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Meeting Summary, February 25, 2016

NextGen Advisory Committee (NAC)

The seventeenth meeting of the NextGen Advisory Committee (NAC) was held on February 25, 2016 at Delta Air Lines, Atlanta, GA. The meeting discussions are summarized below.

List of attachments:

- Attachment 1 - Attendees
- Attachment 2 - Presentations for the Committee meeting - (containing much of the detail on the content covered during the meeting)
- Attachment 3 - Approved October 8, 2015 Meeting Summary
- Attachment 4 - NAC Chairman's Report
- Attachment 5 - FAA Report from The Honorable Michael Whitaker, FAA Deputy Administrator
- Attachment 6 – Delta Air Lines Equipage presentation

Welcome and Introductions

Chairman Anderson opened the meeting at 9:08 a.m. by welcoming the NAC members and others in attendance and introducing five new Committee members:

- Pete Dumont, President, Air Traffic Control Association
- David Melcher, President, Aerospace Industries Association
- Vicki Schmanske, Vice President Operations, Lockheed Martin IS&GS Civil, Defense & Intel

- Dr. Jaiwon Shin, Associate Administrator, National Aeronautics and Space Administration
- Martin Whelan, Director of Future Operations, United States Air Force

Chairman Anderson also recognized the contribution of retiring Committee member Jeff Hamiel, Executive Director/CEO, Metropolitan Airports Commission in representing airports and his service in Minneapolis, Minnesota.

All NAC members and attendees from the general public were asked to introduce themselves (attendees are identified in Attachment 1).

Designated Federal Official Statement

The DFO, The Honorable Michael Whitaker (FAA Deputy Administrator) read the Federal Advisory Committee Act notice, governing the public meeting.

Approval of October 8, 2015 Meeting Summary

Chairman Anderson asked for consideration of the written Summary of the October 8, 2015 meeting. By motion, the Committee approved the Summary (Attachment 3).

Chairman's Remarks

The following is a summary of the remarks made by Chairman Anderson (Attachment 4):

He thanked Administrator Michael Huerta, Mike Whitaker and their leadership team at the FAA for their engagement of the industry in the consensus-based process as we seek to implement NextGen capabilities under the NextGen Advisory Committee (NAC). The Chairman also expressed appreciation to his colleagues in the aviation industry for their commitment to the work of the Committee, the Subcommittee and the various work and task groups.

He summarized 2015 accomplishments:

- The FAA implemented 29 of 31 priorities of the Industry-FAA NextGen Integration Working Group (NIWG), advancing work in the four priority areas of DataComm,

Multiple Runway Operations (MRO), Performance Based Navigation (PBN), and Surface.

- DataComm – In response to NAC recommendations, the FAA resolved implementation issues, including addressing the data recording requirement that presented a potential barrier for aircraft operators to use pre-departure clearances in the terminal area.
- The FAA made substantial progress on Wake Recategorization (Wake ReCat) implementation at locations with simultaneous approaches to parallel runways by reducing separation criteria for multiple runway operations.
- In the critical PBN capability, the FAA moved forward with Established on RNP (EOR) capabilities, Metroplex implementations at Northern California, Atlanta and Charlotte, a Las Vegas PBN analysis and a national standard for Equivalent Lateral Spacing Operations (ELSO).
- Surface and data sharing – The FAA progressed with a deployment of electronic flight strips at Newark Airport, a NASA departure metering capability at Charlotte, and an agreement to have airports participate in Collaborative Decision Making.

As plans and implementations proceed into 2016 and future years he suggested that the overarching goal of NextGen, should be achieving VMC performance in IMC conditions. The Committee must mitigate the risks of implementation, and measure outcomes using the performance metrics identified through the successful transparent collaborative process. We must jointly address all necessary components of each capability, such as training, decision support tools, procedures and policies and have a fully integrated implementation plan.

He noted that the Committee work cannot be political, and underscored the need for the Industry and the FAA to speak with one voice regarding the operational performance improvements attributable to NextGen implementation.

He reiterated the Committee's strong commitment to ADS-B implementation. This included the work of the ADS-B Task Group that identified barriers to meeting the January 2020

implementation date and steps to address these. He asked the OEM's to do a better job of retrofitting with plug and play technology, given the pace of technological advancements.

In conclusion, Chairman Anderson emphasized that there is no better way to ensure mutual success than through a federal advisory committee venue, such as the NAC, supported by the world-class collaboration tools and expertise RTCA has built up over the years.

FAA Report - Mike Whitaker, Deputy Administrator, FAA

The following are the major points from Mr. Whitaker's remarks. The details are contained in the FAA report (Attachment 5).

Mr. Whitaker began his remarks by congratulating Chairman Anderson on his new role as Executive Chairman of Delta's Board, thanking him for his continued leadership of the NAC that will continue through the October 2016 meeting. He also reviewed the agenda items and addressed recent progress that the FAA and the NAC has made since the October meeting.

He highlighted the following FAA News:

Budget – The Fiscal Year 2017 budget calls for $15.9 billion, including approximately $1 billion for NextGen. This budget, if enacted, would restore us to the funding levels needed to execute the NextGen Priorities.

FAA Reauthorization – There is broad acknowledgment that there are opportunities through FAA reauthorization to ensure that the U.S. continues to lead the world in aviation safety and efficiency. We encourage Congress to work in a bipartisan way, consistent with recent approaches on transportation issues. FAA reauthorization will impact a broad and diverse array of stakeholders, and we want to make sure they are all heard throughout this process, which has just begun.

We continue to believe that any proposal should support our core reauthorization principles. These principles include maintaining the safest aerospace system in the world, modernizing the FAA's air traffic control system—including stable funding for air traffic control

operations, NextGen, and the efficient recapitalization of aging facilities—and enabling the integration of new users into the NAS.

Unmanned Aircraft Systems (UAS) – the FAA has been working hard to integrate UAS safely and effectively into our airspace. In December, we made great strides toward this goal by creating a web-based registration process for owners of small drones. More than 350,000 owners of small unmanned aircraft, weighing more than half a pound and less than 55 lbs, have registered their drone.

FAA is continuing to work on the final rule for small UAS and we plan to publish it in late spring. We believe it will meet the majority of current commercial demand.

Micro UAS ARC – This week FAA announced the establishing of an aviation rulemaking committee to develop recommendations for operating micro unmanned aircraft. This work will begin its work in March and will make recommendations for how to safely operate drones over people who are not directly involved in the operation of the aircraft by April. There has been interest in creating a micro UAS category. As part of the proposed rule for small UAS, we asked for comments on a "micro" classification. Based on the comments, the FAA has decided to pursue flexible, performance-based requirements that address potential hazards instead of a classification defined by weight and speed.

In response to a question about the discussed micro UAS 4.4lb weight, Mr. Whitaker explained that the weight had not been determined. The micro rulemaking committee would look at various combinations of weights, shapes and speed, among other factors, to determine what is appropriate for a proposed rule.

PBN NAV Strategy – Mr. Whitaker introduced Mark Bradley (Delta Air Lines) and Josh Gustin (FAA) who provided an overview of the PBN NAS NAV strategy. The strategy establishes a clear vision of PBN as the basis for all daily operations in the NAS, outlines a 15-year plan, and defines navigation service groups. In the near term, the FAA will use the tools and procedures it has in place and then move forward to increase capability by service group.

The plan pulls together much of the work underway with a longer term plan to assist the industry in what is needed.

Mr. Bradley explained three areas for additional follow-up:

1. Department of Defense equipage concerns and capabilities
2. NBAA concerns about depiction of Radius to Fix (RF) procedures on aircraft multi-function displays (under further work by the PARC)[1]
3. NAC Tasking on PBN Time, Speed, Spacing tools

At the end of the discussion in response to a request from Mr. Whitaker the NAC endorsed the PBN NAS NAV Strategy.

PBN Time, Speed, Spacing Task Group

Task Group Co-Chairs Dan Allen, FedEx Express, and Steve Fulton, Sandel Avionics, provided a brief on the FAA tasking to review plans for time, speed, spacing and related capabilities. The purpose is to identify and prioritize tools and technologies that are ground-based and those in aircraft that are appropriate in various operating conditions. The outcome is to develop a 15-year plan for deployment in five year increments of near-2020; mid-2025, and far-2030, that optimize PBN in a mixed equipage environment. Mr. Allen commented that controllers do great work with vectors to manage traffic flows, but need tools to improve efficiency. Mr. Fulton also explained current capabilities on aircraft that are not being fully utilized.

In response to questions from the Committee members, the Co-Chairs outlined the need to examine FAA's Terminal Sequencing and Spacing (TSAS) opportunities and near-term tools to explore the right balance between readily available tools at the facility today such as Converging Runway Display Aid (CRDA), Ground-based Interval Management-Spacing (GIM-S) and future national program deployments, noting that currently available tools have the ability to increase utilization and flexibility today. Another committee member noted the

[1] A representative from NBAA stated that this should be performance-based, not equipment-based. The endorsement of the PBN NAV Strategy was subject to this comment.

need for the NAC to focus priorities on people, processes, and tools for air traffic, airlines, and the ground.

In response to a question from Chairman Anderson, a Committee member representing air traffic controllers stated the need for tools that mirror and build on what is being done today and stressed the need for integration between terminal and ground solutions. An FAA member responded by explaining that it is the Agency's intent to look at interdependencies as the decision support tools are developed and implemented.

Another committee member observed that there is a need for flexibility as capabilities are delivered and programs may need to be modified to accommodate and provide needed capabilities.

The task group will report preliminary findings in June and deliver a final report in October.

NextGen Integration Working Group (NIWG)

The Committee received and executive overview of the work of the NIWG, followed by reports from the joint FAA-Industry NIWG on progress implementing the four priority areas of NextGen capabilities. The goal of the NIWG is to ensure the delivery of measurable benefits by dates certain, and thereby, increase the community's confidence in NextGen.

The NIWG Executive Team: Ed Bolton, FAA NextGen, Teri Bristol, FAA Air Traffic Organization, Steve Dickson, Delta Air Lines, and Melissa Rudinger, AOPA reinforced that the NIWG continues to "plow new ground" in working together and the future work must build on the foundation of what has been accomplished. The process has to be disciplined and focused – but flexible. Open to other Tier 1 priorities. The capabilities should be scalable across the NAS. The Executive Team also explained that the work of the Teams needs to be integrated and not just lay out separate milestones. The 2017-2019 plans will be presented for NAC approval in June.

Ms. Bristol opened the discussion by noting that the NIWG commitments are making a real difference in the NAS and explaining that the Rolling Plan was kicked off in January. Mr. Bolton stated that the group is focusing on three things going forward: (1) continuing

progress; (2) metrics work; (3) rolling plan activities. He echoed comments from Chairman Anderson and expressed the need for more industry milestones. Mr. Dickson noted that the goal of this work is to achieve VFR throughput in IFR conditions. He urged discipline, focus, and flexibility in developing the Rolling Plan. He asked that the group be open to other Tier 1 priorities that may be beyond the original four focus areas and be mindful to scale these priorities across the NAS. He further stated that the work of the teams needs to go beyond milestones and must be integrated.

Rudinger concluded by stating that this process has to evolve with continued laser focus on the four priorities, but broadened to take the general aviation perspective into account.

The introductory remarks were followed by reports and discussion of a progress report on rolling plan (validating 2017, ideas for 2018/19).

The Industry Leads and the FAA Subject Matter Experts (SMEs) for each of the four focus areas presented reports on the existing commitments:

DataComm

FAA SMEs: Paul Fontaine (ANG), Jessie Wijntjes (ATO)

Industry Leads: Dan Allen (FedEx Express), John O'Sullivan (Harris Corporation)

Mr. Wijntjes reported that there are 1465 DataComm equipped aircraft, but stated that the DataComm Program only works if both the FAA and industry do their parts. Industry must equip their aircraft and train their crews and the FAA must deliver the ground automation and air ground communication services and train the controllers. Overall the Tower Services phase of Data Comm is about a year ahead of schedule and moving along nicely against a challenging schedule. Mr. Allen noted that allowing VDL Mode 0 aircraft in Enroute airspace is being addressed as part of the Rolling Plan discussions. This is important since about 500 FANS aircraft have VDL Mode 0, making this a significant cost savings if available to the operators with these legacy aircraft. Mr. Wijntjes noted that the FAA and Industry are working together to formulate a new plan for Enroute full services that fits within the reduced budget profile.

A Committee Member commented that it is important to standardize controller training. Ms. Bristol agreed and explained that the FAA is working hard to resolve the issues and also reiterated the importance of industry equipping aircraft to advance the success of the program.

Multiple Runway Operations (MRO)

FAA SMEs: Jennifer Post (ATO), Paul Strande (NG)

Industry Leads: Glenn Morse (United Air Lines), Jon Tree (The Boeing Company)

The following major areas were highlighted:

- Recent Accomplishments: ReCat in DEN, Dependent Parallel Operations (DAL, JFK, MEM, MSP, PDX, RDU, SEA)
- Change in location: swapping IND for LAX
- Challenges: (1) BOS may not accrue benefit if RNAV approach not published; (2) Hardware/Software upgrades for the Flight Data Input/Output (FDIO) necessary for use with Micro-Enroute Automated Radar Tracking System (MicroEARTS) will not be available in time for HNL ReCat; (3) Assessment underway for enhancements for ReCat for specific locations
- Rolling Plan discussions: More Wake ReCat sites, Converging Runway Display Aid? (CRDA), Wake Turbulence Mitigation for Arrival (WTMA)

Ms. Post provided a status of commitments and noted that Wake ReCat will be implemented at IND this quarter in place of LAX (LAX is delayed due to Standard Terminal Automation Replacement System (STARS) ATC automation issues). She announced that HNL hardware and software issues of are delaying that implementation as well; the FAA is working with industry through the NIWG MRO work group to determine what facility should be moved up in its place. Mr. Tree noted that FAA has been very responsive in trying to accommodate ReCat changes as issues have been identified. The group discussed additional Wake ReCat sites and WTMA as possible future milestones as well as CRDA—recognizing the need to

integrate across other capabilities, the MRO team will work with the PBN team to determine viability.

The Committee requested the MRO Team provide a prioritized list of recommendations for Wake ReCat implementations.

Performance Based Navigation (PBN)

FAA SMEs: Donna Creasap (NG), Josh Gustin (ATO)
Industry Leads: Gary Beck (Alaska Airlines), Steve Fulton (Sandel Avionics)
The following major areas were highlighted:

- Recent Accomplishments: Las Vegas Metroplex Study complete; Established on RNP (EOR) track to fix (TF) analysis complete
- Status: ATL, CLT Metroplex on schedule; EOR National Standard - no risk
- Rolling Plan discussions: PBN NAV Strategy, EOR sites, Equipage, Near Term Decision Support Tools as part of Time Based Flow Management (TBFM) rollout - Targets for TBFM/TSAS and GIM-S
- Challenge: Key to PBN success and benefits is getting ATC clearance to fly the procedures. There is a big time gap before TSAS is available at the most active airports (NAV Services Group 1/2 airports) are identified by the PBN NAV Strategy PARC recommendation, and we need to understand what can be done in the interim.

Mr. Gustin confirmed that Atlanta and Charlotte Metroplex commitments are both on track to be met, and the Team is working to identify implementation milestones, both FAA and industry will track respective progress against milestones. Mr. Fulton explained that the Team is establishing a subgroup led by Ken Speir (Delta) to focus on near-term traffic flow tools for PBN. The group is working on what can be done in the next three years to deliver benefits. Rolling Plan possibilities include identifying a key site for EoR widely-spaced operations, aligning new activities to support steps defined in PBN NAS NAV Strategy, prioritizing applications of EoR and Equivalent Lateral Spacing (ELSO), activities for decision

support tools. A NAC Member encouraged the Team to revisit the criteria used in the original prioritization exercise as it looks at prioritizing and determining new sites and capabilities.

Mr. Fulton noted the concerns expressed by operators over the Las Vegas Metroplex initiative and Ms. Bristol said the FAA is working with affected operators to resolve the issues.

Chairman Anderson commented that when prioritizing activities, the group needs to focus on the capabilities and locations that provide the biggest benefit to the majority of the operations. NAC Subcommittee Co-Chair, Tim Campbell, American Airlines, noted that the FAA often does not have the necessary budget to take action to improve delivery of full benefits where post-implementation analysis indicates shortfalls. It was noted that we need a variety of tools (not just Metroplex) in the toolbox to be nimble in implementing PBN. The Committee discussed the challenge of ensuring that operational benefits are attained from deployments. The Seattle Greener Skies was identified as an implementation that is not delivering as expected. Chairman Anderson gave the action to a small group (Alaska, NATCA, Southwest, Delta, FAA AVS and ATO) to examine Greener Skies for obstacles and possible solutions. This is being incorporated into the tracking of the PBN NIWG Team.

Members encouraged the NIWG to focus on people, processes, and tools for air traffic, airlines, and the ground for the rolling plan.

Two specific actions were given to the PBN Team:

1. Examine PBN traffic flow management capabilities that can be implemented in the near term to increase and utilize PBN - with focus on people, processes, and tools for air traffic, operators, and the ground.
2. An Ad hoc group consisting of representatives from FAA (AVS & ATO), Alaska Airlines, Delta Air Lines, Southwest Airlines, and NATCA was formed to determine what is necessary to bring Greener Skies into fruition to deliver improved benefits. “What is wrong with Greener Skies and how do we fix it?” This includes identifying major issues, causes of the issues and solutions.

Surface

FAA SMEs: Ben Marple (ANG) and Susan Pfingstler (ATO)

Industry Leads: Rob Goldman (Delta Air Lines), Steve Vail (Mosaic ATM, Inc.)

The following major areas were highlighted:

- Status – (1) Advanced Electronic Flight Strips (AEFS) on track; (2) 11 Data elements due this quarter; (3) Airspace Technology Demonstrations (ATD-2) NASA–FAA departure metering project in Charlotte demo is on track
- Rolling Plan discussions: (1) Terminal Flight Data Manager (TFDM) implementation as soon as possible since it is the surface management solution for NextGen – industry wants meaningful inclusion in post FID development; (2) expand surface surveillance information sharing; (3) support Collaborative Decision Making (CDM)
- Risks: (1) TFDM program funding reductions; (2) stakeholders providing 11 data elements; (3) schedule alignment of NASA ATD-2 tech transfer capability vs TFDM deployment; (4) portability of TFDM/Surface among airports

Ben Marple, FAA, was introduced as SME lead and provided status of all commitments. The briefing highlighted that the end state for surface solutions is TFDM with these major components: electronic flight data to replace legacy paper strips, traffic flow management, collaborative decision making, and system consolidation.

It was noted by Mr. Campbell that opening up surface data to industry in non-movement areas that currently can't be seen, such as the de-icing and gate areas of airports.

The briefers emphasized the risk of TFDM slipping to right, and the importance that TFDM stay on track. The industry will be recommending a collaborative engagement process similar to that used for DataComm as the FAA moves forward with TFDM implementation.

PBN JFK Implementation

Responding to a request by the NAC, Bart Roberts, JetBlue, presented an overview of new RNAV procedures that increased arrival utilization of runway 13L at JFK by as much as 50%.

The procedures helped mitigate adverse effects of a runway repair project, and is now improving efficiency and access.

