



## NextGen Advisory Committee (NAC) August 6, 2020 Meeting Summary

The NextGen Advisory Committee (NAC) convened virtually August 6, 2020. The meeting discussions are summarized below. Reference the attachments for additional contextual information.

List of attachments:

- Attachment 1: NAC Presentation Deck
- Attachment 2: Attendance List
- Attachment 3: Public Statement

### Opening of Meeting

NAC Chairman Mr. Chip Childs (SkyWest, Inc.) opened the meeting and welcomed virtual attendees.

### Public Statements

After administrative housekeeping notes, Mr. Greg Schwab (FAA) invited Mr. Mark Shull of Palo Alto, CA to provide his pre-approved public statement. Please reference Attachment 3 for the full statement text.

### Chairman's Report

Mr. Childs then provided the Chairman's Report. To begin, he called for a motion to approve the December 12, 2019 NAC Meeting Summary Package, which the NAC approved.

**Outcome:** The NAC passed a motion to approve the December 12, 2019 NAC Meeting Summary Package

He began his report by acknowledging the difficult time not only for the aviation community, but also the Nation and world. He expressed appreciation for the participation of NAC Members, who are deeply immersed in solving a constant stream of emerging issues, while also working on a road map to recovery. He acknowledged the commitment and ongoing efforts of the NAC Subcommittee (NAC SC), working groups, and ad hoc teams.

The technical experts from NAC member organizations and throughout the aviation community have persevered with their FAA counterparts since the early days of the pandemic to ensure that progress would continue on NAC taskings and the NextGen Joint Priorities. He requested that NAC members pass along the committee's collective thanks to the technical experts.

Mr. Childs then gave thoughts on the state of the industry. He described the current environment as the most disruptive time in the industry's history. He said that the speed and breadth of economic impact occurred almost overnight when commercial flights dropped 94% from last year's levels. After this initial shock, passenger levels slowly rebounded to around 40-60% of year-over-year levels, which led to some cautious optimism. A recent resurgence of the pandemic across the U.S. has caused demand to level off. He described best-laid plans at the beginning of the year as now irrelevant.

Planning involves dozens of variables in a constant state of flux. He described the industry as being forced to plan for a range of potential futures to be able to respond to wherever the pandemic and the economy goes next.

He once again expressed thanks to the NAC SC and its working groups for allowing the executive level to focus elsewhere while they worked to make progress on the future with NextGen. He expressed thanks on behalf of the NAC to those in the community that are transitioning out of their current roles.

Mr. Childs also acknowledged the flexibility and understanding that the NAC has received from the FAA. Within days of the onset of the pandemic, he said that he spoke with FAA Deputy Administrator Mr. Dan Elwell and they quickly agreed to pause a few activities that would demand the time of industry executives. One of those is NAC Task 19-2, which is the Section 547 Congressional request for a pilot program for Enhanced Air Traffic Services. Mr. Childs said that since this effort is tied to a Congressional request, he and FAA Air Traffic Organization Chief Operating Officer Ms. Teri Bristol had very recently initiated a discussion on a potential way forward which revolves around re-engaging the Section 547 Ad Hoc Team with a focus on:

- Addressing the Congressional request
- Determining if any elements of the Congressional request are operationally or fiscally possible on the industry side, and, if not...
- What, if any, existing activities might have elements that could address a portion of the intent of Congress
- And then providing a NAC consensus response back to the FAA

He further explained that this will be challenging to accomplish while ensuring this activity does not impact NAC executives' time too much. He said it will also require extensive coordination with the FAA, which the agency has committed to and the NAC appreciates. Mr. Childs indicated he will continue to keep the NAC updated and that ultimately the advice to the FAA in response to this tasking will be a full NAC recommendation.

## **FAA Report**

Next, Mr. Childs handed off to Mr. Elwell, who provided the FAA Report.

Mr. Elwell began by commending the aviation community for continuing to innovate and adapt in response to the pandemic. He said this is no less true of the FAA, which faced equally significant impacts to government operations during the pandemic and also continues adapting and innovating through this situation.

From the onset, the ATO immediately studied all the available data on the pandemic and quickly adapted contingency plans to ensure continuous safe operations of the air traffic facilities. This required establishing hard crews to limit the virus spreading to the greater air traffic workforce. They also developed procedures to rapidly transfer operations to standby crews in a sterile backup facility, while rapidly cleaning the affected facility and bringing it back online as soon as possible. These procedures were continuously adapted so that now FAA air traffic facilities rarely degrade below 'Normal Ops' for any length of time.

Mr. Elwell said this is also true for the FAA Headquarters staff. The FAA worked very hard with stakeholders to seamlessly transition all work of the NAC, NAC SC, ad hoc teams, and NextGen

Integration Working Groups (NIWGs) to a 100 percent virtual environment. He said that at the NAC SC level there was a conversation on potential opportunities that might exist with this unique moment in time in the National Airspace System that will be discussed later in the agenda. Continuing all of these efforts took tireless dedication by both the FAA and NAC stakeholder team.

Mr. Elwell said these efforts also extended into the NextGen Joint Implementation Plan (NJIP), which has been in a constant state of reassessing the FAA and industry joint milestones. He said that this latest resurgence in positive test results has upended most assumptions on task completion timelines, some of which require face-to-face interaction with FAA and industry experts in the field. He assured the NAC that the FAA has used every bit of its operations, engineering and program expertise to innovate and adapt in an effort to prevent and mitigate delays. Unfortunately, a growing number of FAA and industry programs are now showing delays, some into 2022. He indicated that if the meeting was not virtual, he would be handing off a hard copy of the *NAC NextGen Priorities Joint Implementation Plan CY2019–2021 Update*. However, he said the document is available on the NAC public website<sup>1</sup> and copies will be sent to the NAC members.

He explained that the FAA developed this update and was just about to finalize it in March 2020 when it too experienced the beginning of impacts from COVID-19. The FAA held off signing the update to assess potential impacts from the pandemic. During the assessment, the FAA discovered that some joint milestones are reliant on things like access to the FAA field facilities and experts, which will result in delays that cannot be determined right now. Therefore, the report includes a list of successes, a list of milestone changes, and in some cases TBDs until the FAA can determine an effective date. The FAA decided to publish the update with the best information available, which will give stakeholders and Congress a snap shot of what is known today. This update was accomplished in collaboration with the NAC experts to include updates for both FAA and industry joint milestones.

In closing, Mr. Elwell indicated that he and FAA Administrator Steve Dickson have worked with many of technical staff members in the NAC, and its predecessor, for more than a decade. On behalf of the FAA, he sincerely thanked the industry technical experts for all their efforts in the NAC's many working groups as many transition to other activities during this economic upheaval.

Next, Mr. Elwell handed off to FAA Administrator Mr. Steve Dickson for remarks. He began by thanking the NAC community for its continued leadership and engagement, including the NAC SC and working groups. Mr. Dickson said this is an environment nobody could have anticipated where there will still be progress made, but it will look different.

He described some of the challenges the COVID-19 crisis introduces when it comes to operationalizing NextGen and integrating investments from agency and industry, such as lack of access to air traffic facilities, increased social distancing, inability to travel, lack of access to the Tech Center, and a maintenance moratorium. He acknowledged that there are some opportunity areas with the lower

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<sup>1</sup> *NAC NextGen Priorities Joint Implementation Plan CY2019–2021 Update* direct document link:  
<https://www.faa.gov/nextgen/library/media/NACNextGenPrioritiesJointImplementationPlanCY2019-2021Update.pdf>

traffic volumes, but that the focus is being ready to take advantage of investments and more modern fleets.

Mr. Dickson also thanked the FAA Air Traffic Organization (ATO) and its leadership that has been so creative and innovative in working closely with industry to keep the airspace operating, which has been a huge part of keeping the economy running. He added that air traffic levels that had been down 75 percent or more are now at the 30-40 percent level. He also thanked NATCA, PASS, and other labor unions that have stepped up during the crisis.

He closed by saying that he looks forward to continue working together and handed off to Mr. Elwell, who concluded the FAA Report.

## **NAC Subcommittee (SC) Chair's Report - NAC Taskings Status**

Next, Mr. Childs introduced NAC SC Chairman Craig Drew (Southwest Airlines). He thanked Mr. Drew for his leadership in keeping the NAC SC and working groups productive and engaged during this extraordinary time. Mr. Drew began by echoing Mr. Childs' and Mr. Elwell's sentiments in being amazed at the continued level of productivity and engagement at the NAC SC and working group levels since March.

Mr. Drew said that in early April, it had occurred to many in the NAC SC and working group community that there might be in a unique moment in time where the National Airspace System was running without delays and operators were flying aircraft with relatively high levels of avionics technologies. This led to a conversation focused on opportunities in this environment. He handed off Ms. Bristol to provide additional background.

Ms. Bristol explained that she and Acting FAA Assistant Administrator for NextGen Ms. Pamela Whitley agreed that an opportunities conversation would be valuable under these important conditions:

- Take advantage of historically low NAS operations, however brief
- Understanding that the FAA would have continued access to industry technical experts through October
- Focusing on existing joint agreements, what could be immediately executable

She said that as the conversation progressed from April through early July, it became clear that the rapidly increasing number of positive COVID results impacting the controller workforce was going to severely limit opportunities options since the majority of the recommendations would need face-to-face meetings and/or training at the facilities or in-person testing at the Tech Center. Ms. Bristol added that many of the recommendations did not meet the criteria of being immediately executable. However, she said the majority of the opportunities proposed were already being addressed by joint milestones, as part of a NAC tasking, or through other FAA programs. She concluded by saying that the FAA sees benefit in pursuing a few procedures that appear to be possible in this brief moment in time, while staying true to the existing NAC joint agreements and executing vital infrastructure upgrades.

Mr. Drew then introduced the two procedures that he recommended the NAC endorse, including:

- **LGA 31 RNAV Expressway:** He indicated that this could be worked with the PBN Clarification team to help prioritize this procedure and then integrate with the work of the NEC team under the existing NAC taskings.

- **Escape Routings:** The TEB/HPN (White Plains) escape route concept provides for an alternate route out of the airspace prioritized for EWR/LGA/JFK commercial traffic during inclement weather for capable business aviation aircraft. Mr. Drew said this could be assessed as a potential option under the 547 task and then integrate with the work of the NEC team under the existing NAC taskings.

