Meeting Summary, February 20, 2014

NextGen Advisory Committee (NAC)

The eleventh meeting of the NextGen Advisory Committee (NAC) was held on February 20, 2014 at Honeywell Deer Valley, 21111 N. 19th Ave, Phoenix, AZ 85027. The meeting discussions are summarized below.

List of attachments:

- Attachment 1 - Attendees
- Attachment 2 - Presentations for the Committee meeting - (containing much of the detail about the content of the material covered)
- Attachment 3 - Approved September 19, 2013 Meeting Summary
- Attachment 4 - NAC Chairman’s Report
- Attachment 5 - FAA Report from The Honorable Michael Whitaker, FAA Deputy Administrator
- Attachment 6 - Recommendation “Industry Barriers to NextGen Utilization”

Welcome and Introductions

NAC Chairman, Bill Ayer (Airlines for America) called the meeting to order and welcomed the NAC members and others in attendance. He thanked Carl Esposito of Honeywell Aerospace for hosting the meeting and the tours of Honeywell’s avionics integration and test facilities of air transport and business jet cockpits that demonstrated both in-service and future implementations of NextGen capabilities.

All NAC members and attendees from the general public were asked to introduce themselves (attendees are identified in Attachment 1). Chairman Ayer recognized five new Committee members: Ed Bolton, Assistant Administrator, NextGen, FAA; Teri Bristol, Acting Chief Operating Officer, Air Traffic Organization, FAA; Carl Burleson, Acting Director, Aviation Policy, Planning & Environment, FAA; Ben De Leon, Acting Associate Administrator for Airports, FAA; and Major General Steven Shepro of the United States Air Force.

Designated Federal Official Statement

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

1 After the February 20 Meeting, Teri Bristol was made Chief Operating Officer.
Approval of September 19, 2013 Meeting Summary

Chairman Ayer asked for consideration of the written Summary of the September 19, 2013 meeting. The Committee approved the Summary (Attachment 3) with no revisions or objections.

Chairman’s Remarks

In his remarks, Chairman Ayer (Attachment 4) stated that the industry has influenced NextGen beginning in the early 2000s with the Joint Program Development Office defining NextGen through a 2025 technology-driven concept. This led to a refocus on the business case in 2009 with RTCA’s Task Force 5 moving from defining the “what” to defining the “how” for a successful NextGen program.

The NAC took up the mantle of NextGen implementation through an evolutionary, benefits-driven approach and the Committee is committed to help the FAA achieve the promise of NextGen. He emphasized that the Committee is a supportive and positive force in the implementation of NextGen, highlighting the recent work on Prioritizing NextGen capabilities as a prime example.

Mr. Ayer explained that the NAC is in a unique position of providing a single voice of consensus among all the key organizations that have a stake in the performance of the air transportation system. The Committee is intent on ensuring a continuing constructive partnership with the FAA. To achieve success in any endeavor, it is imperative to set bold, yet reasonable targets, and not falter in achieving those targets.

He highlighted the FAA’s latest move to publish on their website, up-to-date performance snapshots and metrics related to deployments of early NextGen capabilities.

He concluded his remarks by showing an FAA video on DataComm, one of the NAC’s Tier 1 capabilities. The video highlights the benefits that will accrue to operators and controllers once it is fully deployed. He suggested that the FAA and industry work jointly to establish a plan with clearly defined milestones and dates. The goal would be to achieve those milestones through to a nationwide deployment. Such a deployment of the DataComm capability would increase confidence in NextGen, enhance US global leadership, and provide much needed benefits to the FAA, operators and industry.

At the conclusion of his report several Committee members commented favorably about the industry and the FAA working together to identify a couple of capabilities from the prioritization recommendation and develop milestones for implementation.

FAA Report

Mr. Whitaker presented the FAA report (Attachment 5). He reviewed the budget framework passed by Congress in December 2013 that lends stability for the next two years. The compromise leaves the FAA at historically low funding levels and an extremely tight fiscal environment. While anticipating that the FAA will have adequate funding to remain on track with NextGen and provide focus to the priorities identified by the NAC, the agency needs to find ways to operate more efficiently.