Mr. Roberts emphasized the collaboration between the Port Authority New York New Jersey, FAA, air traffic controllers and JetBlue in implementing the procedures. He also stated that other carriers are interested in obtaining approvals necessary to use the procedure.

At Chairman Anderson's request and with support from the Committee, future NAC meetings will include a report from an operator of a local PBN implementation to highlight reasons for implementation and what occurred – "what worked, what didn't and what can we do going forward- what actions should be taken?"

European Air Traffic Management Masterplan

Florian Guillermet, SESAR Joint Undertaking, and Frank Brenner, EUROCONTROL, provided an overview of the European ATM Master Plan that outlines operations and technology and links it to system performance.

Overview of the Plan:

- Security – ensuring high levels of security
- Capacity – up to 30% reduction in departure delays, up to 10% additional flights landing at congested airports, system capable of handling up to 100% more traffic
- Environment – up to 10% reduction in CO2 emissions, positive impact on noise and air quality
- Operational Efficiency – up to 6% reduction in flight time, up to 10% reduction in fuel burn
- Safety – improvements by up to a factor of 4

Joint Analysis Team (JAT)

The JAT is an industry-FAA team that is evaluating the performance improvements attributable to the implementation of selected capabilities at specific locations. The Team is

supported by data from FAA, individual operators and an industry-funded database being developed by Passur Aerospace.

Co-Chairs Ilhan Ince, American Airlines, and Dave Knorr, FAA

Scope of the Evaluations:

- Wake ReCat Implementations at CLT and two Chicago area airports - ORD/MDW
- PBN Metroplex – North Texas
- PBN EOR - Denver

The Co-Chairs reported on the methodology for analyzing Wake ReCat at CLT. Although the overall impacts at CLT are modest, the JAT was able to reach consensus on the methodology that will also be the basis for the evaluation of Chicago. The final results at both locations will be reported at the June NAC meeting.

Mr. Knorr also announced that the JAT will examine North Texas instead of Northern California due to availability of data and the fewer number of airport pairings. The Team will be meeting in early March to begin the work on analyzing EoR Denver and North Texas Metroplex that will be delivered to the Committee in October.

PBN Blueprint Community Outreach Task Group

Co-Chairs of the Task Group, Jim Crites, DFW International Airport, and Brian Townsend, American Airlines, provided an overview of the work underway to develop recommendations addressing community outreach in the implementation of PBN to assist the FAA and the industry with the growing environmental challenges associated with PBN. Building on the landmark Blueprint for Success to Implementing PBN, the Committee will be presented with a set of recommendations for approval in June designed to help address community outreach in the implementation of PBN. The Task Group is assessing the state of outreach, evaluating current implementations for evaluations of best practices and lessons learned. They are also reviewing FAA efforts underway by the Agency's Environmental Office and Air Traffic Organization.

A Committee member expressed appreciation of this work that is helping to educate local communities and another noted that each implementation must include outreach in early in future implementation plans.

ADS-B

Bruce DeCleene, FAA presented the status of aircraft ADS-B Out equipage in meeting the regulatory mandate of January 1, 2020.

Status of ADS-B Out Equipage – February 2016

- General Aviation – 16,765 aircraft out of a fleet of 100K - Substantial number of GA owners still deferring equipage closer to deadline
- Air Carriers – 451 aircraft out of a fleet of 6K - Air carrier equipage plans being filed will improve forecasting
- Equipage Plans have been received by the FAA from the following air carriers that account for approximately 2100 aircraft by 2020:
    - Envoy, Horizon, JetBlue, Delta, FedEx, American, Hawaiian, Southwest, UPS
- Privacy – work continues on the NAC recommendation that the FAA issue temporary credentials to preserve privacy; industry will estimate the number of participating aircraft and how often they would need temporary credentials. Also working towards analyzing the possibility of longer term solution in the next technical standard for ADS-B equipment. The FAA transmitted a letter in December 2015 to RTCA President Margaret Jenny requesting this action.

An FAA representative noted that the Agency is creating streamlined solutions for equipage that do not require approval each time, making certification of commercial aircraft easier. This does not alter the need for operators to act early; vast majority of retrofits will be completed in 2018. Members discussed the complexity of providing their equipage plans to the FAA, but agreed they need to meet the mandate. Mr. DeCleene also clarified that business aviation, general aviation, and UAS need to be a part of the data.

Committee members commented that it is ill-advised to wait until the last minute, and warned that failure to act will be problematic because the marketplace of repair facilities and equipment providers will be flooded with demands for equipment and installations. In response to a question from a Committee Member, Mr. Whitaker reinforced that international carriers will be required to comply with the mandate to operate in the U.S.

At the end of the discussion, the Committee requested that detailed ADS-B equipage plans be provided by air carriers, regional operators and UAS to meet the January 2020 compliance date under the Equip 2020 activities. (Note: releasable data should be de-identified). The National Business Aviation Association will identify issues and solutions for business aviation, including privacy, and the Regional Airline Association will identify issues and solutions for regional fleets. This will be discussed at the June NAC meeting.

NextGen Vision

Mr. Bruce DeCleene and Ms. Michele Merkle from the FAA provided a preliminary look at the FAA's current plans for NextGen through 2030. NextGen originally focused on infrastructure and is now concentrating on the capability implementation phase. FAA will use lessons learned from previous implementations and adjust to budget constraints to implement and realize the benefits of NextGen. Mr. DeCleene noted that aligning activities and investments is important, citing DataComm's successful tower services deployments as a good example of effective collaboration. Collaboration is necessary with the NAC on the future to ensure we are working towards the same equipage, capabilities, and timelines.

A Committee Member commented that the majority of operators are on the cusp of making approximately $3.5 billion dollar investments in ADS-B in the next 18 months, on top of DataComm and PBN investments, and are not likely to have an appetite for more avionics upgrades. Another carrier representative voiced plans to use the SBAS waiver and utilize VDL-Mode 0 if available. Steve Dickson from Delta Air Lines reiterated its strategy for C/N/S from the morning pre-NAC meeting session (Attachment 6, Delta Air Lines Equipage presentation). As a result of comments made, Chairman Anderson asked JetBlue to provide a

briefing for the Committee on its C/N/S fleet plans - ADS-B, PBN and DataComm at the June meeting.

Committee Member Jaiwon Shin, NASA, reiterated that trajectory-based operations are the future of aviation. He commented that an understanding of the industry's future direction and its plans for NextGen is important for NASA to request funding from Congress. Another Committee Member requested that the FAA identify the key performance improvements the industry is collectively seeking as a part of the refinement of the longer term plans so that industry and the FAA can make investment decisions with those objectives.

An FAA Committee Member noted that the FAA is delivering on the four priorities as well as doing R&D. The FAA and NASA must still do R&D to support future capabilities and, while understanding their pragmatic focus on the near-term, call on operators to help us architect the future. Chairman Anderson commented that both NASA and DoD's work in this area is fascinating and gave NASA and DoD the action to report their organizations' vision for the future at the June meeting.

The following entities were requested to present plans for the future at the June NAC meeting:

Presentations on the future of the National Airspace System:

- FAA (building on presentation from February 2016)
- NASA
- DoD
- The Boeing Company

Summary of the Meeting and Next Steps

The NAC Secretary summarized the following actions from the meeting and follow-up items:

Action Item	Responsible Entity	Completion Date
An Ad hoc of representatives from FAA (AVS & ATO), Alaska Airlines, Delta Air	FAA/RTCA	June 2016

Lines, Southwest Airlines, and NATCA was formed to determine what is necessary to bring Greener Skies into fruition to deliver improved benefits. "What is wrong with Greener Skies and how do we fix it?" This includes identifying major issues, causes of the issues and solutions.		
Present a report from an operator of a local PBN implementation to highlight reasons for implementation and what occurred – "what worked, what didn't and what can we do going forward?"	FAA/RTCA	June 2016 and future NAC meetings
NextGen Integration Working group (NIWG) 1. Provide prioritized list of recommendations for Multiple Runway Operations (MRO) implementations. 2. Examine PBN traffic flow management capabilities that can be implemented in the near-term to increase and utilize PBN more effectively with focus on people, processes, and tools for air traffic, operators, and the ground.	NIWG (FAA/Industry)	June 2016
ADS-B Out 1. Detailed ADS-B equipage plans from air carriers, regionals and UAS to meet the January 2020 compliance date. (Note: releasable data should be de-identified) 2. NBAA identify issues and solutions for business aviation 3. RAA identify issues and solutions for regional fleets	1. Industry to provide data via Equip 2020 2. NBAA and RAA report to NAC	June 2016
Briefing for the Committee on Airline C/N/S fleet plans - ADS-B, PBN, DataComm	JetBlue	June 2016
Presentations on future of the National Airspace System: 1. FAA (building on presentation from February 2016)	1. FAA 2. NASA 3. DoD 4. Boeing	June 2016

2. NASA 3. DoD 4. Boeing		

DFO and Chairman Closing Comments

Mr. Whitaker and Chairman Anderson both thanked the members for their participation in the meeting, and the continued work on the NIWG priorities and metrics.

Other Business

No items were requested or discussed.

Adjourn

By motion, Chairman Anderson concluded the meeting of the Committee at 2:42 p.m.

Next Meeting

The next meeting of the NAC is June 17, 2016 in the Washington DC area – site TBD.

Attendees:
February 25, 2016 Meeting of the NextGen Advisory Committee
Atlanta, GA

Name	**Company**
Allen, Dan	FedEx Express
Allen, Mark	Federal Aviation Administration
Anderson, Richard	**Delta Air Lines, Inc.**
Angeles, Eduardo	Federal Aviation Administration
Baker, Mark	Aircraft Owners and Pilots Association
Batchelor, David	SESAR Joint Undertaking
Belger, Monte	Metron Aviation
Bertapelle, Joe	JetBlue Airways
Bolen, Ed	National Business Aviation Association
Bolton, Ed	Federal Aviation Administration
Bowman, Jim	FedEx Express
Bradley, Mark	Delta Air Lines
Brenner, Frank	EUROCONTROL
Bristol, Teri	Federal Aviation Administration
Bunce, Peter	General Aviation Manufacturers Association
Burns, Patrick	Delta Air Lines, Inc.
Campbell, Timothy	American Airlines, Inc.
Canoll, Tim	Air Line Pilots Association
Cebula, Andy	RTCA, Inc.
Challan, Peter	Harris
Childs, Chip	Regional Airline Association
Crites, Jim	DFW Airport
DeCleene, Bruce	Federal Aviation Administration

Diaz, Mario	City of Houston, Texas
Dickson, Steve	Delta Air Lines, Inc.
Donovan, Colleen	Federal Aviation Administration
Dumont, Pete	Air Traffic Control Association
Engola, Paul	Lockheed Martin Corporation
Esposito, Carl	Honeywell International, Inc.
Fulton, Steve	Sandel Avionics
Goldman, Robert	Delta Air Lines
Gomez, Pamela	Federal Aviation Administration
Guillermet, Florian	SESAR Joint Undertaking
Gustin, Joshua	Federal Aviation Administration
Harkey, Charles	Delta Air Lines
Harris, John	Raytheon
Hartman, Ryan	Insitu Inc.
Hennig, Jens	GAMA
Hickey, John	Federal Aviation Administration
Ince, Ilhan	American Airlines
Jenny, Margaret	RTCA, Inc.
Johnson, Sasha	United Airlines, Inc.
Kast, Christian	United Parcel Service
Kenagy, Randy	Air Line Pilots Association
Lee, Tracy	United Air Lines
Lenfert, Winsome	Federal Aviation Administration
Locke, Caitlin	Federal Aviation Administration
Lord, Jim	Delta Air Lines
Maccarone, Chris	PASSUR
Martin, Jeff	JetBlue Airways
McArtor, Allan	Airbus

McDuffee, Paul	Insitu
Melcher, David	Aerospace Industries Association
Miller, Shirley	Federal Aviation Administration
Morse, Glenn	United Air Lines
Murphy, Dan	Federal Aviation Administration
Nordin, Carl	Delta Air Lines
Noren, Per	The Boeing Company
Perrone, Mike	Professional Aviation Safety Specialists
Pierce, Brad	NOISE
Planzer, Neil	The Boeing Company
Ray, Elizabeth	Federal Aviation Administration
Rinaldi, Paul	National Air Traffic Controllers Association
Roberts, Bart	JetBlue
Roberts, Dennis	Federal Aviation Administration
Robinson, Cortney	Aerospace Industries Association (AIA)
Rudinger, Melissa	Aircraft Owners and Pilots Association
Ryals, Lillian	The MITRE Corporation
Schmanske, Vicki	Lockheed Martin Corporation
Shellabarger, Nan	Federal Aviation Administration
Shin, Jaiwon	NASA
Speir, Ken	Delta Air Lines
Staigle, Tom	Delta Air Lines
Swayze, Rich	Federal Aviation Administration
Sypnewski, Jessica	Federal Aviation Administration
Teel, Brandi	RTCA, Inc.
Vail, Steve	Mosaic ATM
Whelan, Martin	U.S. Air Force
Whitaker, Mike	**Federal Aviation Administration**

Wichman, Keith	PASSUR
Name	Company
Allen, Dan	FedEx Express
Allen, Mark	Federal Aviation Administration
Anderson, Richard	Delta Air Lines, Inc.
Angeles, Eduardo	Federal Aviation Administration
Baker, Mark	Aircraft Owners and Pilots Association
Batchelor, David	SESAR Joint Undertaking
Belger, Monte	Metron Aviation
Bertapelle, Joe	JetBlue Airways
Bolen, Ed	National Business Aviation Association
Bolton, Ed	Federal Aviation Administration

Welcome to the Meeting of the NextGen Advisory Committee

February 25, 2016
Delta Air Lines Headquarters
Atlanta, GA

Welcome & Introductions

Richard Anderson, NAC Chairman

PUBLIC MEETING ANNOUNCEMENT
Read by: Designated Federal Official Michael Whitaker
NextGen Advisory Committee
February 25, 2016

In accordance with the Federal Advisory Committee Act, this Advisory Committee meeting is OPEN TO THE PUBLIC.

Notice of the meeting was published in the Federal Register on:

February 5, 2016

Members of the public may address the committee with PRIOR APPROVAL of the Chairman. This should be arranged in advance.

Only appointed members of the Advisory Committee may vote on any matter brought to a vote by the Chairman.

The public may present written material to the Advisory Committee at any time.

3

RTCA

THE GOLD STANDARD FOR AVIATION SINCE 1935

Review and Approval of:

October 8, 2015
Meeting Summary

RTCA

THE GOLD STANDARD FOR AVIATION SINCE 1935

Chairman's Report
Richard Anderson, NAC Chair

NAC Agenda Topics

- PBN Time, Speed, Spacing Task Group
- NextGen Integration Working Group Reports
  - Exec Team Update
  - NextGen Priorities Beyond the Four
- Reports & Discussion
  - DataComm
  - Multiple Runway Operations
  - PBN
  - Surface
- PBN JFK Implementation

NAC Agenda Topics (cont'd)

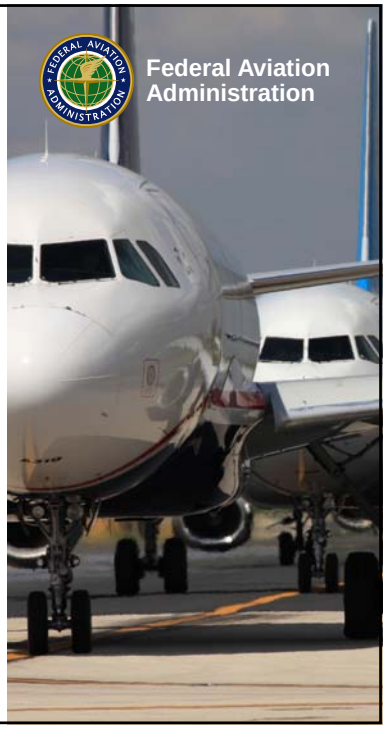
- European Air Traffic Management Masterplan
- Joint Analysis Team
  - Update on FAA-Industry Metrics Project
  - Timing and expectations on analysis
- PBN Blueprint Community Outreach Task Group
- ADS-B
- NextGen Vision

PBN NAS Navigation Strategy

NextGen Advisory Committee (NAC)

By: **Mark Bradley**, Delta Airlines, PARC Chair
Joshua Gustin, FAA, PBN Programs and Policy Group

Date: February 25, 2016



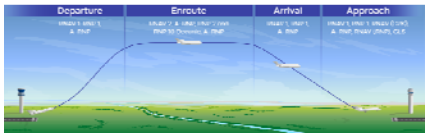
Strategy Document Coordination

June 2015	• Update provided to NAC • Call for Industry participation
August-December	• PARC coordination meetings, document review, and specific action team recommendations
January 2016	• Final integration of PARC recommendations
February	• Present outcomes of PARC coordination to NAC

PBN NAS Navigation Strategy

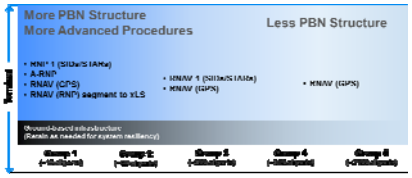
Key Elements

- **Clear vision of PBN as the basis for daily operations at all locations in the NAS**



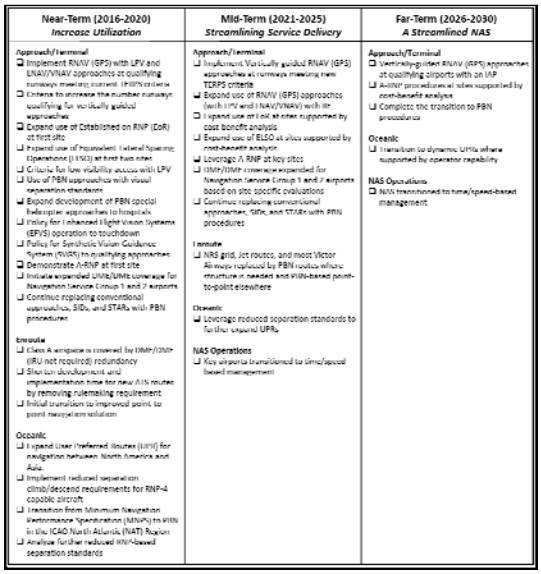
- **Identification of the key navigation capabilities that will be available in the NAS over the next 15 years**

- **Defined service groups for navigation capabilities**



Key Commitments by Timeframe

- **Approach/Terminal**
  - Continue to deploy RNAV (GPS) approaches with vertical guidance
  - Update criteria and policies for increased access
  - Replace conventional procedures with PBN
- **Enroute**
  - Replace Jet routes with PBN-based structure and point-to-point navigation
  - DME/DME redundancy in Class A
- **Oceanic**
  - Expand User Preferred Routes
  - Explore reduced RNP-based separation standards