Mr. Drew recommended to Mr. Childs that the NAC endorse the exploration of these options as part of the existing FAA taskings. Mr. Childs asked for any NAC member objections or comments to this proposal.

**Outcome:** The NAC endorsed exploration of the following options resulting from the NAC SC-level discussion of opportunities for progress during COVID-19:

- Prioritize the LGA 31 RNAV Expressway procedure as part of the PBN Clarification tasking (Task 19-4), then integrate with the work of the Northeast Corridor team (NAC Task 18-4)
- Assess the Escape Routings for TEB/HPN as a potential option under the Section 547 tasking (NAC Task 19-2), then integrate with the work of the Northeast Corridor team (NAC Task 18-4)

### Multiple Runway Operations (MRO)

Next, Mr. Drew introduced the agenda item for recommended responses to NAC Tasks 18-4 & 18-5 from the focus areas. He said these short briefings are focused on updates since the December 2019 NAC, any impacts from COVID-19, and providing a forecast. He handed off to Mr. Natee Wongsangpaiboon and Mr. Raul Zamora from the FAA and industry co-chairs Mr. Glenn Morse from United and Mr. Phil Santos from FedEx.

Mr. Morse began by thanking the FAA team for continued support of MRO opportunities and initiatives that continue to evolve. He reviewed the following accomplishments:

- Use of RNAV for SFO 7110.308 Procedures
  - FAA pre-implementation milestone complete; preliminary analyses show some combinations may be feasible
  - Industry discussions with AJT planned
- Reduced Minimum Radar Separation (MRS) – FAA/Industry Milestones Complete
  - Industry comments delivered to FAA in June with implementation recommendations
  - Additional FAA safety studies in progress; concurrence to pursue extension (2.5 nm w/in 20) before reduction (2.0 nm w/in 10)
  - Identified by “Opportunities ad hoc” as game changing concept
- Wake Turbulence Encounter Reporting
  - Industry Milestone Complete - Encouraged increased wake encounter reporting based on new FAA reporting guidance
- Converted 2 original 2.0/1.5 RECAT sites (DTW and IAH) to Consolidated Wake Turbulence (CWT) standards
- Integrated Arrival/Departure (IAD) concept for Closely-Spaced Parallel Runway (CSPR) Operations
  - FAA pre-implementation milestone complete, additional FAA safety studies in progress

Mr. Morse also reviewed the following COVID impacts and looking ahead items:

- CWT Implementation – FAA Milestone
  - Remaining sites planned for conversion in 2020 and 2021 are delayed until facilities can accept CWT training
  - New schedule TBD
- Consolidated Wake Turbulence (CWT) Separation Standards Benefit Analysis – Industry Milestone
  - Assess benefits from implementation of CWT separations at initial CWT locations (Q4 2020)
  - Preliminary discussions held to identify study locations (IAD, DFW, SEA, BOS) and carrier support
  - Benefits related to fleet mix and traffic demand at each airport/runway; assessment will focus on CWT separation changes within aircraft pairs
  - Potential Risk – Industry resources post-COVID to conduct detailed analysis. Industry may need JAT support for this task based on previous JAT analyses

### Surface and Data Sharing

Next, Mr. Drew introduced the Surface and Data Sharing team including Mr. Doug Swol and Mr. Ayaz Kagzi from the FAA and industry co-chairs Rob Goldman from Delta and Steve Vail from Mosaic. Mr. Goldman reviewed the following COVID impacts to Terminal Flight Data Manager (TFDM):

- All TFDM-related travel, since March 20th, has been restricted only to activities related to sustainment of critical NAS systems.
- Limited access to the FAA Atlantic City tech center for testing
  - Currently, no access to training academy (for training technicians)
- No access to air traffic facilities (to conduct installation, testing, training)
- NAC Milestones on “TBD” status until there is better fidelity of information regarding re-planning efforts and COVID-related constraints
  - TFDM key site Initial Operating Capability (IOC) for Build 1 at PHX will be postponed till 2021
- While TFDM deployment activities are restricted, FAA continues to make progress:
  - TFDM software development and adaptation continues
  - TFDM software “remote testing” initiated

Mr. Goldman then reviewed milestone impacts related to COVID. He also indicated that engagement and commitment remains strong, specifically citing the following as examples:

- NIWG meetings provide programmatic and operational updates as well as exploration of virtual opportunities
- NASA Air Space Technology Demonstration 2 (ATD-2) phase 3 extended from Q4 FY2020 to Q4 FY2021
- SWIM Industry-FAA Team (SWIFT) quarterly (virtual) meetings continue to address System Wide Information Management (SWIM) and the data/information sharing needs of the entire community to support initial Trajectory Based Operations (iTBO) / TBO, Future Flow Management, actionable analytics and more
- TFDM connection testbed option available later this Fall
- FAA will sustain NASA ATD-2 in Charlotte until TFDM is deployed

- FAA will lead Collaborative Site Implementation Team (CSIT) Meetings

### **Performance Based Navigation (PBN)**

Next, Mr. Drew introduced the PBN team including Mr. Juan Narvid, Mr. Aaron Wilkins, and Ms. Wendy O'Connor from the FAA and industry co-chairs Mr. Brian Townsend from American and Mr. Bill Whyte from Regional Airlines Association (RAA).

Mr. Townsend reviewed the following key PBN issues:

- COVID-19 impacts are affecting NJIP due to travel restrictions, training and access facility
- Established on Required Navigation Performance (EoR)
  - Barriers to EoR report complete
  - Industry assessing ways to further next steps
- Vertical Navigation (VNAV)
  - VNAV issue continues to impact EoR implementation
  - FAA continuing work with ALPA

Mr. Townsend also reviewed PBN NIWG milestone statuses.

Mr. Joe DePete (ALPA) raised concerns related to VNAV. He said that when the pressure is on it is time to be very methodical. He said ALPA has been very clear that it wanted to work together with regard to the LNAV (Lateral Navigation) issue. He described LNAV approaches as non-precision approaches with a high workload and not much equipage. He indicated that ALPA was not included in the development of the PBN Clarification Report. He said the PBN Clarification Report does not mention how regional aircraft will ever equip and expressed concern that it may include reduced separation standards. He said that it is impossible for him to consider the report as a viable option when ALPA knows the real challenge is equipage. He said the wonderful thing about aviation is that the pilot in command is the last arbiter of safety and will always weigh what is best and safest. He said there is an opportunity to "reset this circuit breaker." He said that too much of the report was done without ALPA participation.

Mr. Townsend clarified that the VNAV issue is separate from the PBN Clarification activity. He said specifically with VNAV, there has been good dialogue working within the PBN NIWG regarding ILS (Instrument Landing System) outages that provided some level of flexibility under certain constraints. He said his understanding is that the FAA is still considering that, which Mr. Townsend said was the first step. He added that the group is trying to better understand the ALPA safety concerns, which is difficult without ALPA supplying any data. Mr. Townsend said that to his knowledge closely paralleled operations is not on the table with regard to non-VNAV aircraft.

Mr. DePete in response said that in his mind all these efforts tie together. He added that he admires everyone on the NAC and acknowledged that everyone has responsibilities. He said his responsibility is the highest levels of safety.

Mr. Drew said that the PBN Clarification report efforts had been briefed at NAC SC meetings since April and that ALPA had the opportunity to engage. Mr. DePete said that ALPA was not a part of the group creating the report. He said that ALPA will do what it thinks is the safest thing to do. Mr. Drew thanked Mr. DePete for his comments and offered to discuss with him further at a later time.

### **Data Communications (Data Comm)**

Next, Mr. Drew introduced the Data Comm team with Mr. Jesse Wijntjes from the FAA and industry co-chairs Mr. Chris Collings from L3Harris and Mr. Chuck Stewart from United.

Mr. Wijntjes reviewed the following Data Comm accomplishments:

- Activated Data Comm services at first 3 En Route Centers
  - En Route services exceeding operational performance targets – best performing data link capability in the world
- Air-ground interop issues fault isolated & addressed
  - Avionics software updates delivered and/or in development for all identified issues
  - Implemented fixes and upgrades to air-ground networks
  - En Route Automation Modernization (ERAM) system performance & enhancements have been and continue to be critical to program success
- Operators purchased & installed upgrades to enhance air to ground system performance
- Business/General aviation & DoD communities addressing avionics issues and resuming En Route participation

Mr. Stewart reviewed the industry avionics accomplishments depicted in the following chart.

**Completed Actions**

Operator & Fleet Actions Complete	Status
<b>American Airlines: B777</b>	Operating en route, no action required
<b>FedEx: B777</b>	Operating en route, no action required
<b>Southwest Airlines: B737</b>	Operating en route, no action required
<b>UPS: B744, B757, B767, MD11</b>	Operating en route, no action required

**Avionics Actions In Progress**

Avionics Action	Operator/Fleet	Status
<b>Collins CMU 900 Core 16</b>	FedEx	In progress
<b>Collins VDR Update</b>	FedEx	In progress
Boeing 777 AIMS 2 BP17B	United	In progress
<b>Boeing 787 CMF BP6</b>	American, United	In progress

**Pending Avionics Actions**

Avionics Action	Operator/Fleet	Status
<b>Collins CMU 900 Core 16</b>	Alaska, American, Delta, United	Delayed – On hold due to COVID
<b>Collins VDR Update</b>	Alaska, American, United	Delayed – Installs slowed due to COVID
Airbus ATSU CSB 7.5	Alaska, American, Delta, JetBlue	Delayed – Release delayed Q3 2020 due to COVID
<b>Boeing Pegasus 1 Fix</b>	FedEx, UPS, United	Planned – February 2021
Boeing 747-8 ATN-204	UPS	Planned – Q2 2021



Mr. Collings reviewed the following COVID impacts:

- FAA
  - COVID-19 caused the suspension of all En Route facility training and testing activities beyond site 3

- Industry
  - Installation of avionics updates delayed or slowed by COVID-19
    - Collins CMU 900 Core 16
    - Collins VDR update
    - B787 & B777 updates
  - Airbus delayed A320/330 ATSU release 7.5

Mr. Drew then highlighted that the Data Comm team is recommending the NAC forward PBI (Palm Beach), CVG (Northern Kentucky-Cincinnati), and JAX (Jacksonville) as good candidates for the FAA to consider adding additional tower Data Comm services. Mr. Childs asked for any NAC member objections or comments to this proposal.

