Meeting Summary, June 17, 2016

NextGen Advisory Committee (NAC)

The eighteenth meeting of the NextGen Advisory Committee (NAC) was held on June 17, 2016 at The Boeing Company, Arlington, VA. 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 February 25, 2016 Meeting Summary
- Attachment 4 - NAC Chairman’s Report
- Attachment 5 - FAA Report from The Honorable Michael Whitaker, FAA Deputy Administrator
- Attachment 6 – presentation

Welcome and Introductions

Chairman Anderson opened the meeting at 8:55 a.m. by thanking Boeing for hosting the meeting and welcoming the NAC members and others in attendance, and introducing three new Committee members:

- Carl Burleson, Acting Director, FAA Aviation Policy, Planning & Environment
- Jim Eck, Assistant Administrator, FAA NextGen
- Ginger Evans, Commissioner, City of Chicago

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 February 25, 2016 Meeting Summary

Chairman Anderson asked for consideration of the written Summary of the February 25, 2016 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 Deputy Administrator Mike Whitaker for his service as FAA Designated Federal Official and his leadership in engagement with the industry in the consensus based process as the NAC seeks to implement NextGen capabilities. RTCA President Margaret Jenny also recognized him with a plaque.

He covered the three specific recommendations that the Committee would be asked to approve that day:

1. NextGen Integration Working Group 2017-2019 Rolling Plan Recommendation

The Industry-FAA Teams built upon the current industry-FAA collaborative work in the four priority areas to identify specific recommendations for implementing NextGen capabilities at specific sites in the 2017-2019-time frame. The plans include all necessary components of each capability including industry and FAA commitments necessary to implement the capabilities for:

- DataComm
- Multiple Runway Operations – Wake ReCat
- PBN
- Surface

2. PBN Blueprint Community Outreach Task Group

The Task Group developed recommendations for community outreach to assist the FAA and industry with the growing environmental challenges associated with PBN implementations.

3. Joint Analysis Team Performance Assessment of Wake Recategorization (Wake ReCat) at Charlotte and Chicago

The JAT industry-FAA team is evaluating the performance improvements attributable to the implementation of selected NextGen capabilities at specific locations. The Team, using data from FAA, individual operators and an industry-funded database developed by Passur
Aerospace will report on the methodology and results from an analysis of Wake ReCat at CLT, ORD and MDW airports.

He also pointed out that the NAC process means that members of the Committee support the recommendations once they are approved. Since 2010, this body has delivered nearly 40 recommendations to the FAA that cover:

- Prioritization of NextGen Implementation Investments & Locations
- Industry-FAA Joint Implementation Plans
- Metrics – What to Measure & How to Measure Implementation of Capabilities
- PBN – Metroplex, Single Sites, Overcoming Technical/Non-technical Barriers
- ADS-B Out Equipage
- Environmental Review Process, PBN Community Outreach

He concluded that we are all here because we believe our work is making a difference, but it is not clear that our message is getting out, and asked members to think about how they could do a better job of communicating the value of the NAC and the investments being made.

**FAA Report - Mike Whitaker, Deputy Administrator, FAA**

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

He acknowledged Ed Bolton’s outstanding leadership as the head of the FAA’s NextGen Office and the momentum that has been built through this collaborative work. He introduced Jim Eck, Mr. Bolton’s successor, noting his significant contributions to NextGen, and assured the NAC that this will be a smooth transition.

Mr. Eck noted the need for a comprehensive plan to move forward and that the NAC was briefed on the CONOPS, which he encouraged everyone to read as it sets the guiderails for the FAA plans.

Mr. Whitaker also explained the new $500 rebate program for GA ADS-B equipment (20,000 aircraft) to encourage early equipage.

Related to ADS-B, he asked that the NAC be prepared to address the reasons and rationale for pursuing an enhanced surveillance capability in the context of the priorities they have already given, and in light of the tradeoffs that may be required. Teri Bristol explained that while the FAA has a good handle on the technology of space-based ADS-B, the FAA will be seeking recommendations from the NAC on cost/benefit and prioritization. She asked that a task group be formed to examine a requirement for enhanced surveillance in oceanic
airspace; what mechanisms might be used and at what cost; what the tradeoffs might be; and what funding models might be possible if enhanced surveillance is deemed of sufficient value.

Several Committee expediting the results of this work, reflecting industry’s belief that new technologies should not be legislated but identified through collaborative processes. In response to a question about equipage, a NAC Member from an Original Equipment Manufacturer (OEM) commented that an ADS-B transceiver is sufficient for “space-based ADS-B, however additional communications equipment may be necessary depending on the existing capabilities of the aircraft.”

Mr. Whitaker emphasized a key component of this work will be assessing the cost-benefit of space-based against other NextGen investments. During a discussion on need for the capability one commenter asked if capacity in the North Atlantic is an issue, and another commented that preferred altitudes is definitely a need in this airspace. It was also noted that there is a lack of ground-based Nav aid’s in the Caribbean.

In conclusion, the NAC agreed that forming a Task Group is an appropriate way to proceed. The FAA is preparing an official tasking to RTCA.

The following organizations were identified as initial participants, in addition to others who might be identified from the NAC Subcommittee:

- FAA AVS & ATO
- FedEx Express
- Boeing
- MITRE
- JetBlue
- American Airlines
- United Airlines
- Lockheed Martin (Leidos)
- Harris Corporation
- IATA
- NATCA

**Airline C/N/S Fleet Plans—JetBlue Equipage**

Bart Roberts, Vice President Flight Operations, JetBlue, presented a briefing on its C/N/S fleet plans—ADS-B, PBN and DataComm that was requested by the NAC at the February meeting.
Summary of JetBlue Equipage:

- Retrofit all Airbus 321s 2Q2017, 320's with ADSB out and Sat Comm and FANS 4Q2018
- Retrofit all Airbus 320’s with ADSB out and Sat Comm 4Q2018
- Retrofit one Airbus 320 for cost/complexity evaluation 4@2016
- Update MMR’s to enable situational monitoring per regulatory compliance 4Q2018
- Update Traffic Collision Avoidance System with 7.1 per regulatory compliance

Capital spending spread across 2016 to 2018 will make JetBlue a 100% RNP equipped fleet.
Mr. Roberts emphasized the importance of collaboration between the FAA and the industry as NextGen capabilities are implemented. He pointed out the benefits of DataComm and has led his company to make investments in this technology.

Chairman Anderson asked the operator community what they are doing with equipage investments beyond ADS-B 2020 compliance? He expressed the need for the NAC to better understand where the industry stands on equipage. A committee member emphasized the importance of being able to accommodate a mixed equipped fleet. Another committee member noted special challenges for Regional Airlines: pilot availability and new training requirements that is driving fleet and fleet equipage strategies.

Based on the discussion, RTCA was requested to develop list for briefings at future meetings by operators and OEMs on their fleet plans. This includes United Airlines to present at the October meeting and a regional operator representative as well.

In addition, Airbus was also requested to present at next meeting, followed by Honeywell and other OEMs.

As the discussion concluded, a Committee Member stated that operators and OEMs should communicate how the capability equipage leads to specific results.

**How do we demonstrate the value of NextGen and the NAC?**

Picking up on earlier comments, Chairman Anderson asked how the achievements and message about the NAC and NextGen could be more clearly conveyed to Congress and the public. He then led a discussion on focusing more attention on public relations and communication.

An initial comment from a Committee Member stated that the focus on the “what” and “how” of implementing NextGen can cause the industry to lose track of the “why”? It is important to emphasize how the implementation helps achieve the goals of NextGen. Goals includes more access to airports/airspace, improved safety, a reduced environmental footprint, which means getting the most out of system/capabilities. Essentially, why does what we are doing matter and how is it affecting our desired goals? Are we moving more aircraft through the system? Is it safer? Is there less environmental impact? Can operators run a more predictable operation?

Some in the industry and on Capitol Hill have asked, “what is the next big thing?” We should consider concentrating on “fixing” a large Metroplex and build support with a compelling story for NextGen. A Committee Member stated that in the metropolitan areas, the industry is running out of space to build more runways. NextGen adds capacity without the requirements of time, environmental approvals, investments needed for new concrete. A
follow-on comment expressed the need for ways to better communicate that people are benefiting is to make it relevant to them—direct benefits, increased numbers of people flying, more options for flights, locations, capacity—all without new runways.

Chairman Anderson noted the constraint of geography, pointing out that, New York goes so quickly to the National Airspace System (NAS). Mr. Whitaker suggested that rather than picking a site, we should let an airport or Metroplex pick us. They should line of support for a location and get a community to line up support?

Progress was summarized by a participant as a transformation of the NAS and implementation of NextGen that comes from evolution—you have to evolve to transform, it is not a big bang.

Other comments made include:

- Predictability is key for the passenger – working towards making IFR like VFR
- Need for the community to step forward, and explain how infrastructure in the sky may not be as tangible as roads and railroads, but it is just as important to the Nation’s economy.
- It’s important to have unified message about performance metrics – train people to communicate the message
- People living near airports want to know what will happen to them
- It’s important for the work of the AdHoc to include what FAA has been communicating/saying; there is no need to reinvent information
- Operators are already harvesting benefits – aircraft turns system benefits
- Caution against painting too rosy a picture of implementations, and potentially raise questions about future investments.
- Air Traffic Controllers need decisions support tools to make NextGen capabilities such as PBN deliver benefits
- It is informative to look at the impact of NextGen from a Cruise-to-Cruise perspective rather than Gate-to-Gate.

Concluding the discussion, Chairman Anderson stated that the industry must tell the story of the benefits by focusing on three key points: 1) safety first—and we have never been safer; 2) environment—we are the only airspace system with a 2% reduction in emissions per year with a goal of carbon-neutral growth; 3) operational performance—airlines are running at 99% completed flights nearly every day.
An AdHoc of the following entities was identified to work on promotion and report back at the October NAC meeting: NBAA, NOISE, FAA (ATO, ANG, ARP), AIA, ATCA, PASS, NATCA, MITRE, American Airlines (NACSC Leadership).

**ADS-B Update**

Bruce DeCleene, Manager, Flight Technologies and Procedures Division, FAA, gave a status update about the latest equipage statistics and noted that the status of supplier-solution availability is good. He noted that attention is moving beyond just asking if planes are equipped, to determining if they are operating in compliance. GA numbers are well below where they should be, which has led to the rebate program. He noted the NAC attention has also led to increased equipage and compliance numbers for commercial operators. A Committee Member noted that there is a need to determine ADS-B requirements and an equipage path for Unmanned Aircraft Systems (UAS). It was suggested that this be an initial request of the new Drone Advisory Committee because ADS-B equipage is crucial for integrating UAS into the NAS.

Another NAC Member thanked the FAA for the rebate program, anticipating that it will make a difference in increasing equipage for General Aviation operators.

