions imposed on N90 southgates*	TBD		A&P
	P	Perform feasibility study of reduced MRS on final approach including collision risk, impacts on go around rate, and runway occupancy restrictions*	Q1 CY20	Improved Throughput: Increase airport capacity	Separation Management



# Northeast Corridor

## Apr 19 – Dec 21 Candidate Items

- Pre Implementation
- Implementation
- Industry

Operational Needs/Areas in NEC	Milestone P= pre-implementation IM= Implementation I= Industry	Solution/Candidate	Timeframe	Targeted Benefit Pool	Functional Area
7. Full utilization of available LGA capacity					
8. Improvement of JFK runway usage and delay reduction					
9. Improvement of PHL runway usage and delay reduction	I	Conduct assessment of additional 27L high-speed exits	Q4 CY20	Improve Throughput: Increase airport capacity	Airport
	I	Conduct assessment of PHL 27R departure queue taxiway	Q4 CY20	Improve Throughput: Increase airport capacity	Airport
	IM	Improve Arrival Time-Based Management (TBM) to PHL	Q4 CY20	Flight Efficiency: Improved Redistribution of Necessary Delay Improve Throughput: Increase use of existing Capacity	Tools
	I	Conduct assessment of PHL taxiway extension for end around operations	Q4 CY20	Improve Throughput: Increase airport capacity	Airport

# Northeast Corridor

## Apr 19 – Dec 21 Candidate Items

- Pre Implementation
- Implementation
- Industry
- \* - Associated Industry milestone anticipated

Operational Needs/Areas in NEC	Milestone P= pre-implementation IM= Implementation I= Industry	Solution/Candidate	Timeframe	Targeted Benefit Pool	Functional Area
10. Evolve TFM to better manage demand/capacity imbalance in the NEC	P	RAPT Refresher Training for FAA personnel	Q2 CY18	Improved Throughput: Increase use of existing capacity	Tools
	P	Insert DRS info into the NOD prototype and make available to Industry	Q3 CY18	Improved Throughput: Increase use of existing capacity	Tools
	P	Conduct operational analysis to identify enhancements to improve data driven TFM decision making*	Q4 CY19	Improved Throughput: Increase use of existing capacity	Tools

# Additional Airport Items

- **BOS: Conduct GBAS evaluation/assessment (Q4 CY19)**
- **System Wide: Benefits assessment for gate docking technologies to improve surface management (Q4 CY19)**
- **DCA: Conduct Assessment of North end hold pads (Q4 CY20)**
- **BOS: Create additional tower space for TFDM equipment to enable surface metering (Q4 CY21)**

# Mapping Between Industry Recommendations and Candidates

Multiple Airport Deconfliction	<ul style="list-style-type: none"> <li>RNAV transition to ILS LGA13                             <ul style="list-style-type: none"> <li>Modify LGA/EWR airspace to deconflict EWR29 GPS</li> <li>Multiple PBN approaches for LGA31</li> </ul> </li> <li>TBFM metering and pre-scheduling</li> <li>Tools to better manage final approach spacing, TSAS and CRDA</li> </ul>			
	<ul style="list-style-type: none"> <li>Implement PDRR with technology and process changes in place                             <ul style="list-style-type: none"> <li>Expanded low altitude and escape route structure</li> </ul> </li> <li>Better management for fix/route closure during irregular ops (SWAP and Volume)</li> <li>ZDC09 (MAP changes and splitting sector)</li> <li>Vertical climb escape route/high performance escape route</li> </ul>			
Metro NY Airport Throughput and Efficiency	<b>LaGuardia</b> Dispersal headings (TNNIS, NTHNS, GLDMN)	<b>Kennedy</b> EoR for 13R <ul style="list-style-type: none"> <li>ROBER OPD to 22L</li> </ul>	<b>Teterboro</b> RNAV SID TEB19 <ul style="list-style-type: none"> <li>RNAV STARs for TEB19 and TEB24</li> </ul>	<b>Newark</b> 22L & 29 arrivals <ul style="list-style-type: none"> <li>4L visuals</li> </ul>
	<ul style="list-style-type: none"> <li>Use of existing tools/investments to increase airport throughput: adapt ATPA for LGA, CRDA for JFK, high-speed turn-offs at EWR</li> </ul>			



*NEC Implementation Commitments*

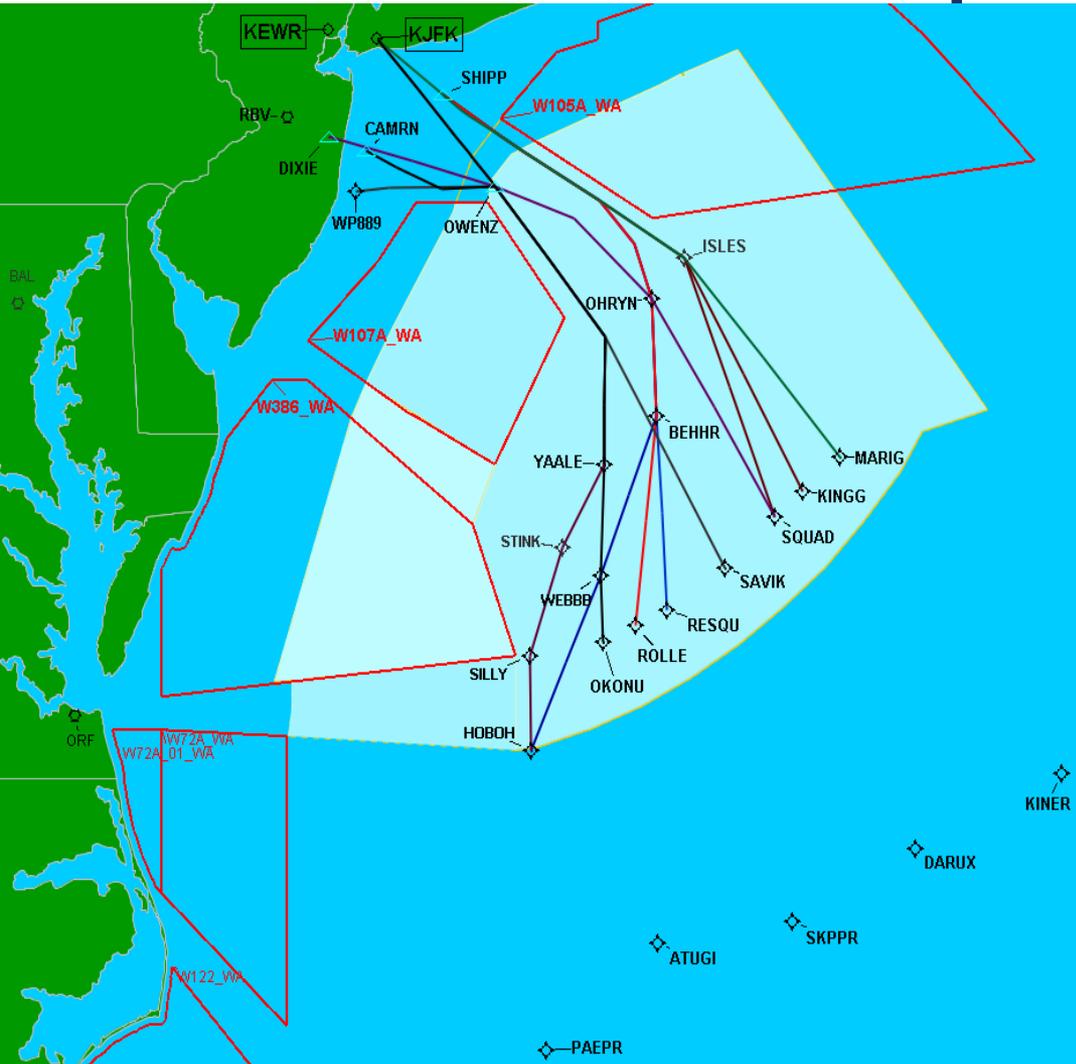


*NEC Pre-Implementation Commitments*

# NEC Implementation Candidates



# Implement PBN Route Structure in ZNY Offshore Airspace



## Operational Objectives:

- Redesign airspace and route structure to enhance efficiency and capacity in NY offshore airspace
- Enhance route options during SWAP
- Segregate NY Metro arrival and departure flows
- Segregate overflight traffic from NY Metro arrivals and departures