He outlined the FAA’s strategic initiatives announced by Administrator Huerta the previous day:
- Deliver benefits through technology and infrastructure
- Make aviation safer and smarter
- Enhance FAA’s global leadership
- Empower and innovate with FAA’s people

Mr. Whitaker concluded his remarks by highlighting recent meetings with European counterparts explaining that many of the joint modernization programs are working well under the existing agreement between the FAA and Europe and there is a commitment to conduct further cooperative efforts. He then introduced the next agenda item for additional details on the meetings.

**FAA/SESAR Presentation and Update and Status Report on DataComm**

In addition to providing more detail on Mr. Whitaker’s comments, Ed Bolton (Assistant Administrator NextGen, FAA), Teri Bristol (Acting Chief Operating Officer, Air Traffic Organization, FAA) and David Batchelor (SJU Liaison Officer, SESAR JU) provided an overview of the “Key Take Away Items”:

- SESAR Deployment Manager to be named - New entity will be established in 2014 to manage and implement the SESAR Deployment Program. Engagement with FAA on deployment strategies will be important.
- DataComm – an agreement exists on how to reach a harmonized message set, as well as a commitment to increase efforts on the links and architecture.

**NextGen Capabilities Prioritization**

Mr. Bolton and Paul Fontaine (FAA NextGen) presented a briefing addressing the NAC’s NextGen Capabilities Prioritization report approved at the September 2013 meeting. In response to the eleven Tier 1 interdependent capabilities contained in the Report, the FAA indicated that the recommendations are extremely valuable, have influenced the budget formulation process, and helped identify and/or clarify some systemic challenges. Mr. Bolton reported that there are no significant budget impacts presented by implementing all Tier 1 capabilities and is following the recommendation by shifting focus to Surface, PBN and Multiple Runway Operations areas.

He also explained that the review has assisted the FAA in identifying and/or clarifying some systemic challenges and they are using the priorities to help sharpen focus in the deployment phase in many areas. The FAA has already begun to take action with the inception of a Deployment Implementation Group (DIG).

Mr. Fontaine provided a summary review of the FAA’s response, including how the priorities are being applied to deliver capabilities in the near-term.

Following the presentation, a Committee member started the discussion by asking how the industry could provide help to the FAA in the implementation process. Several FAA staff members commented that this is under discussion within the agency, including determining the focus areas and ensuring that these areas are effectively delivering capabilities. In response to a question on what drives the
priority for Closely Spaced Parallel Runways, Mr. Fontaine explained that this includes airport configurations and how the changes can improve capacity.

Another Committee member emphasized the importance of both Tier 1A and 1B, stating that they are equally important, both tiers of high benefit, and Tier 1B being ranked lower in implementation readiness.

A Committee member offered positive comments about the value of surface detection specifically those provided by ASDE-X and also encouraged the FAA to consider airport ramp vehicle surveillance.

Several Committee members stressed the importance of a near-term focus in delivering capabilities, in addition to being able to show a “win” with a successful implementation that is “done”, i.e., deployed and delivering promised benefits, thus a return on investment.

At the conclusion of the discussion, the Committee agreed that the next step on the Prioritization of NextGen Capabilities is to identify 1-3 of the Tier 1 capabilities to apply a laser focus, develop a comprehensive joint implementation plan, and commit to achieving all the milestones in the plan. The purpose of this initiative is to increase the confidence in the community’s ability to deliver the full benefits of NextGen by dates certain. The areas discussed were PBN, Surface, Closely Spaced Parallel Runways and DataComm-enabled Controller-Pilot DataLink Communications (CPDLC) and pre-departure clearances.

**Performance-Based Navigation Implementation**

The FAA’s Dennis Roberts outlined how the agency is incorporating into its policy guidance the NAC recommendations for determining the prioritization of new, or the revision or elimination of, existing PBN procedures. This includes quantifying projected benefits (i.e. objectives and goals) for procedures, establishing milestones and providing opportunities for collaboration between aircraft operators, airport officials and controllers.

Several members of the Committee engaged Mr. Roberts in a discussion about the importance of increasing utilization of procedures and identifying the actions that can make this occur.

**CatEx 2**

Mr. Carl Burleson from the FAA Aviation Policy, Planning & Environment Office provided the response to the NAC recommendation on the Categorical Exclusion contained in the FAA Modernization Act of 2012. The Committee had provided the FAA with a process for noise analysis titled “Net Noise Reduction Method” as the means for identifying measurable reductions in noise on a per-flight basis as required by the law. Mr. Burleson reported that the FAA plans to issue a Federal Register notice soliciting comments on the NAC recommendations provided last June, for implementing Congressional authority fostering the implementation PBN approaches using a Categorical Exclusion under the National Environmental Policy Act requirements.