**Outcome:** The NAC endorsed forwarding the Data Comm team's recommendation of PBI (Palm Beach), CVG (Northern Kentucky-Cincinnati), and JAX (Jacksonville) as good candidates for the FAA to consider adding additional tower Data Comm services.

### Northeast Corridor (NEC)

Next, Mr. Drew introduced the Northeast Corridor team with Mr. Aaron Wilkins, Mr. Juan Narvid, and Ms. Wendy O'Connor from the FAA and industry co-chairs Mr. Mark Hopkins from Delta and Mr. Ralph Tamburro, from the Port Authority of New York and New Jersey.

Mr. Hopkins reviewed the following key issues and statuses:

- 2020/2021 Commitments
  - Due to COVID-19, facility access limitations, travel restrictions and fiscal austerity will delay completion of several commitments (e.g. ACR and GBAS)
  - Virtual meetings allow continuation of coordination and planning (e.g. Industry TOS discussions)
- Advancing pre-implementation milestones
  - LGA Runway 31 RNAV GPS collaborative meetings are continuing
  - High-performance escape routes for TEB/HPN
- Looking ahead – meetings planned thru Nov NAC
  - Additional discussion on pre-implementation milestones
  - Support to Ad Hoc Teams and other NIWGs
  - Focus on priorities that support agile recovery, specifically within the NEC

Mr. Tamburro also reviewed the outlook for CY2020 Commitments.

Mr. Warren Christie (JetBlue) pointed out that new procedures are difficult when busy and there is currently some relief from that in the NEC. He encouraged looking for ways to implement some of the milestones and continue exploring ways to be innovative. Ms. Bristol indicated that the FAA would do so, and pull things back if possible.

Mr. Don Dillman (FedEx) requested a concise list of what specifically is holding up NextGen work. Ms. Bristol responded that the FAA has not stopped NextGen work. Although the FAA has stopped putting personnel in facilities to deploy equipment, vendors are still developing software as an example. She indicated that training has stopped in facilities, but the FAA hopes to resume in the near future with the

proper PPE and social distancing in place. Mr. Brian Quigley (United) said that he understands training concerns and advocates returning to normal as soon as we can.

### **Minimum Capabilities List**

Next, Mr. Drew introduced the Minimum Capabilities List (MCL) team with co-leads Mr. Ron Renk from United and Mr. Greg Young from Delta.

Mr. Renk explained that the impetus for the MCL was the common thread in NIWG reports that mixed equipage impedes NextGen. He said the MCL is a forward-fit list of equipage that was created by a large segment of the aviation industry to avoid mixed-equipage issues when implementing NextGen in the National Airspace System. Mr. Young reviewed the NAC Task 19-1 language and sub-tasks. They indicated that the analysis and socialization sub-tasks are complete, but that the recommendations on steps to encourage MCL adoption sub-task is incomplete, specifically the cost/benefit portion citing challenges with gathering OEM (Original Equipment Manufacturers) data.

Mr. DePete said ALPA supports the MCL initiative. Mr. Pete Bunce (GAMA) offered his assistance with engaging OEMs at the executive level.

Mr. Drew recommended that the NAC support the MCL team's request for an extension to develop cost/benefit and scoping cases and provide a more detailed brief at the next NAC. Mr. Childs asked for any NAC member objections or comments to this proposal.

**Outcome:** The NAC supported the Minimum Capability List (MCL) team's request for an extension to develop cost/benefit and scoping cases and provide a more detailed out brief at the next NAC

### **Joint Analysis Team (JAT)**

Next, Mr. Drew introduced the JAT with co-chairs Alex Burnett from United and Dave Knorr from the FAA.

Mr. Knorr reviewed the NEC Phase 1 implementations that the NEC and JAT agreed to evaluate. The JAT was stood up to come to consensus on benefits for these implementations. He reviewed the following findings on escape routes:

- Escape route usage increased 92% from 2016/2017 baseline to 2019
- Additional average flight time of ~11 minutes for each escape route flight
- System delay savings estimated at 10 times the average additional flight time for escape route usage. Additionally, estimated a savings of one cancellation for every four escape routes used
- Conservative estimate of achieved benefits delivers increase from baseline
  - Baseline: 2016/2017 is \$15.5M
  - 2018 resulted in \$8.7M additional savings over Baseline
  - 2019 resulted in \$14.6M additional savings over Baseline

Mr. Knorr said that in the next phase, the JAT will be focused on Atlantic coast routes, offshore routes, driven by implementation timelines discussed earlier. He indicated that this report concludes Phase 1 and expressed appreciation for the participation from all stakeholders.

### **NAC Task 19-4: PBN Clarification**

Next, Mr. Drew introduced the PBN Clarification effort. He described this as a tremendous example of aviation community and FAA collaboration leading to a consensus set of priorities. He acknowledged the early efforts of FAA co-lead Kim Stover in standing up the task and team. The PBN Clarification Ad Hoc Team includes Steve Brown from NBAA, Brian Townsend from American, and Bill Whyte from RAA as the aviation community reps; and Clark Desing, Wendy O'Connor, and Aaron Wilkins as the FAA reps.

Mr. Townsend began by reviewing the Task 19-4 language, including:

- Developing consensus agreement on a PBN baseline
  - FAA Procedures;
  - Industry Equipage;
  - Developing consensus agreement on a joint definition of a PBN NAS; and
- Developing consensus agreement based on gaps in baseline analysis at Core 30 airports (minus HNL, plus TEB), on a list of specific desired outcomes.

He also provided details on aviation community representation and FAA subject matter and technical support. He said there was a lot of energy around certain initiatives that have been captured in a separate Airlines for America (A4A) report in more detail, but were considered to be out of scope. He highlighted that this effort boiled down to the FAA's desire to get specific PBN procedures that would be prioritized and provided to the FAA to begin moving PBN forward because the gateway is clogged due to new procedures and the maintenance of existing procedures. He said this effort has really has nothing to do with the VNAV issue or EoR / closely spaced. He also indicated that many of the prioritized procedures are already in the gateway.

He described the PBN baseline for procedures, including:

- Existing procedures in the NAS
  - Area Navigation (RNAV) Standard Instrument Departures (SID) and Standard Terminal Arrival Routes (STAR)
  - RNAV Global Positioning System (GPS) Approaches
  - Required Navigation (RNP) AR Approaches
  - RNP to xLS (ILS/GLS)
  - Advanced RNP (A-RNP) (SIDs, STARs, Approaches)
  - Ground Based Augmentation System Landing System (GLS) Approaches
  - RNAV Visual Flight Procedures (RVFP)
- A-RNP exists in the NAS but is in various stages of development and maturity
- All but RNAV Visuals are part of the NAS NAV Strategy

He also reviewed the PBN baseline for equipage:

- NAC Minimum Capabilities List (MCL) was used to identify the PBN capabilities for Approach and Terminal phases
- Information from the table below from Operations Specifications (Ops Specs) C052, C063 and C384 were used along with the total fleet size to calculate equipage percentages (updated in June 2020, but subject to change)

Air Carrier	Counts	Baseline MCL						Supplemental MCL	
		Approach					Terminal	Approach	
		RNP AR	A-RNP		RNAV (GPS)		RNP-1 w RF	GLS	LPV
			Capable	Ops Spec	Coupled VNAV	Advisory VNAV only			
Majors	4,644	76%	89%	65%	98%	2%	90%	14%	1%
Regionals	1,881	23%	23%	0%	43%	57%	23%	0%	0%

Mr. Townsend said that the team endorsed the 2016 NAS NAV Strategy as the definition of a PBN NAS, including the “Key Principles” and “Navigation Strategy Overview.” He also reviewed the considerations and scoring metrics used in the analysis (full details in the slide deck). Mr. Townsend indicated that the Aviation Community has submitted 48 proposals as “Desired Outcomes” from the modified Core 30 airports and some airports not included in the tasking letter. He said that the FAA SMEs have conducted an initial internal analysis to determine the status of some recommendations, but added that further FAA analysis needs to be conducted regarding scope, feasibility, environmental considerations, and available resources to provide a final list of procedures consistent with FAA planning. He said the PBN Clarification Ad Hoc Report contains the list of recommendations to move PBN development forward in the near term. He mentioned that he hoped that this dialogue can continue past today’s date. He said that he believes that the team could have a final list of procedures within the next few weeks.

Mr. Ed Bolen (NBAA) said that the A4A report is an important underpinning and recommended it be admitted to the public record.

Mr. DePete said ALPA does not have the benefit of a team doing analysis on this but wants to collaborate. He recommended the NAC delay acceptance of the report to allow ALPA to work with the team on its issues.

Mr. Childs said the NAC is listening very intently to what Mr. DePete feels is his lack of engagement. He proposed the NAC vote accept the report with the ALPA dissent, but pause to work through the issues raised.

Mr. DePete said that there were no line pilots included in this effort. He added he is aware of a series of possible ways forward and that he is disappointed in this approach. He said if the decision is to move forward with the vote, he will vote no and address his issues later.

Mr. Drew clarified that line pilots have been involved, but maybe not ALPA members. He said that Mr. Townsend has the experience and training of a line pilot. He said this effort is a review of PBN and that is it—nothing more than a reprioritization of PBN.

Mr. Townsend said there could be an opportunity in coming out with a final list of what the FAA can commit to. He indicated that this may be an opportunity for ALPA to be involved in that final analysis to help the FAA determine feasibility.

Mr. DePete said there could be good stuff in the report, but he sees some red flags and this could be the opportunity for a reset.

Mr. Elwell recommended tabling this discussion and suggested reconvening the ad hoc team to further discuss. Mr. DePete said thank you and that ALPA will work with them swiftly.

Mr. Quigley made a motion to pause discussion for further review and task the NAC SC to review each issue and provide a recommendation to the NAC at its next meeting.

**Outcome:** A NAC Member objected to proceeding with a vote on approval of the PBN Clarification Performance Based Navigation (PBN) Clarification Ad Hoc Team NAC Task 19-4 Report citing concerns with inclusion of certain procedures and lack of participation in report development / time to review the finished product ahead of presentation to the NAC

- NAC members approved a motion to postpone the vote on report approval until the Winter 2020 NAC

Mr. Drew then acknowledged the long efforts of many in the aviation community that are having to move on as the community continues to struggle with organizational response to the pandemic. Out of respect for the many unique situations and not wanting to miss anyone, he did not name any names specifically, but said that he has truly appreciated working with all those affected.