## Expected Outcomes:

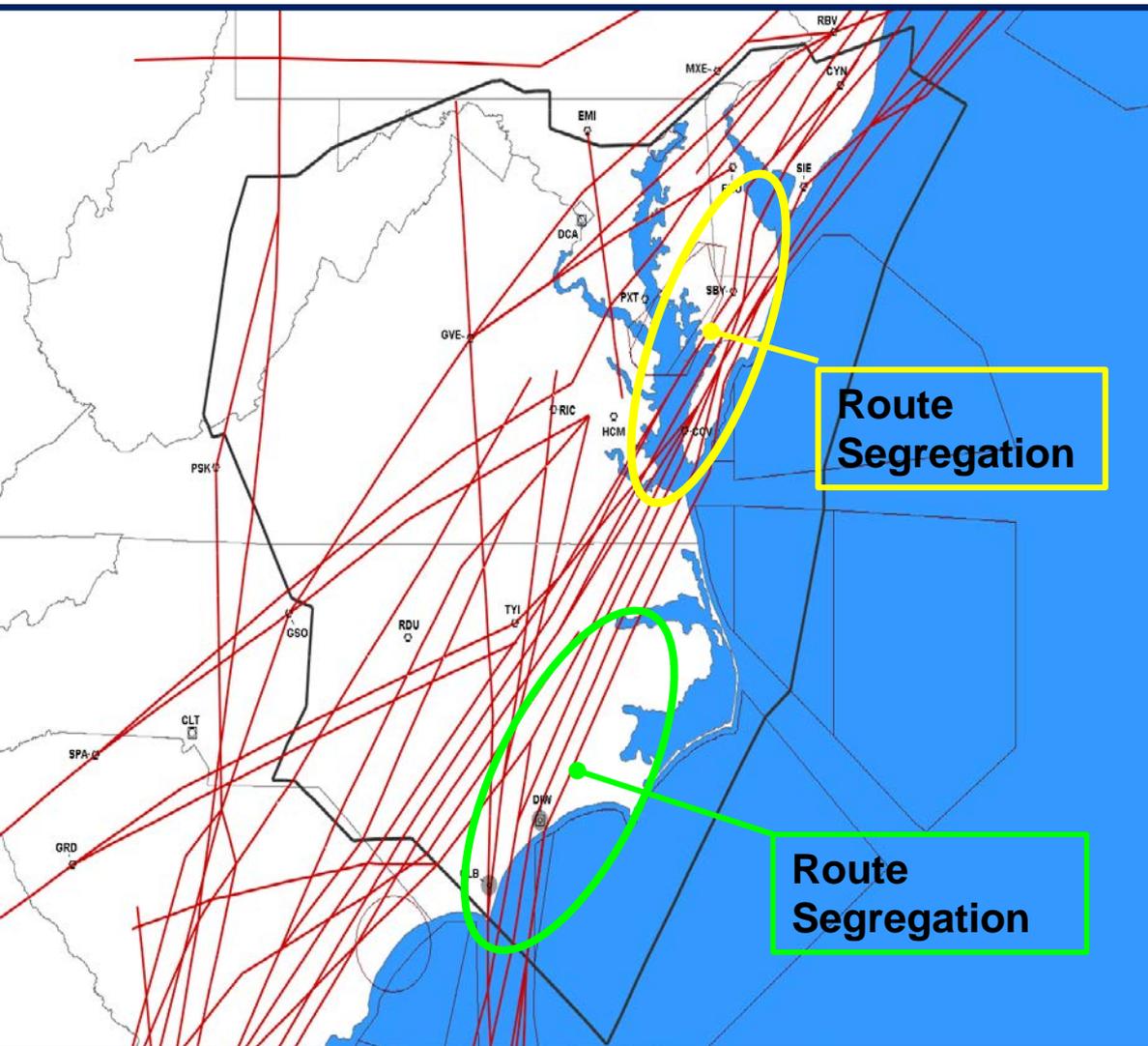
- Increased use of offshore airspace capacity (**throughput**) via additional sector and segregation of flows in tight airspace between Warning Areas.
- Enables greater use of offshore route options during SWAP
- Less vectoring/holding offshore
- Reduced use of MIT restrictions & ground delays for EWR/JFK depts

**Facilities:** ZNY Domestic & Oceanic

**Target Date:** TBD

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# Implement East Coast High Altitude PBN Route Structure



## Operational Objectives:

- Establish segregated routes in constricted east coast airspace to achieve higher throughput, optimal altitudes and increased routing options.
- Alleviate east coast airspace constraints
- Integrate and align recent Metroplex work (DC, CLT, ATL, and FL) into the high altitude enroute structure in NEC

## Expected Outcomes:

- Improve airspace throughput for high altitude traffic to/from NEC airports
- Reduce traffic management restrictions due to east coast airspace constraints for NEC airports
- Reduce airspace complexity
- Reduce radar vectors and reroutes
- Improved accommodation of requested altitudes

**Facilities:** ZBW, ZNY & ZDC

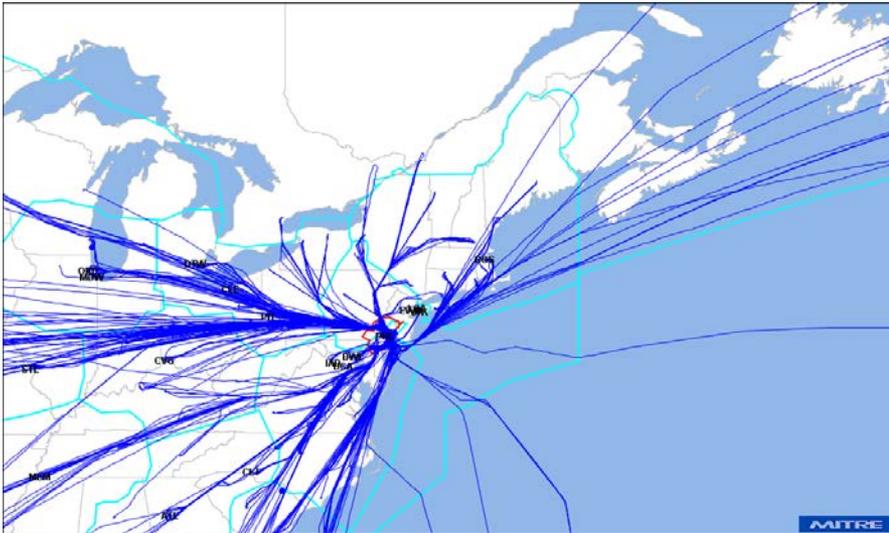
**Target Date:** TBD

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# Improve Arrival Time-Based Management to PHL



## Operational Objectives:

- Provide smoother handling of PHL arrivals at key merge points in en route
- Provide speed advisories to controllers

## Expected Outcomes:

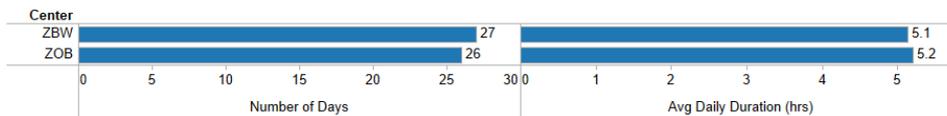
- Increased use of available capacity (**throughput**) via synchronized and smoother arrival flow
- Improved **data-driven TFM** via the flow managed to targeted rates
- Increased flight efficiency from less vectoring and holding in en route airspace
- Increased metering accuracy and compliance

**Facilities:** PHL, ZNY, ZDC, ZBW, ZOB, DCC

**Target Date:** Q4 CY20

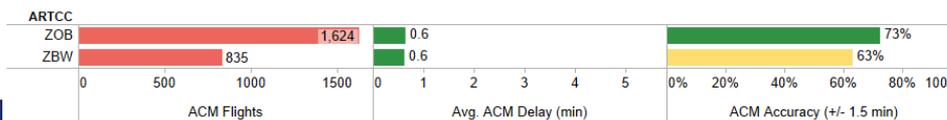
## Airborne Metering to PHL: January 2018

