



NextGen Advisory Committee (NAC) July 30, 2019 Meeting Summary

The NextGen Advisory Committee (NAC) was held July 30, 2019 at The MITRE Corporation in McLean, VA. The meeting discussions are summarized below. Reference the attachments for additional contextual information.

List of attachments:

- Attachment 1: NAC Briefing
- Attachment 2: Attendance List
- Attachment 3: Public Statements

Opening of Meeting / Introduction of NAC Members

Mr. Dan Elwell, Acting FAA Administrator, opened the meeting and welcomed attendees. He explained that the July 30 NAC Meeting had been rescheduled from February due to circumstances outside FAA control related to the lapse in government funding. He announced that despite a presidential executive order in June on limiting the use of federal advisory committees, the NAC will continue per the existing charter. He introduced Ms. Alex Randazzo, Managing Attorney for the FAA Office of the Chief Counsel, who provided an overview of Federal Advisory Committee Act (FACA) guidance as it relates to the NAC.

Ms. Randazzo explained that the FAA Administrator issues NAC taskings for recommendations and advice on various issues. When these taskings are discussed at NAC Subcommittee or working group levels, the recommendations and advice must be presented at a public meeting of the NAC, where all deliberations and decisions will occur on what will be presented to the FAA as advice.

Mr. Elwell announced that Mr. Steve Dickson had been confirmed as the next FAA Administrator, adding that Mr. Dickson was a NAC member until his retirement from Delta Air Lines last year and previously served as a co-chair of the Surface and Data Sharing NextGen Integration Working Group (NIWG). He also announced U.S. Secretary of Transportation Ms. Elaine Chao's appointment of Mr. Russell "Chip" Childs as NAC Chair through the term of the current charter. Mr. Childs is replacing former Chair Mr. David Bronczek, who retired from the FedEx Corporation.

He continued that Mr. Childs is ideally qualified to lead the NAC and facilitate risk mitigation initiatives related to regional airline fleet equipage due to his experience as President and CEO of the largest regional airline in the U.S., Sky West, Inc., and as the past chairman of the Regional Airline Association (RAA). Mr. Elwell said that he joins Secretary Chao in thanking Mr. Childs for taking on the role as the FAA works with industry to jointly implement NextGen.

Mr. Childs thanked Mr. Elwell and the NAC for the warm welcome. He also thanked Mr. Gregg Leone and Mr. Dennis Sawyer from MITRE for hosting the NAC Meeting. He announced Secretary Chao's appointment of the following new NAC members:

- Joe DePete, President of the Airline Pilots Association, representing labor

- Don Dillman, Senior Vice President, Flight Operations, FedEx Express, representing cargo operators
- Candace McGraw, Chief Executive Officer of Cincinnati/Northern Kentucky International Airport and Chair of the Airports Council International, North America, representing airports
- Warren Christie, Senior Vice President of Safety, Security and Fleet Operations, JetBlue Airways, representing air carrier operators
- Jim Graham, Senior Vice President of Flight Operations, Delta Air Lines, representing air carrier operators
- John Ladner, Vice President, Flight Operations, Alaska Airlines, representing air carrier operators
- Bryan Quigley, Senior Vice President of Operations, United Airlines, Inc., representing air carrier operators
- Craig Hoskins, Vice President of Safety and Technical Affairs, Airbus Americas, Inc., representing aircraft manufacturers
- Wayne Schatz, Jr., US Air Force, Major General, retired, who is representing the Department of Defense

Official Statement of Designated Federal Officer (DFO)

Mr. Elwell presented the Federal Advisory Committee Act (FACA) notice that governs public meetings.

Chair's Report

Mr. Childs then provided the Chair's Report. To begin he called for a motion to approve the October 31, 2018 NAC meeting summary, which the NAC approved.

Outcome: The NAC approved the October 31, 2018 NAC Meeting Summary Package

He continued with expressing his appreciation of the work of the working groups and NAC Subcommittee (NAC SC). He introduced some of the key agenda items, including briefings on ADS-B out equipment, NIWG updates, Minimum Capabilities List (MCL), Enhanced Air Traffic Services (EATS), and Joint Analysis Team (JAT) updates. Mr. Childs said that he is excited to work with the NAC members as chair and looks forward to the discussion. Before handing off to Mr. Elwell, he encouraged open communication among the members of the NAC.

FAA Report

Mr. Elwell began with thanking everyone involved in the preparation of the *NAC NextGen Priorities Joint Implementation Plan CY2019–2021*, which was signed in June. He said that the plan highlights the collaboration between Government and Industry. He explained that this is the response to the advice industry provided in the *NAC Recommendations*, *NextGen Integration Working Group Rolling Plan, 2019-2021*, *Final Report* and previously in the *2018 Northeast Corridor Report*.

NOTE: The *NAC NextGen Priorities Joint Implementation Plan CY2019–2021* is available online at the following link:

<https://www.faa.gov/nextgen/library/media/NACNextGenPrioritiesJointImplementationPlanCY2019-2021.pdf>

He said that as the NAC focuses on operational capabilities, it is beneficial to have discussions with all stakeholders to create a common set of expectations that span NextGen technologies, safety

improvements, and NAC processes and procedures. He referenced the Data Communications (Data Comm) tower services program as an example of a tool delivering significant benefits to NAS operations. He emphasized that program success requires that all aviation stakeholders remain committed to the program and joint milestones. Specific to Data Comm, the FAA has met or exceeded all of its commitments. He said the outstanding issues affecting En Route Data Comm are in the aircraft avionics and air-ground interoperability and that industry is responsible for actions to resolve issues and ensure the success of this program.

Mr. Elwell explained that based on the NAC's 2017 recommendation to prioritize NextGen efforts on the Northeast Corridor (NEC), the FAA tasked the NAC to identify risks and provide advice on mitigations for risks to future benefits in the NEC. The NEC NIWG identified mixed aircraft equipment as the major risk, particularly the regional airline fleet. He emphasized that the technical work to integrate the aircraft with the ground system is key, which requires all stakeholders executing their role to turn benefits into reality.

Next, Mr. Elwell provided an update on Aircraft Owners and Pilots Association's (AOPA) request at a prior NAC meeting to restart the General Aviation Fixed Wing, Piston Engine, ADS-B Out Incentive program. The FAA restarted the program and issued an additional 9,792 rebates. The funds have now been exhausted but there is a process to maximize the number of rebates awarded (re-allocation of expired, terminated, rejected, or withdrawn applications). He emphasized that there is still work for the aviation community to do to comply successfully with the January 1, 2020 ADS-B Out mandate. He described ADS-B as an initial, yet important, step in the long-term transformation of the NAS. With specific regard to a general aviation question, Mr. Elwell had previously received regarding concerns on what happens if GPS goes out or is degraded, he said that it will not be a violation if equipment is broadcasting degraded GPS information—controllers will still have secondary surveillance to ensure safety.

On the topic of Space-Based ADS-B, Mr. Elwell said that it is critical for the aviation community and the FAA to work together both near and long-term to define and refine a strategy. He emphasized incremental adaptation and financial justification as key strategy considerations, referencing the Caribbean Islands, disaster recovery missions, and oceanic surveillance as potential examples. He said the phased approach must address technical, operational, safety issues, and benefits before committing to a long-term investment.

Lastly, Mr. Elwell discussed the FAA's budget in the President's Budget for Fiscal Year 2020, which requests \$17.1 billion spread across agency operations, facilities/equipment, research activities, airport grants, etc.

Before concluding, Mr. Elwell publicly thanked Dr. Jaiwon Shin (NASA), who is retiring later this year, for his service and partnership. Mr. Bob Pearce (NASA), who was attending the NAC on behalf of Dr. Shin, thanked Mr. Elwell on behalf of NASA and indicated the partnership would continue.

Public Statements

Next, Mr. Childs invited members of the public present to provide oral statements. Please reference Attachment 3 for the full oral statement text and written statements.

The following citizens provided statements:

- Mark Griswold, Riverdale, IA
- Janet McEneaney, President of Queens Quiet Skies and founder of the Quiet Skies Conference

Mr. Childs thanked both speakers for their time.

NAC Subcommittee (SC) Co-Chair's Report: Aviation Community Risks and Mitigations

Next, NAC SC Co-Chair Mr. Craig Drew (Southwest Airlines) began the NAC SC Co-Chair's Report by saying that industry is working to identify risks and provide advice on mitigations to agreed upon joint FAA-Industry milestones through the five NIWGs. This is in response to NAC Taskings 18-4 NAC NEC Risks & Mitigations Tasking Response and 18-5 NextGen Priorities Four Focus Areas: Implementation Risks and Mitigations of the NextGen Joint Implementation Plan.

Northeast Corridor (NEC)

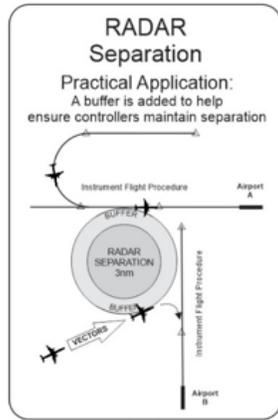
First, Mr. Drew introduced NEC NIWG Co-Chairs Mr. Mark Hopkins (Delta) and Mr. Ralph Tamburro (PANYNJ). Mr. Hopkins described the operational imperative of the NEC activity as a list of tiered benefits, including improving the execution of today's operation in the NEC, operating today's flights more efficiently, and growing the capacity and schedule. He described near-term goals as operating the full intended operation, on time, and predictably. The way to achieve this is through deconflicting airports and airspace, improving throughput, and improving flow management.

Mr. Hopkins continued with a status of T+18 implementation milestones, indicating that FY18 implementation commitments have been completed and that FY19 implementation commitments are delayed due to the federal lapse in funding and Government shutdown. He said that deconfliction commitments have been limited to planning, discussion, and pre-implementation concept assessments, adding that lack of an implementation plan risks meeting the overall objectives for the NEC. To address this risk, he proposed a plan that implements deconfliction initiatives with continued transparency and collaboration.

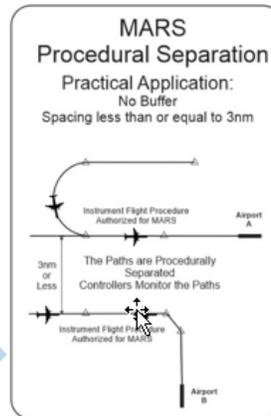
Next, Mr. Hopkins described a series of items needed to get the NEC activity where it needs to be, including the targeted application of NextGen procedures, a new thrust focusing on deconfliction in New York, and leveraging existing or previously designed procedures. Mr. Tamburro also presented a concept called "iMARS," which is detailed in the graphic below.

iMARS in New York

(Initial) Multiple Airport Route Separation in New York



Today, airport and airspace throughput is constrained by close proximity of New York area airports



MARS addresses these challenges through separation concepts that capitalize on PBN's merits

iMARS streamlines this concept and focuses on near-term New York implementation

(34 NY applications have been identified)

In describing upcoming NEC activities, Mr. Tamburro indicated that the NEC NIWG will continue activities in support of the *NAC NextGen Priorities Joint Implementation Plan CY2019–2021* commitments. Additionally, it will work activities needed to implement iMARS in New York and said the NEC NIWG will present these recommendations at a future NAC Meeting.

Mr. Warren Christie (JetBlue Airways), asked how to get the momentum to move quickly in resolving NEC issues. Mr. Hopkins responded that additional collaboration is needed to build plans that implement shared initiatives with specific dates and milestones. This requires support and resources. When discussion continued on how the NAC can help, Mr. Christie directed the NEC NIWG Co-Chairs to be direct about what they need. Ms. Teri Bristol, FAA Air Traffic Organization COO, described some related FAA activity and said the FAA is committed and will continue to work together.

Multiple Runway Operations (MRO)

Next, MRO Co-Chairs Mr. Glenn Morse (United) and Mr. Phil Santos (FedEx) briefed MRO. Mr. Morse began with introducing Mr. Santos, who replaced Mr. Jon Tree (Boeing) as MRO NIWG Co-Chair earlier this year. They reported no obvious risks to achieving operational benefits or to the community or stakeholders. Additionally, 2019 MRO implementation and pre-implementation milestones are on track.

Performance Based Navigation (PBN)

PBN NIWG Co-Chairs Mr. Brian Townsend (American) and Mr. Steve Fulton (Fulton Aviation) briefed PBN. Mr. Fulton began by acknowledging the contributions of PBN NIWG FAA SMEs Donna Creasap and Rob Hunt to the team. He said the PBN NIWG is focused on activities that will deliver the desired outcome of routine PBN use. They continued to provide an overview of identified risks and mitigations detailed in the following table.

Industry Challenge(s), Issue(s), Risk(s) <i>[Existing]</i>	Risk Mitigation Approach/ Strategy	Industry Actions	FAA Actions
Balancing of aircraft equipage capabilities – forward-looking approach to ensure use of PBN and benefits to equipped operators	Collaborative partnership to leverage existing capabilities and incentivize investment	<ul style="list-style-type: none"> • Partner with FAA on barriers to EoR analysis and subsequent efforts • NextGen MCL workgroup • Business case for GBAS/GLS • Work through VNAV issues and document agreements 	<ul style="list-style-type: none"> • Partner with Industry on EoR study and efforts
Balancing Resources – FAA PBN deployment subject to adequate and stable funding	Mission Support Changes headed by HQ MSS Deputy VP tasked with Policy, Strategy and Execution	<ul style="list-style-type: none"> • Review FAA updated IFP priority 	<ul style="list-style-type: none"> • Transparency on IFP Gateway • validation and prioritization of 40,000 IFP backlog in Gateway
Community acceptance of changes in procedures – affirmation of need to modernization procedures	Integrated initiative to address and overcome community objections	<ul style="list-style-type: none"> • Continue to engage with FAA on community outreach needs, with the goal of timely advancement of PBN projects 	<ul style="list-style-type: none"> • Stand-up new noise complaint group • Work with A4A and Industry on community outreach
Controller decision support system tools to accommodate and leverage PBN procedures and equipage - need for a strategy for the time, speed and spacing assignment	Align TBO tools with PBN implementation, and integrate with Industry equipage plans	<ul style="list-style-type: none"> • Work through NAC SC to elevate issues • Pursue more active role in how TBO tools will work and where they will be implemented 	<ul style="list-style-type: none"> • More transparency on tools and plans

During follow-up discussion, Mr. Joe DePete (Air Line Pilots Association [ALPA]), said that he applauds the PBN NIWG efforts and that addressing equipage issues is the only way to achieve results. He added that from the pilots' perspective, predictability of tools is critical and that ALPA looks forward to continuing to work together.