Near-Term (2016-2020) *Increase Utilization*	Mid-Term (2021-2025) *Streamlining Service Delivery*	Far-Term (2026-2030) *A Streamlined NAS*
Approach/Terminal ❑ Implement RNAV (GPS) with LPV and LNAV/VNAV approaches at qualifying runways meeting current TERPS criteria ❑ Criteria to increase the number runways qualifying for vertically guided approaches ❑ Expand use of Established on RNP (EoR) at first site ❑ Expand use of Proximity Tailored Spacing Operations (PTSO) at first two sites ❑ Criteria for low visibility access with LPV ❑ Use of PBN approaches with visual separation standards ❑ Expand development of PBN special helicopter approaches to hospitals ❑ Policy for Enhanced Flight Vision Systems (EFVS) operation to touchdown ❑ Policy for Synthetic Vision Guidance System (SVGS) to qualifying approaches ❑ Demonstrate A-RNP at first site ❑ Initiate expanded DME/DME coverage for Navigation Service Group 1 and 2 airports ❑ Continue replacing conventional approaches, SIDs, and STARs with PBN procedures **Enroute** ❑ Class A airspace is covered by DME/DME (IRU not required) redundancy ❑ Shorten development and implementation time for new A/N routes by removing rulemaking requirement ❑ Initial transition to improved point to point navigation solution **Oceanic** ❑ Expand User Preferred Routes (UPR) for navigation between North America and Asia ❑ Implement reduced separation climb/descend requirements for RNP-4 capable aircraft ❑ Transition from Minimum Navigation Performance Specification (MNPS) to PBN in the ICAO North Atlantic (NAT) Region ❑ Analyze further reduced RNP-based separation standards	**Approach/Terminal** ❑ Implement Vertically guided RNAV (GPS) approaches at runways meeting new TERPS criteria ❑ Expand use of RNAV (GPS) approaches (with LPV and LNAV/VNAV) with RF ❑ Expand use of EoR at sites supported by cost benefit analysis ❑ Expand use of ESLO at sites supported by cost-benefit analysis ❑ Leverage A-RNP at key sites ❑ DME/DME coverage expanded for Navigation Service Group 3 and 4 airports based on site specific evaluations ❑ Continue replacing conventional approaches, SIDs, and STARs with PBN procedures **Enroute** ❑ NRS grid, Jet routes, and most Victor Airways replaced by PBN routes where structure is needed and PBN-based point-to-point elsewhere **Oceanic** ❑ Leverage reduced separation standards to further expand UPRs **NAS Operations** ❑ Key airports transitioned to time/speed based management	**Approach/Terminal** ❑ Vertically-guided RNAV (GPS) approaches at qualifying airports with an IAP ❑ A-RNP procedures at sites supported by cost-benefit analysis ❑ Complete the transition to PBN procedures **Oceanic** ❑ Transition to dynamic UPRs where supported by operator capability **NAS Operations** ❑ NAS transitioned to time/speed-based management

Navigation Service Groups (NSG)

- **Airports grouped based on role within the NAS**
- **NSGs are used to describe where navigation services will be provided across NAS locations over time**

PBN Operation	Near 2015-2020*	Mid 2021-2025	Far 2026-2030	Minimum ICAO Nav Spec to Qualify for PBN Operation (Allowable aircraft and operator qualification)	NSG 1‡	NSG 2	NSG 3	NSG 4	NSG 5
RNAV (GPS) with LNAV minima	→	→	→	A-RNP or RNP APCH A	Provided at qualifying runway ends*				
RNAV (GPS) with LP minima	→	↓	↓	RNP APCH B	The intent is to replace with LPV				
RNAV (GPS) with LNAV/VNAV minima	↑	↑	→	A-RNP or RNP APCH A	Provided at qualifying runway ends				
RNAV (GPS) with LPV minima	↑	↑	→	RNP APCH B	Provided at qualifying runway ends				
RNAV (GPS) to RWY XX (RF and Scalable RNP)	NA	↑	↑	A-RNP	May provide				
RNAV (RNP) to RWY XX (0.3 or lower needed)	↑	→	→	RNP AR APCH	May provide				
RNAV (GPS) to RWY XX (RF outside FAF)	↑	↑	↑	A-RNP or RNP APCH A	May provide				
RNP (RF) initial & intermediate as part of an ILS approach procedure	↑	↑	↑	RNP AR or A-RNP or RNP APCH	Recommended	May provide			
RNP STAR (RF)	NA	↑	↑	A-RNP or RNP 1	Shall provide	May provide			
RNP SID (RF)	NA	↑	↑	A-RNP or RNP 1	Shall provide	May provide			
RNAV STAR	↑	↑	→	A-RNP or RNP 1 or RNAV 1	Uses RNP instead	May provide			
RNAV SID	↑	↑	→	A-RNP or RNP 1 or RNAV 1	Uses RNP instead	May provide			

Arrows indicate whether availability of the operation is increasing, decreasing, or stable in the referenced timeframe

Minimum PBN Capabilities Expected of Operators by Timeframe and Domain

	Near-Term (2016-2020)	Mid-Term (2021-2025)	Far-Term (2026-2030)
Class A Airspace	❑RNAV 2, supported by GNSS or DME/DME		
Navigation Service Group 1		❑GNSS and DME/DME navigation ❑RNAV (GPS) approach capability (LNAV/VNAV or LPV) ❑RNP 1 capability ❑RF capability	❑RNAV (GPS) approach capability (LNAV/VNAV or LPV) ❑Required time of arrival capability ❑RF capability
Navigation Service Group 2		❑GNSS and DME/DME navigation	❑RNAV (GPS) approach capability (LNAV/VNAV or LPV) ❑RF capability
All IFR Operations		❑Early in the mid-term, RNAV 2 and RNAV 1, supported by GNSS ❑RNAV (GPS) approach capability (LNAV at minimum)	❑RNAV (GPS) approach capability (LNAV/VNAV or LPV)*

Note: FAA recognizes the capabilities of specific public aircraft fleets and potential effects these have on the operation within the enroute domain.
*As conventional navigation is reduced in the far-term and beyond, the lowest available minimums may be achieved with an LPV capability.

DISCUSSION

RTCA

THE GOLD STANDARD FOR AVIATION SINCE 1935

PBN Time, Speed, Spacing Task Group

Co-chairs:

Dan Allen, FedEx

Steve Fulton, Sandel Avionics

Tasking Deliverables

- Review the plans for time, speed, spacing and related capabilities
- Develop a 15 year plan for deployment:
  - 5 - year increments 2020, mid - 2025, far term - 2030
  - Identify and prioritize tools and technologies ground vs. aircraft
  - Appropriate in various operating conditions
  - Preliminary Report to NAC in June
  - Final Report in Oct

PBN Strategy Task Group Members

Bill Allen	JetBlue Airways
Dan Allen	**FedEx Express**
Kulsoom Basharat	FAA
Gary Beck	Alaska Airlines
Monte Belger	Metron Aviation, Inc.
Chris Benich	Honeywell International, Inc.
Joe Bertapelle	JetBlue Airways
Frank Black	Metron Aviation
Steve Bradford	FAA
Patrick Burns	Delta Air Lines, Inc.
Andy Cebula	RTCA, Inc.
Lynae Craig	Alaska Airlines
Donna Creasap	FAA
Bruce DeCleene	FAA
Scott Dehart	Southwest Airlines
Sarah Fish	FAA
Steve Fulton	**Sandel Avionics**
Pamela Gomez	FAA
Josh Gustin	FAA
Rebecca Guy	FAA
Dan Hanlon	Raytheon
Rick Heinrich	Rockwell Collins, Inc.
Mark Hopkins	Delta Air Lines, Inc.
Patricia Horan	FAA
Rob Hunt	FAA
Pascal Joly	Airbus
Darnell Jones	FAA
Randy Kenagy	ALPA
Cathy Kern	FAA
Hilary King	GE Aviation
Kirk Kolek	Rockwell Collins, Inc.
Sharon Kurywchak	FAA
Bob Lamond	NBAA
Gary McMullin	Southwest Airlines
Chip Meserole	The Boeing Company
Toby Miller	American Airlines, Inc.

PBN Strategy Task Group Members (cont'd)

Trin Mitra	RTCA, Inc.
Robert Mount	FAA
Tony Ng	Lockheed Martin Corporation
Darrell Pennington	ALPA
Steve Pennington	U.S. Air Force
Ron Renk	United Airlines, Inc.
Scott Sander	Alaska Airlines
Elly Smith	The MITRE Corporation
Chuck Steigerwald	The Boeing Company
Mark Steinbicker	FAA
Ernie Stellings	NBAA
Rocky Stone	United Airlines, Inc.
Chris Sutherland	Harris Corporation
Greg Tennille	The MITRE Corporation
Allan Twigg	United Airlines, Inc.
Diana Wasiuk	HMMH
Jeff Williams	Tetra Tech
Jeff Woods	NATCA

Status of Work

- Common agreement on the Tasking
- Reach agreement on the output necessary to fulfill the FAA's request
- Determine the Assumptions and Guiding Principles necessary to meet the project goals
- Receive briefing(s) to level set the Task Group members on the capabilities
  - FAA NAV Strategy
  - Traffic Flow Management Capabilities and Tools
    - Procedure-specified speeds
    - Ground-based Interval Management –Spacing (GIM-S)
    - Terminal Sequencing and Spacing (TSAS)
    - Path Stretch (with and without Data Communications)
    - Flight Management System (FMS) Lateral Offsets
    - Flight Deck Interval Management (IM): IM En Route and Terminal Operations
    - Controlled Time of Arrival (CTA) Via Time of Arrival Control (TOAC) Guidance and Automation

Initial Observations

- Scope includes both ground based and aircraft based tools
- Transition of tools over time-frame – aircraft/ground based on intended goal of trajectory operations
- The timing reference or desired point of timing is the approach end of the runway designed to achieve a defined throughput
- VMC throughput in “standard” IMC
- Near-term Technology and concept of operations plans must be sufficiently mature to support the recommendations
- Mixed equipage will remain – it is an on-going process and a reality that must continually be addressed

DISCUSSION

BREAK

NextGen Integration Working Group (NIWG) Reports & Discussion

RTCA

THE GOLD STANDARD FOR AVIATION SINCE 1935

Data Comm

Industry Leads:
Dan Allen, FedEx Express
John O'Sullivan, Harris Corporation
FAA SME:
Jessie Wijntjes, ATO
Paul Fountaine, ANG

Status – Data Comm

- **Achieved Initial Operating Capability (IOC) at all three Key Sites and have started the waterfall**
  - Salt Lake City (SLC), key site – August 7, 2015
  - Houston Intercontinental (IAH), key site – September 3, 2015
  - Houston Hobby (HOU), key site – September 10, 2015
  - New Orleans (MSY), first site in the waterfall – January 21, 2016
  - Austin (AUS) – February 4, 2016
  - Louisville (SDF) – February 10, 2016
  - Newark (EWR) – February 12, 2016
  - San Antonio (SAT) – February 19, 2016
  - Sites have been continuous operations since their IOCs
- **Continuing coordination with industry and field sites to support waterfall activities**
  - Conducting Air Traffic and Tech Ops training
  - Operators conducting flight crew training
  - FedEx, UPS, United, Southwest, USAF, British Airways, Air New Zealand, Cargolux, Emirates, Air India, SAS, and Etihad all conducting operations with Data Comm
- **Proceeding with Initial En Route service development and implementation planning**
- **Re-planning Full En Route services program based on budget constraints**

FAA NextGEN

S1P1 Tower Service
Implementation Waterfall

Key Sites			
Site Name	Site ID	ARTCC ID	IOC
Boise (Non-DCL)	BOI	ZLC	06/10/15
KS 1: Salt Lake City	SLC	ZLC	08/07/15
KS 2: Houston Intcl	IAH	ZHU	09/03/15
KS 3: Houston Hobby	HOU	ZHU	09/10/15
NAP – NAP Intgr Compl	N/A	ZLC/ZT	09/30/15

Group A			
Site Name	Site ID	ARTCC ID	IOC
New Orleans	MSY	ZHU	01/21/16
Austin	AUS	ZHU	02/04/16
San Antonio	SAT	ZHU	02/19/16
Los Angeles	LAX	ZLA	03/14/16
Las Vegas	LAS	ZLA	03/28/16
San Diego	SAN	ZLA	04/11/16
John Wayne	SNA	ZLA	04/25/16
Burbank	BUR	ZLA	05/09/16
Ontario	ONT	ZLA	05/23/16
San Francisco	SFO	ZOA	06/14/16
Oakland	OAK	ZOA	06/28/16
San Jose	SJC	ZOA	07/13/16
Sacramento	SMF	ZOA	07/27/16
Reno (Non-DCL)	RNO	ZOA	07/27/16
Phoenix	PHX	ZAB	08/17/16
Albuquerque	ABQ	ZAB	08/31/16
El Paso (Non-DCL)	ELP	ZAB	08/31/16
Seattle	SEA	ZSE	09/22/16
Portland	PDX	ZSE	09/22/16
Dallas Love	DAL	ZFW	10/13/16
Dallas FTW	DFW	ZFW	10/27/16
Will Rogers (Non-DCL)	OKC	ZFW	10/27/16
Honolulu (Non-DCL)	HNL		11/03/16
Anchorage (Non-DCL)	ANC		11/10/16

Group B			
Site Name	Site ID	ARTCC ID	IOC
Louisville	SDF	ZID	02/10/16
Cincinnati (Non-DCL)	CVG	ZID	02/29/16
Indianapolis	IND	ZID	03/14/16
Columbus (Non-DCL)	CMH	ZID	03/14/16
Memphis	MEM	ZME	04/04/16
Nashville	BNA	ZME	04/18/16
Adams Field (Non-DCL)	UT	ZME	04/21/16
Denver	DEN	ZDV	05/09/16
Atlanta	ATL	ZTL	05/23/16
Charlotte	CLT	ZTL	06/07/16
Piedmont (Non-DCL)	GSO	ZTL	06/07/16
Jacksonville	JAX	ZJX	06/28/16
Orlando	MCO	ZJX	07/13/16
Miami	MIA	ZMA	08/03/16
Ft Lauderdale	FLL	ZMA	08/17/16
Tampa	TPA	ZMA	08/31/16
Palm Beach	PBI	ZMA	09/15/16
San Juan (Non-DCL)	SJU	ZMA	09/15/16
St Louis	STL	ZKC	10/06/16
Kansas City	MCI	ZKC	10/20/16
Tulsa (Non-DCL)	TUL	ZKC	10/20/16
Minn-St Paul	MSP	ZMP	11/10/16
Eppley Field (Non-DCL)	OMA	ZMP	11/10/16

Group C			
Site Name	Site ID	ARTCC ID	IOC
Newark	EWR	ZNY	02/12/16
J F Kennedy	JFK	ZNY	02/29/16
La Guardia	LGA	ZNY	03/14/16
Teterboro	TEB	ZNY	03/28/16
Westchester	HPN	ZNY	04/11/16
Philadelphia	PHL	ZNY	04/25/16
Boston	BOS	ZBW	05/16/16
Providence	PVD	ZBW	05/31/16
Bradley	BDL	ZBW	06/14/16
Albany (Non-DCL)	ALB	ZBW	06/14/16
Detroit	DTW	ZOB	07/06/16
Cleveland	CLE	ZOB	07/20/16
Pittsburgh	PIT	ZOB	08/03/16
Buffalo (Non-DCL)	BUF	ZOB	08/03/16
Balt/Wash	BWI	ZDC	08/24/16
Dulles	IAD	ZDC	09/08/16
Reagan	DCA	ZDC	09/22/16
Raleigh/Durham	RDU	ZDC	10/06/16
Andrews (Non-DCL)	ADW	ZDC	10/06/16
Chicago Midway	MDW	ZAU	10/27/16
Chicago O'Hare	ORD	ZAU	11/10/16
Milwaukee (Non-DCL)	MKE	ZAU	11/10/16

TDLS Sites Color Key	
CPDLC DCL Site	
Enhanced PDC Only Site	
Site Operational	

- Waterfall reflects **challenge** schedule dates (calendar year)
  - Baseline schedule Tower deployment dates are 2016-2019

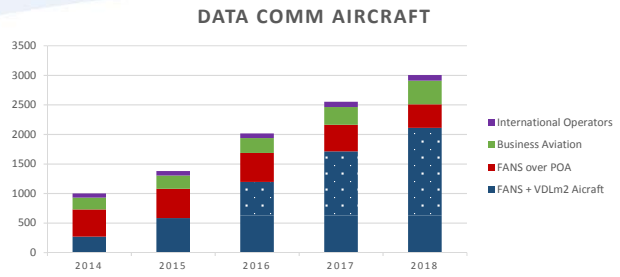
FAA NextGEN

NIWG Commitments – Data Comm

- ✓ **Extend Departure Clearance Operational Trials – Q1 2016**
  - ✓ Trials completed and decommissioned at Newark – January 19, 2016
  - ✓ Trials completed and decommissioned at Memphis – February 2, 2016
- **Final Investment Decision (FID) for En Route services – Q2 2016**
  - ✓ Completed FID for En Route Initial Services – October 2014
  - Re-planning En Route Full Services based on budget constraints
- ✓ **Industry recommendation on Recorder Rule for Retrofit – Q4 2014**
  - ✓ Industry delivered recommendation in December 2014
  - ✓ FAA published clarification in February 2015
- ✓ **Assessment of Boeing 737 Flight Management Computer Issue – Q4 2015**
  - ✓ Assessment completed and Boeing released U12 upgrade – December 2015
- **Feasibility assessment of VHF Data Link Mode 0 (VDL-0) – Q4 2019**
  - Assessment report expected from the PARC CWG in March 2016
- **Airlines to equip 1,900 aircraft – Q4 2019**
  - 1,465 Data Comm equipped aircraft operating in the NAS as of February 16 (includes FANS/VDL Mode 2, FANS/ VDL Mode 0, business jets, and international aircraft)
  - 645 aircraft have been equipped through the Data Comm equipage initiative

FAA NextGEN

Data Comm Equipage



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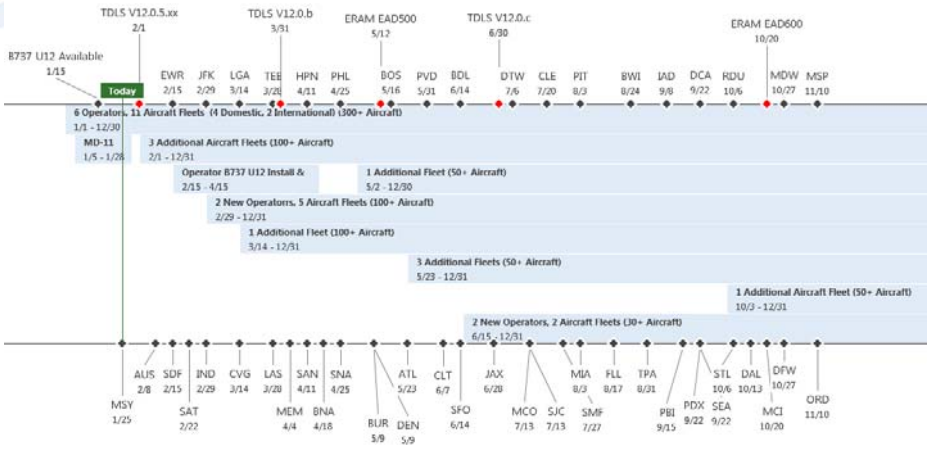
  - Includes FANS/VDL-2, FANS/POA, business jets, and international aircraft
- 645 aircraft have been equipped through the Data Comm equipage initiative