### Airborne Metering



### Flights Metered to TRACON Boundary

### Flights Metered to Center Boundary

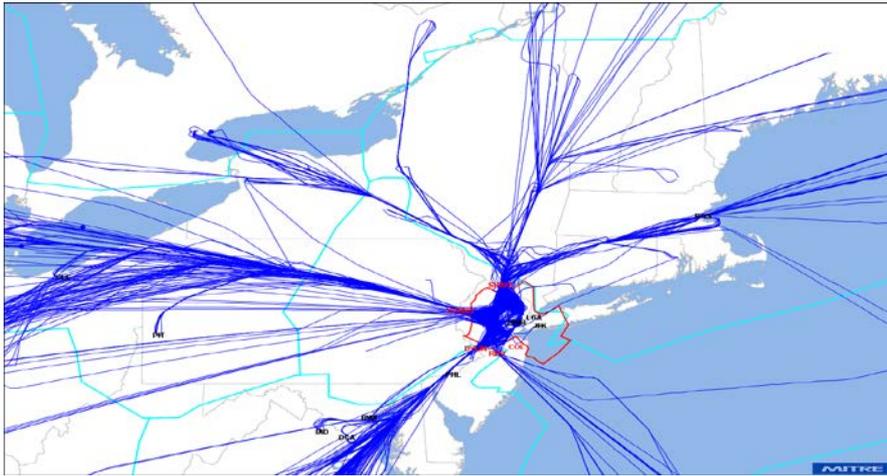


## Targeted Operational Enhancements:

- Apply Extended Metering, Coupled Scheduling, and Speed Advisories
  - Metering Design, Adaptation, Training, AT Procedures

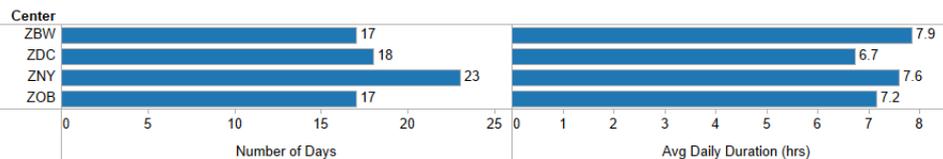
**Note: Improve existing metering operations to PHL is an existing Oct 17 – Mar 19 (T+18) Milestone**

# Improve Arrival Time-Based Management to EWR



## Airborne Metering to EWR: January 2018

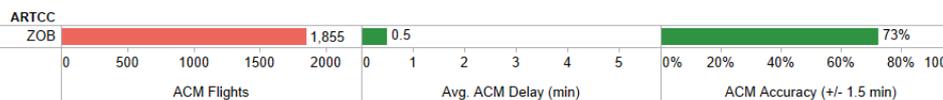
### Airborne Metering



### Flights Metered to TRACON Boundary



### Flights Metered to Center Boundary



### Operational Objectives:

- More consistent and frequent use of airborne metering
- Routine use of times on glass in all supporting facilities (ZNY, ZOB, ZBW, ZDC)
- Increased compliance with airborne metering times
- Increased compliance with TBFM departure times

### Expected Outcomes:

- Increased use of available capacity (**throughput**) via synchronized and smoother arrival flow
- Improved **data-driven TFM** via the flow managed to targeted rates
- Less vectoring in TRACON airspace
- Less vectoring and holding in en route airspace
- Reduced use of MIT restrictions

**Facilities:** N90, ZNY, ZDC, ZBW, ZOB, DCC

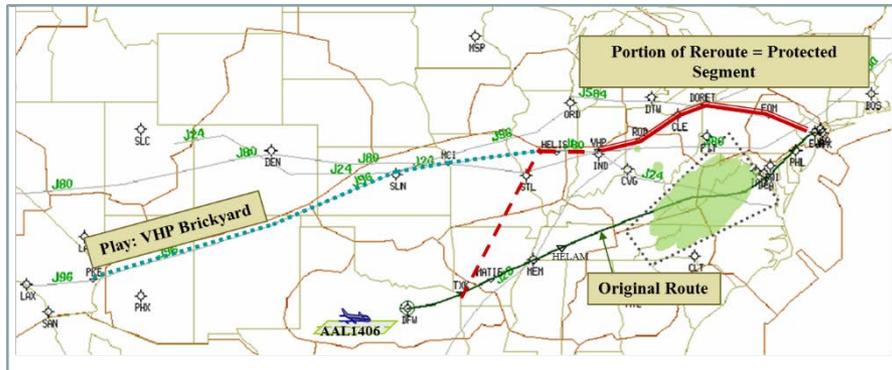
**Target Date:** Q4 CY21

### Targeted Operational Enhancements:

- Improve existing metering operations
  - Adaptation, Training, AT Procedures
  - Active Metering by all supporting facilities
- Apply Extended Metering, Coupled Scheduling, and Speed Advisories
  - Metering Design, Adaptation, Training, AT Procedures



# Implement PDRR/ABRR Enhancements



## Possible Supporting Activities:

- Software modifications
- Training and Education for all facilities and Operators

## Operational Objectives:

- Create the ability to edit Flight Plan Field 11 (Remarks) with a route modification made through RAD
- Ability to use CDRs and allow ERAM to apply local adaptations before route modification
- Increased compatibility/integration with DSP

## Expected Outcomes:

- Increase use of available capacity during reroute situations
- More efficient execution of re-routes

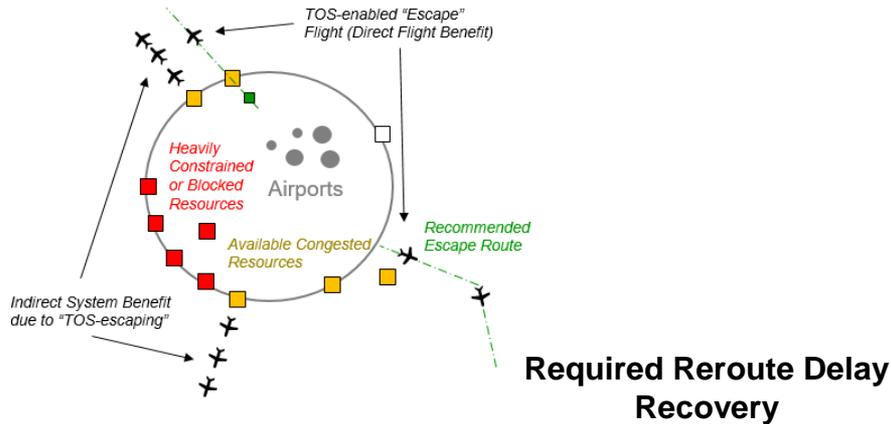
**Facilities:** EWR, LGA, JFK, PHL, N90, ZNY, ZDC, ZBW, ZOB, DCC

**Target Date:** TBD

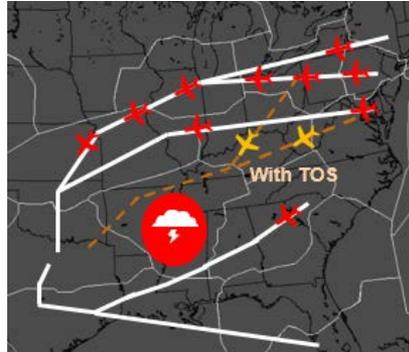
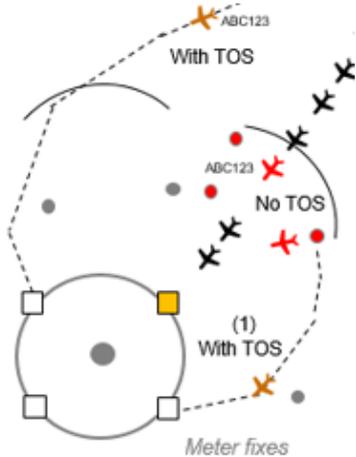


# Use TOSs to Communicate Departure and Arrival Trajectory Preferences From/To PHL and NY Area Airports

## Departure Escape and Congestion Relief



## Time-Based Management Fix Balancing



## Operational Objectives:

- Leverage operator provided alternative trajectory data (i.e., Trajectory Option Set) to improve Traffic Flow Management (TFM) decisions

## Expected Outcomes:

- Increase use of available airspace capacity when there are localized constraints
- Increased flight efficiency from less delay vectoring, ground holds, and airborne holding
- Enable more efficient reroutes and delay recovery
- Apply data-driven TFM to maintain overall arrival and departure throughput during periods of NAS constraints