Mr. Christie asked whether the PBN NIWG Co-Chairs had any advice on the overlap of activity between the PBN NIWG and NEC NIWG and where the best forum is to develop an implementation strategy to clear the backlog. Mr. Fulton responded that many of the key personnel are already in the PBN NIWG and it could include relevant members of the NEC NIWG. Mr. Drew also mentioned the possibility of forming an ad hoc group as a potential option. Mr. Christie indicated he is anxious to see the plan move forward.

Action: NAC SC Co-Chair Craig Drew offered to work with PBN NIWG Co-Chairs and FAA to discuss in an ad hoc environment, TBO issues, and how they are discussed in the NIWG and SC environment

Surface & Data Sharing

Next, Surface & Data Sharing Co-Chair Mr. Rob Goldman (Delta) briefed. He began with sharing some successes including SWIM Industry FAA Team (SWIFT) activity that support how operational improvements can be derived through SWIM information services, and the NASA ATD-2 Demonstration that has highlighted the complexity and needs for decision support tool integration (3T integration/TBO) and the critical importance for operator-provided data. Mr. Goldman identified the following risks:

- **Risk:** Limited industry policy, procedure, and process (P3) discussions
 - **Mitigation:** Continue and increase industry P3 and technical outreach to appropriate stakeholders to ensure full understanding and readiness for TFDM
- **Risk:** Limited industry TFDM data requirements and interface/connectivity requirement discussions
 - **Mitigation:** Industry consensus to continue and fund NASA engagement with a focus on advanced data integration and analytical understanding from field demonstration

Data Communications (Data Comm)

Data Comm NIWG Co-Chairs Chuck Stewart (Delta) and Chris Collings (L3Harris) briefed next. Mr. Stewart explained that the IOC for Initial En Route Services milestone is at risk due to avionics issues presenting operational acceptance challenges for the air traffic control community. He reviewed Data Comm avionics fixes needed to support the waterfall deployment, including:

- Original equipment manufacturer (OEM) commitments to resolve known issues
 - Collins CMU 900 Core 16 available for install by March 2020
 - Collins committed to having a fix built and certified by 20/21
 - Boeing to deliver clear messaging on the path forward for B757/767 Pegasus
- Operator commitments to install the avionics fixes

Regarding the path forward for the Pegasus issue, Mr. Mike Sinnett (Boeing) indicated that Boeing has had a technical team working over the last year and a half on the issue. The team concluded the Pegasus 1 box has sufficient memory module but not throughput. The Pegasus 2 box resolves this issue but the

downside is the cost. Boeing has been working with Honeywell on the Pegasus 2 installation complexity, joint marketing, and pricing. He clarified that fixes to the Pegasus 1 are dead due to needing too many fixes and recertification when you open the box. Mr. Dillman pointed out the need for an interim procedural fix. Ms. Bristol said that the FAA is working closely with industry in the NAC SC and NIWG forums, but that these issues need to be resolved to move forward.

Action: FedEx request of Boeing for interim/published procedures for Pegasus 1 use while waiting on Pegasus 2, with offer for test support

Minimum Capabilities List (MCL)

Next, Mr. Childs introduced Mr. Ron Renk (United) who provided an overview of the MCL, which is a mitigation to a mixed avionics equipage risk to realizing NEC benefits. He explained the history behind the tasking including the PBN NIWG final report identifying mixed equipage as a major risk to realizing benefits of PBN, the NEC NIWG identifying a lack of regional jet equipage as a major risk to achieving NextGen benefits, and the MRO NIWG identifying mixed equipage as preventing optimal usage of multiple runways at ORD during ILS outages. Based on these findings, the NAC directed the NEC NIWG to study ways to reduce regional aircraft equipage-based risks.

Mr. Renk provided an overview of the initial goals, including the following:

- Mixed equipage is an issue which extends beyond regional airlines; it is not geographically limited to the Northeast Corridor – the mainlines also have equipage issues. Benefits should extend globally.
- Effort concentrated on MCL for forward fit aircraft.
- There are numerous issues associated with retrofitting the current fleet; will evaluate once MCL is solidified to accelerate benefits.
- Equipage and benefits must be clear for policy makers/executives to understand the Return on Investment (ROI) they represent.
- Ground based infrastructure must be synchronized to “guarantee” ROI for equipping. As operators are already anxious about ROI, the FAA must ensure equipage investments deliver planned benefits.

Next, he reviewed the first draft of the MCL, which includes two equipage categories—the Minimum Capabilities List and Supplemental Items. There are four fundamental MCL items, including PBN, Data Comm, ADS-B Out, and resiliency equipage. The Supplemental Items lists 12 optional NextGen technologies that operators should consider tailoring with operationally-specific items from the list.

In closing, Mr. Renk identified next steps for the MCL. He indicated that industry participants identified the need for additional work on the MCL to support investment. He requested that the NAC examine planning/packaging of MCL, as well as the cost and ROI. He added that there is also a need to better understand current equipage levels. The FAA must plan for tools/programs that support MCL. He requested NAC endorsement for continuance of this work—warning that there must be successful application in the end to justify the effort. He said that over the last six months many organizations have reviewed this material and none disagreed with the MCL at a technical level. He proposed some additional reviewing organizations, including ICAO, EASA, AOPA, and DoD. He emphasized that an expeditious timeline is of great importance regarding how the MCL relates to the regional fleet, as many 50-seat RJ products are starting to be replaced now. Mr. Renk indicated that the MCL needs to be a

living document and continually revisited. It also needs to help drive alternate Positioning, Navigation and Timing (PNT) solutions.

Based on follow-on discussion among NAC members, Mr. Renk confirmed that the MCL is focused on forward-fit, not retrofit. Based on a question regarding ownership of the living MCL document, Ms. Pam Whitley (FAA) said that the FAA sees the MCL as a recommendation from industry. With approval of the NAC, the FAA will then have to respond at which point the conversation on response specifics takes place. She indicated that the FAA will report out by the next NAC meeting.

Action: Minimum Capabilities List – Ron Renk / NAC SC Chair / FAA to meet on way forward

- Report out at next meeting on progress

Mr. Elwell added that it is premature to discuss the form the MCL will take, but said it is good to have all of industry come in to say what needs to be on aircraft and that this agreement is huge for the whole NAS. Mr. Christie asked about the possibility of rewarding the carriers that make investments, to which Mr. Renk indicated that Ms. Pamela Gomez (FAA) will address this during the Enhanced Air Traffic Services (EATS) agenda item.

Before moving to the next agenda topic, Mr. Childs called for separate motions to approve the responses to Task 18-4, which includes the MCL, and Task 18-5 as formal advice to the FAA.

Outcome: The NAC approved advice to the FAA, in response to:

- Task 18-4: Northeast Corridor: Implementation Risks and Mitigations of the NextGen Priorities Joint Implementation Plan
- Task 18-5: NextGen Priorities Four Focus Areas: Implementation Risks and Mitigations of the NextGen Priorities Joint Implementation Plan

Domestic ADS-B Out

Equip 2020 representatives Jens Hennig and George Ligler provided an update on Equip 2020 and recent related FAA policies. Equip 2020 is an industry / FAA team formed after the 2014 FAA ADS-B Call-to-Action (CTA) Meeting. It was assigned 32 CTA Tasks to support ADS-B equipage and operational implementation (30 of which are closed; 2 of which are addressed on an ongoing basis). It includes approximately 100 Representatives from domestic and international operators, manufacturers, and associations. Equip 2020 comprises the following working groups:

- WG1: Air Carrier (includes prior WG3 after its Development of Exemption 12555 in 2015)
- WG2: General Aviation and Outreach / Education
- WG4: ADS-B IN Benefits
- WG5: Installation and Approvals

In 2019, Equip 2020 collaborated with the FAA in developing a Response to P.L. 115-254 (“FAA Reauthorization”), Section 505, ADS-B Report that was provided to Congress in June 2019. Mr. Hennig reviewed recent FAA policies including:

- Policy for Unequipped Aircraft: April 1, 2019
- Policy for Impacts of Temporary Degradation of GPS Performance: July 3, 2019
- Notice for ADS-B Out Preflight Flight Responsibilities: July 18, 2019
- Interim Final Rule for Sensitive Missions: July 18, 2019

Additionally he reviewed the Remaining Operational Integration & Timeline, including:

- Implementation of ADAPT, a web-based tool for requesting a non-routine authorization to fly in ADS-B Rule Airspace, December 2019
- Completion of ADS-B Fusion Implementation, September 2019
- Implementation of Privacy ICAO Addresses Request for Proposals, September 2019
- Revisions of Policies and Procedures, including the Advisory Circular 90-114() for ADS-B Operations-Related Polices, ongoing (policies issued in July 2019 document key changes)

He provided the following ADS-B Out Compliance Snapshot (current as of July 1, 2019).

Fleet	Compliance Level	Change (from prior month)
Mainline	85%	+247
Regional	78%	+95
Turbojet & Turboprop GA	65%	+422
Single & Multi-Engine Piston GA	42%	+1,807
Rotorcraft	47%	+122
DOD	Various Levels	--
Government Fleet	63%	+59
International	62%	+483

Regarding Equip 2020 next steps, Mr Hennig indicated there are monthly status calls and Quarterly Plenary Meetings through the end of 2019. He described several post-2020 activities, including:

- Post-Mandate Meeting with Focus on Any Operational Implementation Issues that Arise on February 4
- Continued Collaborative Strategic Work on ADS-B In Benefits
 - A long-term "home" is needed for collaboration
- Continued Work on Benefits (e.g., SSR Divestiture)

During follow-on discussion, Mr. Drew asked the FAA to discuss some of potential benefits. Ms. Whitley said based on safety analysis work, the FAA thinks it can get down to three miles separation. Ms. Bristol indicating the FAA is expediting work on a safety case.

Enhanced Air Traffic Services (EATS)

Ms. Gomez briefed the next item, EATS, which is an FAA Reauthorization Act of 2018, Section 547 requirement to develop a two-year pilot program that provides preferential treatment to NextGen equipped aircraft at three airports for at least three consecutive hours, with implementation between September 2021-2023. The FAA is required to consult with stakeholders on airport selection and NextGen avionics.

She provided an overview of the work completed to date, including:

- Establishing an ad hoc working group within the Air Traffic Organization (ATO) to build consensus around proposed selection criteria using a capability maturity model
- Initiating high-level discussions with the FAA senior leadership regarding program direction and mobilization of resources
- Engaging the MITRE Corporation for analytical and engineering support
- Engaging stakeholders

She provided current draft task language:

- Phase I: Identify Potential Airports and Candidate Applications
 - By Fall 2019, identify a short list of potential candidate airports and applications (airport, aircraft capability, and concept) for the pilot program
 - For airports, while the legislation points to providing preferential basis at airports with Ground Delay Programs, the FAA seeks a recommendation from Industry if this is appropriate or other airports are preferred and why.
- Phase II: Down Select Candidate Airports and Applications
 - By Spring 2020, down select to three pilot program candidates
 - Define how implementing each of the pilot program candidates will lead to measurable benefits
 - For each pilot program candidate proposed, identify one or more operator sponsor(s) with commitment of aircraft and training

Ms. Gomez provided clarifications on some of the key questions, including:

- What constitutes “NextGen Avionics”?
 - Provide preference to pilot program candidates for NextGen Avionics that are NextGen transformational programs that also meet industry’s pending “Minimum Capability List” recommendations.
 - Supplemental NextGen Avionics can be considered with preference to more mature avionics
- What is a “Suitable Airport”?
 - Airports with GDP’s (or GS / Other Traffic Management Initiatives) per the reauthorization language
 - Consider Airports where segregating traffic and preconditioned flows are possible
 - Consider Airports where procedures can be implemented/utilized for deconflicting flows
- What are the Objectives and success criteria of the Pilot Program?
 - Benefit the equipped, incentivize the non-equipped
 - Define and solve an operational problem
 - Inform development of enabling operational regulations for more complex demand driven operations – i.e. improved departures, deconflicting airspace initiatives, etc.

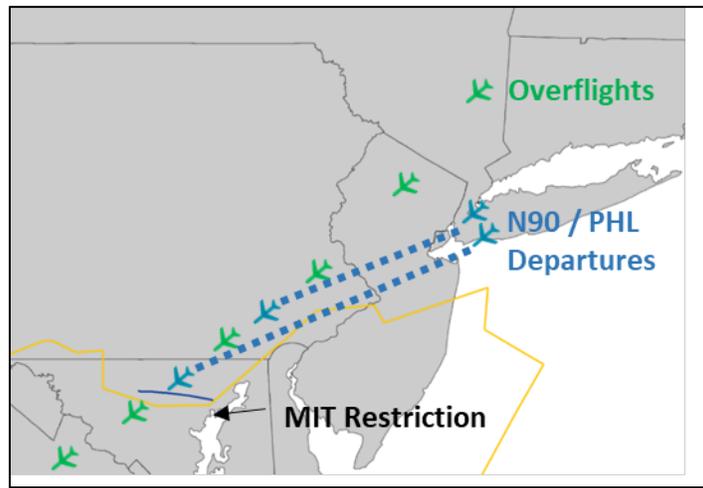
During follow-on discussion, Mr. Drew indicated that EATS is not a tasking from the FAA yet, but that he wanted to bring the topic to the NAC for thoughts. He added that industry needs to be careful about what airports it chooses. Mr. Quigley recommended keeping operators in the loop early in the process.

Mr. Christie expressed support for choosing at least one NEC airport. Based on discussion regarding what Congress's specific intent was with the EATS language, Ms. Gomez indicated a meeting is scheduled within the next month or two to further clarify. Mr. Childs requested that Mr. Drew and the NAC SC continue to engage on this issue.