Mr. Elwell said this is exactly the kind of back and forth he had envisioned at the NAC when the FAA renewed this construct. He said that it can be vigorous but that he is encouraged by the passion and interest. He then presented a tasking letter<sup>2</sup> that contains information on three taskings, including:

- **ADS-B In:** In response to several NAC requests to begin a conversation on future potential applications with ADS-B, the FAA's first task to the NAC requests information on NAC member organizations' insight into ADS-B In operator side applications. The FAA is making infrastructure investments today that will be in place for the next decade or more and our intent is to use this conversation to understand what applications and technologies might be considered for acquisition on the operator side that will need to interface with our infrastructure.
- **VNAV:** As a critical component to achieving the full benefit of a PBN Centric-NAS, the FAA is encouraging the NAC to continue its important discussion on VNAV to reduced barriers to full PBN.
- **Section 547:** The FAA is extending this task to allow the NAC time to explore potential alternatives to address as much of the intent of Congress as possible.

**Outcome:** FAA Deputy Administrator Dan Elwell formally tasked the NAC with the following tasks:

- Task 20-1: ADS-B In Commercial Application Technologies
- Task 20-2: Vertical Navigation (VNAV)
- Task 20-3 (Task 19-2 Extension): FAA Reauthorization Act of 2018, Section 547

He said that in addition to the formal taskings, he wanted to encourage the NAC to continue its industry discussions on avionics. Over the past year, these industry avionics discussions have proven very effective at addressing many long-standing operator and manufacture issues. He said to keep up the

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<sup>2</sup> NAC Task 20-1, 20-2, & 20-3 Tasking Letter direct link:  
[https://www.faa.gov/about/office\\_org/headquarters\\_offices/ang/nac/media/20200810\\_NAC\\_Tasks\\_20-1\\_20-2\\_20-3.pdf](https://www.faa.gov/about/office_org/headquarters_offices/ang/nac/media/20200810_NAC_Tasks_20-1_20-2_20-3.pdf)

good work here and the FAA will keep the associated NJIP milestone open for now to allow this discussion to continue.

## **Closing Comments and Adjourn**

Mr. Childs thanked NAC members for their time and commitment, then adjourned the meeting.



# Attachment 1



# NAC Meeting

August 6, 2020



# Opening of Meeting

Chip Childs, NAC Chairman  
President & CEO, SkyWest Inc.

# PUBLIC MEETING ANNOUNCEMENT

## NextGen Advisory Committee

### August 6, 2020

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This meeting is being held pursuant to a notice published in the Federal Register on July 13, 2020. The agenda for the meeting was announced in that notice, with details as set out in the agenda provided today. The FAA Deputy Administrator, Dan Elwell, is the designated Federal 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.





# Public Statements

Members of the Public



# Chairman's Report

Chip Childs, NAC Chairman  
President & CEO, SkyWest Inc.

# Motion for NAC Approval

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- December 12, 2019, NAC Meeting Summary Package Draft





# FAA Report

Dan Elwell, FAA Deputy Administrator

NAC Designated Federal Official



# NAC Subcommittee (SC) Chairman's Report

Craig Drew, NAC SC Chairman, Southwest Airlines



# Opportunities Discussion

Craig Drew, NAC SC Chairman, Southwest Airlines

Teri Bristol, ATO Chief Operating Officer, FAA

# Recommended Opportunities

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- **Test/Implement LGA RNAV Expressway Visual 31 Approach:** Improve the efficiency of the Expressway 31 approach and allow for future technologies to enhance operations.
- **Test/Implement TEB/HPN Escape Route:** Provides for an alternate route out of the airspace for capable business aviation aircraft.



# NAC Tasks 18-4 & 18-5: Focus Area Risks/Mitigations

FAA NIWG Subject Matter Experts (SMEs)

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Multiple Runway Operations (MRO)

Surface & Data Sharing

Performance Based Navigation (PBN)

Data Communications (Data Comm)

Northeast Corridor (NEC)



# Multiple Runway Operations (MRO)

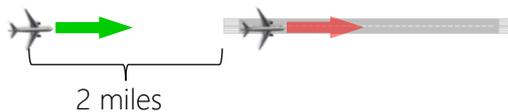
Natee Wongsangpaiboon, FAA & Raul Zamora, Jr., FAA

Glenn Morse, United Airlines & Phil Santos, FedEx

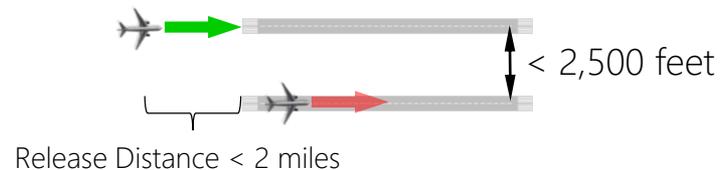
# MRO Update – Accomplishments

- Use of RNAV for SFO 7110.308 Procedures
  - FAA pre-implementation milestone complete; preliminary analyses show some combinations may be feasible
  - Industry discussions with AJT planned
- Reduced Minimum Radar Separation (MRS) – FAA/Industry Milestones Complete
  - Industry comments delivered to FAA in June with implementation recommendations
  - Additional FAA safety studies in progress; concurrence to pursue extension (2.5 nm w/in 20) before reduction (2.0 nm w/in 10)
  - Identified by “Opportunities ad hoc” as game changing concept
- Wake Turbulence Encounter Reporting
  - Industry Milestone Complete - Encouraged increased wake encounter reporting based on new FAA reporting guidance
- Converted 2 original 2.0/1.5 RECAT sites (DTW and IAH) to Consolidated Wake Turbulence (CWT) standards
- Integrated Arrival/Departure (IAD) concept for Closely-Spaced Parallel Runway (CSPR) Operations
  - FAA pre-implementation milestone complete, additional FAA safety studies in progress

Currently Authorized “2 increasing to 3 rule”



IAD Concept (reduced separation)



# MRO Update – COVID Impacts and Looking Ahead

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- **CWT Implementation – FAA Milestone**
  - Remaining sites planned for conversion in 2020 and 2021 are delayed until facilities can accept CWT training
  - New schedule TBD
- **Consolidated Wake Turbulence (CWT) Separation Standards Benefit Analysis – Industry Milestone**
  - Assess benefits from implementation of CWT separations at initial CWT locations (Q4 2020)
  - Preliminary discussions held to identify study locations (IAD, DFW, SEA, BOS) and carrier support
  - Benefits related to fleet mix and traffic demand at each airport/runway; assessment will focus on CWT separation changes within aircraft pairs
  - Potential Risk – Industry resources post-COVID to conduct detailed analysis. Industry may need JAT support for this task based on previous JAT analyses



# Surface and Data Sharing

Doug Swol, FAA & Ayaz Kagzi, FAA

Rob Goldman, Delta Air Lines & Steve Vail, Mosaic ATM

# COVID Impacts to Terminal Flight Data Manager

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- All TFDM-related travel, since March 20<sup>th</sup>, has been restricted only to activities related to sustainment of critical NAS systems.
- Limited access to the FAA Atlantic City tech center for testing
  - Currently, no access to training academy (for training technicians)
- No access to air traffic facilities (to conduct installation, testing, training)
- NAC Milestones on “TBD” status until there is better fidelity of information regarding re-planning efforts and COVID-related constraints
  - TFDM B1 IOC in PHX will postponed till 2021
- While TFDM deployment activities are restricted, FAA continues to make progress:
  - TFDM software development and adaptation continues
  - TFDM software “remote testing” initiated

# NAC Milestone Impact

SURFACE AND DATA SHARING		
PRE-IMPLEMENTATION COMMITMENTS	Old Date	New Date
TFDM program will complete the operational testing for Build 1	Q2 CY2020	<b>Q2 CY2021*</b>
NASA ATD-2 interim technology transfer from Phase 2: Fused IADS at CLT	Q4 CY2019	Complete
NASA ATD-2 final technology transfer from Phase 3: Terminal departure IADS at DFW/DAL	Q3 CY2020	Q4 CY2021
IMPLEMENTATION COMMITMENTS	Old Date	New Date
TFDM program will achieve key site IOC for Build 1 at PHX	Q2 CY2020	<b>Q2 CY2021*</b>
TFDM program will achieve the in-service decision (ISD) for Build 1 to allow additional TFDM system deployments into the NAS	Q4 CY2020	TBD
TFDM program will achieve IOC at 3 additional sites	Q1 CY2021	TBD
TFDM program will achieve the key site IOC for Build 2 at CLT	Q4 CY2021	TBD
TFDM program will achieve ISD for Build 2 to allow additional deployments of the full TFDM capabilities into the NAS	Q1 CY2022	TBD
TFDM program will achieve IOC at 5 additional sites	Q1 CY2022	TBD

\* Notional Dates dependent on ability of program to travel, access FAA facilities, conduct training and conduct testing. If dependencies are not met, the program will not meet these dates.



# Engagement and Commitment Remains Strong:

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- NIWG meetings provide programmatic and operational updates as well as exploration of virtual opportunities
- NASA ATD-2 phase 3 extended from Q4 FY2020 to Q4 FY2021
- SWIFT quarterly (virtual) meetings continue to address SWIM and the data/information sharing needs of the entire community to support iTBO / TBO, Future Flow Management, actionable analytics and more
- TFDM connection testbed option available later this Fall
- FAA will sustain NASA ATD-2 in Charlotte until TFDM is deployed
- FAA will lead Collaborative Site Implementation Team (CSIT) Meetings





# Performance Based Navigation (PBN)

Juan Narvid, FAA; Aaron Wilkins, FAA; Wendy O'Connor, FAA

Brian Townsend, American Airlines & Bill Whyte, RAA

# PBN Key Issues

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- COVID-19 impacts are affecting JIP due to travel restrictions, training and access facility
  - Annual update to JIP is in DRAFT with new JIP dates
- EoR
  - Barriers to EoR report complete
  - Industry assessing ways to further next steps
- VNAV
  - VNAV issue continues to impact EoR implementation
  - FAA continuing work with ALPA

# PBN NIWG Commitment Status

Milestone	Date	Status (New updated JIP dates)
CLE/DTW Post-impl. phase complete	1QCY20	Completed - 10/10/19
DEN Implementation phase start	1QCY20	Completed - ACM 1/28/20
Implementation phase complete	2QCY20	Completed - 3/26/20
Post-impl. phase complete	1QCY21	TBD
LAS Implementation phase start	2QCY20	Completed – 7/7/20
Implementation phase complete	3QCY20	<b>1QCY21</b> - Targeting 11/2020
Post-impl. phase complete	2QCY21	<b>TBD</b>
Florida Implementation phase start	4QCY20	On Track - Expect to commence 10/2020
Implementation phase complete	3QCY21	On Track - Expect to publish procedures 8/2021
Provide input, validate data, review findings and confirm conclusions to post-impl. analyses for implemented PBN procedures.	CLE/DTW Q3CY20 DEN Q3CY21 LAS Q4CY21	On Track – FAA delivered data to Industry focals <b>TBD</b> <b>TBD</b>
Implement select iTBO capabilities in NEC and Denver	NEC Q4CY21  DEN Q4CY21	On track - Currently maturing the time-based metering design and coordinating with field facilities to prepare for departure scheduling from multiple ARTCCs.  On track - Currently planning the implementation of enroute metering improvements in 2020.