**Facilities:** EWR, LGA, JFK, PHL, N90, ZNY, ZDC, ZBW, ZOB, DCC

**Target Date:** TBD

# Next Steps

- **Update Candidates based on feedback**
- **Continue to coordinate with other NIWGs to synchronize activities**
- **Discuss flight deck Advanced Technology Recommendations and proposed Responses**

# Back-Up Materials



# Legend For Chart

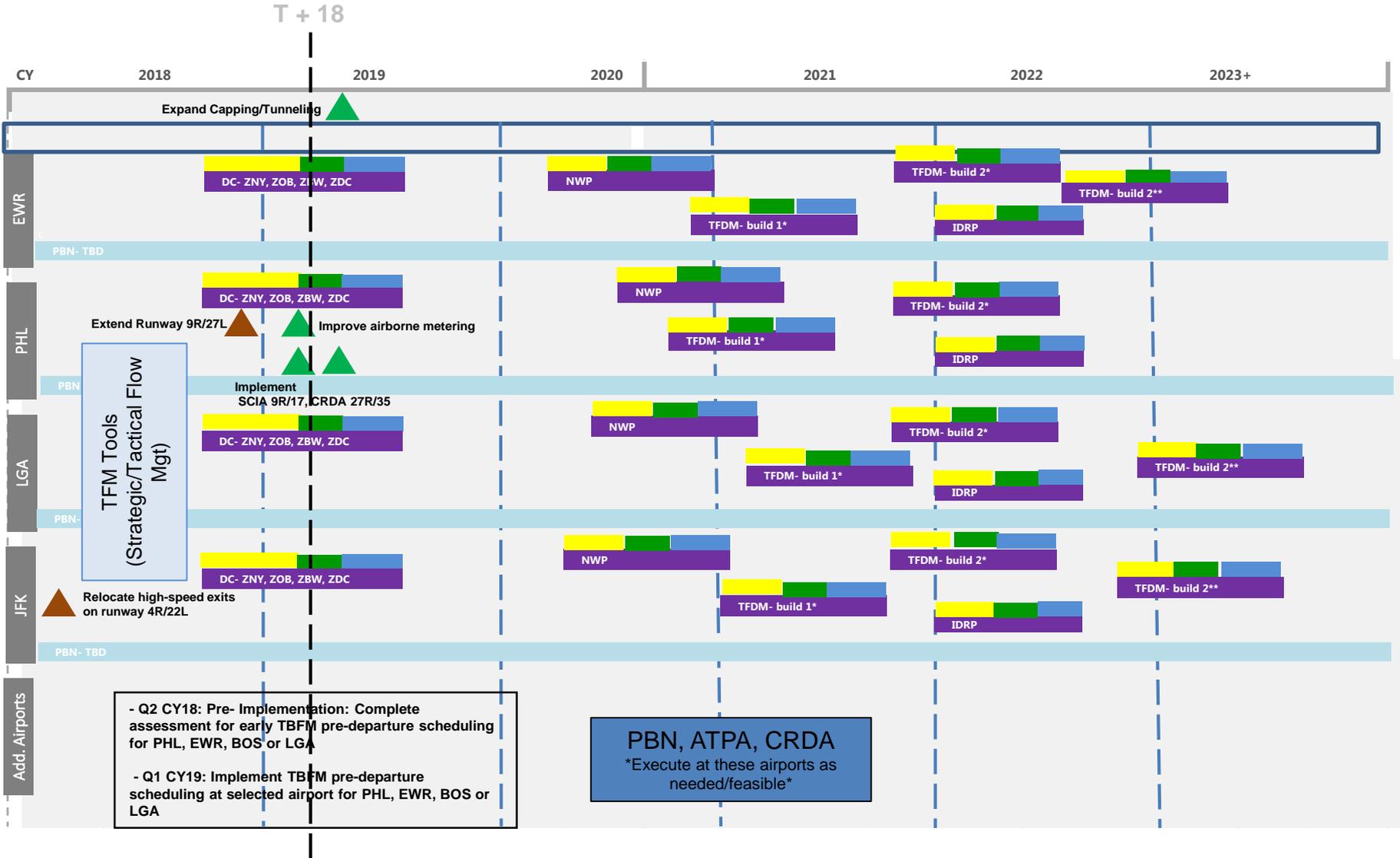
Data Comm S1P2/Initial: 9 months- Pre-implementation 1 month- IOC 2 months- post	GIM-S (XM, CS, Speed Advisories) (tailored/expanded for some sites): 3 months- Pre-implementation 1 month- IOC 1 month- post
TSAS: 6 months- Pre-implementation 1 month- IOC 3 months- post	TFDM Build 1 & 2: 3 months- Pre-implementation 1 month- IOC 3 months- post
NWP1: 3 months- Pre-implementation 1 month- IOC 3 months- post	PDRR/ABRR Enhancements: 1 month- Pre-implementation 1 month- IOC 1 month- post
IDAC: 1 month- Pre-implementation 1 month- IOC 1 month- post	IDRP: 2 months- Pre-implementation 1 month- IOC 1 month- post

## Legend for Charts:

-  - Planned
-  - Pre-Implementation/Site Prep/Etc
-  - Implementation/IOC
-  - Burn In/Sustainment
-  - Possible change
-  - PBN TBD
-  - TBFM WP4