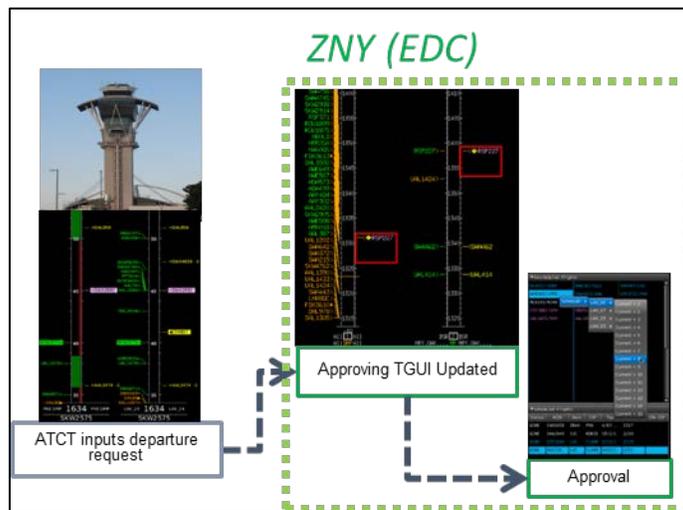
Action: Enhanced Air Traffic Services – FAA / NAC SC Chair to meet on planning the way forward

Joint Analysis Team (JAT) Update

Mr. Childs introduced Mr. Alex Burnett and Mr. Dave Knorr who provided a JAT update. The first part of the briefing focused on the Implement EDC at ZNY and Implement TBFM IDAC at four NY Towers initiatives, respectively. Mr. Burnett described EDC and IDAC as important building blocks toward iTBO in the NEC. En Route Departure Capability (EDC) is a TBFM functionality that assigns runway departure times to flights departing to an en route constraint point (reference image below).



Integrated Departure/Arrival Capability (IDAC) allows tower to interact electronically with departure timeline (previously the tower had to call ZNY) and facilitates use of EDC (reference image below).



Summary EDC / IDAC Findings

Metric	Realized Benefit	Detail
A:00/Block Time	✓	Benefit realized from taxi-out time reduction
Distance in Level Flight*	✓	Slight improvement realized
Taxi-Out Time	✓	~1.2 min per flight decrease to ATL (~\$600K/yr. ADOC benefit)
Departure Distance Flown*	–	No measurable change
Overflight Distance Flown*	–	No measurable change
Throughput / Spacing	–	No measurable change

The second part of the briefing focused on the Implement Simultaneous Converging Instrument Approaches (SCIA) to PHL 9R/17 initiative. SCIA allows aircraft to land on converging runways (9R/17) in low visibility. The SCIA Procedure was updated on July 19, 2018, with the following impacts:

- Ceiling and Visibility for 9R/17 dual operations
 - Minimum Ceiling lowered from 700' to 421'
 - Visibility lowered from 2 miles to 1 mile
- Winds along 17
 - Tailwinds 5 kts or less
 - Crosswind 20 kts or less
- Arrival rate increases from 32 (9R) to 48 (9R/17) (reference image below)



The following diagram details the impact of a 32 compared to a 48 arrival rate.

Impact of 32 vs 48 Arrival Rate

Jan 1, 2016 through May 31, 2019¹

Runway and Called Rate	9R with 32	9R/17 with 48 ²
Total # Qtr Hrs	4,229	9,355
# Cancellations per Hour	2.4	0.9
# EDCTs per Hour	11.2	2.4
Avg Ground Delay (mins) for all Flights	16.3	3.6
Avg Airborne Delay ³ (mins) for all Flights	3.1	1.9
Total Delay per Flight	19.4	5.5

Historical impact of lower called rate is ~1.5 cancellations per hour and ~13.9 minutes of increased delay per flight

Initial Simulation Results

Average number of flights per day is 618
 With 48 rate, with ~40 hours of delay with 0 cancellations
 Using simulated 32 rate, delays increase to ~300 hours per day and cancellation increase to 20 per day

Flights are cancelled when experiencing 2 hour delay

1 During reporting hours
 2 Includes convective season when cancellations and EDCTs may be driven by AFP
 3 Avg Airborne Delay derived from FAA NextGen 2018 TBO Shortfall Study

They concluded by reviewing next steps for the JAT, including Expand SCIA benefit calculations to cover all flights at PHL, determining 12-month achieved benefits, and projecting annual operational benefit from SCIA at PHL. Additionally, the JAT will focus on determining the achieved benefits of capping and tunneling.

Open Discussion

During open discussion, NAC members discussed several additional action items detailed in the *Meeting Actions* table below.

Meeting Outcomes

- The NAC approved the October 31, 2018 NAC Meeting Summary Package
- The NAC approved advice to the FAA, in response to:
 - Task 18-4: Northeast Corridor: Implementation Risks and Mitigations of the NextGen Priorities Joint Implementation Plan
 - Task 18-5: NextGen Priorities Four Focus Areas: Implementation Risks and Mitigations of the NextGen Priorities Joint Implementation Plan

Meeting Actions

Action ID	Action Description
NAC03-01	NAC SC Co-Chair offered to work with PBN NIWG Co-Chairs and FAA to discuss in an ad hoc environment, TBO issues, and how they discussed in NIWG and SC environment
NAC03-02	Minimum Capabilities List (MCL) – Ron Renk / NAC SC Chair / FAA to meet on way forward <ul style="list-style-type: none"> ○ MCL Effort – Report out progress at next NAC meeting
NAC03-03	Enhanced Air Traffic Services (EATS) – FAA / NAC SC Chair to meet on planning the way forward
NAC03-04	FAA to prepare a Space-Based ADS-B briefing for the December 2019 NAC
NAC03-05	FAA to prepare a white paper/talking points/one pager on FAA’s environmental impact (CO2 and NOx (nitrogen oxide) emissions)
NAC03-06	PANYNJ requested a deeper dive into all Northeast Corridor initiatives (benefits into system to align resources) <ul style="list-style-type: none"> ○ GBAS at other airports (NEC focus)

Closing Comments and Adjourn

Mr. Elwell thanked the NAC, the NAC SC, and working groups for their contributions. He added that the incoming FAA Administrator, Steve Dickson, is passionate about the NAC and that he (Mr. Elwell) will return to his role as FAA Deputy Administrator.

Mr. Childs echoed Mr. Elwell's sentiments and thanked him. As a final thought, he expressed the importance of regional airlines talking with their majors, which he indicated that he will personally participate in improving. Mr. Childs adjourned the meeting.



Attachment 1



NAC Meeting

July 30, 2019

Opening of Meeting and Introduction of NAC Members

Chip Childs, SkyWest, Inc.



New NAC Members

- **Warren Christie**, Senior Vice President of Safety, Security and Fleet Operations, JetBlue Airways, representing air carrier operators
- **Joe DePete**, President of the Airline Pilots Association, representing labor
- **Don Dillman**, Senior Vice President, Flight Operations, FedEx Express, representing cargo operators
- **Jim Graham**, Senior Vice President of Flight Operations, Delta Air Lines, representing air carrier operators
- **Craig Hoskins**, Vice President of Safety and Technical Affairs, Airbus Americas, Inc., representing aircraft manufacturers
- **John Ladner**, Vice President, Flight Operations, Alaska Airlines, representing air carrier operators
- **Candace McGraw**, Chief Executive Officer of Cincinnati/Northern Kentucky International Airport and Chair of the Airports Council International, North America, representing airports
- **Bryan Quigley**, Senior Vice President for Flight Operations, United Airlines, Inc., representing air carrier operators
- **Wayne Schatz, Jr.**, US Air Force, Major General, retired, representing the Department of Defense



PUBLIC MEETING ANNOUNCEMENT

NextGen Advisory Committee

July 30, 2019

This meeting is being held pursuant to a notice published in the Federal Register on July 16, 2019. The agenda for the meeting was announced in that notice, with details as set out in the agenda handed out today. I am the designated FAA official responsible for compliance with the Federal Advisory Committee Act, under which this meeting is conducted.

The meeting is open to the public, and members of the public may address the NAC with the permission of the Chair. The public may submit written comments in advance of the meeting. In addition, the Chair may entertain public comment if, in his judgment, doing so will not disrupt the orderly progress of the meeting and will not be unfair to any other person.



Chair's Report

Chip Childs, SkyWest, Inc.



Motion For NAC Approval

- October 31, 2018 NAC Meeting Summary



FAA Report

FAA Administrator



Public Statements

Members of the Public



This presentation is being provided to the NextGen Advisory Committee (NAC) for approval. Upon NAC approval, the material will be provided to the Federal Aviation Administration as advice.

NAC Subcommittee (SC) Co-Chair's Report

Aviation Community Risks and Mitigations – Reports from Working Group Industry Co-Chairs:

- Northeast Corridor (NEC)
- Data Communications (Data Comm)
- Multiple Runway Operations (MRO)
- Performance-Based Navigation (PBN)
- Surface and Data Sharing

Craig Drew, NAC Subcommittee Co-Chair, Southwest Airlines

Melissa Rudinger, NAC Subcommittee Co-Chair, AOPA



NAC Tasking Responses

Task 18-4: Northeast Corridor: Implementation Risks and Mitigations of the NextGen Priorities Joint Implementation Plan

Task 18-5: NextGen Priorities Four Focus Areas: Implementation Risks and Mitigations of the NextGen Priorities Joint Implementation Plan





Northeast Corridor NIWG

Mark Hopkins
Ralph Tamburro

Northeast Corridor - The Operational Imperative

Tiered Benefits:

- Improve execution of today's operation in the NEC
- Operate today's flights more efficiently
- Grow the capacity and schedule

Near-term Goals:

Operate the full intended operation
Operate on time
Operate predictably

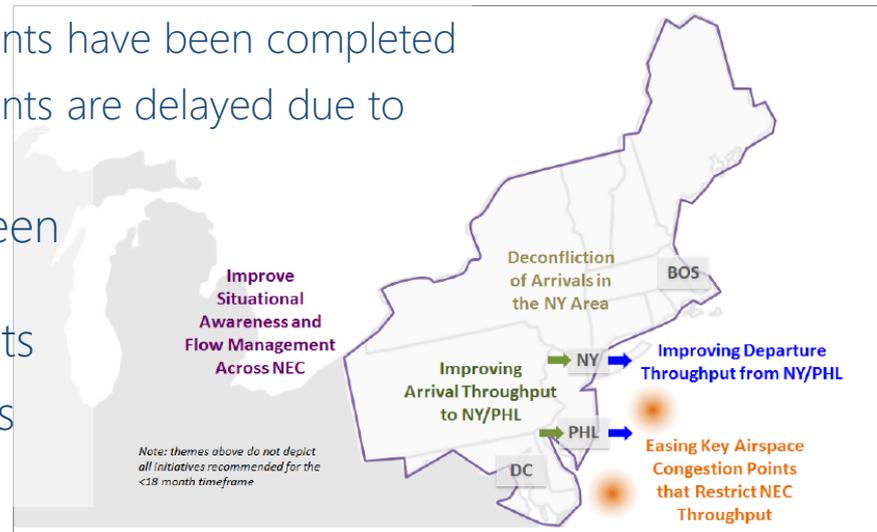
HOW??

Deconflict airports
Improve airport/airspace throughput
Improve flow management



NEC – Where are we?

- “T+18” Implementation milestones
 - FY2018 implementation commitments have been completed
 - FY2019 implementation commitments are delayed due to federal budget lapse
- Deconfliction commitments have been limited to planning and other pre-implementation concept assessments
- Lack of an implementation plan risks meeting the objectives for the NEC



What else do we need to address risks?

- A forward-leaning plan that implements deconfliction initiatives, with continued transparency and collaboration

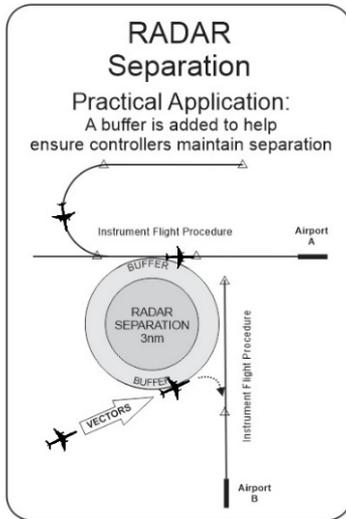
NEC – Where do we need to be?

- Energize groundbreaking change in the NEC
 - Targeted application of NextGen procedures
 - Widely spaced simultaneous operations to different airports
- New thrust with focus on New York, where the deconfliction benefits are most needed
- **Leverage existing or previously designed procedures, and builds on current applications**

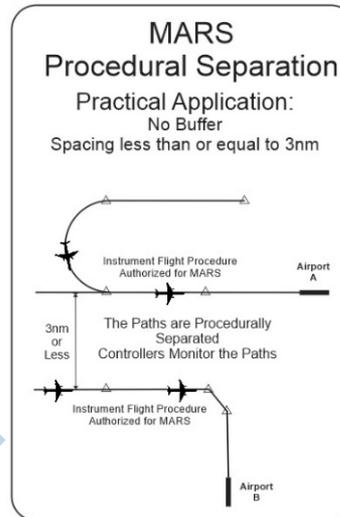


iMARS in New York

(Initial) Multiple Airport Route Separation in New York



Today, airport and airspace throughput is constrained by close proximity of New York area airports



MARS addresses these challenges through separation concepts that capitalize on PBN's merits

iMARS streamlines this concept and focuses on near-term New York implementation

(34 NY applications have been identified)



NEC – What's Next?

- In addition to the activities supporting the NextGen Joint Implementation Plan 2019-2021 commitments...