FAA NextGEN

Data Comm Operator Projections



FAA NextGEN

NIWG Rolling Plan – Data Comm

- **Conducted Data Comm NIWG Kickoff – January 26, 2016**
  - Held follow-on Data Comm NIWG meeting on February 16, 2016
- **Potential areas for inclusion in the Rolling plan update**
  - Concurrence on En Route Full services
  - Progress on equipage
  - VDL-0 in En Route
  - Incorporate lessons learned from AOC dispatch
  - Benefits and metrics
  - Additional airports for Tower Service
  - Operator requests for new capabilities

Challenges

- **The commitments to the NAC for deployment of Tower services reflect program challenge dates and not program baseline dates**
  - Challenge dates assume more risk in the coordination and field implementation of Controller Pilot Data Link Communications (CPDLC) service to the towers
- **Training**
  - Development and acceptance of training materials
  - Timing of training to support initial operations at a site
  - Operator flight crew training to support waterfall
- **Operator commitment /coordination and support of the Tower Services waterfall**
  - Equipped aircraft and operations to support Data Comm services
  - Support to FAA site testing and air-to-ground interoperability
- **Coordination of the delivery and integration of the component subsystems**
  - ERAM/TDLS/DCNS/FTI
- **Site coordination**
  - Coordinating across multiple facilities and operators to transition to Data Comm
- **Determine funding levels to support JRC decision for S1P2 En Route Full Services**
  - Establish scope of Full Service offerings
  - Establish timeframe for development and implementation
  - Coordination of re-plan with operator community
- **Understand implications and address the recommendations from the PARC CWG on accommodation of VDL-0 for En Route**

DISCUSSION

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THE GOLD STANDARD FOR AVIATION SINCE 1935

Multiple Runway Operations

Industry Leads:
Glenn Morse, United Airlines
Jon Tree, The Boeing Company
FAA SMEs:
Jennifer Post, ATO
Paul Strande, ANG

Status - IMRO

- **Wake RECAT**
  - Implemented in DEN in December 2015
  - Due to software issues, RECAT at LAX is being rescheduled
  - Moving up IND 1Q 2016 in lieu of LAX
- **Dependent procedures – Completed 7 Locations**
  - DAL, JFK, MEM, MSP, PDX, RDU, SEA
  - Early implementation is complete for 1 NM dependent staggered approaches to CSPRs with runway centerlines spaced between 2500' and 3600'
- **Assessment of future Wake RECAT**
  - Assessment of categorization concept on ATC, potential benefits, and integration impacts on automation systems is progressing for March 31, 2016
- **Assessment of BOSTON**
  - Publication of RNAV approach for BOS 4L planned for March 31, 2016

Multiple Runway Operations Challenges

- **Boston may not accrue benefit of dependent staggered approaches if RNAV approach is not published**
  - ➢ IMRO and PBN are working to coordinate on future interdependencies
- **Hardware & Software upgrades will not be available in HNL until mid Q4 CY16,**
  - ➢ working group will be working schedule changes accordingly
- **Enhancements for Wake ReCat to optimize for location specific fleet mix**
  - ➢ Assessment underway

MRO Rolling Plan Status

- **2017 Commitments**
  - Dependent stagger and triple simultaneous approach commitments are on track or complete
  - Simultaneous independent parallel operations using an offset – MRO work is complete for safety analysis and procedure authorization, but need for RNAV offset approaches led to identification of need for PBN Team coordination
  - On track for implementing RECAT at 3 sites for Q1-Q3
- **2018/2019 Thoughts to Date**
  - 9 potential RECAT sites have been identified by FAA; preparing benefits assessment and coordinating priorities with industry now
  - Consideration of potential sites and uses for Converging Runway Display Aid (CRDA)
  - Pre-implementation analysis and review of authorized sites for Wake Turbulence Mitigation for Arrivals

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DISCUSSION

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THE GOLD STANDARD FOR AVIATION SINCE 1935

Performance Based Navigation

Industry Leads:
Gary Beck, Alaska Airlines
Steve Fulton, Sandel Avionics
FAA SMEs:
Donna Creasap, ANG
Josh Gustin, ATO

PBN - Status

- **Metroplex**
  - Atlanta and Charlotte in progress – on schedule
- **Established on Required Navigation Performance (EoR) National Standard**
  - In JO 7110.65 *Air Traffic Control* publication cycle; no risk
  - Delivery expected early
- **NIWG Industry meetings**
  - January 12 January 22 February 11 February 19
  - Established a sub-group to look at progress on decision support tool milestones near-term (e.g. TBFM, GIM-S, TSAS)
- **Overall**
  - Good discussions and agreement that our work should result in meaningful operational capability as soon as possible.

FAA NextGEN

PBN Status (cont.)

- **Technical Briefings**
  - TSAS
  - PBN National Route Structure
  - EoR
- **Current Actions**
  - Considering ATL/CLT Metroplex implementation goals broken down into smaller milestones for more visibility of progress
  - Considering adding decision support tool items
  - Adding LAS Metroplex

FAA NextGEN

PBN Commitments & Options 2017-2019

- Validated 2017 schedules on target
  - Metroplex – Atlanta and Charlotte
  - EoR Widely Spaced National Standard
- Under consideration for future milestones
  - Pre-implementation targets for TBFM/TSAS
  - Pre-implementation targets for GIM-S
  - Key site for EoR Widely-spaced operations (may roll into CY 2018)
- 2018/2019 - Thoughts to Date
  - Align any new targets to support progress defined in PBN NAS NAV Strategy
  - Prioritize applications of EoR
    - Identify capability of highest interest to industry
    - Consider potential site deployments (schedule permitting)
  - Targets for TBFM/ TSAS and GIM-S
  - Targets for aircraft capabilities
  - Other industry targets under active consideration/discussion

PBN Challenges & Opportunities

- Key to PBN success and benefits is getting ATC clearance to fly the procedures. There is a big time gap before TSAS is available at Navigation Service Groups 1/2 airports and we need to understand what can be done in the interim.

DISCUSSION

RTCA

THE GOLD STANDARD FOR AVIATION SINCE 1935

Surface Team

Industry Leads:
Rob Goldman, Delta Air Lines
Steve Vail, Mosaic ATM, Inc.
FAA SMEs:
Andras Kovacs, ATO
Susan Pfingstler, NG

Surface Status

- CY14 and CY15 milestones were all completed
- CY16 Implementation milestones:
  - Advanced Electronic Flight Strips
    - EWR ATCT on track to implement by end of Q2 CY2016
    - LAS ATCT and SFO ATCT on track to implement by end of Q3 CY2016
      - Contingent upon on-time completion on ATCT construction and operational acceptance
      - Software build and training underway
  - FAA to Ingest 11 Data Elements via TFMS Update
    - Awaiting completion of Industry milestone to Provide 11 Data Elements (see below)
- CY16 Industry milestone:
  - Industry to Provide 11 Data Elements
    - Data exchange is the foundation of Traffic Flow Management (TFM) in the NAS and surface data elements bridge the gap between surface and airborne TFM
    - Originally defined for a 2015 benefit – now tracked for future capability
    - Coordination underway to establish effective tracking and support mechanisms to foster success
- CY17 Implementation milestone
  - Surface Departure Management
    - Charlotte ATD-2 Demo still on track by end of Q4 CY2017

FAA NextGEN

Core Capabilities Needed

Terminal Flight Data Manager (TFDM) :
is the surface management solution for NextGen

Electronic Flight Data

TFDM will provide Electronic Flight Data (EFD) and Electronic Flight Strips (EFS) in the tower to replace printed flight strips. This functionality will be integrated with Flight Plans for automatic updating.

Collaborative Decision Making for the Surface

TFDM will provide a departure scheduler with live data provided by Air Traffic systems/controllers and Flight Service Providers, that will offer departure metering and other surface management tools, improving surface traffic flow management.

Traffic Flow Management

TFDM will enhance traffic flow management through TFDM, TBFM (Time Based Flow Management) and TFMS (Traffic Flow Management System) data integration to enable airlines, controllers and airports to share and exchange real-time data. This will result in improved surface traffic management and better airport operations.

Systems Consolidation

TFDM will replace multiple unsupportable systems in the National Airspace System through integration of their functionality into TFDM. This achieves technology modernization, improved data sharing and lower maintenance costs.

FAA NextGEN

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Why TFDM?

Flight Operators

- Less taxi time/fuel burn
- Aircraft may be held at gate instead of in line on the taxiway
- Improved schedule predictability/crew utilization
- Increased reliability of connections
- Increased situational awareness – safety & efficiency

Flying Public

- Improved predictability
- Fewer delays
- More reliable flight schedules
- Awareness of potential delays before boarding
- Passengers comfortably waiting in the terminal instead of in the aircraft waiting on the taxiway
- Improved passenger satisfaction

Airport Operators

- Reduced CO2 footprint
- Reduced engine noise
- Improved predictability
- More balanced use of airport resources

Air Traffic Control

- Automatically updated flight plans and electronic flight strips
- Easier rescheduling through generation of a recommended schedule
- Decreased voice communications
- Fewer aircraft in the movement area and departure queue
- Improved surface situational awareness at the TRACON, ARTCC and Command Center
- Improved safety – less heads down time

FAA NextGEN

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2017-2019 Rolling Plan Considerations

- FAA-Industry Engagement in Surface and emphasizing the critical TFDM Concept
  - Meaningful Industry inclusion in post-FID development of Terminal Flight Data Manager
    - Harmonize industry groups and leverage ATO Integrated Product Team (IPT)
    - Provide operational and technical details and insight into waterfall and transition plans
    - Participate in activities essential to successfully implementing TFDM across NAS
- Expand surface surveillance information sharing
  - Explore ways to obtain surface ADS-B data
  - Explore technically feasible ways for FAA to ingest surveillance data to improve Traffic Flow Management (TFM) predictions
  - Explore opportunities to share non-movement area surveillance information
- Support Collaborative Decision Making (CDM) and its role in Surface
  - Develop On-Boarding process for Airports as CDM members
  - Apply CDM model/organization as appropriate for TFDM Industry engagement

Risks & Operational Challenges

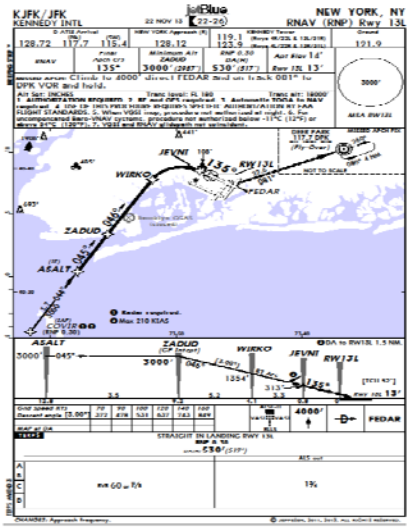
- TFDM Program Funding Reductions resulted in:
  - Reduced visibility into what capabilities will and will not be included in TFDM contingent upon funding
  - Schedule slipping to the right
- Stakeholders providing 11 data elements
  - Flight operators “on-boarding” to SWIM and Ops-cutover
- Schedule alignment of ATD-2 Tech Transfer capability vs. TFDM deployment
  - Challenge mitigated via meaningful inclusion and capture of lessons learned
- Portability of TFDM/Surface between airports
  - Challenge mitigated by industry inclusion

DISCUSSION


jetBlue
JFK RNP/AR RNWY 13/L
NAC
February 25, 2016
Bart Roberts
VP Flight Operations

History

- FAA and MITRE started to develop approach 2004, JetBlue (Capt. Joe Devito) joined effort in 2007 & brought it to conclusion
- Challenges: Decision Altitude in the turn and ensuring lateral containment during missed approach
- Flight trials Resulted in additional **requirement** of TOGA (Takeoff Go Around) to NAV For JFK Rwy 13 L/R (unique to these procedures in NAS) to ensure lateral containment.



Investment considerations

- Tarmac Delay rule implemented 2011
- Crew duty impact of preventable diversions
- Multi-year JFK major runway construction was a factor
- Then Oct 2011 NY diversions into BDL with Tarmac delay hearings, decision to equip E190 fleet with TOGA was made.

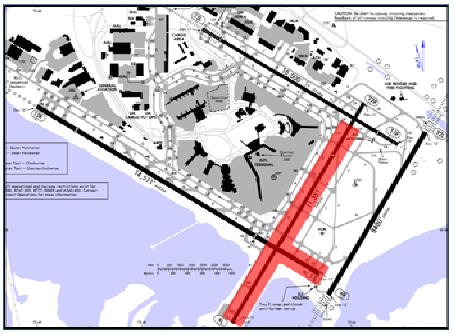
JFK 4L/22L CONSTRUCTION & RNAV RNP 13L APPROACH

- 154-day closure (27 April – 28 Sept 2015)
- 13L became primary arrival runway by necessity

YoY usage: JFK 13L arrivals 4/27-9/28*	
2014	2015
30.6%	**65.3%**

- Without RNAV RNP approach, conditions below VMC are likely to force ILS 13L operation
  - Airport Acceptance Rate 54 → 28
  - Airspace conflict affecting LGA, TEB and EWR
- RNP 13L minimum: RVR 6000
- JetBlue/NY TRACON signed LOA for closure period and beyond
  - JBU assigned RNP 13L when runway in use, weather permits

Peak hour usage (1400-2100L) / Data source: Passur Aerospace

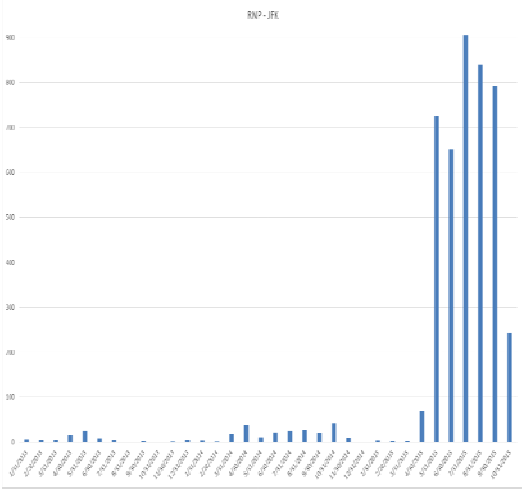


RNAV RNP 13L/R Approach, JBU flight operations	
97.8% Compliance/Success Rate	**5,939** RNAV RNP 13L/R Approaches Logged

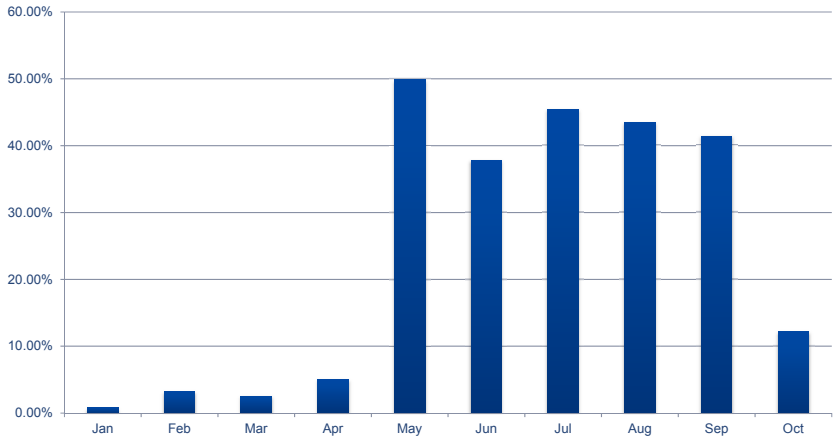
Preliminary numbers based on flight crew self-reporting
April 27 - September 28, 2015

Procedural Acceptance

- Controller acceptance was inconsistent till all JBL aircraft were equipped with TOGA to NAV capability.
- April 2015 JBL/N90/NATCA signed an LOA to assign all JetBlue aircraft the RNP approach
- JBL heavily relies on uses RNP/AR at LGB R12, DCA R19 and JFK R13 L/R (requires TOGA to NAV), R4, R22L



Percent of Runway 13L Arrival Utilization by Month Jan 2015 –Oct 2015



DISCUSSION

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THE GOLD STANDARD FOR AVIATION SINCE 1935

LUNCH

FROM INNOVATION TO SOLUTION

NAC

Florian Guillermet/Frank Brenner

Atlanta, GA

25 February 2016

SESAR JOINT UNDERTAKING

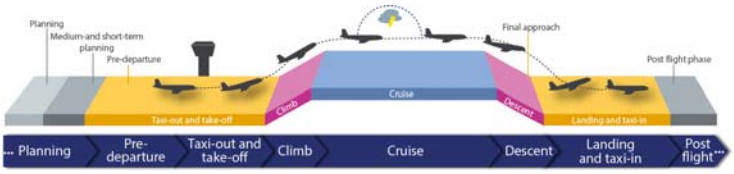
founding members

AGENDA

- European ATM Master Plan
  - Why it matters to Europe?
- Operations and Technology
  - Why it must link to performance?

The European ATM Master Plan

ENABLING PERFORMANCE



Automation support

Flight- and flow-centric operations

Sharing of information

Integration of all vehicles

Integrated systems

Virtualisation

SESAR

Thank you!

RTCA

THE GOLD STANDARD FOR AVIATION SINCE 1935

Joint Analysis Team

Ilhan Ince, American Airlines, Inc.
Dave Knorr, FAA

JAT Highlights

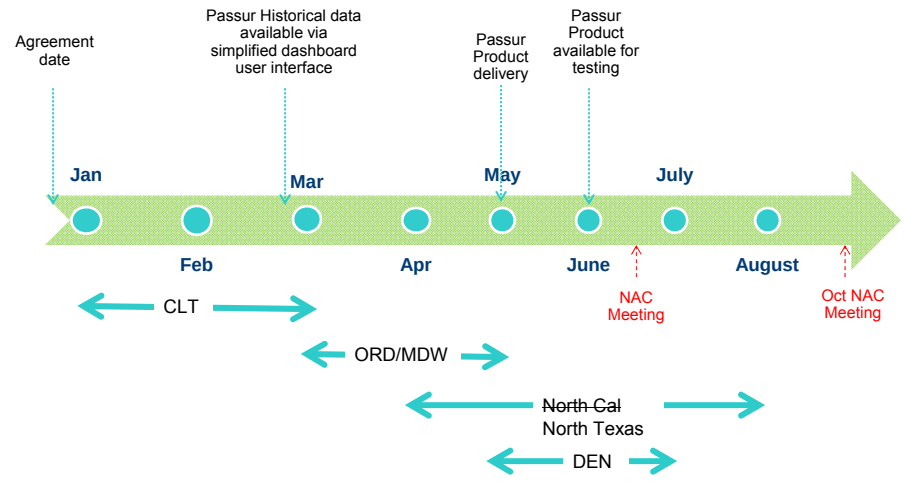
- To Date: Three full team meetings and one sub-team meeting
- Team has agreed on data and methodology for assessing Wake RECAT at CLT
- FAA and Industry have begun data sharing and validation
  - PASSUR data not available for JAT use until end of month
- Initial results using FAA data show clear RECAT improvement between qualifying lead/trail pairs
- Overall RECAT impact on throughput at CLT is negligible due to small numbers of effected qualifying pairs

JAT Next Steps

- Ensure results consistency with industry data – ongoing
- Ensure data consistency with PASSUR Wake ReCat related data*
- Begin RECAT assessment at Chicago (ORD&MDW)
- Full day team meeting at DFW on March 9th

PASSUR is providing additional data element related to runways at no change to schedule or to price.