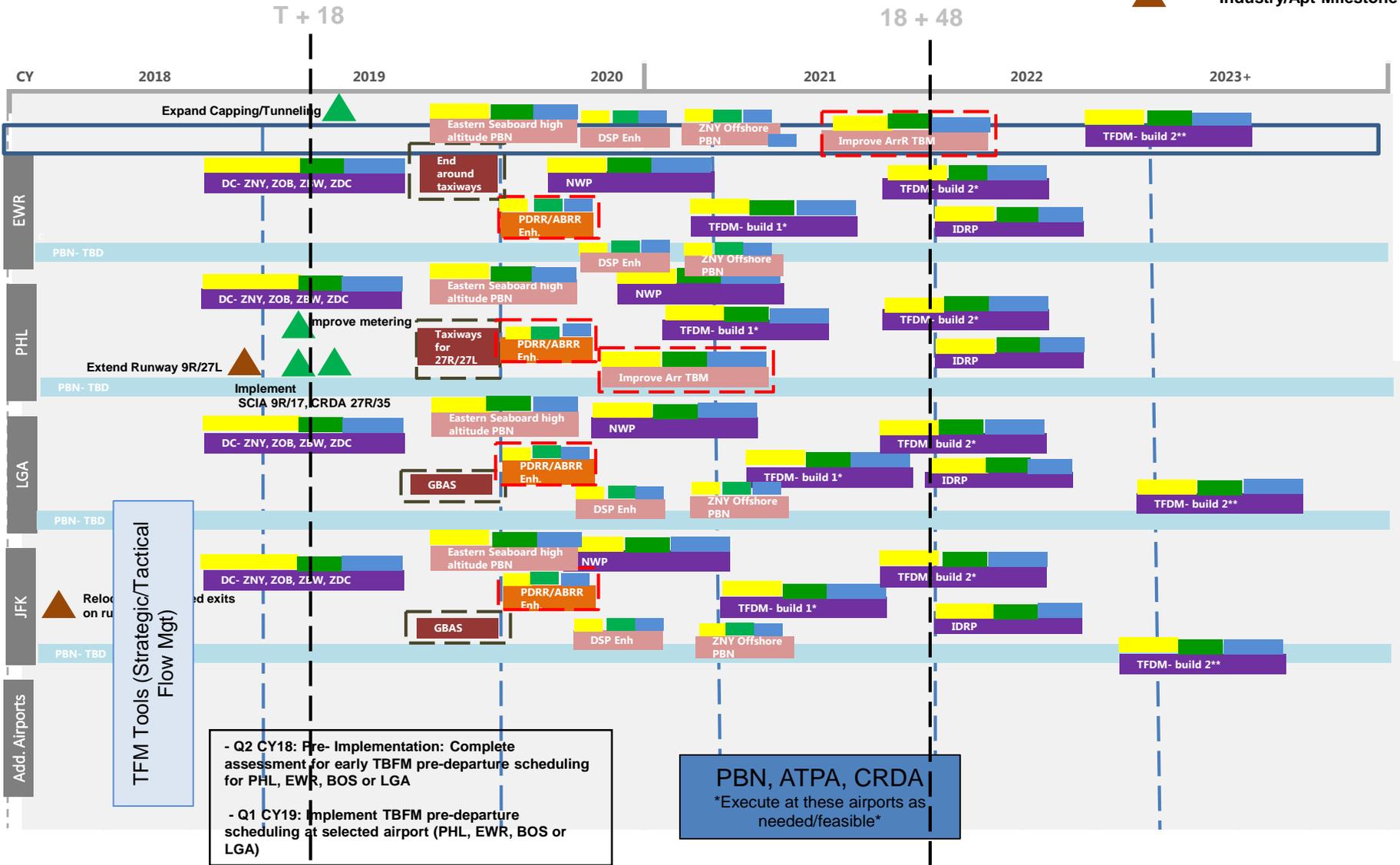
# Current Plans for the NY and PHL Area

-  - Implementation Milestone
-  - Industry/Apt Milestone



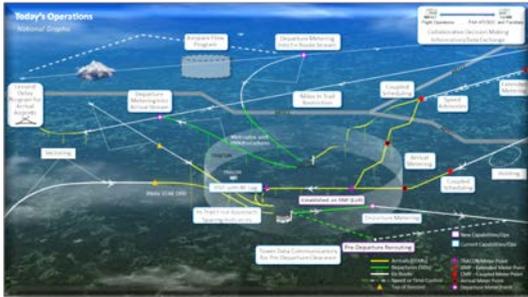
# Candidates for NEC Apr 19 – Dec 21

-  - Implementation Milestone
-  - Industry/Apt Milestone

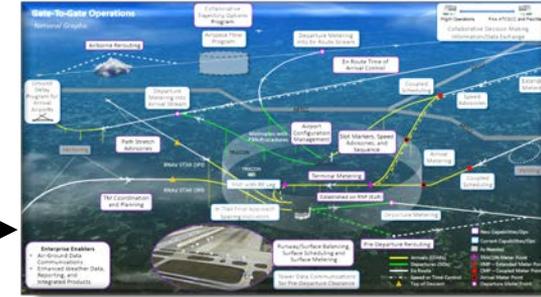


# iTBO – Implementation Approach

## As-Is State



## To-Be State



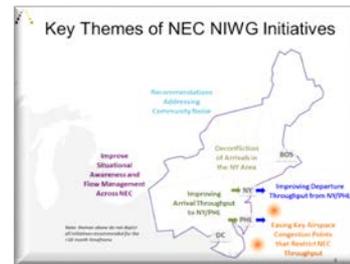
*“Right Tools for  
the Right Location  
at the Right Time”*

<TRANSITION ROADMAP>

Current  
Plans



New Commitments  
(e.g. NEC)



Gap

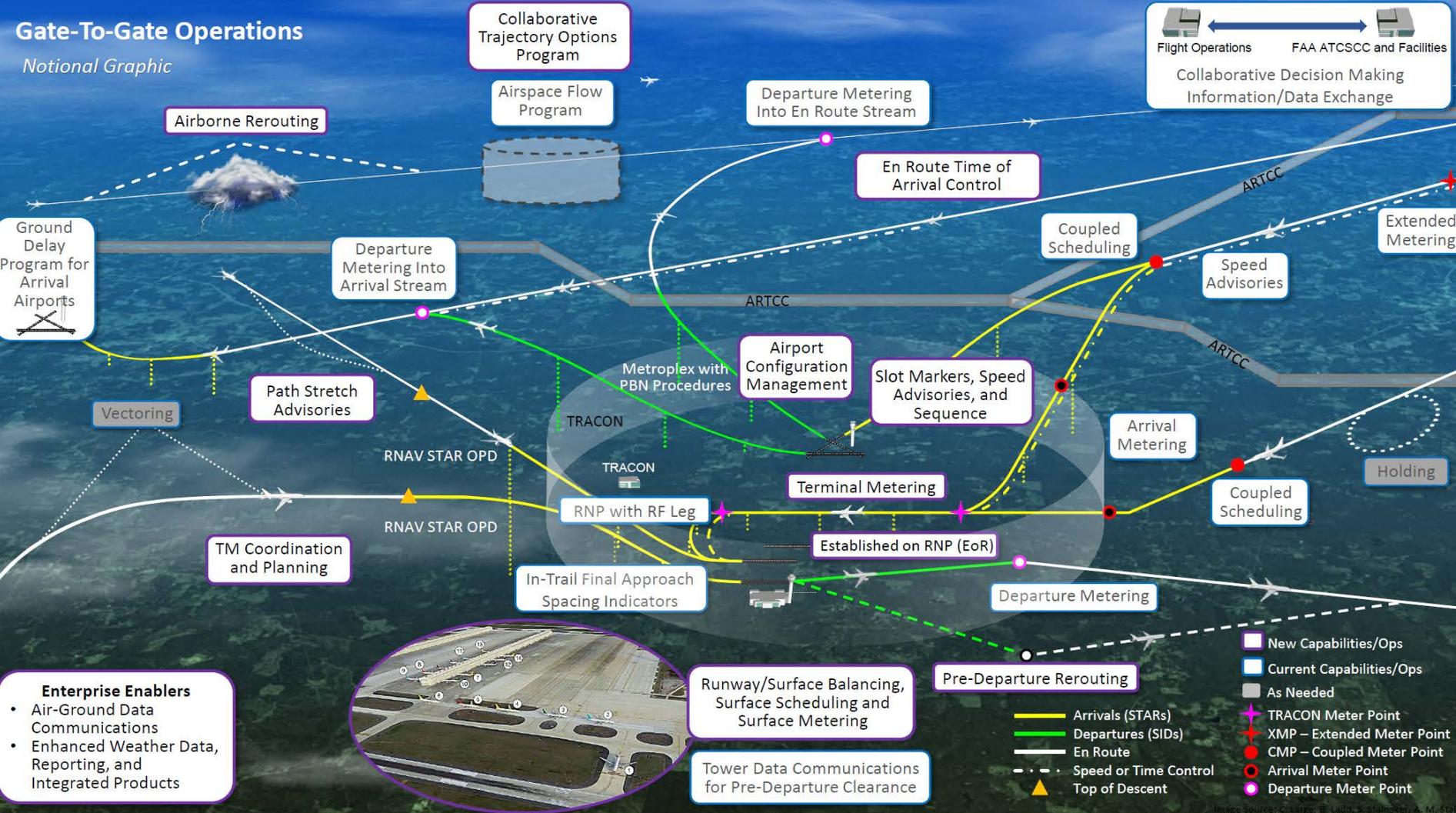
Evolution Plan Content	
<b>Target State</b>	<b>Plan Execution</b>
Objective and Goals	Operating Area Change Increments
Operational Change - Scope - AS-IS vs. TO-BE	Implementation Approach
ITBO Success Criteria and Metrics	Stakeholder Groups and Roles
Assumptions	Integrated Schedule
<b>Integration, Risks, Opportunities</b>	- Leadership Actions
Dependencies, Risks, Mitigations, Opportunities	- Communications Activities
Impact – Procedures/Agreements	- Organizational/facility Alignments
Impact – Surrounding Operating Areas	- Training, Evaluation, and Development
	Post-Implementation Operations Sustainment

- **Develop iTBO Transition Roadmap & Evolution Plans to Close the Gap**

# iTBO Operational Scope

## Gate-To-Gate Operations

Notional Graphic



**Enterprise Enablers**

- Air-Ground Data Communications
- Enhanced Weather Data, Reporting, and Integrated Products