Work collectively and collaboratively to implement iMARS in New York

- Incremental implementation goals for summer 2020 and summer 2021
- Present recommendations to NAC at future meeting



MRO

Glenn Morse, United and Phil Santos, FedEx



MRO Update

- MRO 2019-2021 Rolling Plan status
 - No obvious risks to achieving operational benefits, or to the community or stakeholders have been identified
 - FAA milestones depend on timely completion of safety studies and supporting documentation.
 - Industry commitments linked to FAA milestones.
 - NATS' Time Based Separation (TBS) Closeout – Agreed to address wind-adjusted wake separation as part of dynamic wake separation research pre-implementation milestone (Q4 2019)
- 2019 Milestones on track
 - Implementation
 - Completed Consolidated Wake Turbulence (CWT)/RECAT rollout
 - Last two terminals - DFW 4/30; BOS 5/22
 - Identified 5 tentative 2019 CWT implementation sites (existing 1.5/2.0 RECAT sites)



MRO Update

- 2019 Milestones on track
 - Pre-implementation
 - CSPO High Update Rate Surveillance Simultaneous Parallel Independent Approach Study for duals and triples complete – Reduced separations have been identified; implementation planning underway
 - FAA Wake Encounter Reporting Guidance for Operators under development (Q3 2019)
 - CSPO Departure Concepts – initial studies complete, reduced separations may be possible (Q3 2019); collaboration planned for industry milestone (Q4 2019)
 - Dynamic Wake Separation Research – wind-adjusted wake separations (Q4 2019)
 - ORD Wake Encounter and Mitigation Analysis – addresses wake separations between 28C arrivals and 22L departures (Q4 2019)



MRO Update (cont'd)

Discussion Item

- Simultaneous Independent Parallel Approaches with RNAV (GPS) LNAV Only Update
 - Discussions with ALPA to address ILS or GS out have been progressing



PBN

Steve Fulton, Fulton Aviation and Brian Townsend, American



PBN NIWG

- Goal to bring 2016 PBN NAS Navigation Strategy to an operational level of implementation
 - “...builds on the progress of the past decade and refocuses our priorities and milestones to transition to a truly PBN-centric NAS, that is, a NAS where PBN is used as the basis for daily operations...”
- Focus on activities that will deliver the desired outcome of routine PBN use, supported by appropriate policies, rules and tools



Recommendation/Response

NAC Tasking 18-5 PBN Focus Area

Focus Area	Industry Challenge(s), Issue(s), Risk(s) [Existing]	Risk Mitigation Approach/ Strategy	Industry Actions	FAA Actions
PBN	Balancing of aircraft equipage capabilities – forward-looking approach to ensure use of PBN and benefits to equipped operators	Collaborative partnership to leverage existing capabilities and incentivize investment	<ul style="list-style-type: none"> • Partner with FAA on barriers to EoR analysis and subsequent efforts • NextGen MCL workgroup • Business case for GBAS/GLS • Work through VNAV issues and document agreements 	<ul style="list-style-type: none"> • Partner with Industry on EoR study and efforts
	Balancing Resources – FAA PBN deployment subject to adequate and stable funding	Mission Support Changes headed by HQ MSS Deputy VP tasked with Policy, Strategy and Execution	<ul style="list-style-type: none"> • Review FAA updated IFP priority 	<ul style="list-style-type: none"> • Transparency on IFP Gateway validation and prioritization of 40,000 IFP backlog in Gateway



Recommendation/Response

NAC Tasking 18-5

<i>Focus Area</i>	Industry Challenge(s), Issue(s), Risk(s) [Existing]	Risk Mitigation Approach/Strategy	Industry Actions	FAA Actions
PBN	Community acceptance of changes in procedures – affirmation of need to modernization procedures	Integrated initiative to address and overcome community objections	<ul style="list-style-type: none"> Continue to engage with FAA on community outreach needs, with the goal of timely advancement of PBN projects 	<ul style="list-style-type: none"> Stand-up new noise complaint group Work with A4A and Industry on community outreach
	Controller decision support system tools to accommodate and leverage PBN procedures and equipage - need for a strategy for the time, speed and spacing assignment	Align TBO tools with PBN implementation, and integrate with Industry equipage plans	<ul style="list-style-type: none"> Work through NAC SC to elevate issues Pursue more active role in how TBO tools will work and where they will be implemented 	<ul style="list-style-type: none"> More transparency on tools and plans



Surface and Data Sharing

Rob Goldman, Delta and Steve Vail, Mosaic ATM



Successes:

- **SWIFT Forum (SWIM Industry FAA Team)**
 - Action taken at Feb 2017 NAC meeting:
 - Bridge Operation – IT knowledge gap
 - Efforts support how operational improvements can be derived through SWIM information services.
 - Forum continues to evolve to meet the data and information integration needs of our industry



Successes (continued):

- **NASA ATD-2 Demonstration**

- Response to industry recommendation in initial NIWG report
- Project has highlighted the complexity and needs for decision support tool integration (3T integration/TBO) and the critical importance for operator provided data
- Demonstration has yielded operational benefits to all stakeholders (FAA/NATCA/operators)
- Demonstration has produced significant operational data that has been and should continued to be used to inform the Terminal Flight Data Manager (TFDM) program and industry at large



Risks:

- Limited industry policy, procedure, and process (P3) discussions
- Limited industry TFDM data requirements and interface/connectivity requirement discussions
- Industry must make appropriate business case decisions on TTP connectivity and Terminal Flight Data Manager (TFDM) readiness.
 - Aggressive timeline to meet TFDM deployment.
 - Will require advanced data processing capabilities and procedures/process/policy changes.



Mitigation Recommendation (NWIIG Work Areas):

- Continue and increase industry P3 and technical outreach to appropriate stakeholders to ensure full understanding and readiness for TFDM
- Industry consensus to continue and fund NASA engagement with a focus on advanced data integration and analytical understanding from field demonstration.
 - FAA has already committed to fund transitional ATD-2 operations at Charlotte until TFDM is deployed
 - Industry request is to continue NASA analytical and lessons learned engagement



Data Comm

Chuck Stewart, United and Chris Collings, Harris



Data Comm Milestone Risk

IOC for Initial En Route Services at Risk

Avionics technical issues present operational acceptance challenges

Request NAC to discuss the following mitigations

- Collins Aerospace CMU 900 Core 16 to support Data Comm deployment
- Boeing/Honeywell Pegasus I
- Operator commitment to install updated avionics versions in support of Data Comm waterfall deployment

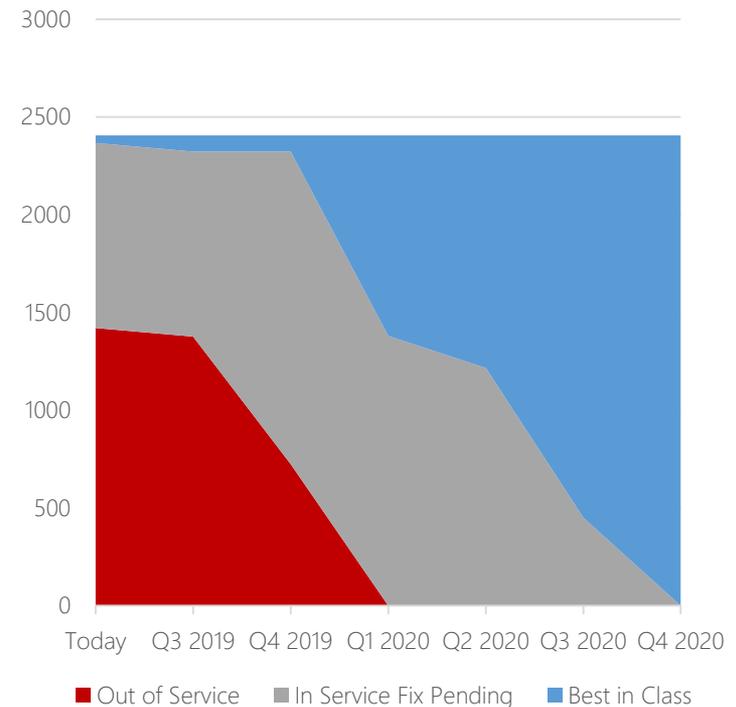


Data Comm Avionics Fixes to Support Waterfall Deployment

OEMs - Commitments to resolve known issues

- Collins CMU 900 Core 16 available for install by March 2020
- Boeing to deliver clear messaging on the path forward for B757/767 Pegasus

Operators - Installation of avionics fixes in support of Data Comm



Required Operator Avionics Actions



CMU 900 Core 14: Installation by end of 2019

CMU 900 Core 16: Plans to install TBD

VDR SB: Installed by end of 2019

A320: Plans to install CSB 7.5



CMU 900 Core 16: Plans to install 80% 3 months from release, full fleet by 6 months

VDR SB: Installed by end of 2019

A320: Plans to install CSB 7.5

B757/67: Plans for Peg 1 or Peg 2 TBD

B777: Plans to install BP 17B after release

B787: Plans to install BP 6 after release



CMU 900 Core 16: Plans to install 80% 2 months from release, full fleet by 6 months

VDR SB: Installed by end of 2019

A320: TBD



CMU 900 Core 14: Plans to upgrade to Core 14

CMU 900 Core 16: Plans to install full fleet by 6 months

VDR SB: Installed within 6 months

B757/67: Plans for Peg 1 or Peg 2 TBD

B777: Plans to install BP 17B after release



A320: Plans to install CSB 7.5 within 6 months of release



CMU -522/523: Plans to install by 2020

VDR SB: Plan to retrofit by 2022



CMU 900 Core 16: Plans to install TBD

VDR SB: Installations to start September 2019 – 8 month duration

B757/67: Plans for Peg 1 or Peg 2 TBD

B777: Plans to install BP 17B after release

B787: Plans to install BP 6 after release



CMU 900 Core 14: 72% complete across fleet

CMU 900 Core 16: Plans to install 70% 3 months from release, full fleet by 6 months

VDR SB: 100% complete

B757/67: No plans for Pegasus 2

B748: BP4 40% complete



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Mainline and Regional Aircraft Equipage

Minimum Capabilities List (MCL)
July 30, 2019

Tasking

- PBN NIWG final report identified mixed equipage as a major risk to delaying benefits of PBN across the NAS.
- NEC NIWG identified a lack of regional jet equipage to participate in NextGen PBN procedures was a major risk to achieving benefits.
- Mixed equipage is also a topic of the MRO NIWG as preventing optimal usage of multiple runways at ORD during ILS outages.
- NAC asked NEC NIWG to study ways to reduce Regional Aircraft Equipage based risks.



Initial Goals Defined

Equipage group has the following recommendations:

- Mixed equipage is an issue which extends beyond Regional Airlines; it is not geographically limited to the Northeast Corridor. Benefits should extend globally.
- Effort concentrated on “Minimum Capabilities List” (MCL) for forward fit aircraft.
 - There are numerous issues associated with retrofitting the current fleet; will evaluate once MCL is solidified to accelerate benefits.
- Equipage and benefits must be clear for policy makers/executives to understand the Return on Investment (ROI) they represent.
- Ground based infrastructure must be synchronized to “guarantee” ROI for equipping. As operators are already anxious about ROI, the FAA must ensure equipage investments deliver planned benefits.



First Draft of the MCL: Overarching Theme

- **Two equipage categories:**
 - Minimum Capabilities List
 - Supplemental Items
- **Four fundamental MCL items:**
 - Performance Based Navigation (PBN)
 - Data Comm (Communication)
 - ADS-B Out (Surveillance)
 - Resiliency equipage
- **There are some important notes regarding current equipage as it relates to the MCL and how Comm/Nav/Surveillance interconnect**
- **The Supplemental Items group lists 12 optional NextGen Technologies operators should consider tailoring their MCL with operationally-specific items from this list.**



MCL Detail View

- Performance Based Navigation (PBN) (Navigation)
 - Key Capabilities - RNP-2 (Enroute) / RNP-1 with RF (Terminal Arrival/Departure) / RNP APCH, RNP AR 0.3 with RF and scalability (Approach) and coupled VNAV
- Data Comm (Communication)
 - Key Capabilities – FANS-1/A over multi-frequency VDL mode 2 with push to load
- ADS-B Out (Surveillance)
 - Mandate
- Resiliency equipage
 - Key Capabilities – Resilient NextGen Operations (Inertial (IRU))



MCL Notes

NOTES:

- 1) Existing equipage should be maintained - This is a list of NextGen technologies which are often not delivered on new aircraft. These technologies are not listed as replacements to current equipage like ILS, VOR, etc but should be viewed as items required above the typical avionics suite ordered today.
- 2) Existing equipage that could be sunset – The equipage group also wanted to recommend equipage that may no longer be of value. One item in this category would be ADF equipment. The number of NDBs over the next decade will continue to be reduced and ADF will provide no NextGen benefits. Although international operations may still provide some benefit, operators should make their own analysis of whether this equipment can be sunset on their fleets.
- 3) Integration of C/N/S for NextGen is important and no one NextGen enabling category should take preference over another. All MCL capabilities should be considered integral with each other.