In response to a question, Mr. Burleson explained that the FAA’s decision was based on a desire to provide a forum for the larger public to comment and based on the Congressional interest in the topic.
Fuel Data Sharing for Measuring NextGen Performance

Ms. Nancy Kalinowski, FAA Air Traffic Organization System Operation Services, thanked the NAC for its recommendation for obtaining fuel use data to measure NextGen implementation in specific areas (key city pairs). She explained that the FAA is working with Airlines for America and specific aircraft operators who are willing to share aircraft weight and fuel consumption data. The data collection should begin in the summer of 2014 and will support NextGen metrics and modeling needs, as well as FAA authorization metrics. The FAA is working to address carrier concerns about data confidentiality.

Industry Barriers to PBN Utilization

NAC Subcommittee (NACSC) Co-Chairs Steve Dickson (Delta Air Lines) and Melissa Rudinger (AOPA) provided a summary of the recommendation contained in a report that identifies and provides mitigations to industry barriers to implementing PBN. The report was developed by the Operational Capabilities Work Group (OCWG), Co-Chaired by Bill Murphy (IATA) and Tom Bock (PANYNJ). The recommendation builds on the NAC’s previous report that focused on FAA barriers.

The list of identified industry barriers and mitigation actions include:

- Tech pilot participants and planners need shared view on how PBN procedures fit and operate in a system of Timed Based Flow Management (TBFM).
- Need to collaborate with the FAA on investment decisions, timelines and priorities related to PBN initiatives, including TBFM tools and related automation capabilities.
- Industry will make SME’s available to facilitate this collaboration.
- Industry would like to play an active and constant role in the design of PBN procedures.
- Industry and FAA should emphasize simplicity in design, with identical key segments/fixes on the procedures where allowable by criteria, and with transparency to the controller.
- Industry to be given access to lessons learned, improved simulation capabilities and test databases. Industry can provide SME’s to support updates and improvements to flight evaluation and simulation capabilities (e.g. – TARGETS).
- Industry and the FAA should incorporate system level modeling and analysis of PBN procedures as part of the design phase.
- Industry should use available resources to develop training materials that can be used in a variety of industry forums and also in partnership with the FAA for joint training.
- Training on the differences among RNAV approach procedures, minimums, aircraft capability, required for VNAV, LNAV, LPV, etc., and local user community capabilities at an airport or in a Metroplex are a necessity.
- The newly established PBN Blueprint Task Group should consider the recommendations from this report, previous NAC recommendations addressing PBN along with the work of the PARC
to inform its deliberations and development of mitigation strategies for known barriers to PBN implementation.

Following the briefing, Committee members offered comments including the need to coordinate between pilots and controllers when designing and implementing procedures, the need for an appropriate set of metrics to evaluate use, and the critical link between the procedures and traffic flow management systems.

Responding to a Committee member, Mr. Dickson explained that issues of individual air carrier operational preferences and operational priorities is an area that he believes the PBN Blue Print Task Group can provide valuable recommendations.

**Committee Action:** The Committee agreed by consensus to approve the recommendation for **Industry Barriers to NextGen Utilization** (Attachment 6) for submission to the FAA. This report, along with others previously approved by the NAC, will be used as a resource for the work of the PBN Blueprint Task Group.

**NextGen Performance Snapshots**

Ms. Victoria Wei (Director of NextGen Performance and Outreach, FAA) provided an overview of the FAA NextGen Performance Snapshots webpage. She expressed appreciation for the NAC and the work of the Business Case and Performance Metrics Work Group, for the recommendations and feedback that assisted the FAA in developing the NextGen performance resource tool.

The following outlines the website statistics:

During calendar year 2013, with no promotion of the site, there were:

- Approximately 1,200 visits to this web page containing FAA operational metrics
- More than 1,800 individual page views
- Approximately 45% of the visits resulted in a download of a pdf from this site with Commercial Fatality and Cost effectiveness metrics downloaded most frequently

In Jan 2014 the FAA reported:

- Over 370 visits to this web page containing operational metrics – compared to a high monthly visit of 284 in July 2013
- Almost 466 page views, compared to about 400 in July 2013, the highest month for 2013

Chairman Ayer encouraged members of the NAC to visit the site: www.faa.gov/nextgen/snapshots

Ms. Beth White of the FAA’s NextGen Office also demonstrated to the Committee a smart phone app containing various resources for NextGen information.