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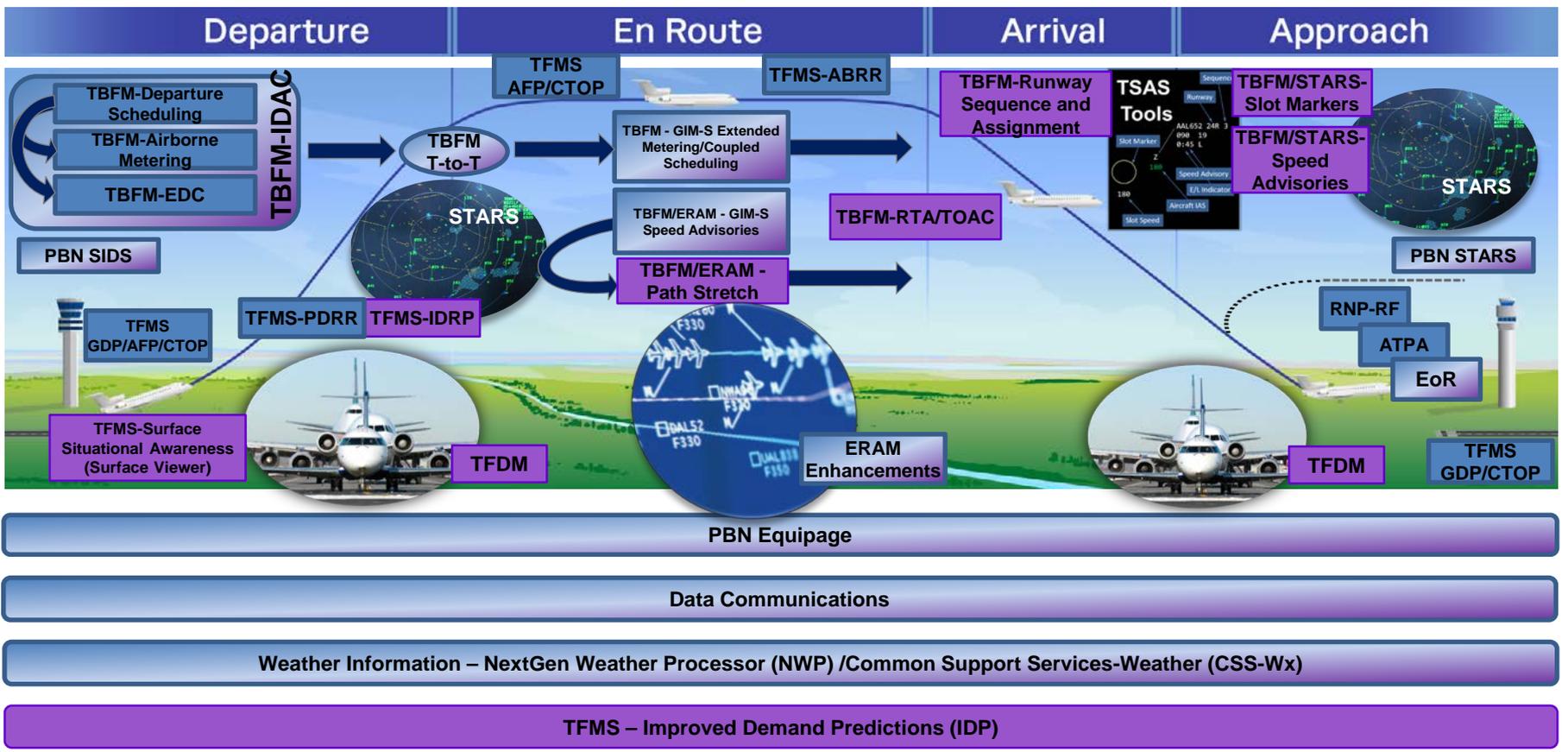
Federal Aviation Administration

# ITBO Capabilities

Function Category	Capabilities	Supporting Technologies	
<b>PBN</b>	RNAV STAR Optimum Profile Descent (OPD) RNAV SIDs RNP / RNP with RF leg Established on RNP (EoR)*	FMS/ RNAV (LNAV/VNAV), RNP, RNP- AR, A-RNP	
<b>Strategic Planning / Flow Management</b>	Airspace Flow Program (AFP), Ground Delay Program (GDP) Collaborative Trajectory Options Program (CTOP)* TM Coordination and Planning	TFMS/ FSM SWIM, TFMS, Operator Ground Automation TFMS/ FSM TBFM/ TM Ops Dashboard and Planning Tool	
<b>Route Management</b>	Automated Reroutes Pre-Departure Rerouting Airborne Rerouting	TFMS/ ERAM PDRR ABRR	
<b>Time-Based Scheduling (Airborne and Surface)</b>	Arrival Metering Coupled Scheduling/Extended Metering Collaborative Air Traffic Management Departure Metering (scheduling) into Arrival Stream Departure Metering (scheduling) into En Route Stream Terminal Metering Runway/Surface Balancing Surface Scheduling and Metering	TBFM/ GIM-S T-to-T, IDAC EDC, IDAC TSAS TFDM	<div style="background-color: #0056b3; color: white; padding: 5px; text-align: center;">Currently Available Capabilities</div> <div style="background-color: #6a3d9a; color: white; padding: 5px; text-align: center;">Planned Capabilities</div>
<b>En Route and Terminal Spacing Tools</b>	Converging/Crossing Runway Operation Spacing Indicators In-Trail Final Approach Spacing Indicators Delay Countdown Timer Speed Advisories Path Stretch Advisories Slot Markers, Speed Advisories, and Sequence En Route Time of Arrival Control (TOAC)	STARS/ CRDA ATPA TBFM/ DCT/MRL GIM-S Path Stretch TSAS TBFM, FMS/ RTA	
<b>Surface Management</b>	Tower Data Communications for Pre-Departure Clearance Electronic Flight Data* Airport Configuration Management	Controller Pilot Data Link for Tower TFDM	
<b>Enterprise Enablers</b>	Information and Data Exchange Air-Ground Data Communication Enhanced Weather Data, Reporting, and Integrated Products	SWIM Controller Pilot Data Link for En Route (Initial Services) NWP, CSS-Wx	



PERTI Processes and Procedures



# ZNY Current and Planned TBO Capabilities

ARTCC	TFM & Enterprise Enablers						NAV Group	Airports	Surface & Departure Management						Arrival Management			Arrival			Approach										
	EDC	ACM	ABRR	CTOP	Data Comm Initial En Route	NWP			RNAV SID	TDLS	SVT at ZNY	IDAC (from)	PDRR	TFDM	IDRP	Departure scheduling (to)	Arrival metering	GIM-S	Path Stretch	RTA & TOAC	RNAV STAR	CRDA	TSAS	ATPA	RNP Approach	RNP RF	EOR				
ZNY	Green	White	TBD	TBD	2019	2020	1	EW R	1	Blue	Blue	Green	Light Blue	A 2021	2022	*	Light Blue		Grey	Grey	2	Blue		4	2						
								JFK	2	Blue	Blue	Green	Light Blue	A 2021	2022				Grey	Grey	1	Light Blue			5			*			
								LG A	5	Blue	Blue	Green	Light Blue	A 2021	2022	*	Green				2019	Light Blue				2					
								PHL		Blue	Blue	Green	Light Blue	A 2021	2022	*	Green					4	Blue				2				
							2	HP N				Green	Light Blue	B+ 2022	2022														2	2	
								TEB	1			Green	Light Blue	B+ 2022	2022											2			2	1	

Bold denotes CORE 30 airport

Legend						
Currently Available and in use	Not fully implemented or used	Planned	Pre-FID	NEC Commitment T+18	Not Planned or in use	* Pre-implementation milestone

# ZBW & ZDC Current and Planned TBO Capabilities

ARTCC	TFM & Enterprise Enablers						NAV Group	Airport	Surface & Departure Management						En Route					Arrival			Approach			
	EDC	ACM	ABRR	CTOP	Data Comm Initial En Route	NWP			RNAV SID	TDLS	SVT at ARTCC or TRACON	IDAC (from)	PDRR	TFDM	IDRP	Departure scheduling (to)	Arrival metering	GIM-S	Path Stretch	RTA & TOAC	RNAV STAR	CRDA	TSAS	ATPA	RNP Approach	RNP RF
ZDC	Blue	CLT	Blue	Light Blue	Purple	Purple	1	BWI	3	Blue	Blue	Light Blue	A 2024	2022			Grey	Grey	4	Light Blue		4	2			
		DCA						9	Blue	Blue	Light Blue	A 2024	2022			Grey	Grey	7				4	2	1		
		IAD						9	Blue	Blue	Light Blue	A 2024	2022			Grey	Grey	6				4	2			
		RDU					7	Blue	Blue	Light Blue	B 2020				Grey	Grey	4	NA			4	4				
		RIC					2		Blue	Light Blue	B 2025	2022				Grey	Grey	3				4	4			
ZBW	Blue	EW R	Light Blue	Light Blue	Purple	Purple	2	BDL		Blue	Blue	Light Blue	B 2025				Grey	Grey				2	2			
		PHL						9	Blue	Green	Blue	Light Blue	A 2021		Blue	Blue		Grey	Grey	3	Blue		Blue			