**NextGen Integration Working Group (NIWG) 2017-2019 Rolling Plan**

The Industry-FAA Teams have developed specific recommendations for implementing NextGen capabilities at specific sites in the 2017-2019-time frame for:

- DataComm
- Multiple Runway Operations – Wake ReCat
- PBN
- Surface

The NIWG Executive Team Members Teri Bristol, FAA Air Traffic Organization, and Steve Dickson, Delta Air Lines, opened the NIWG discussion noting the hard work of the teams that was necessary to arrive at a consensus-driven set of. Ms. Bristol announced that the FAA reached a positive final investment decision (FID) for Terminal Flight Data Manager (TFDM) on June 16. She reminded the NAC of three different types of recommendations:

1. Implementation capabilities where industry agreed on recommendations for specific capabilities to be implemented at specific locations in a specific timeframe
2. Pre-implementation capabilities where we all agree we want to take action but do not have the necessary information to make a firm commitment – in these cases the groups are recommending studies be undertaken to determine what is possible

3. Industry commitments—operators stepping up to serve as lead operators as we work to implement these capabilities

The FAA will respond with a final decision on commitments and document these in an executive report to the NAC Subcommittee in August and the NAC in October.

Mr. Dickson reinforced the need for flexibility, adaptability, and stretch goals. He emphasized the tension between transformation and evolution of the system—lining up improvements with longer-term goals. We have also included stretch goals. The industry with the FAA will learn from success and failure.

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

**DataComm**

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

Industry Leads: John O’Sullivan (Harris Corporation), **Chuck Stewart (United Airlines)**

Mr. Wijntjes reported that the departure clearance tower services installations in the current NIWG plan are 20 months ahead of schedule with more than half of the waterfall finished.

Mr. Stewart presented the rolling plan components for DataComm:

- Continue accelerated DataComm tower services deployment
- Continue deployment of current baselined EnRoute initial services
- Develop baseline for currently budgeted full EnRoute services
- Develop baseline for remaining EnRoute full services
- Consider FANS 1/A over VDL Mode 0 as a viable medium for DataComm EnRoute
- Ensure operators are equipping at least 1,900 aircraft

Chairman Anderson commented that the industry must be ready to use this capability and asked that the DataComm equipage chart be shared at each meeting.
Multiple Runway Operations (MRO)

FAA SMEs: Jennifer Post (ATO), Paul Strande (NG)
Industry Leads: Glenn Morse (United Air Lines), Jon Tree (The Boeing Company)

Prior to covering the rolling plan, Ms. Post explained that the Wake ReCat assessment was completed and that the team is looking at operational impacts and benefits to determine sites where the FAA-industry gets the best return on implementations. Wake ReCat was implemented in SFO (NorCal TRACON) and is on track for ANC and LAX (SoCal TRACON).

The rolling plan presented by Mr. Morse is comprised of the following:

- Continue Wake ReCat 1.5 and 2.0 implementations at additional sites
- Continue safety analyses and publication of new separation standards and pursue supporting RNAV procedure development
- Complete analysis of Vertical Navigation Requirement (VNAV) for Simultaneous Independent Parallel Instrument Approaches to Closely Spaced Parallel Runways
- Complete assessment of potential benefits and facility requirements for upgrade of existing Wake ReCat Phase 1.5 sites to Phase 2.0
- Complete assessment of Time Based Separation (TBS) on final approach for use in the NAS as a transition to dynamic pair-wise wake turbulence separation standards

**Surface**

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

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

Ms. Pfingstler provided an update on current plans, explaining that the Advanced Electronic Flight Strips (AEFS) prototype installations in CLE and PHX continue to be operational and will remain so until replaced by TFDM. She also noted that there have been some stability issues, so SFO and LAS will go operational in new towers with paper strips. They will monitor new builds and revisit implementation in early 2017.

Mr. Goldman shared the following components of the Surface Team rolling plan, noting that the just-announced FID for TFDM is a crucial step towards surface capabilities.

- Implement Capabilities outlined in the Surface Collaborative Decision Making CONOPS & Terminal Flight Data Manager (TFDM) Program
  - Complete demonstration of departure metering at Charlotte Douglas International Airport (CLT) through the Airspace Technology Demonstration 2 (ATD-2) project
  - Electronic flight strips
  - Departure queue management
  - Traffic Flow Management system integration
- Increased data sharing
  - FAA – Surveillance information sharing
  - Flight Operators – Data elements
  - Airports – Pilot airports expanding participation in collaborative decision making
- Establish on-going industry engagement with FAA TFDM/Surface decision support tools, processes, procedures & policies

The importance of continuing to move forward on the ATD-2 work at CLT was emphasized by a Subcommittee leader.

**Performance Based Navigation (PBN)**
FAA SMEs: Donna Creasap (ANG), Josh Gustin (ATO)
Industry Leads: Gary Beck (Alaska Airlines), Steve Fulton (Sandel Avionics)

Providing a brief update on existing work, Mr. Gustin noted that all Metroplex work is on track and that the public workshop in CLT was key to moving that work forward. The Established on RNP (EoR) waiver in DEN led to the national standard, which was just wrapped up and is about a year earlier than planned. Mr. Fulton then shared the components of the PBN rolling plan.

- Established on Required Navigation Performance (EoR) – EoR w/ Radius-to-fix (RF), EoR w/ Track-to-fix (TF), assessment of TF/RF Concurrent Operations
- Metroplex – tracking milestones at three locations
- Established on Departure Operations (EDO) – FAA assessing concept viability
- RF to xLS (RF/TF) – Assessment/identification of pre-implementation milestones
- Optimized Profile Descents (OPD) - Area Navigation (RNAV) Standard Terminal Arrivals (STARs)
- Enhanced Flight Vision Systems (EFVS) – implementation of new capability
- Advanced RNP (A-RNP)
- New Vertical Guidance
- Departures – RNP and RNAV
- Seattle Greener Skies - Actions TBD after assessment

Chairman Anderson asked for a motion and obtained approval of the recommendations for the NIWG rolling plan. He noted that the FAA will respond with an executive report and will present it to the NAC in October. The plan will also be communicated to Congress.

**PBN Implementation**

Bruce DeCleene, FAA, and Jeff Woods, National Air Traffic Controllers Association (NATCA), updated the analysis of the Seattle Greener Skies PBN implementation in response to the action item from the last meeting. The purpose is to determine what is necessary to bring Greener Skies improved benefits to fruition. “What went wrong with Greener Skies and how do we fix it?”

Mr. DeCleene shared the results of FAA research into the status of the Greener Skies work at Seattle, noting that it was a three-part project: 1) design procedures and coordinate with the community; 2) determine how to use them to look at changes in separation standards; 3) implement changes. DeCleene shared that Seattle had three runway closures in a row, which limited use and therefore impacted controller and pilot desire to use it. Additionally, there were some deviations that led controllers to be skeptical of using the procedures.
Procedures have been adjusted and will be published next month to address these deviations and utilization is expected to increase.

A discussion was prompted related to change management critical to successful PBN implementation, not just fielding procedure- post operational implementation to evaluate use, achievement of intended purpose, use by controllers, pilots, availability of necessary ATC decision support tools, etc.

Mr. Woods explained that the key to Greener Skies was collaboration between controllers, pilots and FAA in identifying solutions. He also noted that it is important to recognize that the more automated we get the more complicated we get.

A Committee Member also highlighted the importance of working through the issues associated with workload in the cockpit.

In concluding the conversation, another Committee Member expressed the need to incorporate the Greener Skies next steps into the tracking of PBN NIWG.

Joint Analysis Team (JAT)

The JAT industry-FAA team is evaluating the performance improvements attributable to the implementation of selected capabilities at specific locations to develop a common statement of facts on NAS performance attributable to NextGen. 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, reviewed the findings from the Team on operational performance changes as a result of implementing Wake ReCat in CLT and Chicago.

They explained that the JAT agreed on a methodology to determine Wake ReCat impacts and benefits, and validated the consistency of data sources among the FAA, American and United Airlines, and PASSUR. Agreement was reached on findings and statements of facts, which built trust and confidence among the team members. The findings conclude that fleet mix and demand levels are critical drivers of Wake ReCat impact. Additionally, operational data demonstrates that Wake ReCat achieves changes in separation as expected. Finally, the before-and-after empirical analyses of terminal area, taxi times, and throughput are inconclusive due to exogenous factors. PASSUR data has been compared to FAA and industry data and may be used for Wake ReCat analysis.

The Co-Chairs reviewed the following specific findings:

- Fleet mix and demand levels are critical drivers of Wake ReCat impact
• Operational data demonstrates ReCat achieves changes in separation as expected
  o Before and after empirical analysis of terminal area and taxi times, as well as
    throughput, inconclusive due to exogenous factors, e.g. changes in demand,
    weather, airport construction, etc.

• **Airborne and taxi-out savings** expected for ReCat-impacted flights on runways
  experiencing pressure
  o Includes propagation of changes in separation onto subsequent aircraft when
    pressure/queueing is present

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<td><strong>Estimated total annual savings in Airborne</strong></td>
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<td><strong>and Taxi Out Time due to ReCat</strong></td>
<td><strong>Taxi Out</strong></td>
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• **Throughput improvement** expected when ReCat-impacted flights operate in peak
  airport demand
  • Modeled throughput based on actual separation changes suggests
    improvement in throughput
  • Throughput improvements empirically observed at ORD for IMC peaks when
    ReCat pairs exist, but not sustained enough to justify increase in called rate

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<td><strong>Modeled Potential Change in Throughput</strong></td>
<td><strong>Arrivals</strong></td>
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<td><strong>During Peak Periods due to ReCat</strong></td>
<td><strong>Departures</strong></td>
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At the conclusion, it was noted that the JAT’s Wake ReCat methodology will be leveraged by
the FAA and industry to prioritize future Wake ReCat implementations.
The JAT will make their next assessment of North Texas Metroplex and will explain their current plans for conducting this assessment at the October NAC meeting.

Chairman Anderson asked for a motion to approve the recommendation that was subsequently approved by the NAC.

**PBN Blueprint Community Outreach Task Group**

Co-Chairs Jim Crites, DFW International Airport, and Brian Townsend, American Airlines, presented for NAC approval a comprehensive recommendation for the FAA with the following major elements:

- Establish specialized Community Outreach Team(s)
- Develop a standard Community Outreach Toolkit
- Develop specific Local Community Outreach Toolkits
- Establish ongoing and scalable Community Outreach Programs in collaboration with local airports

The Co-Chairs emphasized the findings from the work of the Task Group that identified the need for outreach. Failure to have a coordinated effort has led to significant problems in certain locations. They also explained the importance of having FAA experts trained to conduct outreach, along with engagement by airport and aircraft operators.

A Committee Member agreed with the recommendations, emphasizing that early engagement is the most important aspect to local communities. An FAA NAC member also commented that outreach is the “right thing to do,” but everyone involved must recognize that real engagement will take more time on the front end, but accomplish a better result.

Chairman Anderson asked for a motion and obtained approval of the PBN Blueprint Community Outreach Task Group recommendation.

**PBN Time, Speed, Spacing Task Group**

Task Group Co-Chairs Dan Allen, FedEx Express, and Steve Fulton, Sandel Avionics, provided an interim report on work to develop a 15-year plan for deployment of PBN in 5-year increments: near-term, 2016-2020; mid-term, 2021-2025; and far-term, 2026-2030. The report identifies and prioritizes tools and technologies ground vs. aircraft. The first two time frames are ground based metering/decision support tools for terminal, TRACON and EnRoute, with longer-term questions about aircraft based metering.
Picking up on the theme from the earlier presentation on Greener Skies, a Committee Member stressed the importance of the cultural issues associated with transitioning to time-based spacing responsibilities of controllers. The Member also questioned the additional investment for aircraft capabilities and the increased responsibilities for the pilot. Another commented that the cultural issues of controllers and pilots is crucial, along with the tools and operational relationships and division of responsibilities.