Supplemental Items

3 Categories – Available, Policy, Future

	NextGen Enabling Category	Aircraft Enabling Capability
A	Performance Based Navigation	RNP AR Approach
A	Performance Based Navigation	LPV
AP	Performance Based Navigation	GLS (CAT I/II/III)
A	Performance Based Navigation	HUD
A	Information Sharing	Airborne Access to SWIM
AP	Performance Based Navigation	EFVS/CVS (for credit)
A	Performance Based Navigation, Low Vis Ops, Surveillance	Position Source - accuracy, integrity, continuity, availability
A	Performance Based Navigation	Synthetic Vision(for credit)
A	Performance Based Navigation	Tightly Coupled (GPS) IRU

	NextGen Enabling Category	Aircraft Enabling Capability
P	Surveillance	ADS-B In - Cockpit Display of Traffic Information (CDTI)
P	Performance Based Navigation	Time of Arrival Control (TOAC)

	NextGen Enabling Category	Aircraft Enabling Capability
F	Surveillance	ACAS-X

- A = Available
- P = Requires Policy
- F = Future Capability



Summary / Next Steps

- **Currently MCL requested in support NEC**
 - Industry participants identified need for additional work to support investment
 - Request NAC support to examine planning/packaging of MCL, cost & ROI
 - Need to better understand current equipage levels
 - FAA must plan for tools/programs which support MCL
 - Request endorsement for continuance of this work – there must be successful application in the end to justify the effort
- **Over the last 6 months many organizations have reviewed this material, no one disagreed with MCL at a technical level**
 - FAA, RAA, NBAA, A4A, Boeing, Airbus, Bombardier, Embraer, Cargo Carriers, Collins, Honeywell, L3
 - Suggested additions: ICAO, EASA, AOPA, DoD
- **Risks of MCL – Equipage from both FAA and industry leading us to TBO NAS**
- **An expeditious timeline is of great importance regarding how the MCL relates to the regional fleet**
 - Many 50 seat RJ products are starting to be replaced now
- **Other important thoughts about MCL**
 - Needs to be a living document and continually revisited
 - Needs to help drive alternate Positioning, Navigation and Timing (PNT) solution



Motion For NAC Approval

1. NAC Responses to:

- Task 18-4: Northeast Corridor: Implementation Risks and Mitigations of the NextGen Priorities Joint Implementation Plan
- Task 18-5: NextGen Priorities Four Focus Areas: Implementation Risks and Mitigations of the NextGen Priorities Joint Implementation Plan

2. Minimum Capabilities List (MCL)



Domestic ADS-B Out

- Equip 2020 - Update to the NextGen Advisory Committee
- FAA Reauthorization of 2018 Section 505

Equip 2020 Representatives: Jens Hennig & George Ligler
FAA





Equip
2020

Equip 2020

Update to the NextGen Advisory Committee
July 30, 2019



Equip2020



Equip
2020

Equip 2020

- Industry/FAA Team Formed after 2014 FAA ADS-B Call-to-Action (CTA) Meeting
- Assigned 32 CTA Tasks to Support ADS-B Equipage and Operational Implementation
 - 30 CTA Tasks Closed
 - 2 CTA Tasks Addressed On An “ongoing” Basis
- Approximately 100 Representatives from Domestic and International Operators, Manufacturers, and Associations





Equip
2020

Equip 2020 Working Groups

- WG1: Air Carrier (includes prior WG3 after its Development of Exemption 12555 in 2015)
- WG2: General Aviation and Outreach / Education
- WG4: ADS-B IN Benefits
- WG5: Installation and Approvals





Equip
2020

WG1: Air Carrier

- Development of ADS-B Equipage “Solution”
Matrices for the Air Transport Fleet
- ADS-B Position Source Qualification including
Pathway for Tightly-Coupled GPS/Inertial
- Exemption 12555
- **U.S. Air Carriers Fully Committed to Equipping
with ADS-B Out**



Equip2020



Equip
2020

WG2: GA and Outreach / Education

- Priority Areas of Engagement
 - Availability of Solutions for Aircraft
 - Incentive Program for Early Equipage (“\$500 Rebate”)
 - Real-time Security and Privacy for ADS-B Enabled Mode S Transponders
- Education and Outreach
 - Coordination between FAA and Industry to Address Areas Benefitting from Targeted Outreach
 - FAA-hosted Panels at Events
 - Information Updates for FAA Website



Equip
2020

WG4: ADS-B Benefits

- Finalizing an Industry developed ADS-B In Strategy Document
- Detailed Briefing to NAC SC Planned
 - Objective to Determine How the ADS-B In Strategy Document will Complement and Support NAC



Equip
2020

WG5: Installation and Approvals

- Completed 7 CTA Tasks (and other subsequently-assigned tasks) involving ADS-B Installations and Approvals (e.g., Use of “No-PNL” Process for ADS-B)
- Currently Meets on an As Needed Basis





Equip
2020

2019 Equip 2020 Activities

- Collaboration with the FAA in Developing Response to P.L. 115-254 (“FAA Reauthorization”), Section 505, ADS-B Report that was Provided to Congress in June 2019



Recent FAA Policies

- Recent Policies

- Policy for Unequipped Aircraft: April 1, 2019
- Policy for Impacts of Temporary Degradation of GPS Performance: July 3, 2019
- Notice for ADS-B Out Preflight Flight Responsibilities: July 18, 2019
- Interim Final Rule for Sensitive Missions: July 18, 2019

- Remaining Operational Integration & Timeline

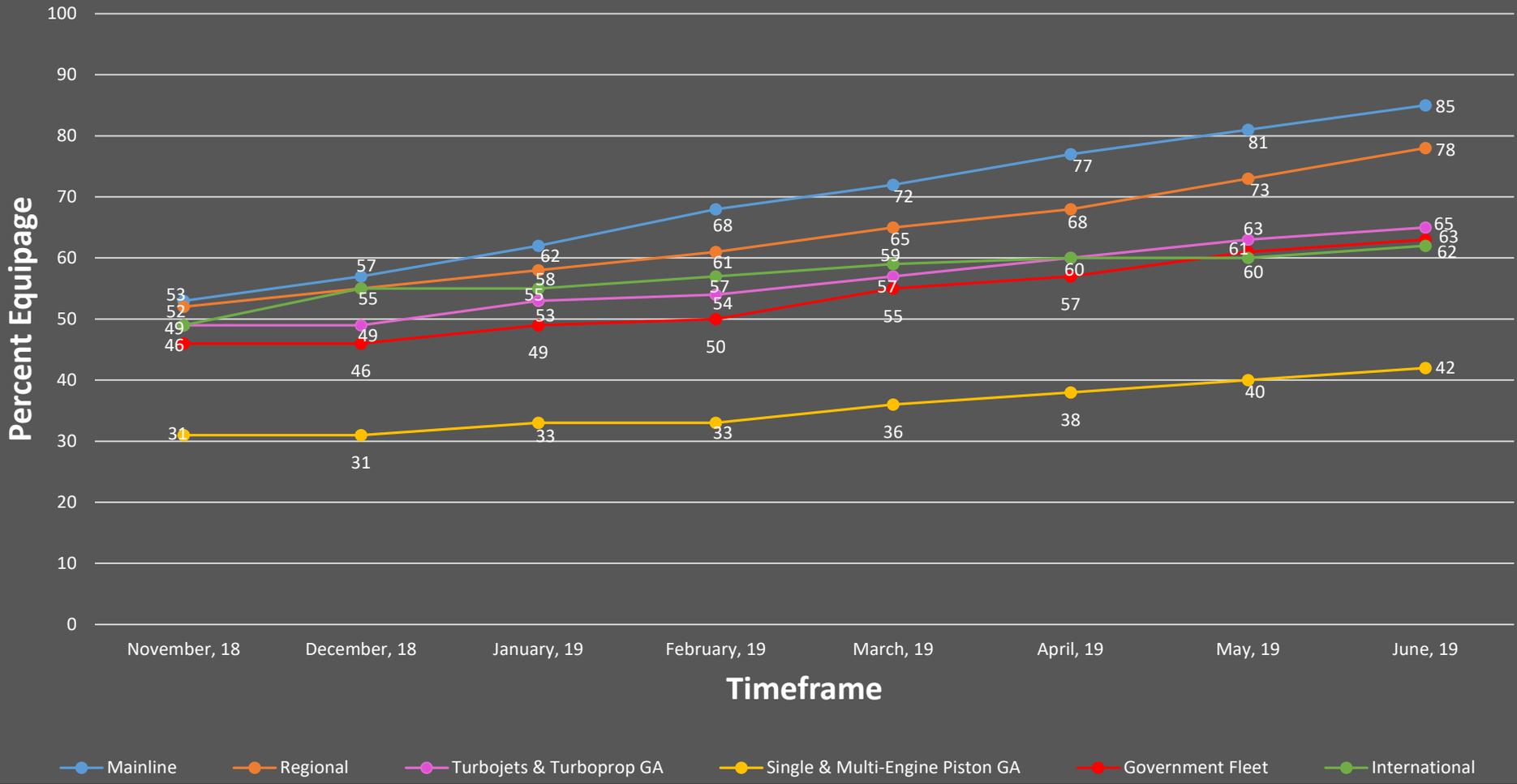
- Implementation of ADAPT, a web-based tool for requesting a non-routine authorization to fly in ADS-B Rule Airspace, December 2019
- Completion of ADS-B Fusion Implementation, September 2019
- Implementation of Privacy ICAO Addresses Request for Proposals, September 2019
- Revisions of Policies and Procedures, including the Advisory Circular 90-114() for ADS-B Operations-Related Polices, ongoing (policies issued in July 2019 document key changes)

ADS-B Out Compliance Snapshot

Fleet	Compliance Level	Change (from prior month)
Mainline	85%	+247
Regional	78%	+95
Turbojet & Turboprop GA	65%	+422
Single & Multi-Engine Piston GA	42%	+1,807
Rotorcraft	47%	+122
DOD	Various Levels	--
Government Fleet	63%	+59
International	62%	+483



High-Level Operator Type Equipage Trends





Equip
2020

Equip 2020 Next Steps

- Monthly Status Calls and Quarterly Plenary Meetings through End of 2019
- Post-2020 Activities:
 - Post-Mandate Meeting with Focus on Any Operational Implementation Issues that Arise on February 4
 - Continued Collaborative Strategic Work on ADS-B In Benefits:
 - A long-term “home” is needed for collaboration
 - Continued Work on Benefits (e.g., SSR Divestiture)
- 2020 is Not the End, but the Beginning of the ADS-B Program...



Enhanced Air Traffic Services (EATS)

- Introduction of FAA Reauthorization of 2018 Section 547

Pamela Gomez, FAA



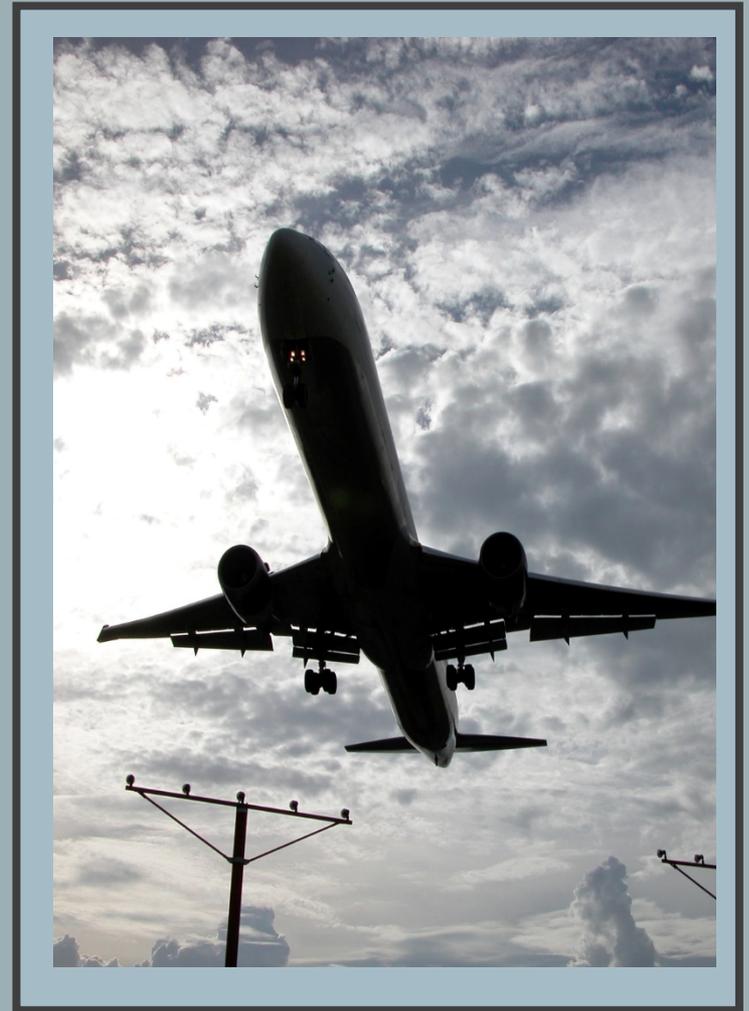
ENHANCED AIR TRAFFIC SERVICES

PILOT PROGRAM

JULY 2019



**Federal Aviation
Administration**





Requirements

- **FAA Reauthorization Act of 2018, Section 547**
- **Provides preferential treatment to NextGen equipped aircraft**
 - Prioritize aircraft with NextGen Avionics during a Ground Delay Program by assigning fewer minutes of delay relative to other aircraft
 - or sequence aircraft with NextGen Avionics ahead of other Aircraft
- **A 2-year pilot program**
- **Operates in at least 3 Airports**
- **Occurs for at least 3 consecutive hours**
- **Implementation NLT September 2021 – 2023**
- **Consult with Stakeholders on airport selection and NextGen avionics**

Work done to date:

- Established an ad hoc working group within the Air Traffic Organization (ATO) to build consensus around proposed selection criteria using a capability maturity model
- Initiated high-level discussions with the FAA senior leadership regarding program direction and mobilization of resources
- Engaged the MITRE Corporation for analytical and engineering support
- Engaged stakeholders

EATS Overview



EATS AIR TRAFFIC
PILOT PROGRAM

- **Approach: Identify 3 pilot program initiatives**
- **Task**
 - **Phase I: Identify Potential Airports and Candidate Applications**
 - By Fall 2019, identify a short list of potential candidate airports and applications (airport, aircraft capability, and concept) for the pilot program
 - For airports, while the legislation points to providing preferential basis at airports with Ground Delay Programs, the FAA seeks a recommendation from Industry if this is appropriate or other airports are preferred and why.
 - **Phase II: Down Select Candidate Airports and Applications**
 - By Spring 2020, down select to three pilot program candidates
 - Define how implementing each of the pilot program candidates will lead to measurable benefits
 - For each pilot program candidate proposed, identify one or more operator sponsor(s) with commitment of aircraft and training



Key Questions

- **What constitutes “NextGen Avionics”?**
- **What is a “Suitable Airport”?**
- **What are the Objectives and success criteria of the Pilot Program?**
- **What Operational Scenarios can be implemented to provide a “Preferential Basis” by Fall 2021?**

Joint Analysis Team (JAT) Update

Alex Burnett, JAT Co-Chair, United Airlines

Dave Knorr, JAT Co-Chair, FAA



NEC T+18 Implementations

	Initiative	Initial Ops Availability	Supporting Org.	Study Periods*	Benefits Assessment*
1	Implement EDC at ZNY	Q1 2018	FAA MITRE AA, DL, UA, JB	Mar-Sep 2017 vs. Mar-Sep 2018	Preliminary: Oct 2018 Initial: Feb 2019 Final: Apr 2019
2	Implement TBFM IDAC at 4 NY Towers	Q1 2018			
3	Implement BOS SWIM Visualization Tool at ZBW	Q2 2018			
4	Implement SCIA to PHL 9R/17	Q3/Q4 2018	FAA MITRE AA	Jan -Jun 2018 vs. Jan -Jun 2019	Preliminary: Apr 2019 Initial: Oct 2019 Final: Jan 2020
5	Implement CRDA DCIA application for PHL 27R/35 for RNAV approaches	Q1 2019	FAA MITRE AA	Apr -Oct 2018 vs. Apr -Oct 2019	Preliminary: Oct 2019 Initial: Feb 2020 Final: Apr 2020
6	Improve airborne metering to PHL**	Q1 2019	FAA MITRE AA		
7	Expand consistent usage of defined and existing capping and tunneling for departures/arrivals to/from the NEC through required advisories	Q1 2019	TBD		
8	Implement TBFM Pre-Departure Scheduling at selected airport	Q1 2019	TBD		