# Data Communications (Data Comm)

Jesse Wijntjes, FAA

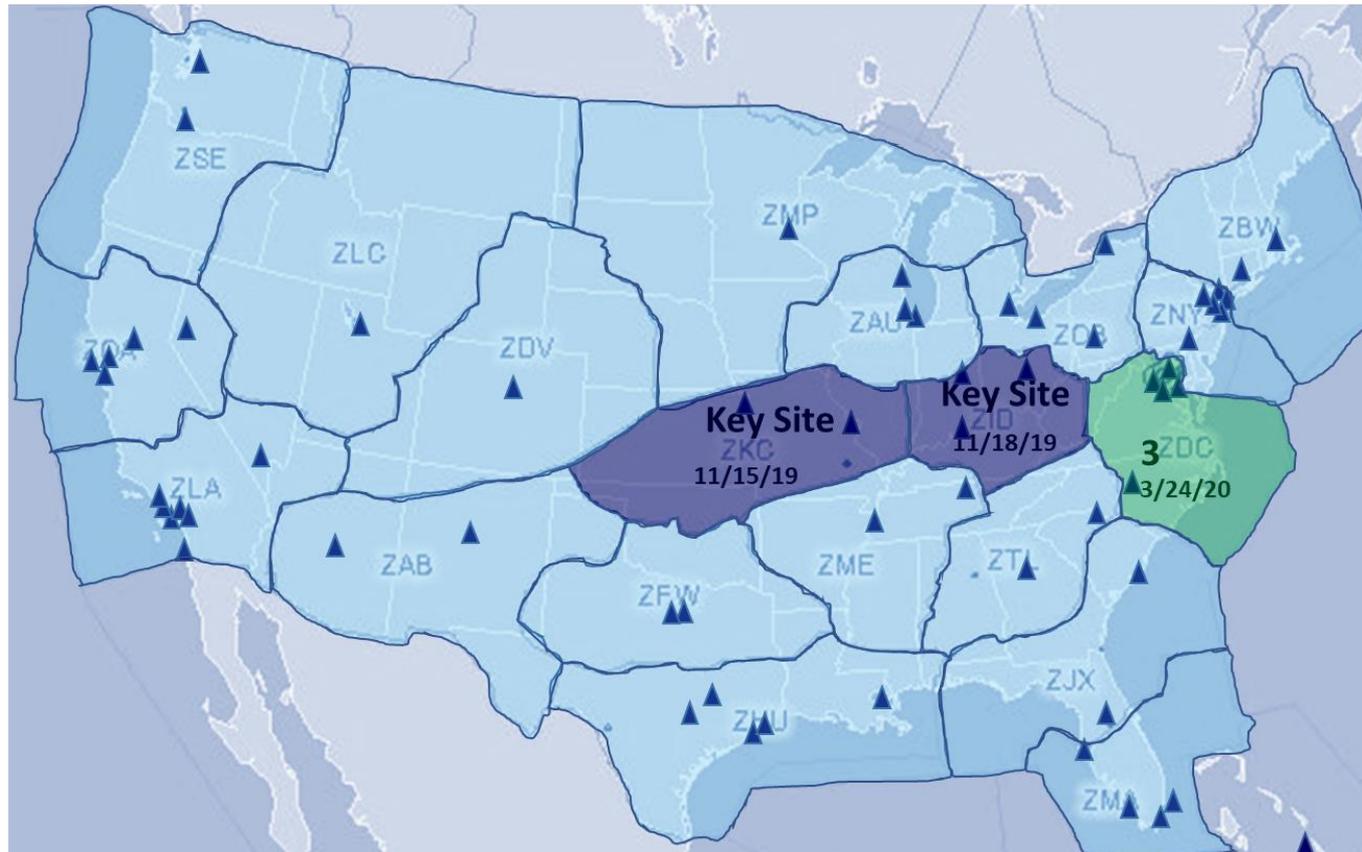
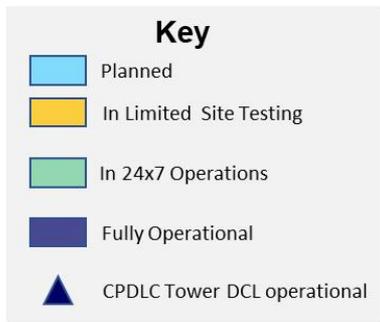
Chris Collings, L3Harris & Chuck Stewart, United Airlines

# Data Comm Accomplishments

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- **Activated Data Comm services at first 3 En Route Centers**
  - En Route services exceeding operational performance targets – best performing data link capability in the world
- **Air-ground interop issues fault isolated & addressed**
  - Avionics software updates delivered and/or in development for all identified issues
  - Implemented fixes and upgrades to air-ground networks
  - ERAM system performance & enhancements have been and continue to be critical to program success
- **Operators purchased & installed upgrades to enhance air to ground system performance**
- **Business/General aviation & DoD communities addressing avionics issues and resuming En Route participation**

# Data Comm Operational Status



# Industry Avionics Accomplishment

## Completed Actions

Operator & Fleet Actions Complete	Status
<b>American Airlines:</b> B777	Operating en route, no action required
<b>FedEx:</b> B777	Operating en route, no action required
<b>Southwest Airlines:</b> B737	Operating en route, no action required
<b>UPS:</b> B744, B757, B767, MD11	Operating en route, no action required

## Avionics Actions In Progress

Avionics Action	Operator/Fleet	Status
<b>Collins CMU 900 Core 16</b>	FedEx	In progress
<b>Collins VDR Update</b>	FedEx	In progress
Boeing 777 AIMS 2 BP17B	United	In progress
<b>Boeing 787 CMF BP6</b>	American, United	In progress

## Pending Avionics Actions

Avionics Action	Operator/Fleet	Status
<b>Collins CMU 900 Core 16</b>	Alaska, American, Delta, United	Delayed – On hold due to COVID
<b>Collins VDR Update</b>	Alaska, American, United	Delayed – Installs slowed due to COVID
Airbus ATSU CSB 7.5	Alaska, American, Delta, JetBlue	Delayed – Release delayed Q3 2020 due to COVID
<b>Boeing Pegasus 1 Fix</b>	FedEx, UPS, United	Planned – February 2021
Boeing 747-8 ATN-204	UPS	Planned – Q2 2021

Data Comm Critical Path Action	Operating, no action required	Operating, pending action	Planned	Delayed / Not operating
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# Data Comm COVID-19 Impacts

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## FAA

- COVID-19 caused the suspension of all En Route facility training and testing activities beyond site 3

## Industry

- Installation of avionics updates delayed or slowed by COVID-19
  - Collins CMU 900 Core 16
  - Collins VDR update
  - B787 & B777 updates
- Airbus delayed A320/330 ATSU release 7.5

# Data Comm Forward Plan

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## FAA

- The team continues to focus on reducing implementation risks once we restart the waterfall
- Completion of the waterfall will be executed as safely and efficiently as possible

## Industry

- Despite the impacts from COVID-19, multiple operators continue to make plans to resume avionics updates
- Boeing and Honeywell are in development on a fix for the B757 & B767 FMS

Industry & FAA Data Comm team is ready to resume the national deployment of En Route services





# Northeast Corridor (NEC)

Aaron Wilkins, FAA; Juan Narvid, FAA; & Wendy O'Connor, FAA

Mark Hopkins, Delta Air Lines & Ralph Tamburro, PANYNJ

# Northeast Corridor - Key Issues and Status

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- **2020/2021 Commitments**
  - Due to COVID-19, facility access limitations, travel restrictions and fiscal austerity will delay completion of several commitments (e.g. ACR and GBAS)
  - Virtual meetings allow continuation of coordination and planning (e.g. Industry TOS discussions)
- **Advancing pre-implementation milestones**
  - LGA Runway 31 RNAV GPS collaborative meetings are continuing
  - High-performance escape routes for TEB/HPN
- **Looking ahead – meetings planned thru Nov NAC**
  - Additional discussion on pre-implementation milestones
  - Support to Ad Hoc Teams and other NIWGs
  - Focus on priorities that support agile recovery, specifically within the NEC

# Outlook for CY2020 Commitments

Type	Commitment/Milestone	NJIP Date	Status
Implementation*	Improved departure management for flights destined for LGA	Q3 CY2020	TBD
Implementation*	DSP enhancements	Q4 CY2020	TBD
Implementation*	Atlantic Coast Routes	Q4 CY2020	Q4 CY2021
Implementation*	PDRR/ABRR Enhancements	Q4 CY2020	TBD
Pre-implement*	FIM review and analyses	Q3 CY2020	Completed**
Industry	GBAS evaluation at BOS	Q2 CY2020	Q4 CY2021
Industry	DCA north end hold pads	Q3 CY2020	TBD
Industry	PHL 27R analyses	Q3 CY2020	Completed
Industry	GBAS at LGA	Q4 CY2020	TBD

\* Implementation and Pre-implementation milestones are all jointly shared by FAA and Industry for the NEC efforts

\*\* Additional coordination between NEC NIWG and Equip2020 WG4 expected





# NAC Task 19-1: Minimum Capabilities List (MCL)

Ron Renk, United Airlines

Greg Young, Delta Air Lines

# How We Got Here...

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- NextGen Integration Working Groups (NIWGs):
  - Northeast Corridor (NEC)
  - Performance Based Navigation (PBN)
  - Data Comm
  - Surface
  - Multiple Runway Operations (MRO)
- Many had a common thread in their reports:

\*MIXED EQUIPAGE impedes NextGen\*

# Refresher – What is MCL?

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The Minimum Capabilities List is a **forward-fit** list of equipage that was created by a large segment of the aviation industry to avoid mixed-equipage issues when implementing NextGen in the National Airspace System.