Mr. Allen committed to cover the cultural aspects in the final recommendation.

Another Committee Member asked about the tools for synchronizing and coordinating trajectories among automation platforms and whether they share a single trajectory model. Mr. Fulton replied that Time Based Flow Management (TBFM) has a central scheduling function, harmonizing between ground-aircraft. Mr. Allen also commented that every decision support tool is fed by the same TBFM engine.

Chairman Anderson asked about the end-state goals for the NAS. Mr. Fulton explained that predictability is enhanced by tools, along with PBN efficiency, fuel savings, and reductions in overall time. The final comments from a Member stressed the need to consider how airport capacity and capabilities are in-line with potential increases in traffic from TSS.

The task group will provide a final report in October.

**Summary of the Meeting and Next Steps**

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

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<th>Action Item</th>
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<tr>
<td>Enhanced Surveillance – a pending tasking to examine its application in US-controlled oceanic airspace from spaced-based ADS-B. Specifically, the group will examine the following:</td>
<td>RTCA</td>
<td>Interim October 2016 Final February 2017</td>
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<td>• The cost and benefits of deploying and equipping for this capability</td>
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<td>• What problem it will solve</td>
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<td>• It’s priority relative to other NextGen capabilities</td>
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<td>Task</td>
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<td>Initial group to include:</td>
<td>FAA AVS &amp; ATO, FedEx Express, Boeing, MITRE, United Airlines, Lockheed Martin (Leidos), Harris Corporation, IATA, NATCA</td>
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<td>Present a report from an operator of a local PBN implementation to</td>
<td>FAA/RTCA</td>
<td>October 2016 and future NAC meetings</td>
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<td>worked, what didn’t and what can we do going forward?”</td>
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<td>Set up a plan going forward to have PBN briefings at subsequent NAC</td>
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<td>meetings.</td>
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<td>Manufacturer briefing on NextGen equipage plans – standards,</td>
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<td>technologies and pathways for the retrofit of existing aircraft.</td>
<td>Airbus</td>
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<td>Ad Hoc tasked with developing a unified, crystalized message –</td>
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<td>demonstrating the value of NextGen capabilities being deployed as</td>
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<td>a result of the government-industry collaboration on the NAC.</td>
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<td>NAC Member participants to include:</td>
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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 October 2016 in Orlando, FL, hosted by JetBlue.
Attendees:
June 17, 2016 Meeting of the NextGen Advisory Committee
Arlington, VA

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Welcome to the Meeting of the NextGen Advisory Committee

June 17, 2016
The Boeing Company
Crystal City, VA
Emergency Evacuation

Evacuation Routes for Long Bridge

When an alarm sounds to evacuate the Long Bridge Facility, leave the facility using the nearest exit, and report to the nearest evacuation location. The grassy area is on the other side of 10th street and the soccer fields are across 6th Street.

Evacuation Location #1
(Grassy Area)

Evacuation Location #2
(Soccer Fields)

Last Updated: 09/25/2014

Welcome & Introductions

Richard Anderson, NAC Chairman
PUBLIC MEETING ANNOUNCEMENT
Read by: Designated Federal Official Michael Whitaker
NextGen Advisory Committee
June 17, 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:

May 18, 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.

5

Review and Approval of:

February 25, 2016
Meeting Summary
Chairman’s Report
Richard Anderson, NAC Chair

NAC Agenda Topics

- Airline C/N/S Fleet Plans—JetBlue Equipage
- ADS-B Update
- NIWG Reports & Plans
  - DataComm
  - Multiple Runway Operations
  - Surface
  - PBN
- PBN Implementation
- Joint Analysis Team – Wake ReCat Assessment Recommendation
NAC Agenda Topics (cont’d)

- Community Outreach: PBN Blueprint Community Outreach Task Group – Recommendation
- PBN Time, Speed, Spacing Task Group – Interim Report
- PBN Blueprint Community Outreach Task Group

NAC Recommendations

- Prioritization of NextGen Implementation Investments & Locations
- Industry-FAA Joint Implementation Plans
- Metrics – What & How to Measure Implementation of Capabilities
- PBN – Metroplex, Single Sites, Overcoming Technical/Non-technical Barriers
- ADS-B Out Equipage
- Environmental Review Process, PBN Community Outreach
Next Gen Advisory Committee
Capt Bart Roberts, VP Flight operations

NextGen JetBlue

JetBlue current status:
- Three fleet types E190, A320, A321
- 39 A320 aircraft equipped with ACSS ADSB-out rule compliant 260B transponders
- Mixed fleet with SA-on and SA-aware MMR’s
- Mixed fleet with TCAS 7.0 and 7.1
- Operates with single HF long range comm under FAA exemption

JetBlue NextGen Scope:
- ADS-B Out and MMR upgrades to meet FAA mandate- all fleet types
- Install Iridium SATCOM system - entire Airbus A320/A321 fleet
- DataComm:
  - A321 Linefit and retrofit
  - A320 retrofit in the future- 1 A320 prototype in 2016 (cost and complexity)
- TCAS 7.1- entire fleet

JetBlue Schedule:
- A321s to be retrofit with all capabilities by 2Q2017
- Starting October 2016 all new A321s will be equipped with entire JetBlue NextGEN package
- A320s will be equipped with TCAS 7.1, ADS-B out and SATCOM
  - Start July 2017 – 5X/Month – finish 2Q2018
JetBlue Scope and Timeline

Starting in Oct. 2016 all new deliveries will come standard equipped

- A321 Fleet and 1 A320 prototype 4Q2019
- ADS-B Out
- SATCOM
- Data Comm

Aircraft Modification Plan:
- Existing Interior Mod Lines:
  - A321 starting Q3 2016
  - A320 starting Q2 2017
- Heavy Maintenance Checks
- Overnights/Ad Hoc Maintenance Events

Current all aircraft are RNP capable and all crew are trained.

NextGen JetBlue Vision/Benefits

1) Retro all 321 2Q2017,320's with ADSB out and Sat comm and FANS 4Q2018
2) Retro all 320's with ADSB out and Sat comm 4Q2018
3) Retro fit one A320 for cost/complexity evaluation 4@2016
4) Update MMR’s to enable situational monitoring per regulatory compliance 4Q2018
5) Update TCAS with 7.1 per regulatory compliance

Capital spend spread across 2016 to 2018. We will be the most compliant fleet across industry because of our 100% RNP fleets.
ADS-B Update
Overview

- **Supplier Status**
- **GA**
  - Equipage Report
  - Rebate
- **Air Carrier**
  - Equipage Report
  - Planned Equipage
Availability of ADS-B Out Solutions Mapped to IFR Flight Plan Derived Fleet

- Suppliers that provided data for second round data collection:
- Current solution database contains 5,549 solutions mapping to 2,031 unique make model combinations

Data current as of 06/15/2016

US GA Equipage and Avionics Performance

Average of 781 aircraft per month: Projects to 33,500
GA Rebate – Overview

• Address Key Barriers to ADS-B Out equipage identified by the Equip 2020 team
  – Need for lower-cost avionics
  – Build repair station capacity to complete installations by the deadline
  – Early resolution of installation issues

• $500 Rebate to up to 20,000 owners, or for one year (whichever is less)
  – Fixed Wing (built before 2016)
  – Single Engine Piston
  – Install new ADS-B equipment with TSO Authorization
  – Verify proper installed performance within rule-defined airspace
US Rotorcraft Equipage & Avionics Performance

US Air Carrier Equipage & Avionics Performance

100% of equipped aircraft have data (May)
* Flight ID Issues
US 14 CFR Part 121 Operator ADS-B Out Equipage Plans Mapped to FAA Forecasted Fleets

- Current Fleet Retrofits
- New Delivery Retrofits
- New Delivery Compliant
- Total Equipped Aircraft

* Operators who did not detail quarterly plan were lumped into 2019

Data current as of 06/15/2016


- Air Wisconsin
- Alaska
- American
- CommutAir
- Compass
- Delta
- Empire
- Endeavor
- Envoy
- ExpressJet
- FedEx
- GoJet
- Great Lakes
- Horizon
- JetBlue
- Piedmont
- PSA
- Republic
- Shuttle America
- Skywest
- Southwest
- Trans States
- United
- UPS

Operator Plans Received (24 Airlines) 88%
Remaining Operators (49 Airlines) 6%

5 Largest Operators Without Submitted Plan 5%
- Allegiant Air
- Hawaiian
- Mesa
- Spirit
- Virgin America

Forecasted New Delivery 2%

Data current as of 06/15/2016
Conclusions

• **Air Carrier Plans** cover 89% of forecast fleet
• **GA Rebate** has potential to more than double GA equipage rate
  – Build installation competency and capacity
  – Incentivize early adoption

• **Education**
  – FAA and industry conducting outreach

• **Privacy**
  – Exploring costs and alternatives in Equip 2020

• **Equip 2020**: June 22
DISCUSSION

Additional Information
Charts Explanation

- Chart data from ADS-B Performance Monitor (APM) Build III Avionics Trend Analysis Tool (ATAT) 6/2/16 download
- Equipage trend-lines for US aircraft represent those with civil aviation registry data only
  - CAR data (aircraft type, airworthiness category) required to determine appropriate aircraft grouping (GA, Air Carrier, Experimental & LSA, etc)
  - Approx. 1,823 V2 equipped aircraft without CAR data
    - Missing CAR data may be result of registration change in previous 2 years which could result in same aircraft being counted as V2 equipped two or more times
  - Excludes SIL=0 aircraft (approx. 2,200 aircraft) which are charted separately
- Performance trend-lines include only aircraft* with available performance data
  - Aircraft flown since APM Build III went live on 12/18/15
  - Approx. 2,238 V2 equipped aircraft without performance data
  - Percentage of aircraft group with performance data is provided on each chart

* Good Install & NPE trending cannot be determined for aircraft without performance data

---

**All US Equipage & Avionics Performance**

- Equipped
- With Performance Data
- Good Installs
- NPE Aircraft
Data Submission Instructions

**ADS-B Solution Provider Data:**
- For updates to solution provider data please download the template from the Equip 2020 SharePoint site
- Please send completed spreadsheet to:
  - Email: 9-AWA-Equip.2020@faa.gov

**Operator Plan Data Submission:**
- Please send completed operator plans and/or questions to the following individuals:
  - Sean McCourt (MITRE)
    - Email: smccourt@mitre.org
    - Phone: 703-983-3567
  - Doug Havens (MITRE)
    - Email: dhavens@mitre.org
    - Phone: 703-983-6130

Data current as of 06/15/2016
Break

NextGen Integration Working Group (NIWG) Reports & Plans
NextGen Integration Working Group
DataComm

Industry Team Leads:
John O’Sullivan, Harris Corporation
Chuck Stewart, United Airlines

FAA SMEs:
Paul Fontaine, FAA - ANG
Jesse Wijntjes, FAA - ATO

Data Comm Tower Services (DCL)
Implementation Status

- Completed
- Planned
Data Comm – Rolling Plan

- Continue accelerated Data Comm Tower Services deployment
- Continue development/deployment of currently baselined En Route Initial Services
- Develop baseline for currently budgeted En Route Full Services
- Develop baseline for remaining En Route Full Services
- Consider FANS 1/A over VDL Mode 0 as a viable medium for Data Comm En Route
- Operators equipping 1,900 aircraft