Note: 1 & 2 will be studied together

* May need to be adjusted based on the actual initial ops availability date and data availability; analysis of baseline performance will be conducted and reported on prior to the preliminary reporting

** May need to compare 2017 to 2019 study periods to eliminate periods with inconsistent use of metering

NEC T+18 Implementations

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6	Improve airborne metering to PHL**	Q1 2019	FAA MITRE AA		
7	Expand consistent usage of defined and existing capping and tunneling for departures/arrivals to/from the NEC through required advisories	Q1 2019	TBD		
8	Implement TBFM Pre-Departure Scheduling at selected airport	Q1 2019	TBD		

Note: 1 & 2 will be studied together

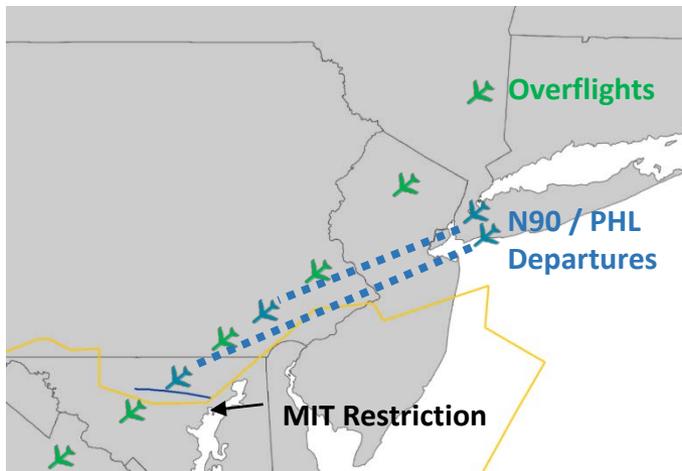
* May need to be adjusted based on the actual initial ops availability date and data availability; analysis of baseline performance will be conducted and reported on prior to the preliminary reporting

** May need to compare 2017 to 2019 study periods to eliminate periods with inconsistent use of metering

What is EDC / IDAC?

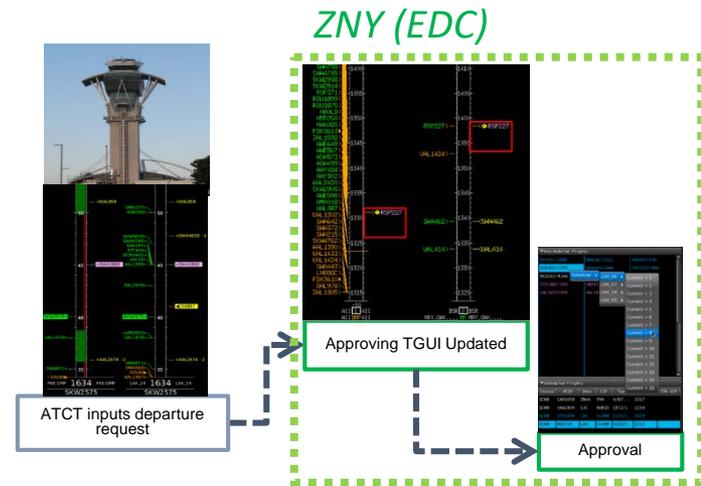
En Route Departure Capability (EDC)

TBFM functionality that assigns runway departure times to flights departing to an en route constraint point



Integrated Departure/Arrival Capability (IDAC)

Allows tower to interact electronically with departure timeline (previously the tower had to call ZNY) and facilitates use of EDC



- EDC / IDAC is an important building block towards iTBO in the NEC



Summary EDC / IDAC Findings

- Analyzed NYC/PHL flights to ATL/CLT (~5% of NYC / PHL flights)
- Results affirm the value of the program

Metric	Realized Benefit	Detail
A:00 / Block Time	✓	Benefit realized from taxi-out time reduction
Distance in Level Flight*	✓	Slight improvement realized
Taxi-Out Time	✓	~1.2 min per flight decrease to ATL (~\$600K / yr. ADOC benefit)
Departure Distance Flown*	—	No measurable change
Overflight Distance Flown*	—	No measurable change
Throughput / Spacing	—	No measurable change

* Primary expected benefit of EDC / IDAC implementation

Note: Analysis compared flights from EWR, HPN, JFK, LGA, PHL, and TEB to ATL in February – August 2017 to February – August 2018; Flights filtered out of analysis: "Moderate" or "Severe" weather, non-reporting hours, outliers, flights not using J48/J75; Factors controlled for include: Origin, origin runway, destination, surface demand, airborne demand, flight counts
Results are independent of other departure improvements from NEC



NEC T+18 Implementations

	Initiative	Initial Ops Availability	Supporting Org.	Study Periods*	Benefits Assessment*
1	Implement EDC at ZNY	Q1 2018	FAA MITRE	Mar-Sep 2017 vs.	Preliminary: Oct 2018 Initial: Feb 2019
2	Implement TBFM IDAC at 4 NY Towers	Q1 2018	AA, DL, UA, JB	Mar-Sep 2018	Final: Apr 2019
3	Implement BOS SWIM Visualization Tool at ZBW	Q2 2018			
4	Implement SCIA to PHL 9R/17	Q3/Q4 2018	FAA MITRE AA	Jan -Jun 2018 vs. Jan -Jun 2019	Preliminary: Apr 2019 Initial: Oct 2019 Final: Jan 2020
5	Implement CRDA DCIA application for PHL 27R/35 for RNAV approaches	Q1 2019	FAA MITRE AA	Apr -Oct 2018 vs. Apr -Oct 2019	Preliminary: Oct 2019 Initial: Feb 2020 Final: Apr 2020
6	Improve airborne metering to PHL**	Q1 2019	FAA MITRE AA		
7	Expand consistent usage of defined and existing capping and tunneling for departures/arrivals to/from the NEC through required advisories	Q1 2019	TBD		
8	Implement TBFM Pre-Departure Scheduling at selected airport	Q1 2019	TBD		

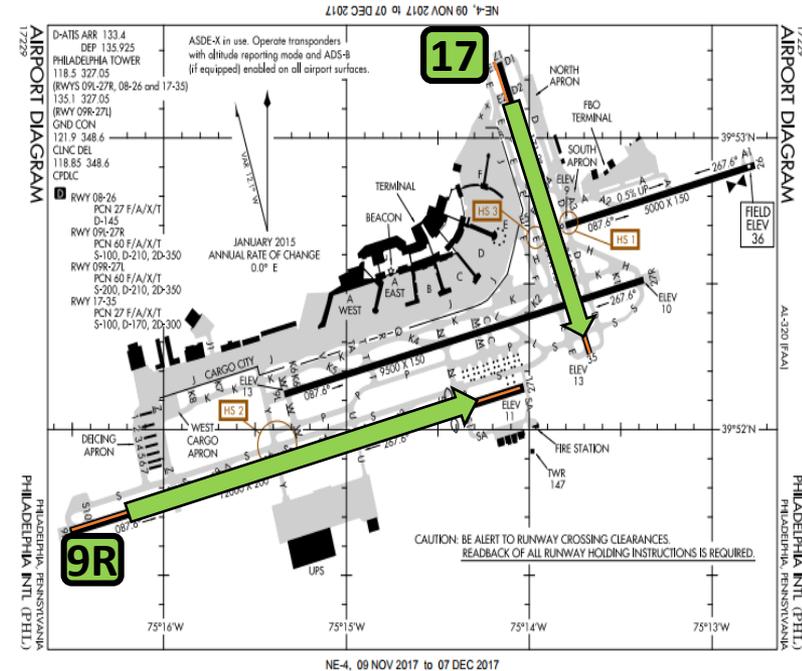
Note: 1 & 2 will be studied together

* May need to be adjusted based on the actual initial ops availability date and data availability; analysis of baseline performance will be conducted and reported on prior to the preliminary reporting

** May need to compare 2017 to 2019 study periods to eliminate periods with inconsistent use of metering

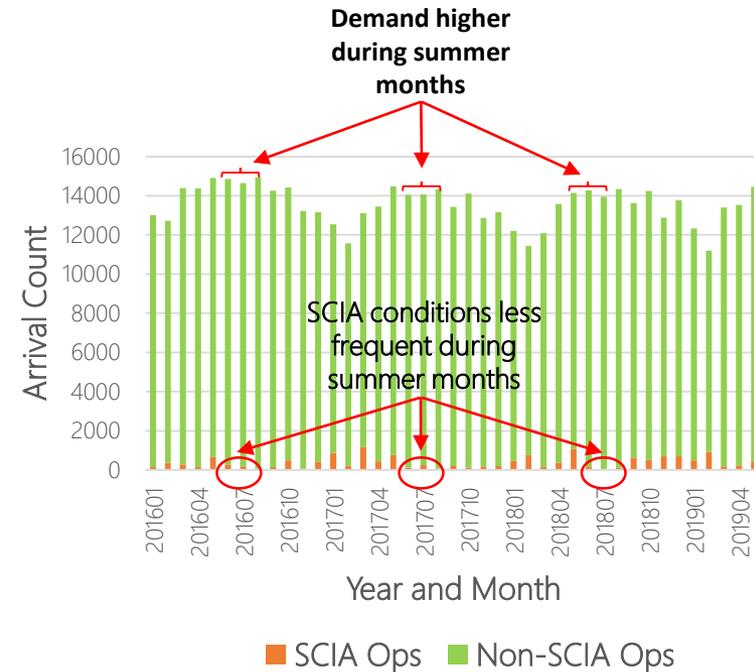
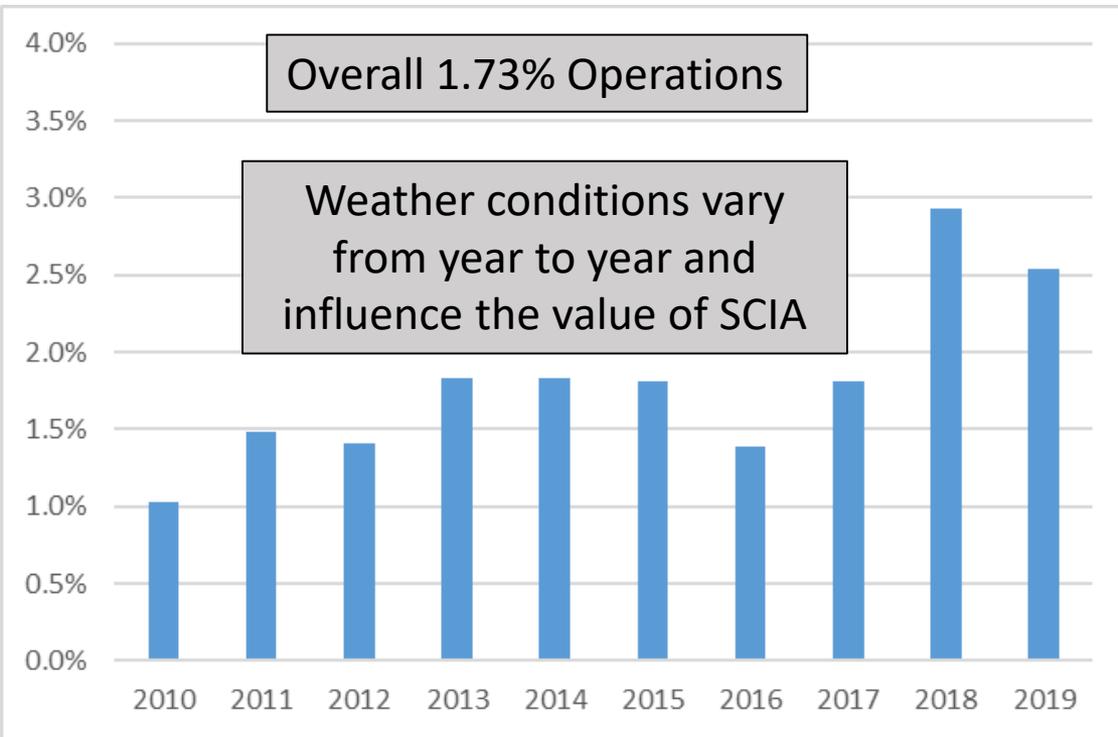
What is SCIA?

- Simultaneous Converging Instrument Approaches (SCIA) at PHL
- Allows aircraft to land on converging runways (9R/17) in low visibility
- SCIA Procedure Updated on July 19, 2018
- Ceiling and Visibility for 9R/17 dual operations
 - Minimum Ceiling lowered from 700' to 421'
 - Visibility lowered from 2 miles to 1 mile
- Winds along 17
 - Tailwinds 5 kts or less
 - Crosswind 20 kts or less
- Arrival rate increases from 32 (9R) to 48 (9R/17)



Historical Opportunity

Proportion of ops occurring in new SCIA conditions



Seasonality Impact

Notes: 2010 & 2011 contain only about half of quarter hours due to missing ceiling data. All other years are complete. 2019 thru May 31. Reporting Hours only (0700 - 2159). Includes SCIA Ceil >= 450' and Vis >= 1 mi. Winds are included for landing on 17.