**PBN Implementation Blueprint for Success**

Ms. Margaret Jenny from RTCA provided a background briefing on the Blueprint for Performance-Based Navigation Procedures Implementation Tasking from the FAA on lessons learned from prior PBN implementations that will be used for developing a blueprint or checklist for future success.
The areas being addressed by the PBN Blueprint Task Group Co-Chaired by Jim Crites, DFW International Airport and Brian Townsend, American Airlines/US Airways are:

- Identify all stakeholders needed and define their roles
- Describe specific outreach strategies associated with each stakeholder to include development of a process/method to ensure stakeholder buy-in of project goals
- Describe specific possible outcomes and identify metrics for success
- Review existing processes and incorporate lessons learned from previous ongoing PBN initiatives, both domestic and international
- Develop a methodology to ensure lessons learned and expertise are captured and incorporated into future efforts

The Committee concluded with breakout discussions of the “outcomes and metrics for success” associated with PBN implementation. The purpose of this exercise was to provide a perspective from the NAC of the top 3-4 performance metrics as input to the the Task Group being formed to address the Tasking.

Highlights from the discussion included the agreement of several key performance metrics, including: (1) predictability is crucial to the travelling public; (2) safety should be enhanced and must be continually evaluated; (3) usage of procedures should be tracked and documented; and (4) capacity and efficiency as measured by reduced fuel burn and block time are key metrics that should be continually measured.

Breakout Group Report Outs to NAC

- Safety is vital, CAST is leading these efforts, change management at the core of issues related to pilot errors/altitude busts and other transition/implementation issues. Also important to track the use of vertical guidance in visual situations.
- Predictability is critical to the traveling public (also to the air carriers) – most likely way to measure is with scheduled block times.
- Successful PBN implementation requires the need to balance capacity and efficiency and correlate this to fuel burn and block time.
- Need to track usage of PBN procedures as transition occurs including whether PBN procedures are offered and if so, the frequency of acceptance by pilots.
- Critical to retain access for general aviation at airports in proximity of air carrier airports where PBN is being implemented.

Recap of Meeting and Anticipated Issues for NAC consideration and action at the next meeting

Chairman Ayer concluded the meeting by reviewing the following actions from the meeting:

1.) Next step on prioritization: the Committee agreed that the next step on the Prioritization of NextGen Capabilities is to identify 1-3 of the Tier 1 capabilities to apply a laser focus, develop a comprehensive joint implementation plan, and commit to achieving all the milestones in
the plan. The purpose of this initiative is to increase the confidence in the community’s ability to deliver the full benefits of NextGen by dates certain. To launch this effort, in early March, the NAC Chairman and RTCA leadership will meet with the FAA (Ed Bolton, Assistant Administrator for NextGen and his team) to select the capabilities and develop the plan for the work of the FAA-Industry Team.

Following that meeting, the NAC and RTCA leadership will meet with Ed Bolton and his team to conduct a “Deep Dive” of selected Tier 1 capabilities. The purpose of the Deep Dive would be for an FAA-Industry Team to identify all the elements of the plan to implement the identified capabilities.

The candidate capabilities for the Deep Dive include (1) DataComm (CPDLC and pre-departure clearance), (2) Surface, and (3) Performance Based Navigation (PBN). The Team will include members of the NAC Subcommittee and Work Groups, as well as related FAA Subject Matter Experts. An interim report on the progress will be provided to the NAC at the June 3rd meeting.

2.) Approved recommendation on Industry Barriers to PBN Utilization
3.) Provided feedback to PBN Blueprint Task Group on outcomes and metrics
4.) Provided web address for performance snapshots and NextGen application in meeting minutes

Other business
None was offered.

Adjourn
Chairman Ayer ended the meeting of the Committee at 3 p.m.