DataComm Milestones

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<th>FAA or Industry</th>
<th>Implementation (I) or Pre-implementation (P)</th>
<th>Milestone Date Q/CY</th>
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<td>Final Investment Decision (FID) for Full En Route Services</td>
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<td>Implementation Framework for non-VHF Digital Link (VDL) Mode 2 media</td>
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<td>Airlines to Equip 1,900 Aircraft</td>
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DISCUSSION

Back-up
VDL-0/Alternate Media in En Route

- FAA Data Comm program is based on providing air-ground services to FANS 1/A and VDL Mode 2 equipped aircraft
  - FAA provides Departure Clearance services on airport surface to FANS 1/A aircraft (VDL Mode 2 and VDL Mode 0/A)
- PARC CWG assessed the feasibility of allowing media beyond VDL Mode 2
  - Report stresses need to establish framework for deploying performance-based CPDLC to address any media
  - Includes assessment on viability of VDL Mode 0/A
- PARC recommendation delivered to the FAA in May
  - FAA reviewing recommendation and program implications
S1P2 En Route Full Services

- The FAA has re-planned S1P2 En Route Full Services based on available budget
- S1P2 En Route Full Services capabilities originally planned to be
  - Controller Initiated Routes (Full)
  - Direct-to-Fix (Full)
  - Crossing Restrictions (Full)
  - Advisory Messages
  - Holding Instructions
- Based on budget restrictions, S1P2 En Route Full Services capabilities revised:
  - Full Services Remaining
    - Controller Initiated Routes (Full)
    - Direct-to-Fix (Full)
    - Crossing Restrictions (Full)
    - Advisory Messages
    - Holding Instructions
- Plan is to baseline En Route Full Service by September 2016

Tailored Arrivals

- DataComm NIWG recommends that deferred En Route full services, a 2014 Tier 1 priority by the NAC, be implemented as soon as possible (baseline 4QFY17)
- Tailored Arrivals was removed from the first stage of Full EnRoute services
- Placed in the second stage for budgetary reasons
- FAA determined tailored arrivals capability that was to be delivered was similar to the Optimized Profile Descents (OPDs) – no need for duplication
- Many in the airline industry believe the capability for a controller to provide altitude and airspeed constrains on a reroute would be a valuable first step in the development of a truly dynamic tailored arrival
- Important element to enable complex path-stretches off OPDs for time based flow management into the terminal area
- Group could not determine how the development of those Tailored Arrivals would best fit into the overall PBN strategy
- Tailored Arrivals was referred to the PBN TSS Task Group
  - Includes consideration for reroutes with altitude and airspeed constraints
Existing Plan Milestone Status
Airlines to Equip 1,900 Aircraft

- 1,657 Data Comm equipped aircraft operating in the NAS (as of June 1)
- 837 of the 1,657 were equipped through the incentive (as of June 1)

NextGen Integration Working Group
Multiple Runway Operations

Industry Team Leads:
Glenn Morse, United Airlines
Jon Tree, Jeppesen-Boeing

FAA SMEs:
Jennifer Post, FAA - ATO
Paul Strande, FAA - ANG
MRO – Status

- Completed ReCat future capability assessment by looking at operational impacts and potential benefits of ReCat Phase 2
  - Examined Impacts to automation systems
  - Examined Impacts for ATC
  - Analyzed Benefits of ReCat Phase 2 at future locations

- Wake ReCat Implementations
  - SFO on May 26th
  - ANC on track for end of June
  - LAX (SCT) Q3

- Working with JAT to use findings to update benefits model as input to prioritize future ReCat sites

MRO – Rolling Plan

- Continue Wake ReCat rollout
- Continue safety analyses and publication of new separation standards
- Complete analysis of removal of vertical navigation requirements for simultaneous approaches
- Complete assessment of benefits and requirements for implementation of ReCat 2 at existing locations
- Complete assessment of time-based separation
- Implement new separation standards where needed
DISCUSSION

Back-up
### MRO Proposed Rolling Plan Commitments

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MRO Proposed Rolling Plan
Commitments

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* Industry and FAA have agreed that flexibility on site implementation schedules is in the best interest of achieving MRO goals. For that reason, commitments have been documented by year. Planned sites are based on current best estimates for benefit, but may be subject to change if further analysis shows that any site(s) are not deemed cost beneficial by the MRO team.

NextGen Integration Working Group Surface

Team Leads:
Rob Goldman, Delta Air Lines
Steve Vail, Mosaic ATM
FAA SMEs:
Ben Marple, FAA - ANG
Susan Pfingstler, FAA - ATO
Surface – Status

- Advanced Electronic Flight Strips
  - CLE and PHX ATCT installed and currently operational
  - EWR ATCT installed and not currently operational
  - New ATCT at SFO and LAS installations planned, and will be set up to handle paper flight strips
  - CLT ATCT installation planned and will remain capable of handling paper flight strips

- Data Sharing: FAA to ingest 11 Data Elements via TFMS Update
  - Synchronized with industry milestone to provide surface data elements
  - Tested; production cutover April 29, 2016

- Data Sharing: Industry to provide 11 Data Elements
  - Surface data elements bridge the gap between surface and airborne TFM
  - Originally defined for a 2015 benefit – now tracked for current and future benefits
  - FAA establishing effective tracking and support mechanisms to foster progress

Surface Evolution to 2017 NIWG rolling plan

- Traffic Flow Management Philosophy
- Surface is top priority
- Leverage CDM organization
- TFDM provides multiple surface capabilities including the S-CDM CONOPS
Surface Rolling Plan

- Implement Capabilities outlined in the Surface Collaborative Decision Making CONOPS & Terminal Flight Data Manager (TFDM) Program
  - Complete ATD-2 CLT demonstration
  - Electronic flight strips
  - Departure queue management
  - Traffic Flow Management system integration

- Increased data sharing
  - FAA – Surveillance information sharing
  - Flight Operators – Data elements
  - Airports – Pilot airports expanding participation in collaborative decision making

- Establish on-going industry engagement with FAA TFDM/Surface decision support tools, processes, procedures & policies

DISCUSSION
Current Problem

- Delay in delivering NAS surface suite of capabilities
  - Inefficient runway utilization (balancing) and non-efficient runway queues waste fuel, CO2 emissions and aircraft/crew utilization
  - 3 year funding delay – continued TFDM program slippage due to funding
  - Antediluvian paper strips, outdated technology, disparate systems reduces productivity and delays safety enhancements
  - Surface efficiency is negatively impacted by the disconnect between En Route restrictions and the first come first serve model
- Need collaborative decision making based on a common situational awareness between the various stakeholders and systems
  - Lack of full stakeholder inclusion and data sharing

Where we are going

- Full FAA “3-T Decision Support Systems program” integration
- A gate-to-gate NAS
- Predictability
Historic Commitment to Surface Activities

Foundational Support Needed for Surface Traffic Management

Airports
FaA
Flt Operators

Timely, Accurate & Comprehensive Information Exchange
### Joint Commitments to Data Sharing
**By FAA, Flight and Airport Operators**

#### FAA
- Expand ASDE-X Data - Provide incidental CAT 10 data (non-movement area)
- ADS-B Data – Provide incidental ADS-B data in NMA
- Provide TFMS data not currently available, such as TBFM departure times, FRC required, MIT restrictions, departure gate closure, etc.

#### Flight Operators
- Surface Data Elements
- EOBT (multiple input sources needed to include all – CDM, Non-CDM, GA)
- Flight Intent/Readiness
- Aircraft Parking Gate/Area
- Actual - out/off/on/in block time (more timely and uniform)

#### Airports
- Selection set of “Pilot” airports. PANYNJ committed
- Supplement Out, Off, On, In times
- ACI (call 5/23) – LAS, CLT, FLL in discussion
- Suggested data elements under discussion
- Milestone for pilot airports committed to data sharing (FY18-19) to coincide with TFDM implementation

---

### Solution: Industry TFDM Recommendation

- **Over-arching activity:** Communicate with NIWG Surface team
- **Achieve TFDM Contract Award in June 2016**
- **Restore FY 18/19 funding for program that will move it 3 yrs left**
- **TFDM program implementation**
  - Forum for continued industry engagement

- Engage with Industry via program and pre-implementation outreach activities such as Collaborative Site Implementation Team (CSIT) efforts, CDM Team (SCT) engagement, and ATD-2
- **NY DSP is in the critical path and its replacement MUST be accelerated to provide immediate capability for numerous TFM NAS enhancements**
  - IDAC, PDRR, ABRR, TBFM, etc.
TFDM to integrate decision support tools commensurate with a gate-to-gate concept co-developed by Industry & FAA

• Provide an improved and more predictable product for flying public
• Improve airport safety, efficiency and predictability
• Reduce taxi times, fuel emissions
• Reduce risks associated with DOT3/FAR117

Collaboration Commitment Needed Between FAA and Industry throughout TFDM Lifecycle

• TFDM end-users provide input throughout program development including but not limited to ensure:
  • Alignment between FAA and Industry activities, including NIWG milestones
  • S-CDM CONOPS alignment and connectivity with Collaborative Decision Making (CDM) organization
  • Waterfall priorities are known given known program constraints
  • Process, Procedure and Policy issues are addressed throughout implementation
  • Lessons learned are captured and refinements incorporated into future revisions or work packages

• Participants should include:
  • FAA ATO (PMO and AJR) / NextGen Offices
  • CDM members
  • Non-CDM participants - Part 121/135/129 Operators, Business Aviation, Decision Support Services and Research organizations
  • Airports and airport user groups
NextGen Integration Working Group
Performance Based Navigation

Industry Team Leads:
Gary Beck, Alaska Airlines
Steve Fulton, Sandel Avionics

FAA SMEs:
Donna Creasap, FAA - ANG
Josh Gustin, FAA - ATO

PBN Status

- **Charlotte Metroplex**
  - Procedure Publications:
    - 7/21/2016 – 7 RNAV STARs (5 originals, 2 amendments), 4 RNAV SIDs (3 originals, 1 amendment)
    - 1/7/2017 – 7 RNAV STARs, 3 RNAV SIDs (satellite airports)
  - Public Workshop held 5/19/2016
  - Focused on procedures located to the northeast corner of Charlotte; 125+ attendees
  - Public Workshop planned for 7/13/2016
  - Focus to be on upcoming procedures located south of Charlotte

- **Atlanta Metroplex**
  - Procedure Publications:
    - 9/15/2016 - 13 RNAV STARs (implement 11/15/2016)

- **Established on RNP (EoR) Widely Spaced National Standard**
Criteria for Site Selection

- Alignment with PBN NAS Navigation Strategy
- Scalability/representative of challenges across the NAS
- Benefits: operators, controllers (system)
- Industry Commitment – Lead Operator Sponsor
- Procedures in place/site readiness
  - Safety study
  - Configuration
  - Procedures Design
- Geographic location
- Tools and procedure available for controllers

PBN Capabilities

- Established on Required Navigation Performance (EoR)
  - EoR w/ Radius-to-fix (RF): DEN, PDX, BNA, IAH
  - EoR w/ Track-to-fix (TF): CLT, PHL, ATL, SDF
  - Assessment of TF/RF Concurrent Operations

- Metroplex
  - ATL/CLT Mature implementations
  - Las Vegas Metroplex (LAS) milestones

- Established on Departure Operations (EDO)
  - Assessing information & developing a plan
  - Possible implementation: ATL, DFW

- RF to xLS (RF/TF)
  - Assessment/identification of pre-implementation milestones
  - Possible implementation: RNO, SEA
## PBN Capabilities (cont.)