JAT: Looking ahead



Preliminary CLT RECAT Evaluation Highlights

Change in Separation Requirements (nm)

Traditional Classes	Trailing Aircraft				
	Super	Heavy	B757	Large	Small
Super	MRS	6.0	7.0	7.0	8.0
Heavy	MRS	4.0	5.0	5.0	6.0
B757	MRS	4.0	4.0	4.0	5.0
Large	MRS	MRS	MRS	MRS	4.0
Small	MRS	MRS	MRS	MRS	MRS

RECAT Categories	Trailing Aircraft					
	A	B	C	D	E	F
A	MRS	5.0	6.0	7.0	7.0	8.0
B	MRS	3.0	4.0	5.0	5.0	7.0
C	MRS	MRS	MRS	3.5	3.5	6.0
D	MRS	MRS	MRS	MRS	MRS	4&5
E	MRS	MRS	MRS	MRS	MRS	MRS
F	MRS	MRS	MRS	MRS	MRS	MRS

Trailing Aircraft

Leading Aircraft: Traditional	RECAT	Super A	Heavy B	Heavy C	B757 D	Large D	Large E	Small F	Aircraft Types
Super	A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	A380's, AN225
Heavy	B	0.0	-1.0	0.0	0.0	0.0	0.0	1.0	B747's, B777's, A340's, A330's
	C	0.0	-1.0	-1.0	-1.5	-1.5	-1.5	0.0	A300, A310, B707, B767, DC8, DC10, MD11
B757	D	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	B757's
Large	D	0.0	0.0	0.0	0.0	0.0	0.0	1.0	A319, A320, A321, B727's, B737's
	E	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	CRJ's, DH8's, E135, E145, E170
Small	F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C550, C560, C570, E120

Red indicates an increase in separation
Green indicates a decrease in separation

Throughput Improvement Potential at CLT

Apr-Aug 2015, Operating Hours

Arrival Pairs during Operating Hours: 77,070

Trailing Aircraft

Leading Aircraft	RECAT	Traditional: Heavy B	Traditional: Heavy C	Traditional: B757 D	Large D	Large E	Small F
Heavy	B	38 (0.0%)	2 (0.0%)	4 (0.0%)	148 (0.2%)	174 (0.2%)	18 (0.0%)
	C	2 (0.0%)	0 (0.0%)	1 (0.0%)	30 (0.0%)	29 (0.0%)	2 (0.0%)
B757	D	2 (0.0%)	0 (0.0%)	5 (0.0%)	240 (0.3%)	257 (0.3%)	21 (0.0%)
Large	D	155 (0.2%)	30 (0.0%)	241 (0.3%)	13,645 (17.7%)	16,897 (21.9%)	759 (1.0%)
	E	223 (0.3%)	37 (0.0%)	261 (0.3%)	16,609 (21.6%)	23,165 (30.1%)	1,413 (1.8%)
Small	F	30 (0.0%)	2 (0.0%)	12 (0.0%)	877 (1.1%)	1,283 (1.7%)	458 (0.6%)

Departure Pairs during Operating Hours: 82,566

Trailing Aircraft

Leading Aircraft	RECAT	Traditional: Heavy B	Traditional: Heavy C	Traditional: B757 D	Large D	Large E	Small F
Heavy	B	49 (0.1%)	1 (0.0%)	10 (0.0%)	402 (0.5%)	473 (0.6%)	16 (0.0%)
	C	1 (0.0%)	1 (0.0%)	10 (0.0%)	134 (0.2%)	100 (0.1%)	0 (0.0%)
B757	D	10 (0.0%)	2 (0.0%)	2 (0.0%)	275 (0.3%)	312 (0.4%)	10 (0.0%)
Large	D	433 (0.5%)	129 (0.2%)	268 (0.3%)	14,657 (17.8%)	17,249 (20.9%)	887 (1.1%)
	E	448 (0.5%)	108 (0.1%)	257 (0.3%)	16,777 (20.3%)	24,339 (29.5%)	1,839 (2.2%)
Small	F	43 (0.1%)	6 (0.0%)	33 (0.0%)	1,296 (1.6%)	1,487 (1.8%)	502 (0.6%)

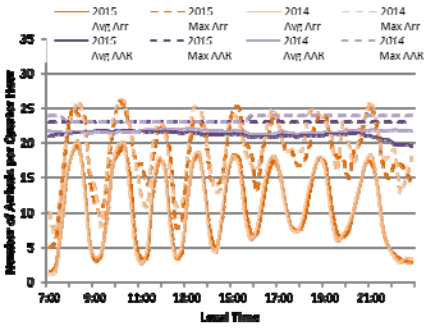
Separation Requirements	Arrival Pairs	Departure Pairs
Decreased	2.6%	3.3%
Unchanged	96.3%	95.6%
Increased	1.0%	1.1%

Red indicates an increase in separations
Green indicates a decrease in separations

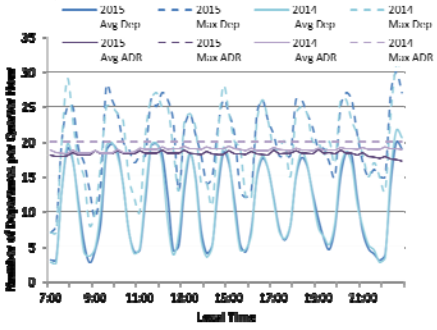
Federal Aviation Administration

Qtr-Hour Throughput and Called Rates

Arrivals



Departures



Federal Aviation Administration

Throughput Improvement Potential at CLT

Apr-Aug 2015, Peak Periods

Arrival Pairs during Peak Periods: 6,355

(8.2% of Arrival Pairs during Operating Hours)

Trailing Aircraft

Leading Aircraft	RECAT	B	C	D	D	E	F
Traditional		Heavy		B757	Large		Small
Heavy	B	3 (0.0%)	0 (0.0%)	0 (0.0%)	4 (0.1%)	6 (0.1%)	0 (0.0%)
	C	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
B757	D	0 (0.0%)	0 (0.0%)	1 (0.0%)	15 (0.2%)	14 (0.2%)	1 (0.0%)
Large	D	9 (0.1%)	0 (0.0%)	11 (0.2%)	1,160 (18.3%)	1,457 (22.9%)	42 (0.7%)
	E	4 (0.1%)	0 (0.0%)	19 (0.3%)	1,382 (21.7%)	1,988 (31.3%)	90 (1.4%)
Small	F	1 (0.0%)	0 (0.0%)	1 (0.0%)	53 (0.8%)	78 (1.2%)	16 (0.3%)

Departure Pairs during Peak Periods: 33,696

(40.8% of Departure Pairs during Operating Hours)

Trailing Aircraft

Leading Aircraft	RECAT	B	C	D	D	E	F
Traditional		Heavy		B757	Large		Small
Heavy	B	0 (0.0%)	0 (0.0%)	2 (0.0%)	88 (0.3%)	118 (0.4%)	1 (0.0%)
	C	0 (0.0%)	1 (0.0%)	7 (0.0%)	72 (0.2%)	53 (0.2%)	0 (0.0%)
B757	D	2 (0.0%)	2 (0.0%)	1 (0.0%)	114 (0.3%)	133 (0.4%)	1 (0.0%)
Large	D	104 (0.3%)	74 (0.2%)	120 (0.4%)	6,341 (18.8%)	7,607 (22.6%)	195 (0.6%)
	E	121 (0.4%)	56 (0.2%)	112 (0.3%)	7,440 (22.1%)	9,703 (28.8%)	484 (1.4%)
Small	F	10 (0.0%)	2 (0.0%)	9 (0.0%)	376 (1.1%)	304 (0.9%)	43 (0.1%)

Separation Requirements	Arrival Pairs	Departure Pairs
Decreased	2.0%	2.6%
Unchanged	97.4%	96.8%
Increased	0.7%	0.6%

Fewer separation miles required by RECAT:

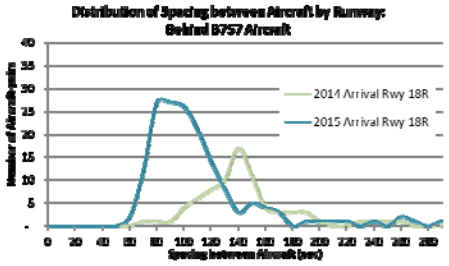
- 0.4% for peak arrivals
- 0.7% for peak departures

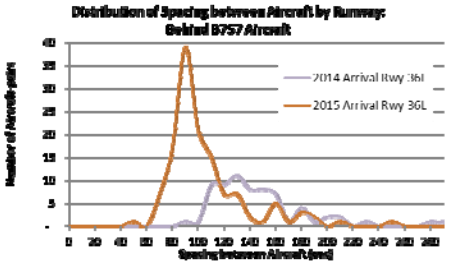
Red indicates an increase in separation
Green indicates a decrease in separation

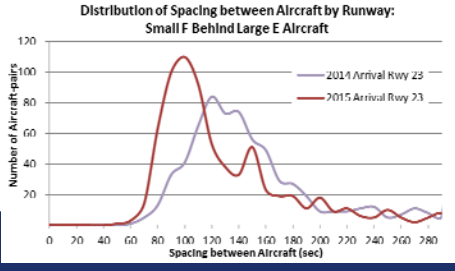
Federal Aviation Administration

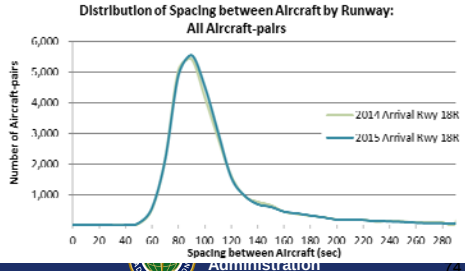
Examples of Changes in Aircraft Spacing

Arrivals on the Same Runway









Federal Aviation Administration

DISCUSSION

RTCA

THE GOLD STANDARD FOR AVIATION SINCE 1935

PBN Blueprint Community Outreach

Jim Crites, DFW International Airport
Brian Townsend, American Airlines, Inc.

Review of Tasking

- Per October 29, 2015 Letter from NAC Chair to FAA Deputy Administrator

"A related issue of impacts on communities associated with PBN procedures was raised during NAC's discussion of both the near-term implementations, and longer term strategic work on PBN. Early community outreach and collaboration has been, and continues to be a major hurdle in fielding PBN procedures. Building on the landmark Blueprint for Success to Implementing PBN, the Committee is enthusiastic about determining how the NAC/NACSC can help address community outreach in the implementation of PBN."

Participating Organizations

- Air Line Pilots Association
- Airlines for America
- Airports Council International (ACI-NA)
- Alaska Airlines
- American Airlines
- ATAC
- Beacon Management Group
- Cessna Aircraft Company
- City of Houston, Texas
- Dallas/Fort Worth International Airport
- Delta Air Lines, Inc.
- Federal Aviation Administration
- FedEx Express
- International Air Transport Association
- HMMH
- JetBlue Airways
- Jetcraft Avionics LLC
- Landrum and Brown
- LeighFisher
- Mosaic ATM, Inc.
- National Air Traffic Controllers Association
- NOISE
- Port Authority of New York & New Jersey
- Port of Portland
- Raytheon
- RTCA, Inc.
- Southwest Airlines
- Tetra Tech
- The MITRE Corporation
- United Airlines, Inc.

Work Plan

- Goal: Final Recommendation June 2016
- Level Setting and Informational Briefings
  - Local Experiences
    - Phoenix, AZ
    - Washington DC
  - FAA Community Outreach Activities
    - Dennis Roberts, FAA Southern Regional Administrator
    - Curtis Holsclaw, FAA Office of Environment and Energy
    - Lynn Ray, FAA, VP Mission Support
  - Aviation Community – ACI, A4A, NOISE
- On-going Actions
  - Review of FAA Community Guidance materials
  - Macro NextGen communication message
  - Develop of recommendation – best practices and suggestions for future actions by FAA and industry

Work Plan (cont.)

- Plan to review FAA documents under development:
  - Office of Environment and Energy Research and Development: Update of the Community Involvement Manual (circa 1990) - Guidance and Best Practices for FAA Environmental practitioners and supporting consultants
  - Air Traffic Organization: Development of a Community Outreach Plan
- Work Group beginning to develop approach to final report
- Making specific recommendations to FAA & providing overall guidance to all stakeholders
- Guidance will focus on providing a consistent yet flexible approach based upon the type of PBN effort (i.e., Metroplex and Single-site) as well as the anticipated challenges posed by an individual project

Major Findings

- A consistently applied, yet flexible approach to community outreach is an essential element of PBN development and implementation
- FAA, Airlines & Airports acting upon the Community Outreach recommendation from the original PBN Blueprint Work Group Report
- All stakeholders recognize the value of collaborating so as to refine and align their best practices pertaining to community outreach

Key Challenges

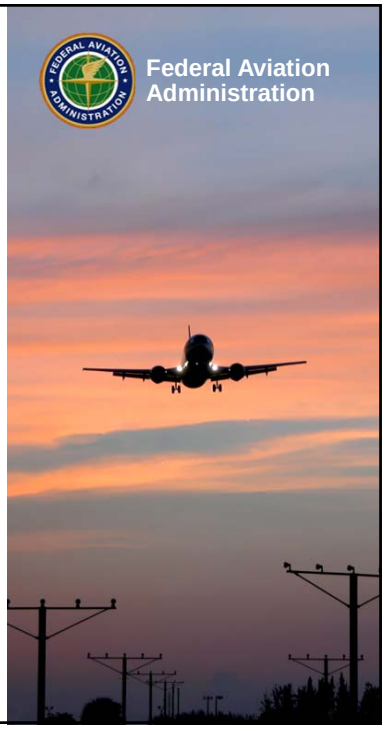
- Identify entity with oversight responsibility
- Define outreach
  - Focus on high level
  - Managing the appropriate message and information
  - Tailor a checklist to the project
- Balancing available resources with the number of projects
  - Having enough bodies to manage the demand
- Making certain the appropriate and qualified representation is at the table
- Failure to adequately address Community Outreach jeopardizes the future and value of PBN implementations

DISCUSSION

Equip 2020
FAA Update

Aircraft as of January 31, 2016
Operations as of December 31, 2015

Date: Bruce DeCleene, AFS-400
February 25, 2016

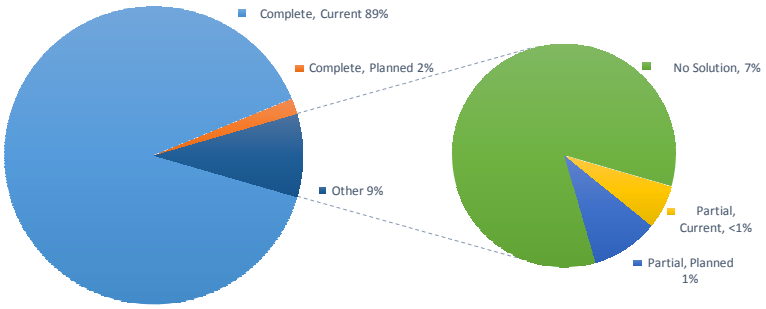


Status of Equipage

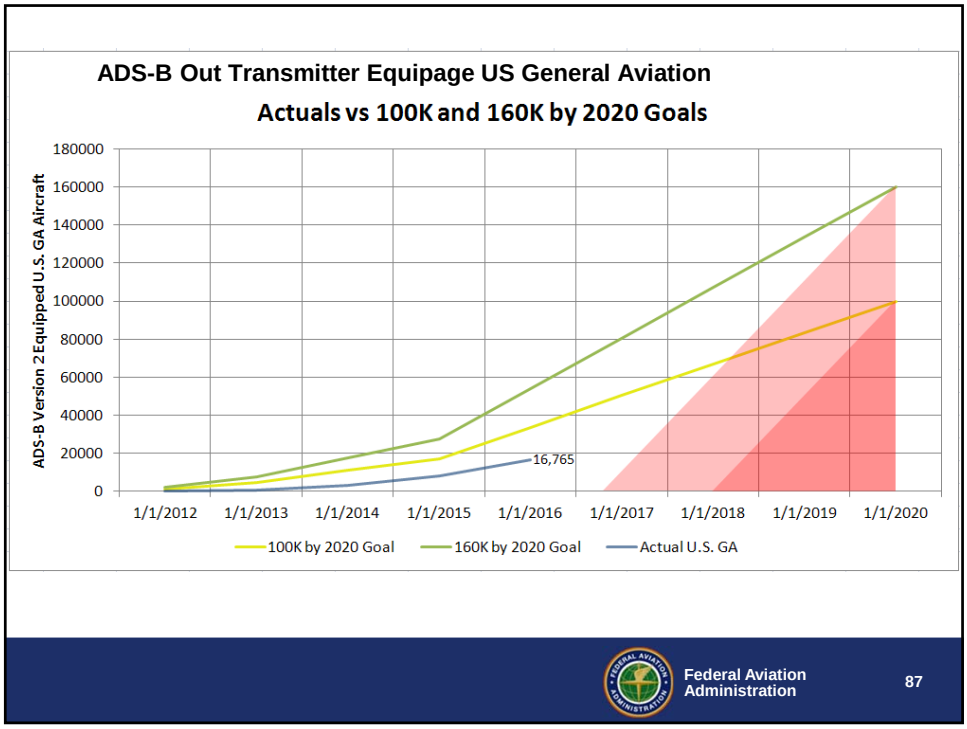
- **Review of Terms:**
  - ADS-B Out = Transmitter, Wiring and GPS
- **Solutions available/planned for almost all aircraft make/model**
  - Suppliers have improved data in Equip 2020 database
- **Aircraft Equipage Counts**
- **Equipped Aircraft by Operator (Part 121)**
- **Equipped Operations**

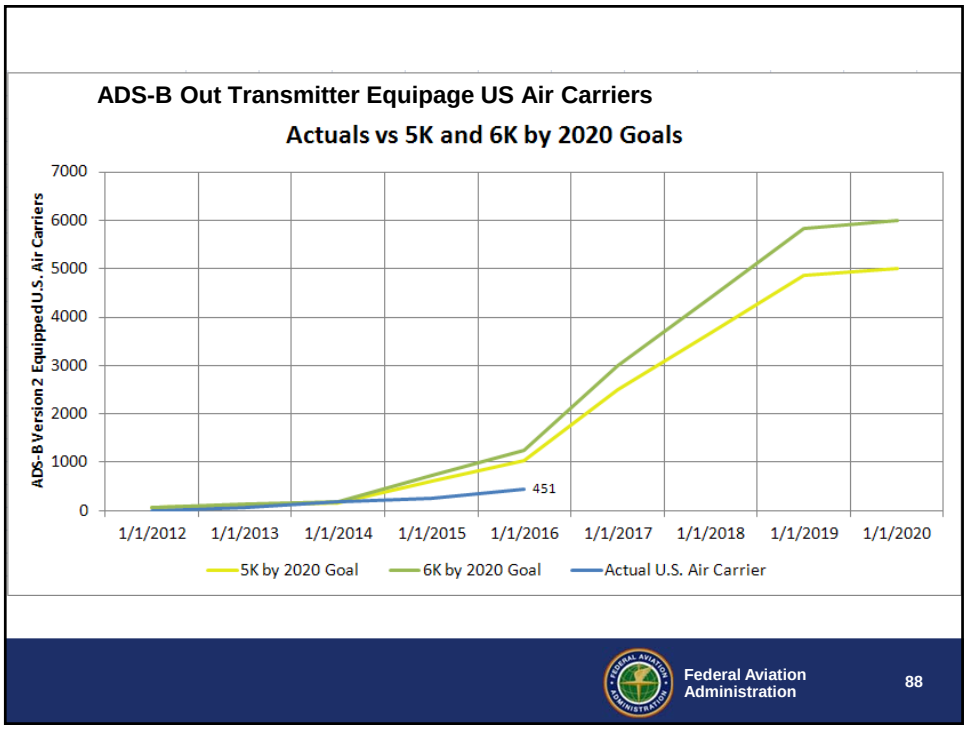
US Fleet Availability of ADS-B Out Solutions

Equip 2020 Database, Supplier-Provided Data
FAA-Approved Solutions



Data still being reconciled, actual situation is better than depicted.