Next Meeting
The next meeting of the NAC is June 3, 2014, in Washington, DC.
Attendees:
February 20, 2014 Meeting of the NextGen Advisory Committee
Phoenix, AZ

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1 Committee members names appear in italics.
Hance, John
Hanlon, Dan
Hill, Stephanie
Hyde, Shaunta
Iversen, Jennifer
Jenny, Margaret
Joly, Pascal
Kalinowski, Nancy
Keller, Bill
Kenagy, Randy
Land, Robert
Maruster, Rob
Melvin, Alicia
Moak, Lee
Mulder, Arlene
Murphy, William
Nadarski, Dominic
Narvid, Colonel Juan
Ovelmen, James
Perrone, Mike
Phoenix, Kathy
Rankin, Jim
Ray, Lynn
Rinaldi, Paul
Robbins, Michael
Roberts, Dennis
Rudinger, Melissa
Ryals, Lillian
Shepro, Steven
Spurio, Nazzareno
Surridge, David
Townsend, Brian
Treakle, Coletta
Van, Wayne
Wei, Victoria
Whitaker, Mike

Department of Transportation
Raytheon
Lockheed Martin Corporation
The Boeing Company
RTCA
RTCA, Inc.
Airbus
Federal Aviation Administration
ATAC Corporation
Raytheon
JetBlue Airways
JetBlue Airways
Air Line Pilots Association
Air Line Pilots Association
O'Hare Noise Compatibility Commission
International Air Transportation Association
Department of Transportation
DoD Policy Board on Federal Aviation
Department of Transportation
Professional Aviation Safety Specialists
Honeywell
Air Wisconsin
Federal Aviation Administration
National Air Traffic Controllers Association
Air Line Pilots Association
Federal Aviation Administration
Aircraft Owners and Pilots Association
The MITRE Corporation
U.S. Air Force
Federal Aviation Administration
US Airways
US Airways
Department of Transportation
Department of Transportation
Federal Aviation Administration

1 Committee members names appear in italics.
Welcome to the Meeting of the NextGen Advisory Committee

February 20, 2014
Honeywell Deer Valley
Phoenix, AZ

Welcome

NAC Chairman Bill Ayer
Chairman
Alaska Air Group
Introductions

Meeting
NextGen Advisory Committee
February 20, 2014
Phoenix, AZ

PUBLIC MEETING ANNOUNCEMENT
Read by: Designated Federal Official Michael Whitaker
NextGen Advisory Committee
February 20, 2014

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:

January 31, 2014

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.
Review and Approval of:

September 19, 2013 Meeting Summary

Chairman’s Report

NAC Chairman Bill Ayer
Chairman
Alaska Air Group
Industry Has Influenced NextGen

- 2007: JPDO: 2025 technology-driven “concept”
  - Defining “what is NextGen”
- 2009: RTCA TF5: 2010-2018; refocus on business case
  - Driven by input from airline finance organizations
  - Evolution not revolution
  - Delivers benefits from existing equipage
  - Builds confidence and momentum
  - Capabilities, not program – when and where needed most
  - Joint investments between industry and FAA
  - Successful implementation ensure US global leadership

The NAC is Here to Help

NAC is a Unique Public-Private Partnership forging a constructive path forward for NextGen
NAC Morning Agenda Topics

- NAC Chairman’s Report
- FAA Report
  - FAA/SESAR Presentation
- FAA Response to Recommendations
  - NextGen Prioritization
  - PBN Implementation
  - CatEx 2
  - Fuel Data Sharing for Measuring Performance

FAA Prioritization Task
Approved September 2013

- Response to FAA Request to understand industry priorities
- Review current FAA NextGen plans and activities
- Develop prioritized list of:
  - Tier 1 - what should continue no matter what (11)
  - Tier 2 - what should continue, resources permitting (8)
  - All Other (17 capabilities not ranked as priority)
- NAC delivered in under 2 months!
NextGen Prioritization Recommendation

- Setting priorities is always good business practice, but imperative in times of uncertain budgets
- Success breeds success; ROI required, dates matter
- If we set and deliver on commitments, confidence will build and business case will close
- Apply laser-like focus on Tier 1 capabilities and complete regardless of budget
- Give FAA the flexibility to move resources among projects to implement Tier 1 capabilities.