- **Optimized Profile Descents (OPD) - Area Navigation (RNAV) Standard Terminal Arrivals (STARs)**
  - LUCIT1 (GYY), JFUND1 (BOS), PINCH 1 (AUS)

- **Enhanced Flight Vision Systems (EFVS)**
  - Final rule publication
  - Possible implementation IND

- **Advanced RNP (A-RNP)**
  - Demonstration sites: SNA, EGE

- **New Vertical Guidance**
  - Potential sites: SMO

- **Departures**
  - RNP – SNA
  - RNAV - HND

- **TBD – Actions related to Seattle Greener Skies**

## Decision Support Tools

- **Leveraging opportunities**

- **DSTs – identified milestones**
  - Maximize existing tools during transition to additional TBFM capabilities
  - TBFM Terminal Sequencing and Spacing (TSAS)
  - TBFM Ground-Based Interval Management-Spacing (GIM-S)
  - TBFM Integrated Departure Arrival Capability (IDAC)
DISCUSSION

PBN Implementation
Seattle Greener Skies

Bruce Declene
Greener Skies Update

Presented to: NAC  
Date: June 17, 2016

From NAC Briefing, 2012

Greener Skies Project Scope

I - Design/Implement PBN instrument procedures into a complex airspace, while providing an environment for research.

- OPO STARs and RNAV (RNP, GPS, RVFP) approaches
- Flight Simulation/Flight Trials – June 2012
- Environmental Study – Publish Procedures March 2013

II - Evaluate concepts, research alternatives and establish requirements resulting in full implementation of PBN technologies within SEA/BFI airspace and NAS-wide.

- RNP Established
- Concurrent Approaches
- RNP to ILS Capture
- Procedurally Separating Arrivals/Departures
- Decision making tools (example: RPI, RTA, TMA)

Implementation – ATC procedures, rule changes, training
Greener Skies Accomplishments

i1 - Design/Implement PBN instrument procedures into a complex airspace, while providing an environment for research.

- Procedures Published March 20, 2013
- RNAV STAR – originally too steep, revised August 22, 2013

i2 - Evaluate concepts, research alternatives and establish requirements resulting in full implementation of PBN technologies within SEA/BFI airspace and NAS-wide.

- RNP Established Boeing Modeling and Simulation Report: December 2012
- RNP Established Human-in-Loop Test Report: May 2014

i3 – NAS Implementation of new procedure, rule making, and TFM/training.

- EOR Waiver approved April 7, 2015
- 70% of controller training completed April, 2015

Operational Use – STAR/OPD

- **Use**
  - 98% of relevant flights file for HAWKZ arrival
  - 60-65% get full OPD benefit in operation

- **Challenges**
  - Published speeds, designed to get consistent deceleration, do not accomplish their goal?
  - ATC sometimes pulls aircraft off the arrival to merge other traffic and to manage compression
Operational Environment

• Runway Closures
  – 16C - May 1 through mid December, 2015
  – 16L - April 1st to mid-May, 2016
  – 16C – June 1 to 28, 2016

• Increase in Traffic
  – Double-digit increase in average arrivals

• Seasonal Winds
  – EOR opportunity during south flow, expected to become normal operation in September
Challenges – Track Conformance

- Discontinuity between arrival and approach
  - Addressed through crew procedure
- Several aircraft went off track
  - Operators re-emphasized and have not seen another incident
  - Events caused ATC to lose confidence in crew procedure as mitigation,
  - Procedure being modified to address issue
  - Facility limited EOR to VMC until procedure is published

Challenges – Merging & Spacing

- Controller HITL showed aircraft are vectored off arrival/approach to maintain spacing
  - Particularly during higher traffic rates and wind conditions

Figure 22: Location of Aircraft at Start of Vectoring Communication

Table 14: Aircraft Vectored off the EoR Approach
**Lessons Learned**

- **Community Engagement**
  - Addressed within PBN Blueprint

- **Airport Coordination**
  - Operational use can be significantly affected by construction

- **Coordinating Implementation**
  - Need for coordination during development and initial use
  - Local, national, FAA, NATCA, operators
  - Improved procedure design guidance

- **Design for Safety**
  - Eliminated cross-over approach transitions so controller can verify proper approach is loaded into FMS
  - Procedural solutions should be short-term, and not replace long-term improvements (STAR-approach transition)

**Next Steps**

- **Amend STAR to resolve discontinuity – July**
- **Gain operational experience when practical**
  - Even with RNAV(RNP) Z approaches (no EOR separation)
  - Runways open by July
  - Winds shift to predominantly south flow - Sept
- **Evaluate effect of speed constraints on predictable compression**
- **Automation evolution**
  - Adapting and evaluating use of CRDA to improve utilization for STAR and EOR
  - GIM-S: Initial use by September, 2016
  - TSAS: Seattle is initial site in waterfall
Questions?

OLYMPIA vs. HAWKZ & EoR
Example – Inside Turn

LUNCH
Joint Analysis Team

Wake ReCat Assessment

Recommendation

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

Goal: develop common statement of facts on NAS performance attributable to NextGen

Analytical experts from industry and FAA

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
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<tr>
<td>Mike Cirillo</td>
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<tr>
<td>Kevin Swiatek</td>
<td>United Parcel Service</td>
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JAT Schedule and Status

- Wake ReCat Assessment
  - CLT
  - ORD/MDW

- PBN Assessment
  - North Texas Metroplex
  - Denver Established on RNP (EoR)

JAT Accomplishments

- Agreed on a methodology to determine RECAT impacts and benefits
- Validated consistency of data sources between FAA, AA, UA, and PASSUR
- Agreed on findings/statement of facts
- Built trust and confidence
JAT Findings (1 of 4)

- Fleet mix and demand levels are critical drivers of ReCat impact
- Operational data demonstrates ReCat achieves changes in separation as expected
- Before and after empirical analysis of terminal area and taxi times, as well as throughput, inconclusive due to exogenous factors
  - e.g. changes in demand, weather, airport construction, etc.

Examples of Changes in Aircraft Spacing at ORD
Arrivals on the Same Runway

- Distribution of Spacing between Arrivals on Rwy 27L: Behind B757
  - 2014: 417 data points
  - 2015: 394 data points

- Distribution of Spacing between Arrivals on Rwy 28C: Behind Heavy C
  - 2014: 595 data points
  - 2015: 565 data points

- Distribution of Spacing between Arrivals on Rwy 27L: All Aircraft-pairs
  - 2014: 31,893 data points
  - 2015: 31,238 data points

- Distribution of Spacing between Arrivals on Rwy 28C: All Aircraft-pairs
  - 2014: 23,089 data points
  - 2015: 16,121 data points

Data Source: ASDE-X
JAT Findings (2 of 4)

- **Airborne and taxi out savings** expected for ReCat-impacted flights on runways experiencing pressure
  - Includes propagation of changes in separation onto subsequent aircraft when pressure/queueing is present

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<th>Implications of Wake ReCat</th>
<th>Airports</th>
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<td>Estimated total annual savings in Airborne and Taxi Out Time due to ReCat&lt;sup&gt;2&lt;/sup&gt;</td>
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<td>Taxi Out</td>
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<td>Total</td>
<td>$237K</td>
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JAT Findings (3 of 4)

- **Throughput improvement** expected when ReCat-impacted flights operate in peak airport demand
  - Modeled throughput based on actual separation changes suggests improvement in throughput
  - Throughput improvements empirically observed at ORD for IMC peaks when ReCat pairs exist, but not sustained enough to justify increase in called rate

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<td>Departures</td>
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JAT Findings (4 of 4)

- PASSUR data has been compared to FAA and industry data and may be used for ReCat analysis

- JAT’s ReCat methodology may be leveraged to prioritize future implementations of ReCat

DISCUSSION
## Summary of Analysis Results

### Implications of Wake ReCat

<table>
<thead>
<tr>
<th>Percent of eligible pairs of flights at the airport potentially impacted by ReCat (%) with decreased separation / % with increased separation</th>
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<th>ORD</th>
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<td>Arrivals</td>
<td>2.6% / 0.0%</td>
<td>4.4% / 0.0%</td>
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<td>Departures</td>
<td>3.3% / 1.1%</td>
<td>4.7% / 0.6%</td>
<td>1.1% / 7.6%</td>
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<th>ORD</th>
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<td>Arrivals</td>
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<th>Estimated total annual savings in Airborne and Taxi Out Time due to ReCat</th>
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1. Eligible pairs of flights are sequential flights on the same runway that are the same type of operation (both arrival or both departure), and are within 5 minutes of each other and operate during the study’s reporting hours (0600-2200 Local for ORD, 0700-2100 Local for MDW and 0700-2300 Local for CLT). For ORD, approximately 92% of flights are captured in eligible pairs, 47% of flights at MDW are captured in eligible pairs, and 76% of flights at CLT are captured in eligible pairs.

2. Due to the significant year-over-year change in O'Hare during the JAT’s study time period (new runway, United and American banking schedules, etc.), year-over-year taxi analysis was deemed to be meaningless. Instead, the JAT used queueing models to estimate impacts on taxi time.

### Change in Separation Requirements (nm)

#### Traditional Classes

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<th>C</th>
<th>D</th>
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#### RECAT Categories

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<td>SMALL</td>
<td>CRJ's, DH8's, E135, E145, E1170</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>C550, C560, C570, E120</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Red indicates an increase in separations
Green indicates a decrease in separations
*Based on observations at CLT, ORD, and MDW
**RECAT Affected Aircraft Pairs at ORD**
Jul 1-Sep 25, 2015: Reporting Hours (6am-9:59pm local time)

3,922 Affected Arrival Pairs
(4.4% of all arrival pairs)

<table>
<thead>
<tr>
<th>Separation Requirements</th>
<th>Arrival Pairs</th>
<th>Departure Pairs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decreased</td>
<td>4.4%</td>
<td>4.7%</td>
</tr>
<tr>
<td>Unchanged</td>
<td>95.6%</td>
<td>94.7%</td>
</tr>
<tr>
<td>Increased</td>
<td>0.0%</td>
<td>0.6%</td>
</tr>
</tbody>
</table>

Data Source: ASDE-X
Red indicates an increase in separations
Green indicates a decrease in separations

**Comparison of Underlying Data**
ORD Wake RECAT Analysis
Aircraft Pairs - Jul 1, 2015 to Sep 25, 2015

<table>
<thead>
<tr>
<th>All Reporting hours (0600 – 2159)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting Hours</td>
</tr>
<tr>
<td>Arrivals</td>
</tr>
<tr>
<td>Departures</td>
</tr>
<tr>
<td>UA</td>
</tr>
<tr>
<td>AA</td>
</tr>
<tr>
<td>FAA</td>
</tr>
<tr>
<td>Total Number of Pairs</td>
</tr>
</tbody>
</table>

| Decreased Separations (% of pairs) | 4.1% | 4.4% | 4.4% | 4.2% | 4.3% | 4.7% |
| Increased Separations (% of pairs) | 0.0% | 0.0% | 0.0% | 0.3% | 0.4% | 0.6% |
## RECAT Impact Comparison