Impact of 32 vs 48 Arrival Rate

Jan 1, 2016 through May 31, 2019¹

Runway and Called Rate	9R with 32	9R/17 with 48 ²
Total # Qtr Hrs	4,229	9,355
# Cancellations per Hour	2.4	0.9
# EDCTs per Hour	11.2	2.4
Avg Ground Delay (mins) for all Flights	16.3	3.6
Avg Airborne Delay ³ (mins) for all Flights	3.1	1.9
Total Delay per Flight	19.4	5.5

Historical impact of lower called rate is ~1.5 cancellations per hour and ~13.9 minutes of increased delay per flight

Initial Simulation Results

Average number of flights per day is 618

With 48 rate, with ~40 hours of delay with 0 cancellations

Using simulated 32 rate, delays increase to ~300 hours per day and cancellation increase to 20 per day

Flights are cancelled when experiencing 2 hour delay

1 During reporting hours

2 Includes convective season when cancellations and EDCTs may be driven by AFP

3 Avg Airborne Delay derived from FAA NextGen 2018 TBO Shortfall Study

JAT Next Steps

- EDC/IDAC – Complete
- SCIA
 - Expand benefit calculations to cover all flights at PHL
 - Valuation of Delay
 - Valuation of Cancellation
 - Determine 12 month achieved benefits
 - Project annual operational benefit from SCIA at PHL
- Capping and Tunneling
 - Determine achieved benefits
 - Benefit of increased throughput
 - Benefit from decrease in ground delay
 - Higher completion rate
 - Dis-benefit of capped trajectory flight profiles



Summary of Meeting and Action Item Review

Greg Schwab, FAA



2019 NAC Engagements

- November 12: Time TBD



NAC Taskings

ID	NAME	START	STATUS
18-1	Northeast Corridor: Joint Analysis Team (JAT) Assessment of Phase 1 Improvements	June 2018	Est. Completion Date (ECD): April 2020
18-2	Northeast Corridor: Finalize Phase 2 Recommendations	June 2018	Complete: June 2018
18-3	Finalize 2019-2021 Joint Implementation Rolling Plan	June 2018	Complete: October 2018
18-4	Northeast Corridor: Implementation Risks and Mitigations of the NextGen Priorities Joint Implementation Plan	October 2018	ECD: October 2019
18-5	NextGen Priorities Four Focus Areas: Implementation Risks and Mitigations of the NextGen Priorities Joint Implementation Plan	October 2018	ECD: October 2019
Future	Taskings Regarding Mixed-Equipage Risk Mitigation for the NEC related to Communications, Navigation, and Surveillance (MCL initiative)	Pending results of MCL initiative	Pending results of MCL initiative

Closing Comments and Adjourn

Chip Childs, SkyWest, Inc.





Back-up

NEC Completed Milestones

2017

Phase 1 Report – NEC objectives, goals, success metrics

Phase 2 Interim Report – T+18 implementation milestones and other pre-implementation commitments

Implementation completed:

- JetBlue and United provide aircraft intent data

2018

Phase 2 Final Report – Commitments in support of the 2019-2021 Rolling Plan (feeds into the FAA NextGen JIP)

Implementation completed:

- DSP enhancements
- EDC at ZNY
- IDAC for 4 NY airports
- SCIA to PHL 9R/17Capping and tunneling
- Eliminate passback restrictions for NEC
- High-speed exits on JFK runway 4R/22L
- Improve airborne metering to PHL
- TBFM refresher training for metering to PHL
- BOS Surface Viewer Tool at ZBW
- DRS info into the NOD prototype
- Extension of BWI International Concourse E

Pre-implementation completed:

- Procedure/route design: ACR; ZNY Offshore; ZDC redesign
- Procedure concept assessment/feasibility: modified missed approach for LGA22
- Pre-departure scheduling site selected (PIT-PHL)
- RAPT Refresher Training
- Input on emerging NEC applications for SWAP 2019
- NOD review and feedback

Community/Environmental:

- Dispersal headings for LGA13 on existing GLDMN/TNNIS/NTHNS
- Community Involvement strategy for the NY area

Safety assessment:

- SCIA operations with RNAV for PHL 9R/35

2019

Reconciled Industry milestones for June 2019 NJIP

Implementation completed:

- DSP enhancements
- EDC at ZNY
- IDAC for 4 NY airports
- SCIA for PHL
- Capping and tunneling
- Eliminate passback restrictions

Pre-implementation completed:

- Sequence analysis of NEC airports to receive en route metering
- Procedure concept assessment/feasibility:
 - Deconflict LGA/EWR/TEB when on LGA 13ILS
 - JFK EoR simultaneous operations to 13R RNP and 13L ILS
 - MARS concept exploration and priorities



Overview of Challenges/Issues/Risks

Risks

- Lack of implementation dates, and associated interim milestones for several NEC initiatives
- Direct engagement with operational personnel from local FAA facilities

Challenges/Issues

- Progress on “NextGen Initiatives” identified in the NEC Phase 2 Interim Report



Recommendation/Response

NAC Tasking 18-4 Northeast Corridor

Industry Challenge(s), Issue(s), Risk(s) <i>[Existing]</i>	Risk Mitigation Approach/Strategy	Industry Actions	FAA Actions
<p>A large number of NEC initiatives still do not have implementation dates, or even target years for implementation. Without at least a rough estimate of planned implementation, Industry cannot plan and execute its role in initiative implementation. Lack of transparency hinders Industry's ability to develop its own plans for the resources. For operators, equipment investment, equipment placement, crew training, schedule modification all require significant lead times, from several months to several years. Similarly for airports, planning is required to ensure capital investments are aligned with FAA plans. For everyone, community engagement activities must be aligned and environmental review timing must be understood.</p>	<p>Increased transparency on implementation plans</p> <p>More clarity on interim steps leading to implementation</p> <p>Continued cooperation on community outreach</p>	<p>Partner with FAA to establish target implementation timelines</p> <p>Educate FAA on lead times associated with operator actions</p> <p>Commit to attend community outreach meetings, with appropriate coordination and lead times</p>	<p>Review implementation process steps and clarify timelines associated with each step</p> <p>Establish trigger points when potential implementation timelines can be discussed with Industry</p> <p>Provide more visibility into the community engagement planning and environmental review process</p> <p>Allow for informal discussion with Industry on timelines</p> <p>Share interim steps in implementation plans with Industry</p>

Recommendation/Response

NAC Tasking 18-4 Northeast Corridor

Industry Challenge(s), Issue(s), Risk(s) <i>[Existing]</i>	Risk Mitigation Approach/Strategy	Industry Actions	FAA Actions
<p>For the NEC NIWG, communication between Industry and local FAA facilities has been conducted through the NIWG FAA SMEs and members of the FAA-NATCA NEC Collaborative Workgroup. This approach was prescribed by the FAA in 2017. Industry is concerned that this is an inefficient mode of communication. It restricts Industry's ability to effectively partner with the FAA, in particular providing timely input to concept assessments, feasibility studies, and solution design. The current method adds weeks or months to activities that may have been resolved in minutes or hours. Furthermore, lack of communication stifles the productivity of a direct exchange. Lack of access and transparency may create disconnect between all parties.</p>	<p>More direct involvement of facility personnel in workgroup deliberations, specifically defining and designing solutions to operational issues associated with completion of commitments</p>	<p>Define and clarify the specific questions and interaction expectations, to help clarify when direct facility interaction is needed</p> <p>Work through NIWG SMEs to identify and coordinate interaction opportunities</p>	<p>Provide opportunity for facilities to participate, remotely if necessary, when agenda items in the full NEC or in sub-workgroups can be defined</p> <p>Allow facilities to monitor meetings, if full participation is not warranted</p>



Recommendation/Response

NAC Tasking 18-4 Northeast Corridor

Industry Challenge(s), Issue(s), Risk(s) <i>[Existing]</i>	Risk Mitigation Approach/Strategy	Industry Actions	FAA Actions
<p>In the first interim report for NEC Phase 2, the NIWG proposed key NextGen initiatives that should be the cornerstone for operational change and desired outcomes for the NEC:</p> <ul style="list-style-type: none"> • Targeted application of NextGen procedures • Widely spaced simultaneous operations to different airports <p>From these initial proposals the FAA developed the MARS concept. Concept development has been ongoing for almost two years, but steps to full implementation are not readily understood by Industry, making progress questionable. A new thrust for this important concept is needed, with focus on New York where the deconfliction benefits are most needed.</p>	<p>iMARS in New York – initial MARS, streamlined version of MARS concept for New York that leverages existing or previously designed procedures, and builds on current applications using waivers</p> <p>Additional insight into the MARS effort, including plans and interim steps for national standard</p>	<p>Propose iMARS in New York early applications, and share with FAA</p> <p>Refine iMARS in New York concept with FAA, and build a target implementation plan achievable in the next 18-24 months</p>	<p>Refine iMARS in New York with Industry</p> <p>Focus portion of upcoming MARS TIM on iMARS in NY applications</p> <p>Clarify the next steps for the MARS effort, both nationally and in the NEC</p>

MCL APPENDIX



MCL Item # 1 – PBN Requirements

NextGen Enabling Category	Aircraft Enabling Capability	Key Missing Components	Benefit	Example Use Cases	Ground Enabling Capabilities	Risks to ROI	Risks of Not Equipping
Performance Based Navigation	RNP-2 (Enroute) / RNP-1 with RF (Terminal Arrival/Departure) / RNP APCH, RNP AR 0.3 with RF and scalability (Approach) and coupled VNAV	RF Leg Type, auto-coupled VNAV, auto-throttle, FMC database size	Precise deconflicted arr and dep with reduced separation requirements, shorter track miles, reduced fuel burn, maximize available poor weather capacity, predictable flows, airport access, required for Trajectory Based Operations (TBO)	Established on RNP (EoR), RNAV/RNP arrivals/departures, Optimum Profile Descents (OPD), Q routes, LNAV/VNAV approach minima, approaches where ground infrastructure does not exist or being removed.	Airspace and procedures enhancements, reduced lateral separation between routes, controller training, process to implement new procedures (IAP, EoR), FAA Policy	<ul style="list-style-type: none"> - Environmental work required - other non-equipped a/c - Decision Support Tools and automation enhancements - Requires pre-conditioned flows - Right sizing development, maintenance and removal of procedures - FMC database size to support new procedures, waypoints 	<ul style="list-style-type: none"> - Continued delays during poor weather (ie. Make IMC days look more like VMC days with EoR, weather avoidance), Inability to accept growth in demand, Reduced ROI for invested stakeholders - TBO effectiveness potentially limited or not available without PBN



MCL Item # 2 – Data Comm Requirements

NextGen Enabling Category	Aircraft Enabling Capability	Key Missing Components	Benefit	Example Use Cases	Ground Enabling Capabilities	Risks to ROI	Risks of Not Equipping
Data Comm	FANS-1/A over multi-frequency VDL mode 2 with push to load	CMU, Radios, FANS capable FMC/FMGC	Shorter ground delay for clearances, reduced communication errors, efficient delivery of complex clearances, reduce long voice communications, accurate re-route, weather avoidance, pilot requested re-routes, enables Trajectory Based Operations (TBO)	High rate clearances during SWAP, efficient re-route around weather, Less human factors (errors in re-route entries), more efficient routing	Development and delivery of data comm services, Decision support tools and automation enhancements, controller training	<ul style="list-style-type: none"> - Pilot Training - Other non-equipped a/c - Actual system performance - Conformity of equipment to use FANS messages (older spec being adapted for modern use) 	Loss of departure positions to equipped operators, added taxi-time/departure delays, continued risk of incorrect route programming and navigation errors by pilots

MCL Item # 3 – Resiliency Requirements

NextGen Enabling Category	Aircraft Enabling Capability	Key Missing Components	Benefit	Example Use Cases	Ground Enabling Capabilities	Risks to ROI	Risks of Not Equipping
Performance Based Navigation, Low Vis Ops, Surveillance	Resilient NextGen Operations (Inertial (IRU))	IRU Hardware	Resilient NAS operations when loss of GPS (GPS Jamming or hardware failure) and lack of DME coverage. Enabling technology for HUD/EFVS, RNP AR operations.	RNP AR, EFVS, Lack of GPS signal availability (jamming, spoofing, solar event)	None	Risk based on benefit case used to fund. - No risk for resiliency. - Risk to ROI if you expect to do RNP AR but don't get approvals.	Loss of operational integrity

MCL Item # 4 – Surveillance Requirements

NextGen Enabling Category	Aircraft Enabling Capability	Key Missing Components	Benefit	Example Use Cases	Ground Enabling Capabilities	Risks to ROI	Risks of Not Equipping
Surveillance	ADS-B Out - Mandate	a) Transponder b) High integrity position source	Improved surveillance in areas not served by radar (including surface), higher accuracy and greater update rates of surveillance data, improved safety via enabled ATC automation functions and TFM decision support tools, improved Separation Services in non-radar coverage areas and reduced separation standards in select situations, improved Planning and Traffic Flow Management Services, enables ADS-B In applications	Mandate	Ground infrastructure, ERAM enhancements	Mandate	Mandate