# Tasking:

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## NAC Task 19-1:

NAS Aircraft Minimum Capability List (MCL) Oct 4<sup>th</sup>, 2019

### Sub-Task #1

*Collaborative analysis* of current fleet equipage with respect to the MCL capabilities

### Sub-Task #2

*Socialization* of the MCL with additional stakeholder groups, including aircraft and equipment manufacturers and regional airlines not involved in discussions to date

### Sub-Task #3

*Recommendations on steps to encourage MCL adoption* and commitments to equip aircraft with the associated capabilities

# Sub-Task #1: Analysis

Air Transport Aircraft	Total Count	Baseline MCL						
		Approach					Terminal	En Route
		RNP AR	A-RNP		RNAV (GPS)		RNP-1 w RF	RNP-2
			Capable	Ops Spec	Coupled VNAV	Advisory VNAV only		
WB/NB	5,355	4,827	4,859	4,088	5,130	225	4,859	5,303
Regional	2,033	702	887	509	1,106	927	887	2,021
WB/NB	5,355	90%	91%	76%	96%	4%	91%	99%
Regional	2,033	35%	44%	25%	54%	46%	44%	99%

Air Transport Aircraft	Total Count	Baseline MCL	
		Data Comm	
		DCL	Enroute CPDLC
WB/NB	5,355	3,603	3,134
Regional	2,033	34	31
WB/NB	5,355	67%	59%
Regional	2,033	2%	2%

Air Transport Aircraft	Total Count	Baseline MCL
		Resiliency
		DME/DME/IRU
WB/NB	5,355	5,242
Regional	2,033	705
WB/NB	5,355	98%
Regional	2,033	35%

\* Pre-COVID numbers, Regional = 90 seats or less

# Sub-Task #2: Socialization

- Baseline and Supplemental matrices complete

NextGen Enabling Category	Aircraft Enabling Capability	Key Missing Components	Benefit	Example Use Cases	Areas Receiving Benefit	Ground Investment	Risks to ROI
<b>Performance Based Navigation</b>	<ul style="list-style-type: none"> <li>RNP-2 (Enroute)</li> <li>RNP-1 w/ RF (Terminal SID/STAR)</li> <li>RNP APCH w/ RF (Approach)</li> <li>A-RNP or RNP AR 0.3 w/ RF (Approach)</li> <li>RNP Scalability</li> <li>Autopilot-coupled VNAV</li> </ul>	<ul style="list-style-type: none"> <li>RF Leg Type</li> <li>Autopilot-coupled VNAV</li> <li>Auto-throttle</li> <li>RNP AR capability</li> <li>FMC database size</li> </ul>	<ul style="list-style-type: none"> <li>Precise deconflicted arr and dep with reduced separation reqs</li> <li>Shorter track miles</li> <li>Reduced fuel burn</li> <li>Maximize poor weather capacity</li> <li>Predictable flows</li> <li>Increased access</li> <li>Reqd for Trajectory Based Operations (TBO)</li> </ul>	<ul style="list-style-type: none"> <li>Established on RNP (EoR)</li> <li>RNAV/RNP arrivals/departures</li> <li>Optimum Profile Descents (OPD)</li> <li>Q/T/Y routes</li> <li>LNAV/VNAV apch minima</li> <li>Apchs where ground based navaid does not exist or is being removed.</li> </ul>	<ul style="list-style-type: none"> <li>North East Corridor (NEC)</li> <li>NSG-1/NSG-2 Airports</li> <li>Terminal Airspace</li> <li>GA Airports with restricted access due to conflicts with terrain or other airports                             <ul style="list-style-type: none"> <li>SMO, G3ADS, PWK</li> <li>HHR, MRI, OPL</li> </ul> </li> <li>Enroute (more efficient routing)</li> <li>Maintain access after NAVAID decommissioning</li> </ul>	<ul style="list-style-type: none"> <li>Airspace and procedures enhancements</li> <li>Reduced lateral separation between routes</li> <li>Controller training</li> <li>Procedure implementation process (IAP, EoR)</li> <li>FAA Policy</li> </ul>	<ul style="list-style-type: none"> <li>Reqd environmental work</li> <li>Non-equipped a/c</li> <li>Decision Support Tools</li> <li>Automation enhancements</li> <li>Requires pre-conditioned flows</li> <li>Right sizing development</li> <li>Maintenance and removal of procedures</li> <li>FMC database size to support new procedures &amp; wpts</li> </ul>
<b>Data Comm</b>	<ul style="list-style-type: none"> <li>FANS-1/A with "Push to Load" over VDL Mode 2 with multi-frequency</li> </ul>	<ul style="list-style-type: none"> <li>CMU/CMF/ATSU</li> <li>VHF Digital Radios</li> <li>FANS 1/A capable FMC/FMGC</li> </ul>	<ul style="list-style-type: none"> <li>Shorter ground delay for clearances</li> <li>Reduced communication errors</li> <li>Efficient delivery of complex clearances</li> <li>Reduce long voice communications</li> <li>Reduced freq congestion</li> <li>Accurate re-route</li> <li>Weather avoidance</li> <li>Pilot requested re-routes</li> <li>Enables Trajectory Based Operations (TBO)</li> <li>CTOP/TOS</li> </ul>	<ul style="list-style-type: none"> <li>High rate clearances during SWAP</li> <li>Efficient wx re-route</li> <li>Improved human factors (errors in re-route entries)</li> <li>More efficient routing</li> </ul>	<ul style="list-style-type: none"> <li>NAS ground ops</li> <li>Enroute ops</li> </ul>	<ul style="list-style-type: none"> <li>Development / delivery of Data Comm svcs</li> <li>Enhanced automation and Decision Support tools</li> <li>Controller training</li> </ul>	<ul style="list-style-type: none"> <li>Pilot/Controller training during implementation</li> <li>Non-equipped a/c</li> <li>Actual system performance</li> <li>Conformity of equipment to use FANS messages (older spec being adapted for modern use)</li> <li>Partially equipped aircraft - Meets some but not all FANS 1/A requirements</li> </ul>
<b>Surveillance</b>	<ul style="list-style-type: none"> <li>ADS-B Out - Mandate</li> </ul>	<ul style="list-style-type: none"> <li>Transponder</li> <li>Highly accurate position source with integrity</li> </ul>	<ul style="list-style-type: none"> <li>Enables 3NM enroute separation</li> <li>Reduced separation in select situations</li> <li>Improved surveillance in non-radar areas (including surface)</li> <li>More accurate position; more frequent update rate</li> <li>Enables improved safety via ATC automation and TFM Decision Support tools</li> <li>Improved Planning and TFM Services</li> <li>Improved SAR</li> <li>Enables ADS-B IN applications</li> </ul>	<ul style="list-style-type: none"> <li>3NM enroute separation</li> <li>Western Atlantic Route System (WATRS) operations surveillance</li> <li>Reduced terminal vectoring due to conflict</li> <li>Enhanced SAR</li> </ul>	<ul style="list-style-type: none"> <li>Enroute</li> <li>Terminal</li> <li>Non-radar environments</li> <li>Mountainous terrain</li> </ul>	<ul style="list-style-type: none"> <li>Ground infrastructure</li> <li>ERAM/STARS enhancements</li> <li>Controller training</li> <li>Reduced Spacing</li> </ul>	
<b>Performance Based Navigation, Low Vis Ops, Surveillance</b>	<ul style="list-style-type: none"> <li>Resilient NextGen Ops (DME/DME/IRU)</li> </ul>	<ul style="list-style-type: none"> <li>Airworthiness approval for DME/DME, IRU Hardware</li> </ul>	<ul style="list-style-type: none"> <li>Resilient terminal and enroute ops with GPS loss (Jamming or hardware failure)</li> </ul>	<ul style="list-style-type: none"> <li>Q/T/Y Routes</li> <li>RNAV SIDs and STARS</li> </ul>	<ul style="list-style-type: none"> <li>Navigation and surveillance resilience for all NAS ops; needed most in remote areas.</li> </ul>	None	



# Sub-Task 2: Socialization (cont.)

NETJETS®



← EMBRAER

Southwest®

UNITED 

 DELTA

AIRBUS

 BOEING®

American Airlines 



 Collins Aerospace

**RAA**  
Regional Airline Association

 **MITSUBISHI**  
AIRCRAFT CORPORATION



jetBlue

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NATIONAL BUSINESS AVIATION ASSOCIATION



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# Sub-Task #3: Adoption and Commitment

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- Scope – To whom does the MCL apply? (**DONE**)
- Retrofit – “If I took delivery of airplanes just last year, what items would I need to buy so as not to become an impediment to NextGen?” (**DONE**)
- Cost/Benefit – “What will this cost me and what will I get in return?” (**INCOMPLETE**)

# Conclusion

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- 2 year effort: Level of interest and collaboration was robust
- The Baseline and Supplemental matrices are complete
- No doubt a “WIN” for all stakeholders
  - Path forward to use technology to improve NAS operations
- In order to assure MCL success, it needs:
  - High level of participation/adoption from Industry, and
  - Corresponding FAA investment response

# Conclusion

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- Best outcome – Airlines and General Aviation Operators, that are within scope, elect to use the MCL to establish aircraft equipage specifications for OEMs (MCL Baseline becomes standard equipment).
- Though NAC tasking, in spirit, is “complete;” completion of the final three issues are critical to its success. Due to COVID issues we request one additional meeting cycle to finalize the effort and provide the NAC a more detailed conclusion.