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ORD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arrivals</td>
<td>87</td>
<td>16.4%</td>
<td>11.8%</td>
<td>89,457</td>
<td>14,231</td>
<td>1,117.3</td>
<td>182.9</td>
</tr>
<tr>
<td>Departures</td>
<td></td>
<td>23.4%</td>
<td>16.3%</td>
<td>90,089</td>
<td>21,905</td>
<td>1,125.2</td>
<td>262.8</td>
</tr>
<tr>
<td>MDW</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arrivals</td>
<td>87</td>
<td>33.5%</td>
<td>21.3%</td>
<td>13,402</td>
<td>5,557</td>
<td>296.9</td>
<td>99.4</td>
</tr>
<tr>
<td>Departures</td>
<td></td>
<td>32.4%</td>
<td>20.2%</td>
<td>10,621</td>
<td>4,582</td>
<td>293.7</td>
<td>95.2</td>
</tr>
<tr>
<td>CLT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arrivals</td>
<td>153</td>
<td>7.8%</td>
<td>4.3%</td>
<td>77,739</td>
<td>7,739</td>
<td>679.7</td>
<td>52.8</td>
</tr>
<tr>
<td>Departures</td>
<td></td>
<td>36.6%</td>
<td>20.6%</td>
<td>83,559</td>
<td>33,961</td>
<td>704.4</td>
<td>257.8</td>
</tr>
</tbody>
</table>

Data Source: ASDE-X and ASPM

## Queuing Benefits Summary

**Average Change in Spacing: 30 sec**

### Summary of Savings

<table>
<thead>
<tr>
<th></th>
<th>CLT</th>
<th>ORD</th>
<th>MDW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range (secs/flt)</td>
<td>-48 to 67</td>
<td>-60 to 180</td>
<td>-60 to 53</td>
</tr>
<tr>
<td>Average (secs/flt)</td>
<td>0.58</td>
<td>2.69</td>
<td>-0.30 sec</td>
</tr>
<tr>
<td>Affected Flts. (%)</td>
<td>4%</td>
<td>11%</td>
<td>3%</td>
</tr>
<tr>
<td>Avg. per Affected Flight (secs/flt)</td>
<td>15 sec/aff. Flt</td>
<td>24 sec/aff. Flt</td>
<td>-10 secs/aff. Flt</td>
</tr>
<tr>
<td>Daily Savings Range (mins/day)</td>
<td>0.25 to 42.53</td>
<td>44.22 to 214.18</td>
<td>-16.45 to 4.18</td>
</tr>
<tr>
<td>Average (mins/day)</td>
<td>23.42</td>
<td>100.53</td>
<td>-2.99</td>
</tr>
<tr>
<td>Annual Savings ($) - Terminal</td>
<td>$180,380</td>
<td>$590,325</td>
<td>-$42,136</td>
</tr>
<tr>
<td>Annual Savings ($) - Airport Surface</td>
<td>$56,878</td>
<td>$359,618</td>
<td>-$31,856</td>
</tr>
<tr>
<td>Total Annual Savings ($)</td>
<td>$237,257</td>
<td>$949,942</td>
<td>-$33,992</td>
</tr>
<tr>
<td>ADOC: Airborne</td>
<td>$29.56/min</td>
<td>$28.86/min</td>
<td>$39.22/min</td>
</tr>
<tr>
<td>ADOC: Ground</td>
<td>$23.24/min</td>
<td>$22.15/min</td>
<td>$30.71/min</td>
</tr>
</tbody>
</table>
**Modeled Throughput Improvement: Peak Periods**

**CLT: Apr-Aug, 2015 / C90: Jul 1-Sep 25, 2015**

<table>
<thead>
<tr>
<th>Change Potential</th>
<th>Aircraft Spacing (%)</th>
<th>Throughput (ops/hr)</th>
<th>Throughput Change (%)</th>
<th>Avg. Daily Ops Count</th>
<th>Separation Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td># Pairs Decreased</td>
</tr>
<tr>
<td>CLT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arrival</td>
<td>-0.82%</td>
<td>0.50</td>
<td>0.83%</td>
<td>52.8</td>
<td>125</td>
</tr>
<tr>
<td>Departure</td>
<td>-0.92%</td>
<td>0.63</td>
<td>0.94%</td>
<td>257.8</td>
<td>876</td>
</tr>
<tr>
<td>ORD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arrival</td>
<td>-1.99%</td>
<td>1.76</td>
<td>2.07%</td>
<td>182.9</td>
<td>611</td>
</tr>
<tr>
<td>Departure</td>
<td>-1.56%</td>
<td>1.54</td>
<td>1.61%</td>
<td>262.8</td>
<td>817</td>
</tr>
<tr>
<td>MDW</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arrival</td>
<td>-0.47%</td>
<td>0.10</td>
<td>0.47%</td>
<td>99.4</td>
<td>67</td>
</tr>
<tr>
<td>Departure</td>
<td>2.33%</td>
<td>-0.42</td>
<td>-2.22%</td>
<td>95.2</td>
<td>52</td>
</tr>
<tr>
<td>C90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arrival</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3.4%</td>
</tr>
<tr>
<td>Departure</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3.3%</td>
</tr>
</tbody>
</table>

Data Sources: ASDE-X and ASPM

---

**RECAT Affected Aircraft Pairs and Modeled Throughput at ORD**

**Jul 1 - Sep 25, 2015: Peak Periods**

### 611 Affected Arrival Pairs (0.7% of all arrivals pairs)

<table>
<thead>
<tr>
<th>Leading Aircraft</th>
<th>Traditional</th>
<th>Heavy</th>
<th>B757</th>
<th>Large</th>
<th>Small</th>
</tr>
</thead>
<tbody>
<tr>
<td>RECAT</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>Heavy</td>
<td>78 (0.5%)</td>
<td>11 (0.1%)</td>
<td>4 (0.0%)</td>
<td>171 (1.2%)</td>
<td>274 (1.9%)</td>
</tr>
<tr>
<td>C</td>
<td>19 (0.1%)</td>
<td>1 (0.0%)</td>
<td>93 (0.4%)</td>
<td>128 (0.8%)</td>
<td>4 (0.0%)</td>
</tr>
<tr>
<td>D</td>
<td>7 (0.0%)</td>
<td>2 (0.0%)</td>
<td>66 (0.4%)</td>
<td>113 (0.8%)</td>
<td>2 (0.0%)</td>
</tr>
<tr>
<td>Large</td>
<td>185 (1.3%)</td>
<td>64 (0.4%)</td>
<td>1,698 (11.9%)</td>
<td>2,802 (19.7%)</td>
<td>88 (0.6%)</td>
</tr>
<tr>
<td>E</td>
<td>270 (2.0%)</td>
<td>117 (0.8%)</td>
<td>106 (0.7%)</td>
<td>2,787 (19.6%)</td>
<td>4,718 (33.1%)</td>
</tr>
<tr>
<td>Small</td>
<td>5 (0.0%)</td>
<td>6 (0.0%)</td>
<td>72 (0.5%)</td>
<td>138 (1.0%)</td>
<td>2 (0.0%)</td>
</tr>
</tbody>
</table>

**Separation Requirements**
- Decreased: 4.3% 3.7%
- Unchanged: 95.7% 95.8%
- Increased: 0.0% 0.4%

**Change Potential**
- Arrivals: Aircraft Spacing (%): -1.99%
- Departures: Aircraft Spacing (%): -1.56%
- Throughput (ops/hr): +1.76 +1.54
- Throughput Change (%): +2.07% +1.61%

Data Sources: ASDE-X and ASPM

---

### 910 Affected Departure Pairs (1.0% of all departure pairs)

<table>
<thead>
<tr>
<th>Leading Aircraft</th>
<th>Traditional</th>
<th>Heavy</th>
<th>B757</th>
<th>Large</th>
<th>Small</th>
</tr>
</thead>
<tbody>
<tr>
<td>RECAT</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>Heavy</td>
<td>77 (0.4%)</td>
<td>9 (0.1%)</td>
<td>9 (0.0%)</td>
<td>186 (1.4%)</td>
<td>221 (1.7%)</td>
</tr>
<tr>
<td>C</td>
<td>23 (0.1%)</td>
<td>9 (0.0%)</td>
<td>89 (0.6%)</td>
<td>110 (0.8%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>D</td>
<td>10 (0.0%)</td>
<td>7 (0.0%)</td>
<td>85 (0.6%)</td>
<td>147 (1.0%)</td>
<td>3 (0.0%)</td>
</tr>
<tr>
<td>Large</td>
<td>148 (0.7%)</td>
<td>76 (0.4%)</td>
<td>85 (0.6%)</td>
<td>3,113 (14.2%)</td>
<td>4,516 (19.6%)</td>
</tr>
<tr>
<td>E</td>
<td>262 (1.2%)</td>
<td>135 (0.6%)</td>
<td>343 (2.0%)</td>
<td>4,536 (20.6%)</td>
<td>7,221 (33.0%)</td>
</tr>
<tr>
<td>Small</td>
<td>15 (0.1%)</td>
<td>4 (0.0%)</td>
<td>109 (0.6%)</td>
<td>193 (1.1%)</td>
<td>12 (0.1%)</td>
</tr>
</tbody>
</table>

**Change Potential**
- Arrivals: Aircraft Spacing (%): -1.99%
- Departures: Aircraft Spacing (%): -1.56%
- Throughput (ops/hr): +1.76 +1.54
- Throughput Change (%): +2.07% +1.61%

Data Sources: ASDE-X and ASPM

Red indicates an increase in separations
Green indicates a decrease in separations
## RECAT Affected Aircraft Pairs and Modeled Throughput at MDW

### Jul 1-Sep 25, 2015: Peak Periods

#### 67 Affected Arrival Pairs

(0.5% of all arrival pairs)

<table>
<thead>
<tr>
<th>Leading Aircraft</th>
<th>Traditional</th>
<th>Heavy</th>
<th>B757</th>
<th>Large</th>
<th>Small</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Large</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Small</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

#### 385 Affected Departure Pairs

(3.6% of all departure pairs)

<table>
<thead>
<tr>
<th>Leading Aircraft</th>
<th>Traditional</th>
<th>Heavy</th>
<th>B757</th>
<th>Large</th>
<th>Small</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Large</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Small</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Change Potential

<table>
<thead>
<tr>
<th>Arrivals</th>
<th>Departures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft Spacing (%)</td>
<td>+0.47%</td>
</tr>
<tr>
<td>Throughput (ops/hr)</td>
<td>+0.10</td>
</tr>
<tr>
<td>Throughput Change (%)</td>
<td>+0.47%</td>
</tr>
</tbody>
</table>

### Data Sources: ASDE-X and ASPM
- Red indicates an increase in separations
- Green indicates a decrease in separations

### Throughput Change

- Throughput Change: 0.10 (ops/hr)
- Percentage Change: ±0.47%

## RECAT Affected Aircraft Pairs and Modeled Throughput at CLT

### Apr-Aug 2015, Peak Periods

#### 125 Affected Arrival Pairs

(0.2% of all arrival pairs)

<table>
<thead>
<tr>
<th>Leading Aircraft</th>
<th>Traditional</th>
<th>Heavy</th>
<th>B757</th>
<th>Large</th>
<th>Small</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Large</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Small</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

#### 1,072 Affected Departure Pairs

(1.3% of all departure pairs)

<table>
<thead>
<tr>
<th>Leading Aircraft</th>
<th>Traditional</th>
<th>Heavy</th>
<th>B757</th>
<th>Large</th>
<th>Small</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Large</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Small</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Change Potential