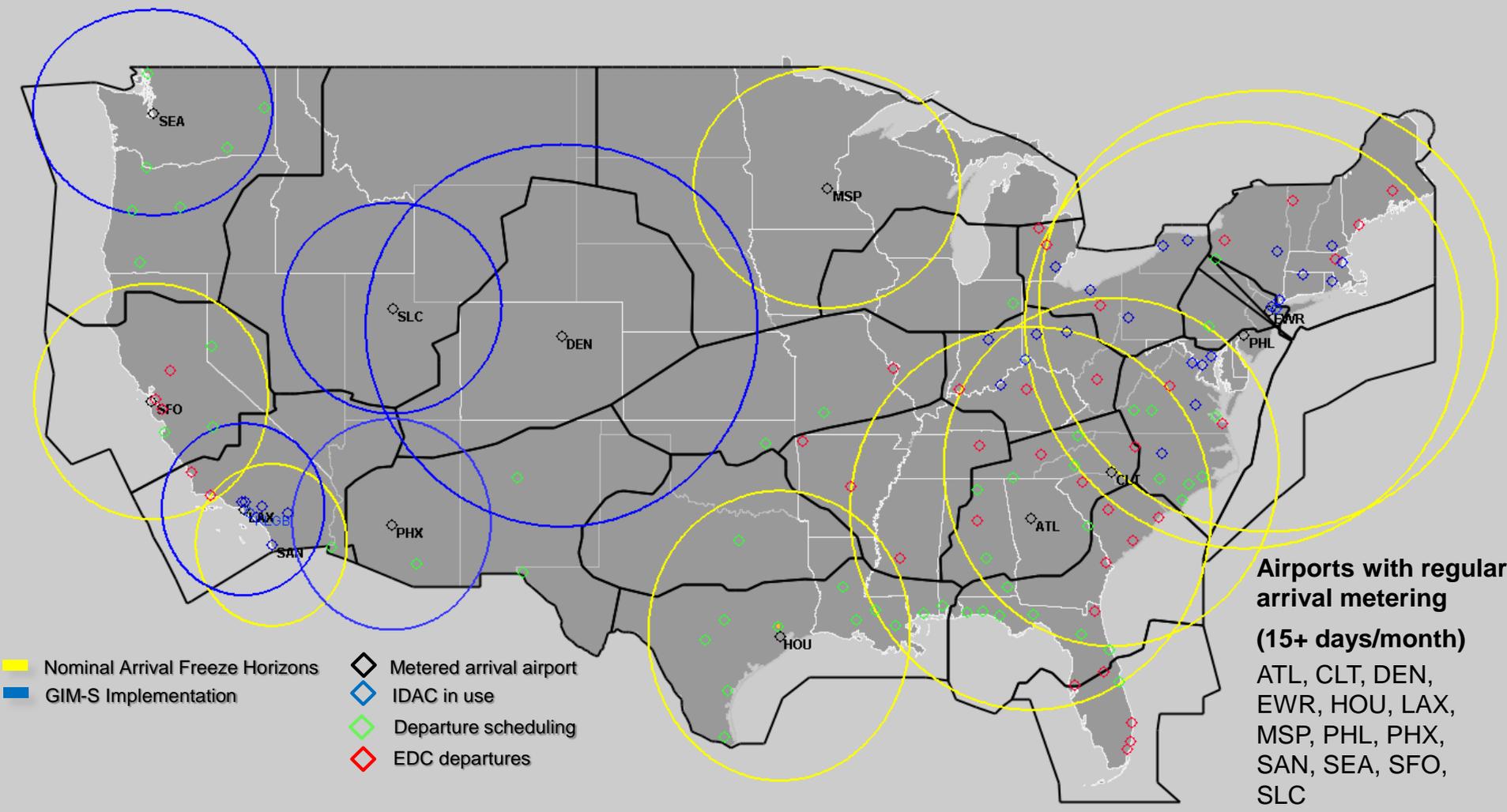
Bold denotes CORE 30 airport

Legend					
Available and in regular use	Not fully implemented or used	Planned 2019-2022	Pre-FID	NEC Commitment T+18	Not Planned or in Use

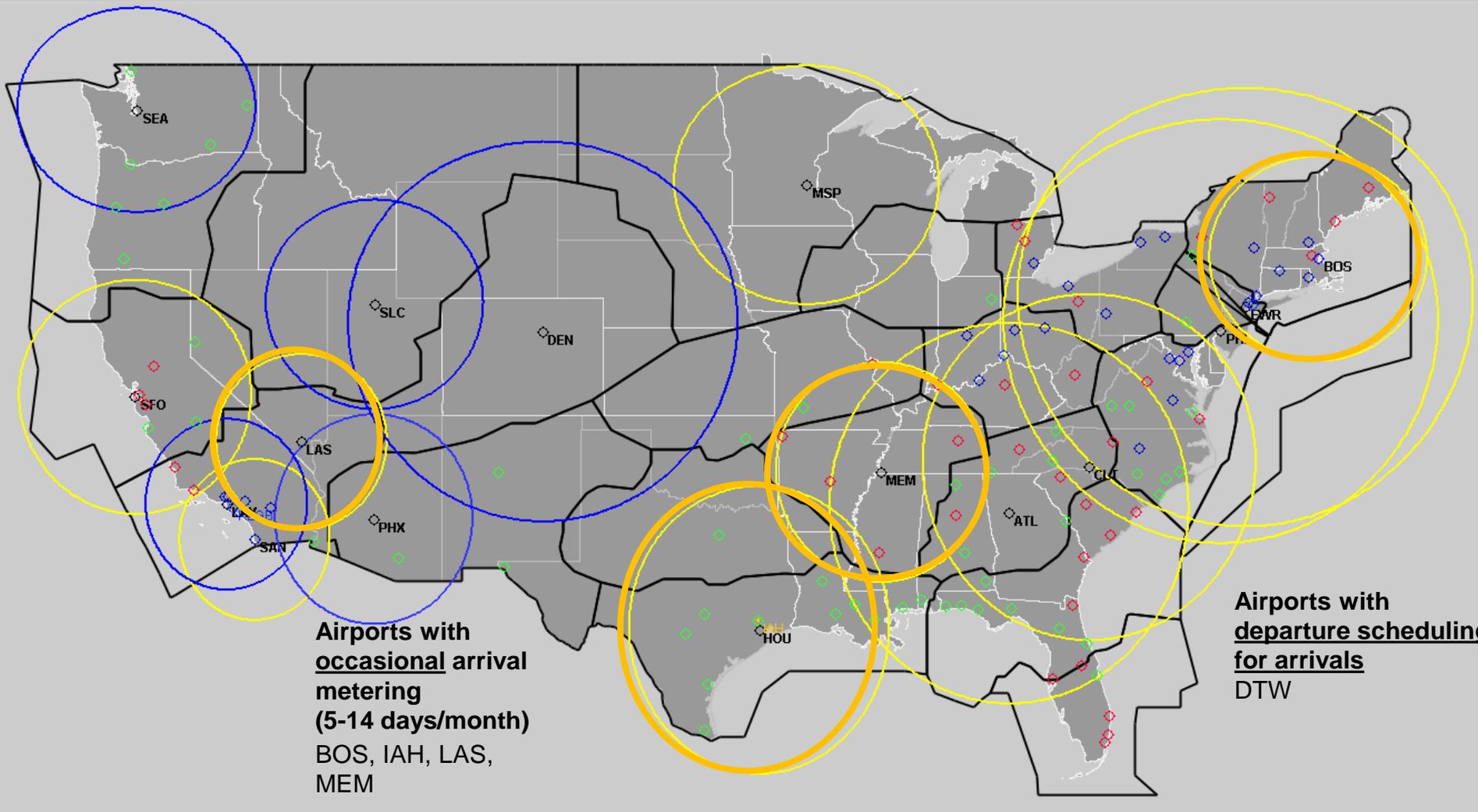
# ZID & ZOB Current & Planned TBO

ARTCC	TFM & Enterprise Enablers						NAV Group	Airport	Surface & Departure Management						En Route				Arrival			Approach										
	EDC	ACM	ABRR	CTOP	Data Comm Initial En Route	NWP			RNAV SID	TDLS	SVT at ARTCC	IDAC (from)	PDRR	TFDM	IDRP	Departure scheduling (to)	Arrival metering	GIM-S	Path Stretch	RTA & TOAC	RNAV STAR	CRDA	TSAS	ATPA	RNP Approach	RNP RF	EOR					
ZID	ATL	CLT	MEM		2018	2021	2	CHS	5		2018-2019		B 2025						8	NA			2	2								
								CMH				B 2022								1	NA						4					
								CVG	9			B 2024																	8			
								IND				B 2020																		6	6	
								SDF	4			B 2024																		4	4	
ZOB	EWR	PHL			2019	2020	2	BUF					B 2025											2	2							
								CLE	1			B 2020																				
								DTW				A 2024																				
								PIT				B 2026													4					6		