# NAC Task 19-3: Joint Analysis Team (JAT)

David Knorr, FAA

Alex Burnett, United Airlines

# NEC Phase 1 Implementations

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

\* Implementations with measurable quantitative benefits in bold

Note: 1 & 2 will be studied together as systems combine to produce measurable benefit



# Background

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- **JAT Tasking:**
  - Evaluate expanded consistent usage of defined and existing capping and tunneling (escape routes) for departures/arrivals to/from the NEC through required advisories
- **What is an escape route?**
  - Escape routes offer a means to increase departure capacity during significant Severe Weather Avoidance Plan (SWAP) events and during special events or holiday traffic volume situations

# Escape Routes - Summary Findings

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- Escape route usage increased 92% from 2016/2017 baseline to 2019
- Additional average flight time of ~11 minutes for each escape route flight
- System delay savings estimated at 10 times the average additional flight time for escape route usage. Additionally, estimated a savings of one cancellation for every four escape routes used
- Conservative estimate of achieved benefits delivers increase from baseline
  - Baseline: 2016/2017 is \$15.5M
  - 2018 resulted in \$8.7M additional savings over Baseline
  - 2019 resulted in \$14.6M additional savings over Baseline

# Escape Route Usage





## NAC Task 19-4: PBN Clarification

Ad Hoc Co-Chairs: Steve Brown, Brian Townsend, & Bill Whyte

FAA SMEs: Clark Desing, Wendy O'Connor, & Aaron Wilkins

# Task 19-4: Performance Based Navigation (PBN) Clarification

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The NAC is asked to provide aviation community consensus advice by:

- Developing consensus agreement on a PBN baseline
  - FAA Procedures
  - Industry Equipage;
- Developing consensus agreement on a joint definition of a PBN NAS;  
and
- Developing consensus agreement based on gaps in baseline analysis at Core 30 airports (minus HNL, plus TEB), on a list of specific desired outcomes.

# Aviation Community Representatives

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- The Airline Co-Chair for the PBN NextGen Integration Working Group (NIWG) Brian Townsend, American Airlines
- A representative from Regional Aviation Bill Whyte, Regional Airline Association (RAA)
- A representative from Business/ General Aviation Steve Brown, National Business Aviation Association (NBAA)
- Additional support provided by A4A with member and non-member airlines with carrier provided Air Traffic Management and Technical Pilot expertise
- Also included participation from RAA and NBAA



# FAA Support

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- FAA Subject Matter Experts (SMEs) from the Air Traffic Organization (ATO):
  - Wendy O'Connor
  - Aaron Wilkins
  - Clark Desing
- Additional invited technical support:
  - NATCA
  - MITRE

# PBN Baseline for Procedures

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- Existing procedures in the NAS
  - RNAV SIDs and STARs
  - RNAV GPS Approaches
  - RNP AR Approaches
  - RNP to xLS (ILS/GLS)`
  - Advanced RNP (A-RNP) (SIDs, STARs, Approaches)
  - Ground Based Augmentation System Landing System (GLS) Approaches
  - RNAV Visual Flight Procedures (RVFP)
- A-RNP exists in the NAS but is in various stages of development and maturity
- All but RNAV Visuals are part of the NAS NAV Strategy

# PBN Baseline Equipage

- NAC Minimum Capabilities List (MCL) was used to identify the PBN capabilities for Approach and Terminal phases
- Information from Table 1 from Operations Specifications (Ops Specs) C052, C063 and C384 were used along with the total fleet size to calculate equipage percentages
- Updated in June 2020, but subject to change

Air Carrier	Counts	Baseline MCL						Supplemental MCL	
		Approach					Terminal	Approach	
		RNP AR	A-RNP		RNAV (GPS)		RNP-1 w RF	GLS	LPV
			Capable	Ops Spec	Coupled VNAV	Advisory VNAV only			
Majors	4,644	76%	89%	65%	98%	2%	90%	14%	1%
Regionals	1,881	23%	23%	0%	43%	57%	23%	0%	0%

# Consensus Agreement on a PBN NAS

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- The Ad Hoc Team endorses the 2016 NAS NAV Strategy as the definition of a PBN NAS
  - Including the “Key Principles” and “Navigation Strategy Overview”
- The introductory remarks of then-FAA Administrator Michael P. Huerta are still relevant and are an accurate reflection of the definition of a PBN NAS:

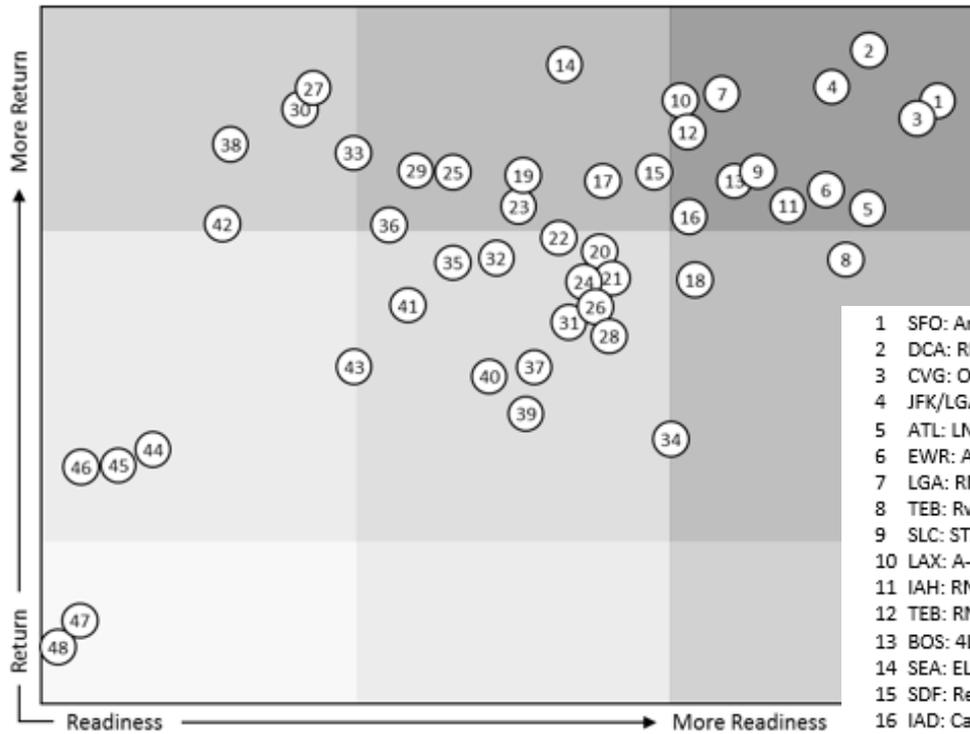
*“A truly PBN-centric NAS, that is, a NAS where PBN is used as the basis for daily operations. It charts a course that will allow the public and private sectors to advance the NAS collaboratively and constructively for the benefit of all aviation stakeholders, including aircraft operators, the traveling public, as well as new entrants such as unmanned aircraft systems and commercial space vehicles.”*

# Consensus Agreement On Specific Desired Outcomes

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- Identify gaps in baseline analysis at Core 30 airports (minus HNL, plus TEB)
- Post tasking airport considerations
  - Cargo Carrier airports and other vital airports outside of the Core 30
  - DEN, LAS and Florida Metroplex excluded
- Airports were individually prioritized by the operators
  - Desired PBN outcomes proposed for each airport
- Ranking the procedures was based on Readiness and Return scoring metrics

# Summary of Aviation Community Readiness and Return



- |   |  |
|---|--|
| 1 SFO: Amend SSTIK and retire OFFSHORE          | 25 ORD: Optimized SIDs/STARs                     |
| 2 DCA: RNAV (GPS) for Rwy 19                    | 26 PHX: EAGUL6 STAR optimization                 |
| 3 CVG: OPDs, CCOs, RNP w RF                     | 27 EWR/TEB: MARS application                     |
| 4 JFK/LGA: SKORR/GLDMN departures               | 28 DCA: RNAV (RNP) for Rwy 01                    |
| 5 ATL: LNAV for parallel ops                    | 29 MEM: xLS transitions and A-RNP to all runways |
| 6 EWR: Align RNAV with ILS, revise RNP Rwy 29   | 30 DAL/DFW: MARS application                     |
| 7 LGA: RNAV (GPS) for Rwy 31                    | 31 PHL: RNAV (GPS) for Rwy 09L/R                 |
| 8 TEB: Rwy 19 offset and RUUDY departure        | 32 DCA: CLIPR/DEALE optimization                 |
| 9 SLC: STARs/SIDs in IFP gateway                | 33 SEA: RNAV STARs and RNP from east             |
| 10 LAX: A-RNP approaches (enables EoR)          | 34 HOU: RNAV (RNP) to Rwy 13R, 31L, 22, 04       |
| 11 IAH: RNP(AR) for Rwy 27 & 08L (enables EoR)  | 35 SLC: Curved approach for Rwy 35               |
| 12 TEB: RNAV SID for Rwy 19                     | 36 SLC: RF/TF overlay with xLS (enables EoR)     |
| 13 BOS: 4L GPS offset with VNAV                 | 37 SFO: GLS applications/procedures              |
| 14 SEA: ELSO in existing departure corridor     | 38 SFO/OAK: MARS application                     |
| 15 SDF: Redesigned SIDs/STARs (enables EoR)     | 39 FLL: Metroplex RNP approaches                 |
| 16 IAD: Capital Redesign (enables EoR)          | 40 BOS: RNP(AR) for Rwy 22L with GPS overlay     |
| 17 EWR: Replace vectors SIDs                    | 41 MCO: Metroplex RNP approaches                 |
| 18 DAL: Approaches for Rwy 13L/R and 31L/R      | 42 EWR: .308 procedures for parallel operations  |
| 19 TEB: RNAV to replace conventional procedures | 43 SFO: .308 procedures for Rwy 19L/R operations |
| 20 PDX: EoR with waiver                         | 44 EWR: GLS applications/procedures              |
| 21 BNA: A-RNP approaches (enables EoR)          | 45 LGA: GLS applications/procedures              |
| 22 JFK: Approaches for Rwy 13L/R (enables EoR)  | 46 JFK: GLS applications/procedures              |
| 23 ATL: RF/TF overlay with xLS (enables EoR)    | 47 IAH: GLS applications/procedures              |
| 24 DFW: Offload RNAV STAR for NE corner         | 48 ATL: GLS applications/procedures              |

*NOTE: This is the list the FAA will work from to determine what procedures are within scope and can feasibly be developed*

# FAA Procedures Analysis and Final Outcome

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- The Aviation Community has submitted 48 proposals as “Desired Outcomes” from the modified Core 30 airports and some airports not included in the tasking letter
- The FAA SMEs have conducted an initial internal analysis to determine the status of some recommendations. Further FAA analysis needs to be conducted regarding scope, feasibility, environmental considerations, and available resources to provide a final list of procedures consistent with FAA planning.
- The PBN Clarification Ad Hoc Report contains the list of recommendations to move PBN development forward in the near term

# Motion for NAC Approval as Advice to the FAA

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- Performance Based Navigation (PBN) Clarification Ad Hoc Team  
NAC Task 19-4 Report





# New NAC Taskings

Dan Elwell, FAA Deputy Administrator

NAC Designated Federal Official



# Summary of Meeting & Action Item Review

Greg Schwab, FAA

# NextGen Advisory Committee (NAC) Upcoming Meetings

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- Winter 2020
  - \*November 17, 2020
- Spring 2021
  - March 2021 (target month)
- Summer 2021
  - July 2021 (target month)





# Closing Comments & Adjourn

Chip Childs, NAC Chairman  
President & CEO, SkyWest Inc.