<table>
<thead>
<tr>
<th>Arrivals</th>
<th>Departures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft Spacing (%)</td>
<td>-0.82%</td>
</tr>
<tr>
<td>Throughput (ops/hr)</td>
<td>+0.50</td>
</tr>
<tr>
<td>Throughput Change (%)</td>
<td>+0.83%</td>
</tr>
</tbody>
</table>

### Data Sources: ASDE-X and ASPM
- Red indicates an increase in separations
- Green indicates a decrease in separations

### Throughput Change

- Throughput Change: 0.42 (ops/hr)
- Percentage Change: ±0.83%
### CLT Wake RECAT Analysis

**PASSUR comparison – Qualifying aircraft pairs**

Comparison of Aircraft-pair Counts

<table>
<thead>
<tr>
<th></th>
<th>All Operating Hours</th>
<th>Peak Hours</th>
<th>Peak Hours IMC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Arrivals</td>
<td>Departures</td>
<td>Arrivals</td>
</tr>
<tr>
<td></td>
<td>AA PASSUR</td>
<td>AA PASSUR</td>
<td>AA PASSUR</td>
</tr>
<tr>
<td>Total Number of Pairs</td>
<td>79,256</td>
<td>79,904</td>
<td>83,294</td>
</tr>
<tr>
<td>Decreased Separations</td>
<td>(%) of pairs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.65%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased Separations</td>
<td>(%) of pairs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### April – August 2015, Reporting hours (0700 – 2259)

### CLT Wake RECAT Analysis

**PASSUR Comparison – Throughput and Taxi Time Metrics**

#### QtrHr ARR and DEP throughput and taxi-times show a strong match between the two datasets

<table>
<thead>
<tr>
<th>AA</th>
<th>PASSUR</th>
<th>Difference (AA – PASSUR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 11th May 2016
CLT Wake RECAT Analysis
PASSUR comparison – Separation time distribution

- Arrivals behind 757

Attachment 2

PBN Blueprint Community Outreach

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

- Small number PBN initiatives are catalyst for significant high-profile attention
- Opposition delays and/or halts the overall initiative
- Adds time and resources needed to resolve issues
- Results in unstable results, unpredictable costs and loss of benefits to the national air transportation system
- Community outreach adds tremendous value in effectively identifying and resolving issues
- Recommendations should be viewed as an investment in the NextGen infrastructure

Overall Comments on FAA’s Community Involvement Manual
General Findings

- Community Outreach:
  - Achieve community understanding and acceptance/advocacy of the goal of the PBN procedure effort.
  - More than just satisfying applicable legal requirements.
  - FAA leads the effort
- PBN success is not solely dependent upon the FAA
  - Stakeholders must participate and be held accountable for fulfilling their respective roles and responsibilities
  - Airports play an essential role in PBN implementation - community outreach
- “No surprises” to local community leaders/local government is crucial
- Successful PBN implementation efforts established outreach long before initiation of PBN

Recommendations: FAA Should

- Establish Specialized Community Outreach Team(s)
- Develop a Standard Community Outreach Toolkit
- Develop specific Local Community Outreach Toolkits
- Establish Ongoing and scalable Community Outreach Programs in collaboration with local airports
Recommendations (cont.)
Moving Forward FAA Should

- Disseminate both this document & original Blueprint for Success to Implementing PBN to airport operators, and airlines
- Incorporate the best practices outlined throughout this document
  - Preparation
  - Education
  - Engagement
  - Advocacy
  - Post-implementation steps in PBN-related community engagement

DISCUSSION
Tasking Overview

- Goal: Final Recommendation to FAA designed to…
  “… help address community outreach in the implementation of PBN”
- Conducted Level Setting and Received Informational Briefings
  - Local Experiences
  - FAA Community Outreach Activities
  - Aviation Community
  - FAA Community Guidance materials
  - Macro NextGen communication message formulation
- FAA guidance should 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
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
- UPS
- United Airlines, Inc.
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 2016-2020, mid – 2021-2025, far term – 2026-2030
  - Identify and prioritize tools and technologies ground vs. aircraft
  - Appropriate in various operating conditions
  - Preliminary Report to NAC in June
  - Final Report in Oct
Capabilities Being Examined

- Ground-based Interval Management – Spacing (GIM-S)
- Terminal Sequencing and Spacing (TSAS)
- Path Stretch (with and without Data Communications)
- Controlled Time of Arrival (CTA) Via Time of Arrival Control (TOAC) Guidance and Automation
- TBFM including Integrated Departure and Arrival Capability (IDAC)
- Flight Deck Interval Management (IM): IM En Route and Terminal Operations
Preliminary Findings – Interim Report

- Cultural challenges part of the solution for transition to PBN NAS
- Ground based metering is essential to successful implementation of PBN
- FAA investing heavily in Ground Based systems for first two time frames – industry supports
- Aircraft based system standards developed, capabilities & use in R&D and trials
- Longer term horizon area of Task Group analysis

DISCUSSION
Preliminary Recommendations

Near Term 2016-2020

- **TBFM**: Continue TBFM system improvements to ensure a strong foundation to build upon for future capabilities that will address the sequencing and spacing necessary for routine use PBN in all domains.
- **CRDA**: Leverage local level ingenuity – applying at current level of deployment. Evaluate Facilities based on want/need.
- **GIM-S**: GIM-S (15 ARTCC's by 2020) – changes should be incremental to allow controllers to adapt. All centers could have GIM-S, 5 remain. Build business case for path stretch investment decision.
- **TSAS**: Initial site IOC FY19, first 9 complete by 2022. Recommend analysis be conducted to determine if RNP arrival procedure use increases over CRDA use.
- **RTA**: Research/assessment/study – variant being developed
- **FIM**: Research/demo (ATD1 flight test) FAA working to close business case. FIM criteria/triggers. FAA Investment decision.
Preliminary Recommendations

Mid Term 2021-2025

- TBFM: Complete deployment of IDAC to NSG1 and, NSG2 airports that frequently subject to a call for release.
- CRDA: Continue use at NSG1 and NSG2 airports at sites that will not have TSAS.
- GIM-S: Path Stretch (planning IOC 2022). All TSAS sites recommended as a priority for implementation.
- TSAS: NSG1 airports, special attention airports east of the Mississippi as well as other specific transportation centers. Additional deployment to added additional airports that are high value to industry.
- RTA: Potential implementation to complement/replace extended metering.

Far Term 2026-2030

- TBFM: Improved trajectory modeling by Downlinking of a/c data via B2
- GIM-S: Potential deployment GIM-S with path stretch at additional airports.
- TSAS: Potential deployment at additional airports.
- FIM: Implementation based on positive results of near/mid term trigger points and closure of a positive business case.
More on FIM

- Team will be focusing on maturing FIM recommendations
- Review of the ADS-B IN ARC Recommendations
- What level of precision is needed to accomplish the goal?
- The case for IM is built off the capability of TSAS. The performance delta between the two will require more understanding and data
- Cultural issues and changes in roles and responsibilities

Summary of Meeting and Next Steps
DFO and NAC Chairman Closing Comments
Concluding Items

- Action Items
- Other Business
- Next Meeting
  - October 6 – Orlando, FL, JetBlue
  - Optional Pre-NAC Tour Harris Corp – Melbourne, FL (October 4)

Adjourn
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 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:

<table>
<thead>
<tr>
<th>Action Item</th>
<th>Responsible Entity</th>
<th>Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>An Ad hoc of representatives from FAA (AVS &amp; ATO), Alaska Airlines, Delta Air</td>
<td>FAA/RTCA</td>
<td>June 2016</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Event Description</th>
<th>Responsible Parties</th>
<th>Timeframe</th>
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<tbody>
<tr>
<td>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?”</td>
<td>FAA/RTCA</td>
<td>June 2016 and future NAC meetings</td>
</tr>
<tr>
<td>NextGen Integration Working group (NIWG)</td>
<td>NIWG (FAA/Industry)</td>
<td>June 2016</td>
</tr>
<tr>
<td>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.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADS-B Out</td>
<td></td>
<td>June 2016</td>
</tr>
<tr>
<td>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</td>
<td>Industry to provide data via Equip 2020 1. NBAA and RAA report to NAC</td>
<td></td>
</tr>
<tr>
<td>Briefing for the Committee on Airline C/N/S fleet plans - ADS-B, PBN, DataComm</td>
<td>JetBlue</td>
<td>June 2016</td>
</tr>
</tbody>
</table>
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.
NAC Chair Report
Talking Points for Richard Anderson
Washington DC (Crystal City, VA) – June 17, 2016

• As we begin today’s meeting of the NAC, I want to acknowledge the important contribution of Mike Whitaker for his service as FAA Designated Federal Official and his leadership in engagement with the industry in the consensus based process as we seek to implement NextGen capabilities under the NextGen Advisory Committee (NAC).

• Ask Margaret for comments related to Mike’s departure from the FAA

• Today’s meeting will cover three specific recommendations that the Committee will be asked to approve:

  1. **NextGen Integration Working Group 2017-2019 Rolling Plan Recommendation**

     The Industry-FAA Teams have built upon the current industry -FAA collaborative work in the four priority areas to identify specific recommendations for implementing NextGen capabilities at specific sites in the 2017-2019-time frame. The plans include all necessary components of each capability including industry and FAA commitments necessary to implement the capabilities for:

     • DataComm
     • Multiple Runway Operations – Wake ReCat
     • PBN
     • Surface

  2. **PBN Blueprint Community Outreach Task Group**
The Task Group has developed recommendations for community outreach to assist the FAA and the industry with the growing environmental challenges associated with PBN implementations.

3. Joint Analysis Team Performance Assessment of Wake ReCat at Charlotte and Chicago

The JAT industry-FAA team is evaluating the performance improvements attributable to the implementation of selected NextGen capabilities at specific locations. The Team, supported by data from FAA, individual operators and an industry-funded database developed by Passur Aerospace will report on the methodology and results from an analysis of Wake ReCat at CLT, and ORD and MDW airports in Chicago.

- Today’s agenda also has several areas we requested from our meeting in February:
  - As the Committee requested, representatives from JetBlue will present a briefing on its C/N/S fleet plans - ADS-B, PBN and DataComm.
  - The Committee will also receive an update on ADS-B implementation from the FAA – specifically the status of ADS-B equipage. There were two areas identified by the Committee at the last meeting:
    - Industry providing detail compliance plans- including regional fleet
    - Identification of near/long term solutions for business aviation
  - The FAA will brief us on the analysis of the Seattle Greener Skies initiatives and plans to improve on the PBN implementation. As a
part of that, we should discuss change management that is pivotal to our collective success in implementing NextGen. Task Force 5 identified the critical elements such as pilot and controller training, decision support tools, procedures and policies, site readiness, etc. as areas critical to the successful deployment of NextGen capabilities to deliver benefits. It is not just fielding technology or procedures, but it is the effective operational implementation that improves operational performance.

- We will also be hearing from the Time Speed and Spacing Task Group about its work on policy recommendations related specifically to the aircraft and ground based traffic flow management decision support tools essential for the successful implementation of PBN.