# Current TBFM Use Across the NAS: March 2018



# Airports with Regular and Occasional Airborne metering



# Other use cases for a TOS

- **TOS for Departure Volume or Route Closure**
- **TOS for Escape Routes**
  - SERBOS (low altitude for BOS)
  - SERMN (low altitude for NY metros)
  - LIMBO (low altitude for DC metros)
- **TOS for Special Equipage**
  - AZEZU (routes over the Atlantic Ocean used by East Coast facilities)
- **TOS for Better Decision Making**
  - Reroute reduction
  - Reduced MIT
  - More timely Decision Making
- **TOS for Special Activity Airspace**
- **TOS for Reroute Cancellation**

# Industry Operational Needs in NEC

(March 2019 to December 2021)

**Deconflict  
Airports to  
Improve  
Throughput**



- Constrained NEC departure routes
- Loss of throughput arriving LGA 13 or 31
- Arrival throughput/GDPs at EWR
- Satellite airport access to NY area airspace

**Grow  
Throughput**



- Full utilization of available LGA capacity
- Improve JFK runway usage and delay
- Improve PHL runway usage and delay
- Reduced separation and spacing

**Leverage Data to  
Improve Traffic  
Flow Management  
Decisions**



- Evolve traffic flow management to leverage big data analytics for decisions

# NEC Oct 17 – Mar 19 (T+18) Milestones

# NextGen NEC Rolling Plan CY 2018

Focus Area	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter
<b>Northeast Corridor</b>	<ul style="list-style-type: none"> <li>■ Tools — Implement En Route Departure Capability (EDC) (ZNY) (*Q4-17)</li> <li>■ Tools — TBFM Integrated Departure/Arrival Capability (IDAC) for Metro NY Airports (*Q4-17)</li> <li>■ Tools — Training and Operating Agreements to Support EDC at ZNY (*Q4-17)</li> <li>■ Procedures — Design PBN Arrival and Departure Procedures for NY Metro Area Airports from ZNY Oceanic</li> <li>■ Procedures — Design and Testing for Vertical Climb Escape Route for TEB/HPN</li> <li>■ Tools — NAS Operations Dashboard (NOD) Trial</li> <li>■ Airports — JFK Runway 4R/22L Rehabilitation and Delay Reduction Taxiway Improvements (i)</li> <li>■ Procedures — NBAA to Participate in Design and Testing for Vertical Climb Escape Route for TEB/HPN (i)</li> <li>■ Procedures — Participate in Design Activities Associated with the New PBN Arrival and Departure Procedures for the ZNY Oceanic Transition Sectors (i)</li> </ul>	<ul style="list-style-type: none"> <li>■ Tools — Implement Surface Visualization Tool (SVT) (ZBW)</li> <li>■ Tools — Implement TBFM IDAC(*Q4-17)</li> <li>■ Procedures — Atlantic Coast Routes: Design Validation of Eastern Seaboard High-Altitude PBN Routes, Including SID/STAR Connectivity</li> <li>■ Tools — Assessment for Early TBFM Pre-Departure Scheduling</li> <li>■ Procedures — Atlantic Coast Routes: Participate in Design Activities, Including SID/STAR Connectivity (i)</li> <li>■ Tools — NAS Operations Dashboard (NOD) Trial (i)</li> </ul>	<ul style="list-style-type: none"> <li>■ Procedures — Update the Minima for Existing Simultaneous Converging Instrument Approaches (SCIA) Procedure to PHL 9R and 17</li> <li>■ Tools — NAS Operations Dashboard (NOD) Trial Study</li> </ul>	<ul style="list-style-type: none"> <li>■ Procedures — Implement Simultaneous Converging Instrument Approaches (SCIA) to PHL 9R and 17</li> <li>■ Procedures — Environmental Review for the Use of Dispersal Headings for LGA 13 Departures</li> <li>■ Procedures — Feasibility Study for the Modified Missed Approach for LGA 22</li> <li>■ Procedures — Safety Assessment of SCIA Operations with RNAV for PHL 9R and 35</li> <li>■ Airports — BWI International Terminal Improvements and Additional New Gates (i)</li> <li>■ Airports — PHL Runway 9R/27L Extension (i)</li> <li>■ Procedures — Participate in Community Engagement for Dispersal Headings for LGA 13 Departures (i)</li> <li>■ Procedures — Participate in Feasibility Study for the Modified Missed Approach for LGA 22 (i)</li> <li>■ Procedures — Provide Expertise to Support the Safety Assessment of Simultaneous Converging Instrument Approaches (SCIA) Operations with RNAV for PHL 9R and 35 (i)</li> <li>■ Tactical — Airspace Users to Complete Training to Support Capping and Tunneling for Departures/Arrivals to/from the NEC</li> </ul>
<b>Totals</b>	3 of 9 completed	1 of 6 completed	0 of 2 completed	0 of 10 completed

# NextGen NEC Rolling Plan CY 2019

Focus Area	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter
Northeast Corridor	<ul style="list-style-type: none"> <li>■ Tactical — Consistent Usage of Defined and Existing Capping and Tunneling for Departures/Arrivals to/from the NEC</li> <li>■ Tools — Converging Runway Display Aid (CRDA) Dependent Converging Instrument Approaches (DCIA) Application for PHL 27R and 35 for RNAV Approaches</li> <li>■ Tools — Implement TBFM Pre-Departure Scheduling at a Selected Airport</li> <li>■ Tools — Improve Airborne Metering</li> <li>■ Tactical — Feasibility Study to Create a Process to Reduce and/or Eliminate Passback Miles-in-Trail for NY Departures</li> <li>■ Tools — Complete TBFM Refresher Training for Metering to PHL</li> <li>■ Tools — Determine the Sequence of Additional Airports to Receive En Route Metering</li> <li>■ Tools — Review/Update Adaptation for Improving Airborne Metering to PHL</li> <li>■ Airports — PANYNJ to Exchange Flight Data with FAA/Airlines (i)</li> <li>■ Procedures — Contribute to Associated Community Engagement Activities for the New PBN Arrival and Departure Procedures for JFK and EWR from ZNY Oceanic (i)</li> <li>■ Tools — Education of Airspace Users to Support TBFM Pre-Departure Scheduling (i)</li> </ul>	<ul style="list-style-type: none"> <li>■ Procedures — Concept Exploration of Simultaneous Operations on Widely-Spaced Approaches to Different Airports</li> <li>■ Procedures — Feasibility Assessment of EoR Simultaneous Operations to JFK 13R RNP and 13L ILS</li> <li>■ Procedures — Participate in the Concept Exploration of Simultaneous Operations on Widely-Spaced Approaches to Different Airports (i)</li> <li>■ Procedures — Participate in the Feasibility Assessment of EoR Simultaneous Operations to JFK 13R RNP and 13L ILS (i)</li> </ul>	<ul style="list-style-type: none"> <li>■ N/A</li> </ul>	<ul style="list-style-type: none"> <li>■ N/A</li> </ul>
Totals	0 of 11 Complete	0 of 4 Complete		