ADS-B Out Transmitter Equipage US General Aviation
Actuals vs 100K and 160K by 2020 Goals
ADS-B Version 2 Equipped U.S. GA Aircraft
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
16,765
1/1/2012
1/1/2013
1/1/2014
1/1/2015
1/1/2016
1/1/2017
1/1/2018
1/1/2019
1/1/2020
100K by 2020 Goal
160K by 2020 Goal
Actual U.S. GA
Federal Aviation Administration
87


ADS-B Out Transmitter Equipage US Air Carriers
Actuals vs 5K and 6K by 2020 Goals
ADS-B Version 2 Equipped U.S. Air Carriers
7000
6000
5000
4000
3000
2000
1000
0
451
1/1/2012
1/1/2013
1/1/2014
1/1/2015
1/1/2016
1/1/2017
1/1/2018
1/1/2019
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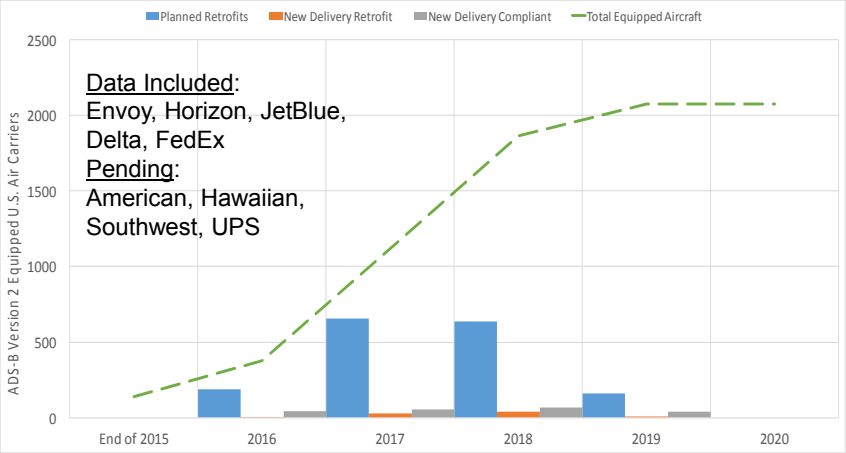
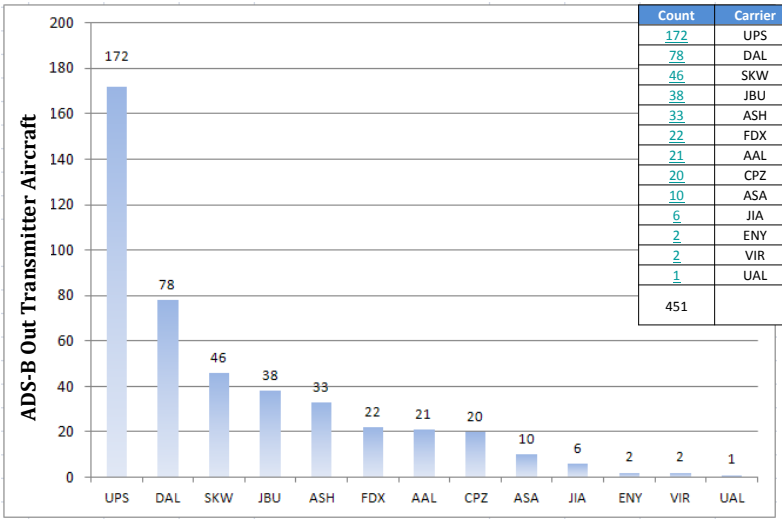
5K by 2020 Goal
6K by 2020 Goal
Actual U.S. Air Carrier
Federal Aviation Administration
88

U.S. Air Carrier Equipage Plans

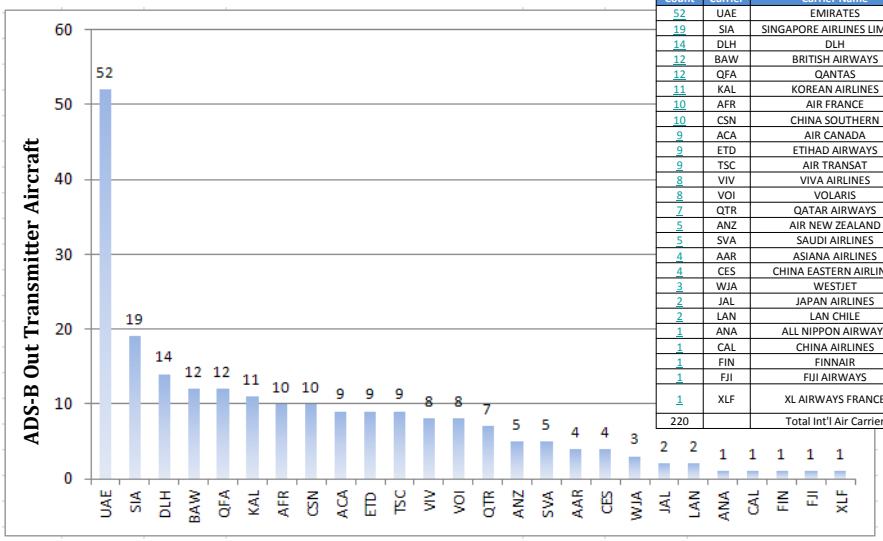


Equipage Status – U.S. Air Carrier



Count	Carrier	Carrier Name
172	UPS	UPS
78	DAL	DELTA
46	SKW	SKY WEST
38	JBU	JETBLUE
33	ASH	AIR SHUTTLE
22	FDX	FEDEX
21	AAL	AMERICAN
20	CPZ	COMPASS
10	ASA	ALASKA AIRLINES
6	JIA	PSA AIRLINES
2	ENY	ENVOY AIR
2	VIR	VIRGIN ATLANTIC
1	UAL	UNITED
451		Total U.S. Air Carrier

Equipage Status – Int'l Air Carrier



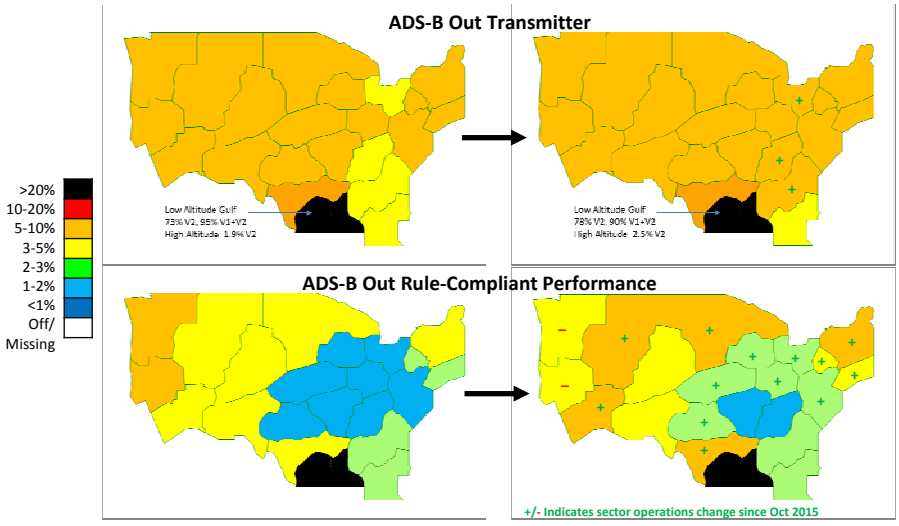
Count	Carrier	Carrier Name
52	UAE	EMIRATES
19	SIA	SINGAPORE AIRLINES LIMITED
14	DLH	DLH
12	BAW	BRITISH AIRWAYS
12	QFA	QANTAS
11	KAL	KOREAN AIRLINES
10	AFR	AIR FRANCE
10	CSN	CHINA SOUTHERN
9	ACA	AIR CANADA
9	ETD	ETIHAD AIRWAYS
9	TSC	AIR TRANSAT
8	VIV	VIVA AIRLINES
8	VOI	VOLARIS
7	QTR	QATAR AIRWAYS
5	ANZ	AIR NEW ZEALAND
5	SVA	SAUDI AIRLINES
4	AAR	ASIANA AIRLINES
4	CES	CHINA EASTERN AIRLINES
3	WJA	WESTJET
2	JAL	JAPAN AIRLINES
2	LAN	LAN CHILE
1	ANA	ALL NIPPON AIRWAYS
1	CAL	CHINA AIRLINES
1	FIN	FINNAIR
1	FJI	FIJI AIRWAYS
1	XLF	XL AIRWAYS FRANCE
220		Total Int'l Air Carrier

Equipage - New Developments

UPDATED

Heat maps of Percent of Equipped Operations Oct15 – Dec15 (En-route SVs)

Oct 2015 → Dec 2015

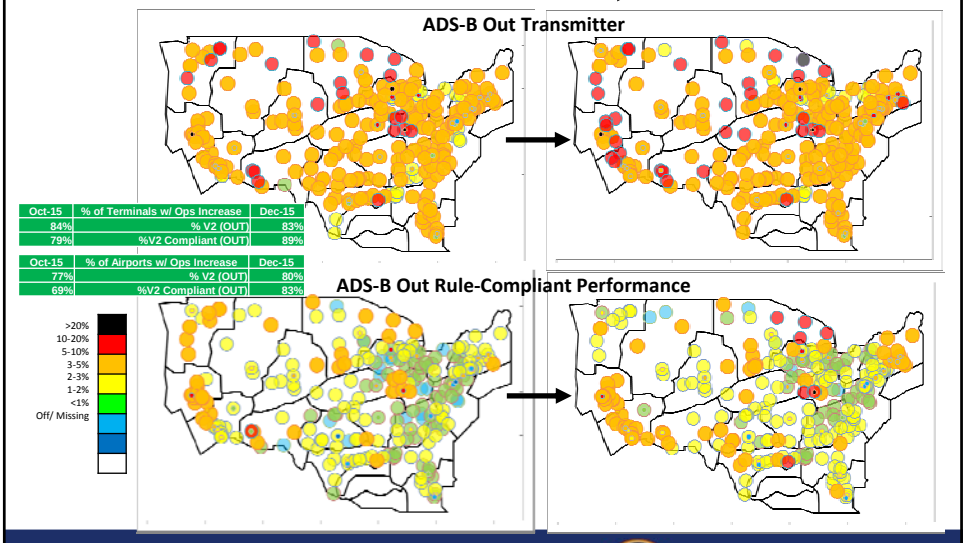


Equipage - New Developments

UPDATED

Heat maps of Percent of Equipped Operations Oct15 – Dec15(Terminal/Airport)

Oct 2015 → Dec 2015



Oct-15	% of Terminals w/ Ops Increase	Dec-15
84%	% V2 (OUT)	83%
79%	%V2 Compliant (OUT)	89%

Oct-15	% of Airports w/ Ops Increase	Dec-15
77%	% V2 (OUT)	80%
69%	%V2 Compliant (OUT)	83%

Conclusions

- **Continue to see increase in equipage**
  - Air carrier equipage plans will improve forecasting
  - Substantial number of GA owners still deferring equipage to closer to deadline
- **Education**
  - FAA and industry conducting outreach
  - http://www.faa.gov/nextgen/equipadsb
- **Privacy**
  - Industry estimating number of potential participants and period of updates for temporary-identities to enable FAA costing
- **Equip 2020: March 18**

DISCUSSION

RTCA

THE GOLD STANDARD FOR AVIATION SINCE 1935

The Future of the NAS - 2030

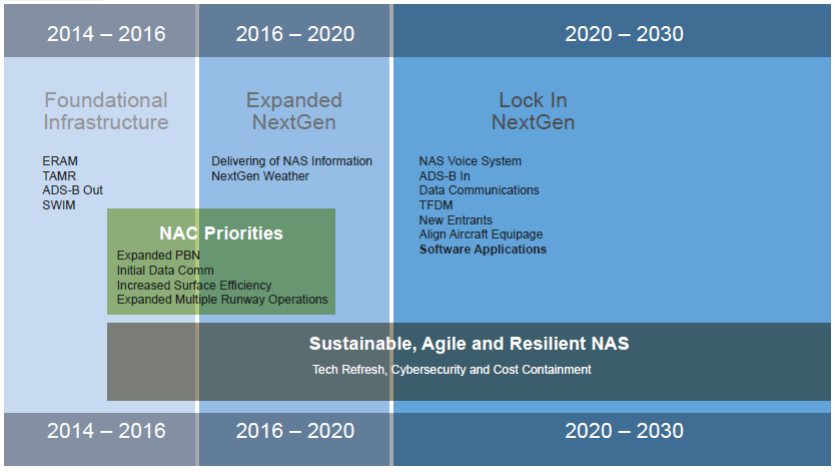
Bruce DeCleene, FAA
Michele Merkle, FAA

The Future of the NAS - 2030

- **With the NextGen foundation in place it is time to re-examine our path forward and ensure we are on the right track**
  - The NextGen Midterm Concept of Operations, NAS sustainment and resiliency efforts, addressing new challenges, and lessons learned from NextGen implementation come together to create the NAS of 2030
- **The *Future of the NAS - 2030* is intended to:**
  - Reaffirm commitment to providing enhanced service delivery to our stakeholders
  - Ensure our budget, workforce, and stakeholders remain committed to the work and investments necessary to create a NAS that is highly resilient, efficiently operated, and takes full advantage of integrated NextGen capabilities to achieve operational benefits
- **NextGen comes together across the NAS around 2030; anticipated benefits of NextGen can be achieved because:**
  - Transformational systems implemented across NAS
  - Key functionality matured
  - Data integrated across systems (both air and ground)
  - Capabilities operationally used

NextGEN

Building the Future NAS



FAA

NextGEN

NextGen Evolution

- 2011 NextGen Mid-Term Concept of Operations continues to evolve based on input from different sources
  - Stakeholder Inputs
  - Aviation Rulemaking Committee results
  - RTCA special committees
  - Detailed implementation plans including approach and timing
  - Research results
  - Technology selections
  - Lessons learned and independent assessments
  - Budget and affordability

Building the Future NAS

- Meeting New Challenges
  - New Entrants - Environmental Protection - Cybersecurity
- NextGen transformational systems continuing to deliver improved services
  - Trajectory Based Operations - Improvements to Separation Assurance - Increased Access to Airports
- Seamless Integration
  - Seamless integration encompasses end-to-end operations and the data, systems, and people that have an operational role in the NAS
- Aircraft and Operator Implications
  - Integration of strategic planning and tactical execution – integration of capabilities for the pilot– dependency on aircraft equipage – alignment of ground system acquisition and aircraft capabilities

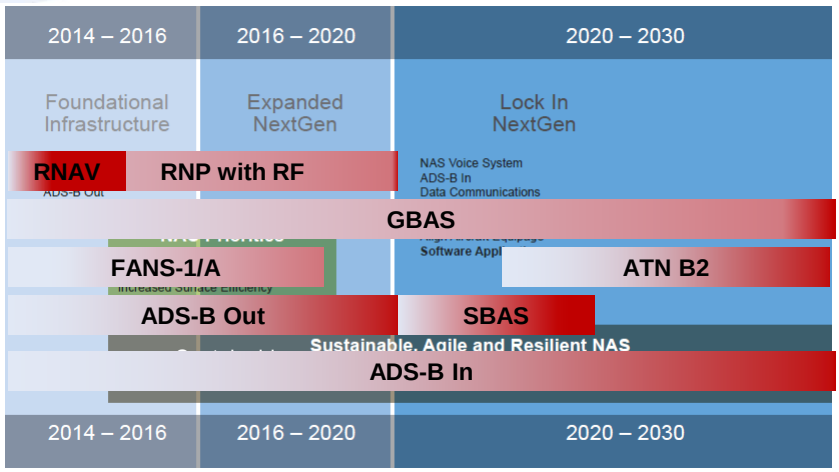
Locking in NextGen

- Trajectory Based Operations
  - Performance Based Navigation
  - Optimized Profile Descents and Ascents
  - Airborne Time -Based Management
  - Airborne Spacing-Based Management
  - Data Comm complex clearances and downlink of intent
- Airborne Collision Avoidance System-X
  - TCAS alerts during routine operations must be overcome
- Aircraft capability to conduct low visibility operations
- Static and Dynamic Information Access
  - Additional information wanted by Users
  - User Information (FOC and Aircraft) that will benefit ATC operations
- Collaborative Air Traffic Management

FAA NextGEN

Sample Aircraft Capabilities

(Air Carrier Example)



FAA

Legend

1 Aircraft 95%

NextGEN

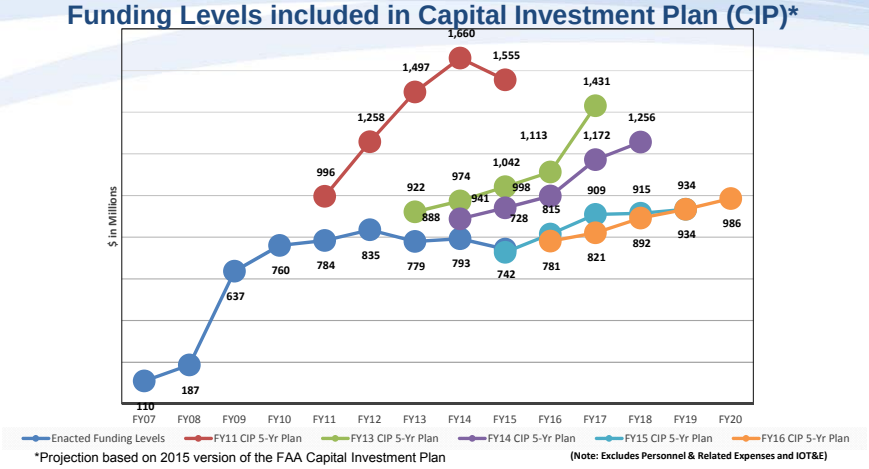
Conclusion

- NAC Tier 1 Priorities maximize near-term value of current equipage
- Need corresponding stability and alignment of long-term ground and aircraft investments
- Navigation Strategy illustrated value of aligning long-term expectations
- Time, Speed and Spacing Management task
  - Informing tradeoffs of various techniques for future separation
  - Concepts have equipage connotations
- International harmonization remains a key driver

Backup

NextGen Facilities and Equipment

Funding Levels included in Capital Investment Plan (CIP)*



*Projection based on 2015 version of the FAA Capital Investment Plan

(Note: Excludes Personnel & Related Expenses and IOT&E)

FAA

NextGEN

RTCA

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Summary of Meeting and Next Steps

DFO and NAC Chairman Closing Comments

Concluding Items

- Action Items
- Other Business
- Remaining 2016 Meeting Schedule
  - June 17 – Washington, DC
  - October 6 – Orlando, FL, JetBlue
    - Optional Pre-NAC Tour Harris Corp – Melbourne, FL (October 4)

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Adjourn

Attachment 3

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RTCA Paper No. 290-15/NAC-37

October 28, 2015

Meeting Summary, October 8, 2015

NextGen Advisory Committee (NAC)

The sixteenth meeting of the NextGen Advisory Committee (NAC) was held on October 8, 2015 at Fed Ex Express, Memphis, TN. The meeting discussions are summarized below.