# Attachment 2



## NextGen Advisory Committee (NAC) August 6, 2020 Attendance List

Last Name	First Name	Affiliation
Adcock	Tom	National Air Traffic Controllers Association
Allen	Jack	Airlines for America
Allen	Mark	Federal Aviation Administration
Allen	Daniel	FedEx Express
Andrews	Malcolm	Federal Aviation Administration
Baker	Jodi	Federal Aviation Administration
Beasley	Stephanie	POLITICO Pro
Bechdolt	Anne	FedEx Express
Berlucchi	Robert	American Airlines, Inc.
Bertapelle	Joseph	Aireon, LLC / JetBlue Airways Corp.
Bolen	Ed	NBAA
Bristol	Teri	Federal Aviation Administration
Brown	Lee	JetBlue Airways Corp.
Brown	Steve	NBAA
Brown	Kelly	Federal Aviation Administration
Bunce	Pete	General Aviation Manufacturers Association
Burnham	Kristen	Federal Aviation Administration
Burns	Patrick	Delta Air Lines, Inc.
Butler	Steven	Federal Aviation Administration
Buttie	Steve	Department of Defense
Capezzuto	Vincent	Aireon, LLC
Carey	Bill	Aviation Week

<b>Last Name</b>	<b>First Name</b>	<b>Affiliation</b>
Cebula	Andy	Airlines for America
Challan	Peter	L3Harris
Childs	Russell	SkyWest, Inc.
Christiansen	Cindy	BOS Fair Skies Grassroots Group
Clarke	Steven	NASA
Collings	Chris	L3Harris
Cochran	Walter	Leidos
Conway	Sheila	The Boeing Company
Cook	Charles	JetBlue Airways Corp.
Cornett	Megan	Department of Defense
Cunha	Jason	Concept Solutions
Dalton	Richard	Southwest Airlines
Denicuolo	Mark	Federal Aviation Administration
DePete	Joe	Air Line Pilots Association
Dickson	Steve	Federal Aviation Administration
DiJoseph	Mary	NASA
Dillman	Don	FedEx Express
Donohue	Denis	Raytheon Technologies
Dowd	Jody	Federal Aviation Administration
Drew	Craig	Southwest Airlines
Duffy	Kent	Federal Aviation Administration
Dumont	Pete	Air Traffic Control Association
Eck	Jim	L3Harris
Egentowich	John	Federal Aviation Administration
Elwell	Daniel	Federal Aviation Administration
Fanning	Eric	Aerospace Industries Association
Fenkell	Max	Aerospace Industries Association

<b>Last Name</b>	<b>First Name</b>	<b>Affiliation</b>
Girard	Andy	Federal Aviation Administration
Glenn-Chase	Abigail	Air Traffic Control Association
Goldenberg	Jana	Plane Sense 4 LI
Goldman	Robert	Delta Air Lines, Inc.
Gomez	Pamela	Federal Aviation Administration
Gottlieb	Christopher	JetBlue Airways Corp.
Graham	Jim	Delta Air Lines, Inc.
Guillermet	Florian	SESAR Joint Undertaking
Gusky	Amy	Federal Aviation Administration
Guthrie	Roddy	American Airlines, Inc.
Guy	Rebecca	Federal Aviation Administration
Hamel	Christopher	Studio Aerospace LLC
Helton	Douglas	Noblis
Hill	Fran	Leidos
Hollander	Anne	Montgomery County Quiet Skies Coalition, Ltd.
Hopkins	Mark	Delta Air Lines, Inc.
Huling	Murray	AOPA
Ingram	Michael	Honeywell
Jensen	Dave	Honeywell
Johnson	Antionette	Federal Aviation Administration
Jones	Tammy	Federal Aviation Administration
Kagzi	Ayaz	Federal Aviation Administration
Kamyab	Ahmad	Federal Aviation Administration
Kauffman	Don	Honeywell
Kenagy	Randy	Air Line Pilots Association
Knorr	Dave	Federal Aviation Administration
Kowalewski	Deborah	Airline Dispatchers Federation

<b>Last Name</b>	<b>First Name</b>	<b>Affiliation</b>
Kozica	Shawn	Federal Aviation Administration
Krahulec	John	Concept Solutions
Ladner	John	Alaska Airlines
Lamparello	Sandra	PAI Consulting
Landesmann	Jennifer	San Francisco Bay Area Citizen
Lawrence	Huntley	Port Authority of New York and New Jersey
Lee	Marlene	Federal Aviation Administration
Leone	Gregg	MITRE
Loring	Christopher	Federal Aviation Administration
Madera	Norbert	Concept Solutions
Matulenas	Caitlin	Federal Aviation Administration
McGraw	Candace	Cincinnati/Northern Kentucky International Airport
Mclean	Donna	PlanzerMcClean
Menchion	Christopher	JetBlue Airways Corp.
Mercer	Roosevelt	Federal Aviation Administration
Merritt	Jon	United Airlines, Inc.
Mitchell	Tiffany	Federal Aviation Administration
Mitchell	Derek	Honeywell
Morse	Glenn	United Airlines, Inc.
Nadarski	Dominic	US Government Accountability Office
Narvid	Juan	Federal Aviation Administration
O'Connor	Wendy	Federal Aviation Administration
Olson	Lee	NASA
Ortega	Reynaldo	JetBlue Airways Corp.
Pascal	Joly	Airbus
Pennington	Darrell	Air Line Pilots Association
Perrone	Mike	Professional Aviation Safety Specialists

<b>Last Name</b>	<b>First Name</b>	<b>Affiliation</b>
Peyton	Bret	Alaska Airlines
Pfingstler	Susan	United Airlines, Inc.
Pierce	Robert	National Association to Insure a Sound Controlled Environment
Quigley	Bryan	United Airlines, Inc.
Renk	Ron	United Airlines, Inc.
Rice	Colin	Port of Seattle
Rinaldi	Paul	National Air Traffic Controllers Association
Santos	Phil	FedEx Express
Sawyer	Dennis	MITRE
Schatz	Rowayne	Department of Defense
Schwab	Gregory	Federal Aviation Administration
Shaffer	Kirk	Federal Aviation Administration
Shull	Mark Kevin	Palo Alto Citizens
Silverman	Eric	American Airlines, Inc.
Sinnett	Michael	The Boeing Company
Spaw	Carol	Cincinnati/Northern Kentucky International Airport
Spurio	Nazzareno	Raytheon Technologies
Steinbicker	Mark	Federal Aviation Administration
Stevenson	Dawn	Evans Consulting
Stewart	Chuck	United Airlines, Inc.
Stone	Kimball	American Airlines, Inc.
Sullivan	Lisa	Palantir Technologies
Sunny	De Paul	JetBlue Airways Corp.
Surridge	David	American Airlines, Inc.
Swol	Doug	Federal Aviation Administration
Sypniewski	Jessica	Federal Aviation Administration

<b>Last Name</b>	<b>First Name</b>	<b>Affiliation</b>
Tamburro	Ralph	Port Authority of New York and New Jersey
Thoma	Donald	Aireon, LLC
Toerber	Tim	Port of Seattle
Townsend	Brian	American Airlines, Inc.
Tranter	Emily	National Association to Insure a Sound Controlled Environment
Trevisan	Amy	Federal Aviation Administration
Vail	Steve	Mosaic ATM, Inc.
Warren	Christie	JetBlue Airways Corp.
Wendling	Kelle	L3Harris
Whitley	Pamela	Federal Aviation Administration
Whyte	Bill	RAA
Wijntjes	Jesse	Federal Aviation Administration
Wilkins	Aaron	Federal Aviation Administration
Willey	Doug	Air Line Pilots Association
Williams	Heidi	NBAA
Wongsangpaiboon	Natee	Federal Aviation Administration
Woods	Jeff	National Air Traffic Controllers Association
Yaplee	Darlene	Palo Alto Citizens
Yates	Vaughn	Federal Aviation Administration
Young	Gregory	Delta Air Lines, Inc.



# Attachment 3

Good afternoon. I'm Mark Shull from Palo Alto California.

My early career was at BBN, and one of the things I know about the Shultz curve developed there is that the highly annoyed category in the DNL metric is defined by a point where people are so annoyed, they take action. NextGen's architecture of concentration has driven many to this level of annoyance. People and cities are taking action, contacting congress people, attending meetings and filing lawsuits.

Building efficiency based on invariant repetition ultimately does not scale over highly populated areas, for noise and health reasons. For example, ultra-fines particulate plumes under concentrated arrival paths have been shown by multiple major university studies to be a significant and growing problem.

Whatever safety and efficiency have meant in past is unlikely to be a good guide as to what they will mean in the future, particularly against more comprehensive and ultimately competitive international models.

The US is five years behind Europe in simple measures like retrofitting 319s and 320s to eliminate the piercing whistle during arrivals. We don't have models for respite or path rotation. At SFO near where I live, we had Tailored Arrivals to final pre-NextGEN, now we have OPDs that terminate at 6 to 8,000 ft, just before they hit the most populated areas, often over energy with air brakes on one arrival and a noisy descend and maintain on another. San Francisco Bay is increasingly used for separation space between SFO and Oakland airports, leaving most of the traffic over populated areas instead. I get that these two airports compete commercially, but from an FAA perspective, it would seem that operating them logically as one airport, where the separation is between runways and not airports, would be safer and more efficient, and make much better use of the Bay. Also, SFO is implementing the GBAS Landing system, but this is actually projected to increase noise because the STARs will not be modified to take advantage of GBAS' path capabilities. It is becoming yet another PR problem, when it should be a win.

We live in a time of unimagined tipping points, where air travel is at a pause and being re-thought globally. NextGen's RTCA Task Force 5 recommendations were implemented quickly. I would urge you to create tasking to now go back to look at what can be improved in these existing NextGEN implementations. At least here at San Francisco, there is a lot of low hanging fruit that could greatly improve relations with the community. (I'd be happy to provide examples.)

Thank you for listening,