ADS-B Backup





Backup



Airports with GDP and GS's

Top 8 GDP and Ground Stop Airports in CY2018

PerformanceAnalysis
ATOSysOps

GDP Counts (CY2018)		
	FACILITY	Total
1	EWR	209
2	SFO	194
3	LGA	117
4	PHX	83
5	SEA	79
6	BOS	78
7	JFK	73
8	PHL	72

GS Counts (CY2018)		
	FACILITY	Total
1	EWR	196
2	LGA	193
3	PHL	170
4	ORD	139
5	JFK	92
6	SFO	92
7	TEB	84
8	ATL	78

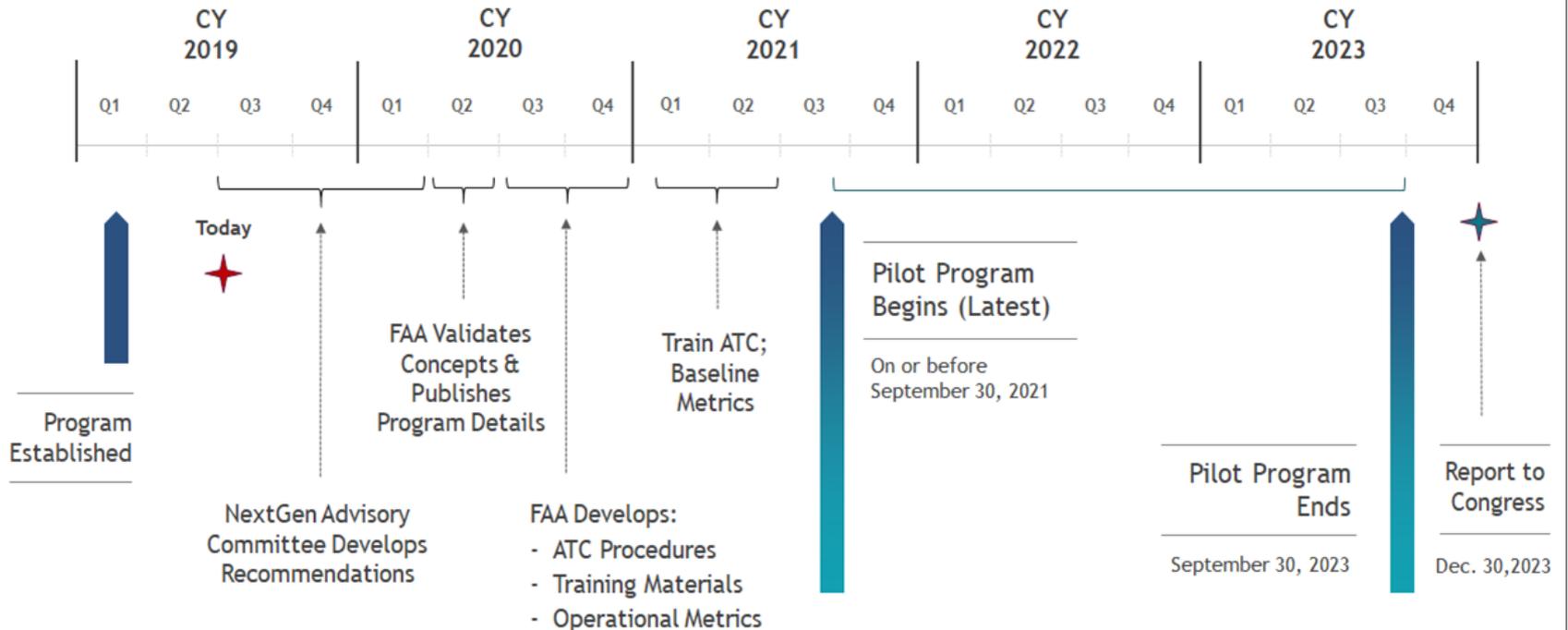


EATS Pilot Program Draft Timeline



EATS AIR TRAFFIC PILOT PROGRAM

Enhanced Air Traffic Services Pilot Program: Draft Timeline





Attachment 2



NextGen Advisory Committee (NAC) July 30, 2019 Attendance List

Last Name	First Name	Affiliation	NAC Member
Allen	Dan	FedEx Corporation	
Allen	Jack	Airlines for America	
Amin	Vishal	AERTRON, Inc.	
Artist	Mike	Federal Aviation Administration	
Baker	Mark	Aircraft Owners & Pilots Association	NAC Member
Batchelor	David	SESAR Joint Undertaking	
Bechdolt	Anne	FedEx Express	
Bertapelle	Joe	JetBlue Airways	
Bolen	Ed	National Business Aviation Association	NAC Member
Bonds	Nazanin	MITRE	
Boynton	Mike	American Airlines, Inc.	
Bristol	Teri	Federal Aviation Administration	NAC Member (non-voting)
Brown	Lee	JetBlue Airways	
Bunce	Pete	General Aviation Manufacturers Association	NAC Member
Burnett	Alex	United Airlines, Inc.	
Burnham	Kris	Federal Aviation Administration	
Butler	Steven	Federal Aviation Administration	
Capezzuto	Vincent	Aireon LLC	
Carey	Bill	Aviation Week	
Carlucci	Greg	Honeywell	
Caroll	Joseph	FedEx Express	
Cebula	Andy	Airlines for America	
Challan	Peter	L3Harris	
Childs	Chip	SkyWest, Inc.	NAC Chair
Christie	Warren	JetBlue Airways	NAC Member
Collings	Chris	L3Harris	
Cook	Charles	JetBlue Airways	
Cooper	Stuart	Federal Aviation Administration	
Creasap	Donna	Federal Aviation Administration	
Cunha	Jason	Federal Aviation Administration	
Dalton	Rick	Southwest Airlines	

Last Name	First Name	Affiliation	NAC Member
Davis	Melvin	Cavan Solutions	
Day	Richard	6DOTS, Aviation Consultants	
DePete	Joe	Air Line Pilots Association	NAC Member
Dill	Marseta	Federal Aviation Administration	
Dillman	Don	FedEx Express	NAC Member
Drew	Craig	Southwest Airlines	NAC Member
Duffy	Kent	Federal Aviation Administration	
Dumont	Pete	Air Traffic Control Association	NAC Member
Eagan	Mary Ellen	HMMH	
Edwards	Bailey	Federal Aviation Administration	NAC Member (non-voting)
Elwell	Dan	Federal Aviation Administration	DFO
Fanning	Eric	Aerospace Industries Association	NAC Member
Fenkell	Max	Aerospace Industries Association	
Fulton	Steve	Fulton Aviation, LLC	
Furleigh	Dan	Department of Defense	
Gallo	Tracy	SkyWest, Inc.	
Gautier	Todd	L3Harris	
Glenn-Chase	Abigail	Air Traffic Control Association	
Goldman	Rob	Delta Air Lines, Inc.	
Gomez	Pamela	Federal Aviation Administration	
Graham	Jim	Delta Air Lines, Inc.	NAC Member
Griswold	Mark	Riverdale, IA Resident	
Gurciullo	Brianna	Politico	
Hamel	Christophe	L3Harris	
Harris	John	Raytheon	
Hennig	Jens	General Aviation Manufacturers Association	
Hill	Fran	Leidos	
Hollander	Anne	Montgomery County Quiet Skies Coalition	
Hope	Christopher	Department of Transportation	
Hopkins	Mark	Delta Air Lines, Inc.	
Huegel	Carol	American Airlines, Inc.	
Huffman	Mike	Federal Aviation Administration	
Hunt	Rob	Federal Aviation Administration	
Jacoby Lemos	Drew	Regional Airline Association	
Johnson	Antionette	Federal Aviation Administration	
Johnson	Sasha	United Airlines, Inc.	
Joly	Pascal	Airbus	
Kearns	Kathleen	AlternaSource, Inc.	
Kenagy	Randy	Air Line Pilots Association	

Last Name	First Name	Affiliation	NAC Member
Knorr	Dave	Federal Aviation Administration	
Ladner	John	Alaska Airlines	NAC Member
Lawrence	Huntley	Port Authority of New York & New Jersey	NAC Member
Lee	Bob	Collins Aerospace	
Lee	Marlene	Federal Aviation Administration	
Lenfert	Winsome	Federal Aviation Administration	
Liu	Lirio	Federal Aviation Administration	
Maffei	John	Federal Aviation Administration	
Matulenas	Caitlin	Federal Aviation Administration	
McCoy	Tiffany	Federal Aviation Administration	
McEneaney	Janet	Queens Quiet Skies	
McGraw	Candace	Cincinnati/Northern Kentucky International Airport	NAC Member
McLean	Donna	PlanzerMcClean	
McVenes	Terry	RTCA, Inc.	
Mercer, Jr.	Roosevelt	Federal Aviation Administration	
Merritt	Jon	United Airlines, Inc.	
Mitchell	Tiffany	Federal Aviation Administration	
Moloney	John	The Boeing Company	
Morse	Glenn	Delta Air Lines	
Narvid	Juan	Federal Aviation Administration	
Novia	Robert	Federal Aviation Administration	
O'Connor	Wendy	Federal Aviation Administration	
Orton	Arthur	Federal Aviation Administration	
Pagliariello	Melinda	Airports Council International – North America	
Pearce	Bob	National Aeronautics and Space Administration	
Pennington	Darrell	Air Line Pilots Association	
Perrone	Michael	Professional Aviation Safety Specialists	NAC Member
Peyton	Bret	Alaska Airlines	
Pfingstler	Susan	United Airlines, Inc.	
Pierce	Brad	National Association to Insure a Sound Controlled Environment	NAC Member
Plans	Barry	Department of Transportation	
Quigley	Bryan	United Airlines, Inc.	NAC Member
Randazzo	Alex	Federal Aviation Administration	
Renk	Ron	United Airlines, Inc.	
Rhee	Jamie	City of Chicago	

Last Name	First Name	Affiliation	NAC Member
Rice	Colin	Metro Washington Airports Authority	
Rinaldi	Paul	National Air Traffic Controllers Association	NAC Member
Rudinger	Melissa	Aircraft Owners and Pilots Association	
Santos	Phil	FedEx	
Savage	Derrick	National Geospatial-Intelligence Agency	
Sawyer	Dennis	The MITRE Corporation	
Schwab	Greg	Federal Aviation Administration	
Secen	Alex	RTCA, Inc.	
Shepley	Katie	MITRE	
Silver	David	Aerospace Industries Association	
Sinnett	Michael	The Boeing Company	NAC Member
Snow	Marissa	SkyWest, Inc.	
Stewart	Chuck	United Airlines, Inc.	
Stone	Kimball	American Airlines, Inc.	NAC Member
Stone	Rocky	United Airlines, Inc.	
Stover	Kim	Federal Aviation Administration	
Swiatek	Kevin	United Parcel Service (UPS)	
Takemoto	Paul	Federal Aviation Administration	
Tamburro	Ralph	Port Authority of New York & New Jersey	
Townsend	Brian	American Airlines, Inc.	
Tranter	Emily	National Association to Insure a Sound Controlled Environment	
Wending	Kelle	L3Harris	
Whitley	Pam	Federal Aviation Administration	NAC Member (non-voting)
Wichman	Keith	PASSUR Aerospace	
Wijntjes	Jesse	Federal Aviation Administration	
Woods	Jeff	National Air Traffic Controllers Association	
Wongsangpaiboon	Natee	Federal Aviation Administration	
Wright	Janelle	Montgomery County Quiet Skies Coalition and DCA Community Working Group	



Attachment 3



Oral Statement 1:

Mark Griswold, Riverdale, IA

My name is Mark Griswold (retired) I spent 35 years working for Alcoa and Alcan Aluminum Companies.

I spent the last 15 years working with the Boeing Commercial Division in Seattle Washington.

My question “Why was there No discussion of Cyber Attacks for these crashes”

October 29th 2018 Lion Air (Indonesia) flying a 737Max-8 Boeing aircraft crashed killing 189 people on board

March 10th 2019 Ethiopian air flying a 737Max-8 Boeing aircraft crashed killing 159people on board

I believe both planes were crashed as a result **cyberattacks**
I'm here today to discuss cybersecurity on the Next Gene aircraft

My reference GAO report April 2015 GAO-15-370. Report to Congressional requesters.

Air Traffic Control

“ FAA needs a more comprehensive approach to address cybersecurity as Agency transitions to NextGen “

October 29th 2018 Lion Air (Indonesia) flying a 737Max-8 Boeing aircraft crashed killing 189 people on board

March 10th 2019 Ethiopian air flying a 737Max-8 Boeing aircraft crashed killing 159people on board

Lion Air ‘s(Indonesia operates 10 737 Max
Ethiopian airlines operates 4 737 Max

There are a total of 346 model 737 Max aircraft in service

These airline had no crashes

Southwest Air 34

Air Canada 24

American airlines 24

China Southern 24

“Why did Lion Air (Indonesia) and Ethiopian airlines 737 Max aircraft Crash ?

I believe the LionAir and Ethopian Airline were Cyber Attacked- to send a message to the world we are Not Safe anywhere

Question **Were the aircraft CyberAttacked ?**



Oral Statement 2:

**Janet McEneaney
President of Queens Quiet Skies
and Founder of the Quiet Skies
Conference**

Good Morning -

My name is Janet McEneaney. I am the President of Queens Quiet Skies, an aviation-focused community advocacy organization in New York City. I am also a founder of the Quiet Skies Conference, a coalition of about 80 community advocacy groups nationwide.

Queens Quiet Skies has had a good working relationship with the NOISE organization for a long time. There are areas in which we overlap with NOISE, but we have different constituencies. The community groups that make up the Quiet Skies Conference are not Roundtables. Most of us are not Roundtable members and cannot be reached through our local roundtables. We directly represent many people who have a stake in aviation decision-making.

I came here on my own dime today, using two of my annual leave days from work, to attend this meeting. I am here because I want to know how our community advocacy groups can be a resource for the NAC in developing its community involvement strategies.

I have only two minutes to speak. I've thought for weeks about what would be the most important message to convey in two minutes. Here it is:

We need to talk.

Times of change present windows of opportunity. We are in a time of change now. Congress wants the aviation industry and the FAA to involve communities in NextGen planning. I believe the people at this table want to do that effectively. We do, too. The question is "how"?

I'll give you a quick example of how I see part of the answer to that question. We often hear that community outreach – which means offering information to a community – will result in community acceptance of new plans. Unfortunately, it hasn't always worked out that way in the past.

When I see that particular recommendation for responding to community concerns, I ask myself, "What will be the strategy if the community just doesn't accept the new plans, in spite of all the outreach?" This is one area, I think, that needs some consideration.

The terms "community engagement", "community involvement" and "community outreach" have often been used interchangeably. I looked up the definitions of the words *outreach*, *engagement* and *involvement*. They mean different things. They are not synonyms.

A more effective community strategy would recognize the differences and use the most productive aspects of each of these three approaches in a more comprehensive strategy. You would more likely get buy-in if representatives of your target audience worked with you develop the approach.

It's sometimes hard to take the first step into a different way of doing things, especially when the parties may have been adversarial. But it can be done. I worked for 30 years as a mediator, ombuds and arbitrator. I've participated in resolving thornier problems than the ones we share.

A different strategy might allow all sides to identify and meet interests instead of hardening positions. What's required are open minds and listening ears on all sides, as well as the commitment to make a good faith effort. That's how parties create trust and forward motion. It would be a most welcome and productive paradigm shift.

I think you need to tweak the NAC's community involvement strategy. We could help you do that by giving you feedback and suggestions, by having discussions, by helping each other understand how we see things and why we have certain priorities.

I am suggesting that we begin a conversation about how to involve communities in NextGen planning. It can be formal or informal – or both. It can be a standing committee, a series of meetings – we could have a barbecue. Whatever methods we choose, we should do this regularly. We just need to start. Let's try doing something different together.

So I leave you with this question: in terms of effective community involvement in NextGen planning and implementation, how can our community advocacy groups assist the NAC?