List of attachments:

- Attachment 1 - Attendees
- Attachment 2 - Presentations for the Committee meeting - (containing much of the detail on the content covered during the meeting)
- Attachment 3 - Approved June 5, 2015 Meeting Summary
- Attachment 4 - NAC Chairman's Report
- Attachment 5 - FAA Report from The Honorable Michael Whitaker, FAA Deputy Administrator

Welcome and Introductions

Chairman Anderson opened the meeting at 8:45 a.m. by welcoming the NAC members and others in attendance. He recognized meeting host David Cunningham, Executive Vice President & Chief Operating Officer of FedEx Express who welcomed the Committee and highlighted the collaboration between FedEx and the FAA in moving the industry forward with NextGen. This was illustrated by FedEx's Dan Allen and Josh Kendrick who focused on how the NextGen capabilities have improved efficiency, reduced fuel consumption emissions and expanded capacity during a presentation prior to the NAC meeting. This included a review of the 17% capacity gain, 3 min reduced taxi-out time, and 2.5 min reduced approach time through the implementation of Wake Recategorization (Wake ReCat) at Memphis International Airport.

The meeting officially began at 9:01 with all NAC members being asked to introduce themselves, and attendees from the general public were asked to sign the attendance sheet, (attendees are identified in Attachment 1 and the presentation used during the conduct of the meeting are contained in Attachment 2).

Designated Federal Official Statement

In his role as the DFO, The Honorable Michael Whitaker (FAA Deputy Administrator) read the Federal Advisory Committee Act notice, governing the public meeting.

Approval of June 5, 2015 Meeting Summary

Chairman Anderson asked for consideration of the written Summary of the June 5, 2015 meeting. By motion, the Committee approved the Summary (Attachment 3).

Chairman's Remarks

The following is a summary of the remarks made by Chairman Anderson (Attachment 4):

> We are seeing tangible results from the deployment of some of the capabilities we identified as top priorities. It has been one year since approval by the NAC of the NextGen Integration Working Group (NIWG) final report and the NextGen Priorities Joint Implementation Plan that the FAA presented to Congress. Collectively we have achieved many successes in meeting implementation milestones for fielding NextGen capabilities. The plans must be kept up to date, working towards the goal of not just implementation, but improvements in operational performance. This included rolling out wake ReCat on an expedited manner.
>
> While there are many interim programmatic and infrastructure milestones along the way for which all involved should receive due credit, until we move the needle on performance, we must remain diligent in our work together to see that all necessary components of each capability are achieved, such as training, decision support tools, procedures and policies.

From the start, there was a realization that there were stretch goals incorporated into the plan and many of these have been met or are on the path to completion. In other cases, for numerous reasons, milestones have been delayed. Understanding the root-cause, the NIWG Teams should now review the plans and modify as appropriate through the successful collaborative process. Through this transparent process, the Teams will review the program milestones and decide how to address issues.

Interdependencies of the capabilities, among not only the four priority areas, but also among how we integrate other capabilities in a way that makes the four priority areas more beneficial to the operation of the national airspace system, is crucial. Implementing capabilities in one alone, while helpful, doesn't always lead to the bigger benefits we are all seeking.

It is encouraging that the FAA is including near-term flow management capabilities into the PBN focus area. Throughput is needed in a rational and metered way.

We must remain focused on throughput at airports – what we are doing is hard and we need to collaborate to be successful. Long term collaboration is the key to success.

The FAA is showing its continued confidence in the NAC and with the outstanding collaboration between the FAA and the NAC with the new Tasking on Metrics that builds on the six metrics and methods for tracking performance improvements approved by the NAC at the last meeting. The FAA and the industry are working together to collaboratively analyze and report performance on the specific implementations.

The NAC is a forum for the Industry and FAA to speak with one voice regarding the operational performance improvements attributable to NextGen implementation.

FAA Report - Mike Whitaker, Deputy Administrator, FAA

The following are the major points from Mr. Whitaker's remarks. The details are contained in the FAA report (Attachment 5).

- The FAA is closely working with NASA on Low Visibility technology to achieve safety enhancements, and lowering the cost of maintaining the NAS.

  - NASA Representative- Dr. Jaiwon Shin has been added to the NAC to enhance this interagency effort.
- Jim Bowman, Senior Vice President, Flight Operations, FedEx Express has replaced Bob Gray, ABX Air as the NAC representative for the Cargo Airlines Association.
- The FAA has announced a new Compliance Philosophy:
  - US is the gold standard for safety
  - Shift to risk-based decision making
  - Undercurrent of the policy is cooperation and trust
  - FAA will continue to have a zero tolerance policy for safety violations
- The key principles of the FAA's work with Congress on Reauthorization includes the need for stable funding for air traffic control operations and NextGen investments.
- New leaders have been announced for the FAA's Unmanned Aircraft Systems (UAS) efforts: Gen. Marke "Hoot" Gibson is the Senior Advisor on UAS Integration and Earl Lawrence is the Director of the UAS Integration Office.
- The FAA has made progress on major NextGen infrastructure programs of ERAM and ADS-B. The Agency has had success with its key site Data Comm tests and has approvals for implementations in 2016.
- Teri Bristol, Chief Operating Officer, FAA Air Traffic Organization, explained the FAA's response to an August ERAM software outage and steps being taken to prevent a reoccurrence. She also explained that the FAA had reached out directly to respond to questions raised during the June NAC meeting related to the FAA's actions that ensure the integrity of the DataComm infrastructure from cyber-attacks.
- The FAA-Industry have made progress in the updating the NextGen Priorities plan, and the steps to jointly measure and analyze implementations.
- The NAC will be asked to provide recommendations to the FAA on plans to increasing their focus on Time Based Flow Management in the near-term, to optimize PBN, and in the long-term for PBN strategy.
- There are growing environmental challenges with PBN, which illustrates the importance of early engagement with airport communities. This was raised during NAC's discussion of both the near-term implementations, and longer-term strategic work on PBN. Early and relentless

community outreach and collaboration has been, and continues to be, a major requirement in fielding PBN procedures.

Upon completion of the FAA report, Committee members engaged in discussion.

Chairman Anderson applauded the FAA on its statement of recent announcements on safety, and encouraged the Agency to make a similar commitment for NextGen.

On the issue of UAS, a NAC Member echoed statements that he made at a recent Congressional hearing on UAS and the need for the FAA to do something to prepare for the large numbers of UAS operations. The concern is the FAA and industry risk falling behind, and safety is an overarching concern in this new and emerging technology and aviation user. Another Member commented that many existing UAS operators who conduct operations in a professional manner recognize that technology development is underway to make UAS safer and for a safe integration into the National Airspace System (NAS).

Several committee members agreed with Mr. Whitaker's point about the growing need to engage communities earlier in the PBN process with a determination to better address their interests. It was also suggested that the NAC or a subgroup of the NAC assist the FAA with a process to discern the impact on communities. Another Member noted that the use of future technologies and implementing NextGen is important and interest in noise is growing, underscoring the need to engage communities earlier. It was also recognized that arrivals do not generate as strong a response, but that each airport has unique demographics and there is a need to demonstrate trust to the community that what was predicted to occur does, in fact, occur.

In response to questions about what the NAC can do, a Committee Member emphasized the need for interaction with communities to avoid surprises in implementation. Another commented that airports, FAA, and aircraft operators are all in this together.

An FAA representative explained that it is a complicated issue and the Agency is trying to get out in front with outreach for Metroplex implementations. This includes participating in airport roundtables, increasing opportunities to engage with the communities about implementation and find a balance between community concerns and industry's needs. This prompted a NAC Member to state that while dramatic progress has been made on overall noise reduction, dialogue is critical as PBN is implemented.

At the end of the discussion, the NAC agreed to the following:

Committee Action: Building on the landmark "Blueprint for Success to Implementing PBN" *October 2014*, the Committee has requested the PBN Blueprint Task Group help address community outreach in the implementation of PBN.

NextGen Integration Working Group (NIWG) - Priority Area Reports

The Committee received reports from the joint FAA-Industry NIWG on progress implementing the four priority areas of NextGen capabilities. The goal of the NIWG is to ensure the delivery of measurable benefits by dates certain, and thereby, increase the community's confidence in NextGen.

Mr. Ed Bolton and Ms. Teri Bristol, FAA, explained that the collaborative effort reached the one-year mark since the NIWG final report was transmitted to the FAA, and the NextGen Priorities Joint Implementation Plan was presented to Congress, tackling the challenges inherent in the deployment of DataComm, Improved Multiple Runway Operations (IMRO), Performance-Based Navigation (PBN) and Improved Surface Operations capabilities.

Their comments reviewed the lessons learned and the vitality and energy of the FAA and industry in executing the implementations. They also emphasized how the FAA and industry have collectively achieved many successes in meeting implementation milestones for fielding NextGen capabilities and expressed agreement to roll the plan forward through 2019.

The NAC was presented with nine revisions to the 2014 plan:

Focus Area	#	Implementation /*Pre-implementation Commitment	Original Date	Change	Rationale
Data Comm	1	FID for En Route Services*	**Q4 CY14 originally for 1 FID**	Added - Q4 2015 (Feb. 2015 NAC)	Split Final Investment Decisions for Initial and Final En-route services due to budget constraints.
Surface	2	AEFS – Newark	*Assessment Complete Q4 CY14*	Added - Q2 2016 (June 2015 NAC)	Feasibility assessment of electronic flight data for New York AEFS resulted in new implementation milestone for an additional AEFS site at Newark Tower
	3	Departure Management – Charlotte	*Assessment Complete Q1 CY15*	Add - Q4 2017 (June 2015 NAC)	Feasibility assessment for Terminal Flight Data Manager (TFDM) Departure Management resulted in new milestone for Surface Departure Clearance in Charlotte
	4	Surface Data via ASSC	**CLE = Q3 CY15** *CVG, PIT, MCI = Q3 CY16; PDX, MSY = Q4 CY16; ANC, ADW = Q1 CY17*	Remove (except SFO complete Q3 2014) (June 2015 NAC)	Data will not be available. At ASSC locations, safety analysis identified the need for changes to ensure controllers have a complete picture of the surface, program changes underway.
	5	Industry to provide 11 Data Elements	**Q4 CY15**	Revise – Industry working to provide New Date	Industry replan to align with data availability and program plans.
MRO	6	BOS - 7110.308 and Dependent Parallel Operations (DPO)	**.308 = Q3 CY15** **DPO = Q2 CY17**	Add Pre-implementation Commitment Q1 CY2016	Commitment is dependent on RNAV/GPS approach to RWY 4L implementation. Change milestone to pre-implementation commitment: Assessment to implement 7110.308 and Dependent Parallel Operations (2500' – 3600').
	7	ORD - Independent Parallel Operations (Dual w/Offset & Triple)	N/A	Add - ORD - Q4 CY2015	New procedures being implemented when new runway opens October 2015.
	8	Wake Recategorization	SFO - Q3 CY15	Merge Wake ReCat Implementation Commitments Revise SFO – Q2 CY16 Add Pre-implementation Commitment Q1 CY2016	Simplify tracking of Wake Recat commitments Add pre-implementation commitment: assessment of future Wake Recategorization capabilities
PBN	9	Metroplex – LAS Study Team Completion*	*Assessment Complete Q4 CY14*	Add - Q1 2016 (Feb 2015 NAC)	As the result of a positive Single Site Assessment of Las Vegas Basin pre-implementation commitment

The purpose of the revisions is to reflect the flexibility of the plan as the needs of the NAS and its users change. During discussions, the need for industry involvement in the planning was emphasized.

The Committee endorsed updates to the 2015 plan, based on the slides presented during the meeting. These plans will be briefed to Congress by the FAA prior to the end of the year.

The Committee discussed initiating a rolling three-year implementation plan that will include a review of existing capabilities and locations in 2017 and the addition of new commitments within the four focus areas through 2019. The NIWG will report back to the Committee with an interim report at the February 2016 meeting, a final report at the June 2016 meeting, and publish the new plan in October 2016.

Committee Action:

1. The NAC approved the 2015 plan revisions that will be forwarded to Congress.
2. The NAC agreed that the NIWG, through the NACSC, will report back to the Committee with an interim report at the February 2016 meeting. This includes a review of 2017 plans, and inclusion of 2018 and 2019 plans.

NIWG Focus Area Reports

The Industry Leads and the FAA Subject Matter Experts (SMEs) for each of the four focus areas presented reports on the existing commitments.

DataComm

- FAA SMEs: Jessie Wijntjes (ATO), Paul Fontaine (NG)
- Industry Leads: Dan Allen (FedEx Express), John O'Sullivan (Harris Corporation)

Mr. Wijntjes discussed the FAA program for Surface Data Comm pre-departure clearances and En route Controller-Pilot Data Link Communications (CPDLC). He explained that the Final Investment Decision (FID) for En route is under development. The FAA is accelerating implementations for pre-departure clearance locations to meet 2016 challenge dates.

Mr. Allen pointed out that the collaboration has been good between the FAA and industry. In response to a question from a NAC member about the timing for the system to be fully operational, Mr. Wijntjes explained that the three-year roll-out will be complete in 2019 because the FAA has accelerated ground-based technology, but now there is a need for a higher level of equipped aircraft.

Committee Members commented that equipage and training constraints for operators need to be addressed along with the business case. It was noted by Mr. Whitaker that incentives for equipage being employed in the Data Comm program are preferred to mandates, and operators have weighed-in on the capabilities that have driven decisions for the program.

Multiple Runway Operations

- FAA SMEs: Tom Skiles (ATO), Paul Strande (NG)

- Industry Leads: Glenn Morse (United Air Lines), Jon Tree (The Boeing Company)

The briefing highlighted the implementation of Wake Recategorization (Wake ReCat). Chairman Anderson, along with several committee members encouraged the FAA and the industry to continue to work to deliver benefits from Wake ReCat implementation and encouraged continued acceleration of the capability wherever possible. Operator representatives commented that there is a high degree of benefit from bringing the implementation timelines to the left, essentially minimal investment to receive important capacity benefits.

Mr. Tree recognized the efforts of retiring FAA senior manager, Tom Skiles, and his work in the Wake ReCat effort.

Performance-Based Navigation (PBN)

- FAA SMEs: Josh Gustin (ATO), Donna Creasap (NG)
- Industry Leads: Gary Beck (Alaska Airlines), Steve Fulton (Sandel Avionics)

The Team reviewed the status of the following commitments

- Develop a National Standard for Equivalent Lateral Spacing Operations for Departures (ELSO) (2015)
- Complete Established on RNP (EoR) Special Authorization for Widely Spaced Operations at Denver (2015) – the waiver has significantly increased utilization
- Develop a National Standard for EoR Widely Spaced Operations (2017)
- Complete an EoR RNP Track-to-Fix Safety Assessment (2015)
- Complete 3 additional Metroplex sites: Northern California (2015), Charlotte (2017), and Atlanta (2017)
- Complete a Las Vegas Basin Assessment (2014) – FAA is moving forward with the Metroplex initiative. The study team will be in place to give a report by the end of the calendar year.

Mr. Fulton explained that as he has flown in northern California, there are improvements in north-south operations on the west coast, continuous descent arrivals, and simplified flight procedures making it easier for pilots and controllers. Mr. Beck noted collaboration was essential for the EOR TF and AR support for inclusion in NIWG, and that this represented a balance among operators and a willingness of the FAA to support both procedures.

Though not a specific NIWG commitment, the industry team leads commented that operators in Seattle, WA have also experienced savings in fuel consumption and emissions since EOR AR procedures were implemented in April. In addition, the procedures were important to minimize the capacity effects from a runway closure.

An operator member of the Committee made the point that an important success story of PBN implementation has occurred at JFK. It was enabled by close partnership between the FAA, NATCA and industry, and increased throughput for the airport during time of runway closure making commitment for PBN implementation even though a runway was closed.

Surface

- FAA SMEs: Robert Varcadipane (ATO) and Nick Lento (NG)
- Industry Leads: Rob Goldman (Delta Air Lines), Steve Vail (Mosaic ATM, Inc.)

The SMEs and Team Leads reviewed the status of the implementations and pre-implementation activities that includes airport participation in Collaborative Decision Making (CDM) and access to surface data (SWIM); Airport Surface Departure Metering; Advanced Electronic Flight Strips (AEFS); and utilizing Earliest Off Block Time (EOBT) for short range flights.

The briefing included updates on the on-going work of the NASA–FAA departure metering project in Charlotte and the industry's identification of the data elements necessary to support departure Metering and the EOBT initiative. The industry will present a revised milestone prior to the end of the year.

Team Lead Steve Vail emphasized the need for the FAA to review its various surface FAA-Industry collaborative efforts to avoid duplication and maximize the effectiveness of the cooperative work.

Metrics: Measuring Effects of Implementations

Mr. Bolton and Mr. Joe Post, FAA, reviewed the FAA's plans for moving forward with the Metrics tasking, following the last NAC meeting when the Committee approved six metrics to evaluate the NextGen implementations at selected sites. NAC Subcommittee Co-Chairs, Mr. Tim Campbell, American Airlines, and Ms. Melissa Rudinger, AOPA, also participated in the discussion.

The vehicle for accomplishing the FAA-Industry work is the Joint Analysis Team (JAT). The JAT supports the goal of evaluating the performance improvements attributable to the implementation of selected capabilities at specific locations.

Ms. Margaret Jenny, RTCA, explained the industry response to the FAA including the names of the industry representatives for the JAT that will be conducting the work. This includes quantitative assessments and outreach to FAA and industry Subject Matter Experts with operational expertise on the specific implementations.

She introduced the representatives from Passur Aerospace, an independent vendor selected by RTCA to provide a dashboard and associated analytic capability, who then presented their capabilities to the NAC. Jim Barry and Ron Dunsky, Passer Aerospace, provided an overview of the work they have been contracted to perform related to supporting the JAT and working collaboratively with the industry and the FAA.

Ms. Jenny explained that the industry's analytic capability, along with that from the FAA, will be used collectively to evaluate the implementations, promote success and identify and address any obstacles to success, as requested by the FAA's tasking. Chairman Anderson and other representatives from the industry emphasized that trust is essential—the industry and the FAA must speak with one voice regarding the operational performance improvements attributable to NextGen implementation. Each member of the NAC, and subordinate groups, is committed to adhering to stringent guidelines for the use of the RTCA/PASSUR industry analytic capability and its output.