- In closing, the NAC process means that members of the Committee support the recommendations once they are approved. Since 2010, this body has delivered nearly 40 recommendations to the FAA that cover:
  - Prioritization of NextGen Implementation Investments & Locations
  - Industry-FAA Joint Implementation Plans
  - Metrics – What & How to Measure Implementation of Capabilities
  - PBN – Metroplex, Single Sites, Overcoming Technical/Non-technical Barriers
  - ADS-B Out Equipage
  - Environmental Review Process, PBN Community Outreach

- **Discussion:** While we are all here because we believe our work is making a difference, it is not clear that our message is getting out. It is not enough to
respond to FAA tasks and deliver consensus recommendations, or even to see those recommendations incorporated in FAA NextGen plans, if we want to convince Congress or the public that the partnership here is resulting in tangible outcomes, I think we need to focus more attention on PR, on communication. I invite the Committee members to offer your thoughts about how to promote the significant accomplishments of the NAC? How do we get our message out? **Call first on Ed Bolen to get the ball rolling.** *(consider having MJ capture comments in real time on screen so everyone will feel their thoughts were captured.)* Ed Bolen and Margaret are prepared to initiate dialogue

- **Conclude discussion** on promoting achievements of NAC by identifying AdHoc of NAC to work on promotion and report back to the NAC at October meeting. RTCA will provide notes from this conversation and facilitate the ad hoc.

- Thank you again for your participation in the NAC. The time and energy you continue to devote to the Committee reflects your commitment to facilitating the delivery of air traffic service to the flying public that are leading to increased capacity, improved efficiency and safety and reduced environmental impact. That is the purpose of the NAC.

-
Introduction

Thank you, Richard [Anderson, NAC Chairman].

Good morning, everyone.

We have an important meeting ahead of us today, with a number of recommendations we’re eager to receive. But this is our first NAC meeting without Ed Bolton at the helm of our NextGen organization, and I want to take a moment to acknowledge Ed’s contributions to this program. Ed made an indelible mark on the FAA and the National Airspace System as an unflagging champion of collaboration. He believed passionately in the power of working together toward a commonly envisioned goal and he led this agency – kicking and screaming at times, it must be said – toward an attitude of greater transparency and cooperation that culminated in the first NextGen Priorities joint implementation plan. We all benefit from the
momentum he worked so hard to create. As I’m sure many of you are aware, Ed accepted a position at The Aerospace Corporation as senior vice president of Systems Planning, Engineering, and Quality. We wish him all the best in his future endeavors.

Fortunately, we have a strong successor to Ed. It’s my pleasure to introduce Jim Eck as the new Assistant Administrator for NextGen. As he would tell you, he was present at the dawn of NextGen, and has helped shepherd this effort ever since. He was most recently Vice President of FAA’s Program Management Office, where he was responsible for overseeing all NextGen program activity. In that role, Jim has been a silent partner in our success over the past couple of years, keeping us on track through challenging budgetary times. He understands these programs better than most, and is perfectly positioned to continue the momentum and lead us to true operational integration.

I should mention that Jim has another significant role this weekend, father of the bride. Thank you for taking time
out of that agenda, Jim, to join us for the first part of today’s meeting. [Turn over to Jim]

Jim

- initial observations based on experience in implementing programs, will have an eye on maintaining direction, longer term vision is important, Good things in NextGen Priorities but NextGen overall is big, we need to press on toward the future, Good foundation of the path to the future includes equipage, CNS rule was painful, we can avoid rulemaking this time if we all agree on a path forward, If we work together closely, we don’t need to bring in the regulatory process, DataComm equipage numbers; we want to hear about your fleet equipage plans, Incentive/non-incentive equipped planes

[Turn back to Mike]

Thanks, Jim.

NextGen Priorities

I’d like to highlight some of the recent successes we’ve had in implementing the NextGen Priorities. Our milestones remain on track for completion. Wake RECAT at the Northern California TRACON went operational last month. Anchorage RECAT is on track for the end of this month. Data Comm is an unprecedented 20 months ahead of schedule. Tower departure clearance services are now
operational at 28 sites. The program calls for departure clearance services to be deployed at 56 towers by 2019, but we are well on our way to meeting that goal by the end of this year, and that clearly shows the commitment everyone has made to the program. Kudos go not only to the Data Comm program office but also to NATCA and the operators. It takes a lot of hard work and coordination to bring these towers online and to ensure that controllers and flight crews are ready.

**PBN Strategy**

We’ve been working for the better part of a year now with you all and with the PARC on a new PBN Strategy, which we will be publishing shortly. This document lays out the vision for transitioning the NAS to PBN as the primary means of navigation.

Let me be clear what we’re talking about here. This document defines what services will be available in what kinds of airspace, and importantly, which ones will not be.
A successful transition to a PBN-centric NAS will require a sustained, long-term focus from aircraft operators, manufacturers, airport operators and local communities. It will engender a lot of hard but necessary conversations, but there is much common ground, and we must take on these challenges if we are to advance the system. The NAC will continue to be a central forum for this work. The NIWG’s new round of PBN recommendations support the near-term phase of this strategy, and the time, speed and spacing task that we’ll hear about today will go a long way to aligning us for the longer-term.

Community Engagement

We’ve spent a lot of time assessing the value of PBN improvements amongst ourselves as an operating community, but it has become abundantly clear that the potential benefits we all recognize cannot be achieved unless we bring local communities into the discussion.

One realization that we’ve come to recently is that when talking to residents, we speak to them as we speak to each other. In doing so, we fail to provide the fundamental
context about the way we fly and the challenges we are facing in each of these locations. Last month in Charlotte, we tried out a new approach to educating those who are not steeped in aviation, using new communications tools to help them visualize how we perceive operational challenges and how we develop our solutions to them.

We looked at each of the specific procedures being deployed in the next few weeks and showed them in varying levels of specificity and overlaid on both street and Google Earth maps. We were able to show exactly where airplanes would be flying in each of the variations and airport configurations. At the public meeting we provided a solid and understandable presentation, followed by a deep dive for each of the procedures with subject matter experts available to answer questions.

Additionally, we ensured that we not only had the presence but the vocal participation of both the Charlotte Airport and the lead carrier, American Airlines. We were pleased to present this information as a team.
While not every participant at the meeting was thrilled to find out that there may be new or increased airport noise in their community, they seemed very pleased by the level of detail and the willingness of the FAA and others to come forward and explain the process to them.

Much remains to be done to refine this effort, but I believe the model is consistent with the report the NAC will share with us today. I’m counting on those recommendations to include your commitments to participate in this outreach with us. I cannot overstate the value of this partnership in Charlotte.

**ADS-B Equipage/GA Incentive**

Moving on now to ADS-B, the FAA announced a new program for eligible general aviation aircraft owners, which will pay a $500 rebate to help offset the cost of purchasing ADS-B Out equipment.

This is available to owners of U.S. registered, fixed-wing, single-engine piston aircraft who purchase equipment that meets the FAA’s technical standards. To be in
compliance, an aircraft must have installed an approved GPS receiver and an ADS-B Out system.

New aircraft or aircraft that have already been equipped with ADS-B will not be eligible for the program.

We’ll be issuing 20,000 rebates on a first-come, first-serve basis for one year starting this fall, or until all 20,000 rebates are claimed – whichever comes first.

We hope this new initiative will encourage aircraft owners to equip early and take advantage of all the safety benefits ADS-B has to offer.

I’d like to thank our partners in AOPA, GAMA and AEA for their support. Bruce DeCleene will provide an update on the overall state of ADS-B Out equipage later in the day. You’ll see that we have much better situational awareness on the equipage plans of the commercial operators, thanks in large part for the attention that the NAC has paid to the issue.

While we are on the subject of ADS-B, we should acknowledge that the community has been talking widely
about the potential benefits of space-based ADS-B in the oceanic environment. We’ve seen proposed reauthorization language that would mandate us to move in that direction. The FAA is always interested in helping the community leverage the full benefits of its equipage. At the same time, as stewards of the taxpayers’ dollars, it’s incumbent on us to do our due diligence with all new investments.

To that point, rather than handling this through legislation, I believe it would make sense to use the NAC as a forum to discuss the reasons and rationale for pursuing an enhanced surveillance capability in the context of the priorities you have already given us and in light of the tradeoffs a green light might require. That’s critical, because a new investment here would come at the expense of other NextGen programs.

Teri, I know you have some thoughts on this issue.

Teri:

**Thanks, Mike. We have been doing a lot of work on space-based ADS-B for some time, so we have a good...**
technical handle on the capability. We’ve had a harder time with the cost/benefits case and we would value some additional input from the community to inform our thinking. I think we should ask the NAC to form a task group to more deeply examine the potential and specific benefits of more precise position information in U.S. controlled oceanic airspace. The group should look at what mechanisms might be used to gain this capability, and at what cost. Your point about priorities and tradeoffs is spot on. I think a final part of the discussion should be around what funding models could be used to provide the capability, should the NAC deem it to be of sufficient value.

[Pause for discussion. Teri turns back to Mike.]

Thanks, Teri.

UAS

The work we are doing together is transforming aviation in very profound ways. That’s true not just for
NextGen, but UAS as well. Our list of shared accomplishments in this area is growing. More than 460,000 hobbyists have registered their drones, and that means we have reached that many people with our safety message. The Academy of Model Aeronautics recently reported that drone sightings by pilots have decreased in recent months, which suggests that our message is being received. We recently expanded the system so commercial operators can register online rather than use the legacy paper-based system.

We are working to finalize Part 107, our small UAS rule, and we expect to publish it shortly. It will allow for routine commercial drone operations and make it a lot easier to operate in the NAS.

As an agency, we have matured in our management of UAS activities, and are ready to engage this broad, diverse, and non-traditional set of new partners as a community. In April we held a symposium at Embry-Riddle University in Florida to start that dialogue. As the saying goes, imitation is the sincerest form of flattery and so last month the
Administrator announced the creation of a Drone Advisory Committee, which will also be supported by RTCA.

Like the NAC, the DAC will provide an open venue for the FAA and those who operate UAS in the NAS to collaboratively identify issues and challenges affecting the efficiency and safety of UAS integration. Prioritization and transparency will be two big areas of focus, which will help everyone understand who’s doing what and when it needs to be done.

Brian Krzanich, CEO of Intel Corporation, will chair the DAC. As a major player in Silicon Valley, Brian brings a passion for technology, including UAS; we respect and want to leverage that passion. As a pilot, Brian also understands traditional aviation and will help bridge the gap between the manned and unmanned communities moving forward.

As you might expect, we have a lot of interest from organizations that would like to be members of this new federal advisory committee — nearly 400 of them. We plan to have 30 voting members and so we are working with
RTCA to assess those applications. We anticipate the DAC’s first meeting will be held this August.

Though UAS are capturing all of the headlines these days, it is critical that the NAC remain singularly focused on continuing the work at hand. The ultimate goal is to safely integrate UAS with manned operations, and to do so we need the infrastructure, tools and flexibilities that NextGen provides. The work we do here improves the future for all categories of operators.

**Conclusion**

There’s one last transition I should address today, my own. I feel that I am leaving NextGen and the FAA in good stead and in capable hands. I want to express my thanks and admiration to all of you in this NAC community — both from industry and from the FAA — who have dedicated hundreds of hours to teleconferences, background briefings, and writing sessions; who have provided context and historical perspective; who have leaned in and at times fought it out; all to help this community, this nation, realize the vision of a transformed
NAS. Together, through the NAC, we have created momentum by delivering near-term capabilities, and we have affirmed a shared vision of the future. The success we’ve had working on our current priorities gives me great hope for the possibility of making joint commitments that realize the full benefits of NextGen.

Thank you. This concludes the FAA Report.