The Committee requested that the benefits received by the aviation industry from NextGen implementations be promoted. Two specific examples cited were JFK PBN and Memphis Wake ReCat implementations. The NAC Subcommittee will take the initiative to follow-up on this action.

It was noted during the discussion that the metrics will also support the NIWG work on developing a rolling plan.

Other Committee members noted that data is needed to tell the story of how implementations have provided benefits and it is critical that the FAA and industry communicate and work together on this effort.

In response to a Committee members question about business aviation, it was noted that implementations are important to all operators and the evaluations must incorporate the impacts of various aspects of the industry.

In conclusion, Mr. Campbell expressed appreciation to the FAA for agreeing to work with the industry, and the NAC will receive an update on the actions at the next meeting.

FAA NextGen Promotional Effort

Ms. Pamela Whitley, Assistant Administrator for NextGen, presented the FAA's plans for featuring an FAA NextGen Promotional Program at the upcoming Air Traffic Control Association industry event.

NAC ADS-B Ad Hoc Group Report

Mr. John Hickey, Mr. Bruce Decleene and Mr. Jim Linney, FAA, outlined the current state of ADS-B equipage, the Equip 2020 effort for operator equipage with ADS-B out, and future plans for the FAA's infrastructure necessary to support the implementation with ADS-B In. Discussion ensued on the low equipage numbers, both for air carriers and general aviation. It was noted that commercial operators are developing plans for equipage and it is imperative that operators not wait until the last minute to meet the deadline. The Committee agreed that carriers should report on the status of plans for output of 2020 fleet equipage of ADS-B via the Equip 2020 activity, and the FAA report on fleet progress at future NAC meetings.

A Committee Member also pointed out that the repair facility capacity for installing the equipment is an important part of the compliance process. A question was raised about the status of the document needed to identify integrated solutions. In response to comments from the Committee, Mr. Hickey emphasized that the FAA certification offices will not be an impediment for obtaining approvals needed for ADS-B equipment installations.

One NAC Member stated that the privacy issue is still unresolved and work is underway on possible solutions at the Equip 2020 meeting in December. This continues to be an outstanding issue from the ADS-B Task Group recommendation approved by the NAC.

Performance Based Navigation (PBN) National Airspace System Navigation Strategy

Mr. Mark Bradley, Delta Air Lines, and Chairman of the PBN Aviation Rulemaking Committee (PARC), provided an out-brief about the work underway to develop revisions to the FAA 2006 PBN National Airspace System Navigation Strategy that outlines a plan to transition to a PBN NAS over the next 15 years. The PARC has been coordinating closely with the NACSC to receive important industry input. As a result, the NAC will be officially tasked to develop recommendations related to traffic flow management automation and decision support tools, a key enabler for successful PBN deployment.

NextGen Plan

Mr. Paul Fontaine, FAA NextGen Office, provided a briefing of the integrated FAA plan for NextGen. Committee members recommended adding the challenge of funding investments and emphasizing the value proposition of NextGen investments. FAA officials explained the difficulties if Congressional funding is reduced from the requested amounts and the impacts that this would have on the timing of implementations.

Committee members also identified the value of relevant metrics to evaluate implementations and assist the FAA in maximizing NextGen investments. Committee members discussed the relevance of knowing when implementations are successful, having achieved the intended goals.

Summary of the Meeting and Next Steps

The NAC Secretary summarized the following actions from the meeting and follow-up items (contained in a table below):

Action Item	Responsible Entity	Completion Date
Determine how the NAC/NACSC can address community outreach in the implementation of PBN (community impacts)	FAA/RTCA	TBD based on FAA and airports review of current actions at November 2015 NACSC meeting
NAC accepted October updates to NextGen priorities. Updates will be incorporated into the plan and Congress will be briefed.	NIWG Leadership (FAA/Industry)	November 2015
NextGen Integration Working Group will initiate developing a rolling plan	NIWG Leadership (FAA/Industry)	Kick-Off Nov NACSC meeting Interim February NAC meeting Final June NAC meeting

Carriers report on status of plans for output of 2020 fleets equipage of ADS-B (Note: releasable data should be de-identified)	Industry: provides data via Equip 2020; Reports fleet progress at NAC meeting	December Equip 2020 Meeting Update: February NAC 2016 meeting
Report on ADS-B equipage status for air carrier and general aviation at future NAC meetings	FAA	2016 NAC Meetings February/June/October
Pending FAA tasking related to traffic flow management, as a result of PBN Aviation Rulemaking Committee's work on PBN NAS Navigation Strategy	FAA/PARC	November 2015 Presentation of Tasking to NACSC; Due Date for Tasking, TBD
NAC should promote benefits received by the aviation industry from NextGen implementations, specifically JFK PBN implementation and Memphis Wake ReCat	NAC/NACSC	November 2015 NACSC meeting Agenda Item to determine follow-up activities

DFO Closing Comments

Mr. Whitaker thanked the members for their participation in the meeting, and the continued work on the NIWG priorities and metrics.

Chairman Closing Comments

Mr. Anderson emphasized the need for continuing to tell the story of NextGen implementations citing the FedEx experience at Memphis and JFK PBN implementation as examples. This will foster a better understanding of the benefits and the return on investments from NextGen.

Other Business

RTCA President Margaret Jenny presented Committee Member Jim Bowman with a plaque, recognizing him for his previous work as Co-Chair of the RTCA Tactical Operations Committee (TOC). The TOC is addressing the implementation elements of many NAC recommendations.

Adjourn

By motion, Chairman Anderson concluded the meeting of the Committee at 2:55 p.m.

Next Meeting

The next meeting of the NAC is February 25, 2016 in Atlanta, GA, hosted by Delta Air Lines.

NAC Chair Report

Talking Points for Richard Anderson

Atlanta, GA - February 25, 2016 fnl

- Entering into our first meeting of 2016, I want to thank Administrator Michael Huerta, Mike Whitaker and their leadership team at the FAA for their engagement of the industry in consensus based process as we seek to implement NextGen capabilities under the NextGen Advisory Committee (NAC).
- I also express my sincere appreciation to my colleagues in the aviation industry for their commitment to the work of the committee, the Subcommittee and the various work and task groups.
- Before addressing today's meeting, I want to review the highlights of the past year's work of the NAC:
    - The Industry -FAA NextGen Integration Working Group (NIWG) implemented 29 of 31 priorities in 2015 advancing work in the four priority areas of DataComm, Multiple Runway Operations, Performance Based Navigation (PBN), and Surface.
    - DataComm – worked through the implementation issues, including addressing the data recording requirement that presented a potential barrier for aircraft operators to use pre-departure clearances in the terminal area.
    - Made important progress on Wake Recategorization (Wake ReCat) at locations with simultaneous approaches to parallel runways by reducing separation criteria for multiple runway operations.
    - In the critical PBN capability, we moved forward with Established on RNP capabilities, Metroplex implementations at Northern California, Atlanta and Charlotte, a Las Vegas PBN analysis and a national standard for Equivalent Lateral Spacing Operations (ELSO).
    - Surface and data sharing – progressed with a deployment of electronic flight strips at Newark Airport, a NASA departure metering capability at Charlotte, and an agreement to have airports participate in Collaborative Decision Making.

- As the Committee will hear this morning, the Teams are hard at work to continue the industry -FAA collaboration of NextGen implementations in 2016, 2017 and we are adding 2018-19. They are reviewing the plans and modifying these as appropriate through the successful transparent collaborative process designed to move the needle on performance. This includes all necessary components of each capability, such as training, decision support tools, procedures and policies.
- The Teams are also working to identify and mitigate the risks that jeopardize success, as well as turning their attention to ensuring the timely deployment of essential the air traffic controller decision support tools that were part of the Tier 1 priorities identified by the NAC in 2014.
- We are also beginning to discuss what other capability areas should be covered.
- Because the goal of the NIWG plans is to ensure deployment of capabilities that will lead to tangible improvements in operational performance, last year the Committee approved a recommendation for six metrics to evaluate the impacts of implementing NIWG capabilities. The resulting Joint Analysis Team, consisting of FAA and Industry experts will report on its initial progress to collaboratively analyze and report performance on the specific implementations since starting its work in December.
- Repeating two comments from our last meeting:
    - I want to caution that the purpose of the implementation work is to evaluate the implementations, promote success and identify any obstacles to success that need to be addressed. It is not for political purposes – we must not politicize the NAC. To that end, we must be of a single mind even when we find that capabilities are not delivering the anticipated benefits. In such cases, and trust me, they will happen, as they do for any organization that is attempting something this big, we must work together to identify the root causes and fix them. More importantly, we must become collectively more comfortable tackling some stretch goals. We do this by highlighting the risks up front, and by working together to mitigate them. This means also that we must all be prepared to help explain to those who oversee the FAA on the Hill that this is

part of good business practices. If you hit every milestone and achieve every benefit, you are probably not aiming high enough.

  - Let me underscore the need for the Industry and the FAA to speak with one voice regarding the operational performance improvements attributable to NextGen implementation.
  - There is no better way to ensure mutual success than through a federal advisory committee venue such as the NAC supported by the collaboration tools and expertise RTCA has built up over the years to support us.

- At each of our 2015 meetings, we received a series of briefings on the FAA's NAV Strategy in advance of a request from the Agency for policy recommendations related specifically to the aircraft and ground based traffic flow management decision support tools essential for the successful implementation of PBN. This report is due in October and will address a critical component of the future of operations in the National Airspace System (NAS).
- The Committee has expressed a strong industry commitment to ADS implementation. This included the work of the ADS-B Task Group that identified barriers to meeting the January 2020 implementation date and steps to address these. We will hear from the FAA the status of ADS-B equipage.
- As we discussed at our breakfast meeting, the commitment to equip and the associated plans is a decision that must be made early. It is imperative that aircraft operators not wait until the last minute and support from the OEMs is a crucial part of this process. There are also outstanding questions related to privacy and a path for equipping certain aircraft in the air carrier and general aviation fleets. The NAC stands ready to help address these and any other issues the FAA wishes to send out way.
- In closing I want to reinforce that through the NAC, we are in this (NextGen implementation) together. We must all be committed to work together to overcome unforeseen challenges and take advantage of unexpected opportunities.
- Thank you to the FAA and all my colleagues on the Committee for being here today.

Mike Whitaker
NextGen Advisory Committee Meeting – FAA Report
Atlanta, GA
February 25, 2015

Introduction

Thank you, Richard [Anderson, NAC Chairman]. Good morning, everyone.

I want to first acknowledge Richard's tremendous work as CEO of Delta and congratulate him on his new role as Executive Chairman. I also want to thank him heartily for his continued and very effective leadership of the NAC. We are all very glad that Richard will continue as our chairman for the duration of his term.

I also want to welcome all of our new NAC members.

Today's Agenda

My remarks will be relatively brief this morning. I'll begin with an overview of the agenda, and then provide brief updates on the 2017 budget, reauthorization, and some of our UAS efforts around UAS integration.

You'll have noticed by now that there are multiple agenda items related to PBN. I want to spend a few moments putting these into context.

It was exactly a year ago, in this same room, we started a discussion on a long-term PBN strategy that would provide a clear vision of GPS-based navigation as the basis for daily operations in our national airspace and how do we get to that point. As a result of that conversation, we took our internal work to the PARC, the Performance-based Operations Aviation Rulemaking Committee, and one year later we have that strategy. It lays out a consensus view of where the aviation community as a whole wants to go through 2030. I'll yield time at the end of my remarks to Josh Gustin and Mark Bradley to walk us through that really excellent work that they have been leading.

Out of that work came a NAC tasking on PBN Time, Speed, and Spacing, which is intended to inform a 15-year plan for the deployment of traffic flow tools that will complement the PBN Strategy. Importantly, this will explore where those capabilities should reside – on the

ground or in the air. That task has just kicked off and we'll hear from the leads how they are approaching that work.

We'll look at our progress on some near-term PBN work when we review the status of our current NextGen Priorities plan, which continues to be a fruitful collaboration. Richard mentioned that we completed 29 commitments in our first year of execution. I'm happy to add that we've completed 13 more since October. Data Comm is now in use in Salt Lake City, New Orleans, Louisville, Newark, Austin and the two Houston airports, and is coming soon to a tower near you, including right here in Atlanta. We implemented wake recat in Denver, and we've increased efficiency during instrument conditions at seven airports, by reducing the standard spacing for dependent parallel operations.

You'll hear more from the focus area leads on these accomplishments, as well as on their preliminary efforts to roll the plan forward with new commitments for 2018 and 2019.

As we talked about this morning, the NAS operates pretty well on blue sky days. It's in off-nominal conditions

where NextGen provides opportunity for improvement. Bart Roberts of Jet Blue will tell us today how a PBN procedure, coupled with an agreement with the local facility, made all the difference for his operations during a JFK runway closure.

The final PBN item is an update from the Community Outreach task group. PBN changes, especially new routes, are among the few parts of NextGen that the general public can actually see, and these changes have caught the attention of underlying communities in various parts of the country. At the last NAC meeting, we talked about the need to more fully engage communities before we implement procedures, and the FAA is committed to being smart and thoughtful about educating, involving, and getting input from residents – building on good past practices and using new techniques. The NAC touched on this subject in earlier recommendations, and will amplify those thoughts through this new task. I look forward to hearing the update from that group today.

We also have a few non-PBN agenda items:

European ATM Master Plan

We remain focused on ensuring that NextGen is harmonized with modernization efforts across the globe and so it's important for us to understand how other programs are progressing. Florian [Guillermet] and Frank will talk to us about the European ATM Master Plan. We look forward to hearing from them on that.

JAT

We'll hear from the Joint Analysis Team. The NextGen Prioritieswere chosen by industry and the FAA because they were deemed to be of high benefit. We will be looking to the expertise of the Joint Analysis Team to assess their impact. The team's work is intended to help us collectively understand the data and methodology that the FAA and industry use to examine changes in operational performance and to support a common approach. I understand that the team has had some insightful

conversations and I look forward to hearing more about that today.

ADS-B/Equip 2020

We've already heard some about that today. The Equip 2020 working group is continuing to work through equipage challenges in order to ensure that everyone meets the January 1, 2020 mandate, and Bruce DeCleene will walk us through the current state of affairs in that effort.

As Richard mentioned it is important to havevisibility into fleet plans for ADS-B equipage in order to make sure that we are ahead of the mandate and that we can continue to make this transition as seamless as possible.

I would like to thank Delta and American Airlines for their commitment to provide this information. We look forward to receiving their data as well as the data from other carriers very soon.

NextGen Vision

Bruce will then be joined by Michele Merkle for our final presentation of the day, which you'll see titled "the

NextGen Vision." Earlier I mentioned our PBN strategy, which outlines the way ahead for ***navigation*** through 2030. We have a complementary product that does the same for the ***full scope*** of NextGen. Consider this an update to the 2011 NextGen Mid-Term Concept of Operations. It reaffirms the FAA's commitment to providing enhanced service delivery in decades to come. It also lays the groundwork for further discussions here at the NAC and is a suitable topic to conclude today's meeting. The success we've had working on our near-term priorities gives me great hope for the possibility of making joint commitments that take us far into the future.

FAA News

Now I'd like to turn to a few other items of perennial interest and just give you a brief update:

First The Budget

The President released his budget earlier this month for Fiscal Year 2017. The budget calls for $15.9 billion dollars for FAA, including approximately $1 billion for NextGen.

This budget, if enacted, would restore us to the funding levels needed to ensure that we are able to execute the NextGen Priorities as we have discussed. However, since this request is above the two-year budget agreement, we may continue to experience budget uncertainty. Given that, we must remain flexible as we execute our current plan and establish new priorities for 2018 and 2019, and align those plans with budgets as actually passed.

Reauthorization

I also want to briefly, and I emphasize briefly, address the FAA reauthorization bill. As you are aware, earlier this month the House Transportation & Infrastructure Committee unveiled a proposal for how air traffic control services could be provided in the future.

There is broad acknowledgment that FAA reauthorization offers an opportunity to ensure that the U.S. continues to lead the world in aviation safety and efficiency. FAA reauthorization will impact a broad and diverse array of stakeholders, and we want to make sure they are all heard throughout this process, which has just

begun. We encourage Congress to work in a bipartisan way, consistent with recent approaches on transportation issues.

We continue to believe that any proposal should support our core reauthorization principles. These principles include maintaining the safest aerospace system in the world, modernizing the FAA's air traffic control system—including stable funding for air traffic control operations, NextGen, and the efficient recapitalization of aging facilities—and enabling the integration of new users into the NAS. Other principles include allowing better alignment of resources with the needs of the NAS and securing appropriate funding for the nation's airports. These principles are intended to guide reauthorization to improve safety, make our airspace more efficient, and improve service for air travelers and other stakeholders.

UAS

Finally, on UAS, as many of you may know, the FAA has been working hard to safely and effectively integrate UAS into our airspace. This remains a significant challenge.

But, in December, we made great strides toward this goal by creating a web-based registration process for owners of small drones.

We are requiring the owners of small unmanned aircraft, weighing more than half a pound to register their drones. To date more than 350,000 have done so, giving us the opportunity to work with a whole new group of aviators. There are now more unmanned aircraft registered in the US than there are traditional aircraft.

We established a task force, wrote and implemented the interim rule for the registry, and stood up a registry website, all in two months.

The speed with which we were able to roll this out is a testament to the invaluable input we received from the diverse task force of stakeholders we brought together to work on this issue. And it's further proof that when government and industry partner, we can innovate, cut

through red tape, and use technology to tackle emerging risks.

This is essential with UAS because of how quickly this field is evolving. Almost on a daily basis, we're seeing proposals from operators who'd like to use unmanned aircraft to do everything from package delivery and pipeline inspection to newsgathering and real estate photography.

Meanwhile, we are continuing to work on the final rule for small UAS and we plan to publish that in late spring.

MICRO UAS ARC

This week we also announced that we are going to establish an aviation rulemaking committee to develop recommendations for operating micro unmanned aircraft. The committee will begin its work in March and will make recommendations for how to safely operate drones over people who are not directly involved in the operation of the aircraft.

There has been widespread interest in creating a separate micro UAS category. As part of the proposed rule for small UAS, we asked for comments on a "micro" classification. Based on the comments, the FAA has decided to pursue flexible, performance-based requirements that address potential hazards, instead of a classification defined by weight and speed. We expect the ARC to issue its final report in April.

The fast turnaround again demonstrates our commitment to being flexible in our regulatory approach so that we can accommodate innovation while maintaining our high level of safety.

We will start working on the rule once we receive the committee's recommendations.

[Pause here for questions before going onto the PBN NAS Navigation Strategy.]

PBN NAS Navigation Strategy (Tee up, Ask for NAC endorsement)

Let me now invite Josh and Mark up for their briefing on the PBN NAS Navigation Strategy before we move to the formal agenda.

[Turn over to Josh Gustin and Mark Bradley, co-chairs of this PARC task. After they finish, it goes back to you.]

Thank you, Josh and Mark.

Richard, we ask the NAC to endorse this strategy so that we can move into the planning and execution phases.

Thank you. This concludes the FAA Report.