FAA Snap Shots Web Site

- http://www.faa.gov/nextgen/snapshots/
PBN Procedures

- Task: Recommend criteria for:
  - Prioritizing requests for new PBN procedures
  - Modifying or eliminating existing PBN procedures

- Recommendations
  - Revise FAA Order for Regional Airspace Procedures Teams
    - A standardized checklist to aid in quantifying projected benefits (i.e. objectives and goals for procedures)
    - Require any new procedure to have a demonstrated benefit (i.e. capacity, efficiency)
    - Include target completion date for procedures
  - Implement collaborative process involving all concerned parties
    - Collaboration should be done locally to account for airport configuration variances, aircraft equipage and controller procedures

Environmental – CatEx 2 Task Group

- Implement CATEX in FAA Modernization Act, 2012
- Unanimous recommendation from diverse group
- Fully vetted with Hill
- Sought voice of all stakeholders
- Devised creative “Net Noise Reduction Method”
- Measuring PBN noise impacts on a “per flight” basis

Community outreach essential to success!
Data Sources for Measuring Fuel Usage

Task:
• Identify data sources for fuel usage

Recommendations to FAA:
• Capitalize on operator willingness to share aircraft weight & fuel consumption data
• Collaborate with the aviation community to identify the finite data elements that create a solid baseline from which to project ongoing benefits (e.g., “calibrate and count”)
• Explore the use of this shared data to improve modeling capabilities and robustness

Afternoon Topics

- PBN Industry Barriers Recommendation
- NextGen Performance SnapShots – added report from the FAA
- Blueprint for PBN Implementation
  • New Tasking
  • Workshop Session
FAA DataComm Video

- Highlights benefits
- Perspectives from many stakeholders
- Tier 1 Priority
- Within our sights to achieve
- Maintain global leadership
- NAC ready to work with the FAA to achieve
- http://www.faa.gov/nextgen/snapshots/

DISCUSSION
FAA Senior Official Visit to Brussels
January 2014

Purpose:
- Assess current agreements, technical work, and engagement
- Promote collaboration in ATM modernization activities
- Encourage interoperable standards, technologies and capabilities

Discussions With:
- SESAR JU, EASA, Eurocontrol, European Commission and US Government Officials
- A6 Alliance: ANSPs from Spain, Germany, France, Italy, UK, and NORACON
- A4 Group of European Airlines
- Association of European Airlines

Remarks Delivered to European Aviation Club

Key Take Away Items

SESAR Deployment Manager to be Named
- New entity will be established in 2014 to manage and implement the SESAR Deployment Program
- Engagement with FAA on deployment strategies will be important

DataComm
- Agreement exists on how to reach a harmonized message set
- Also agreed to increase efforts on links and architecture
Current Agreement Structure

EU – US Memorandum of Cooperation
- MOC structure working well in support of global interoperability
- Closer senior-level involvement in management/oversight

High-Level Committee
- ANG-1 and ATO-1 now both members

Next Steps

Address Areas for Future Engagement
- Explore new demo opportunities
- Develop coordination plans for additional areas of cooperation

Continue Senior - Level Engagement
- Meetings at World ATM Congress & Beyond

Regular updates to the NAC, NextGen Management Board, etc.
In General

- NAC recommendations are extremely valuable to us
- NAC recommendations informed and influenced our budget formulation process
- Review helped us identify and/or clarify some systemic challenges
- As we are heading into the deployment phase in many areas, these priorities help sharpen our focus
- We have already begun to take action with inception of a Deployment Implementation Group (DIG)

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<th>Capability</th>
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<td>1-A</td>
<td>PBN /OAPM</td>
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<td>Wake Re-categorization &amp; Wake Separation</td>
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<td>CATM – Flight Planning Feedback</td>
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<td>CATM-CDM</td>
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<tr>
<td>1-B</td>
<td>Enroute PBN</td>
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Overview

What are we going to do differently?

- **Surface**
  - A Significant investment in surface management capability has been undertaken since TF5
    - **Shift**: efforts need to focus on increased usage of surface surveillance data and increased “two-way” information sharing with internal / external customers

- **Performance-Based Navigation (PBN)**
  - Tremendous base of PBN has been built
    - **Shift**: efforts need to move toward institutionalizing consistent use across the NAS as a foundational capability

- **Multiple Runway Operations**
  - Development work nearing completion;
    - **Shift**: focus needs to be on implementation where needed

We are focusing on delivering priorities in the near-term
Performance Based Navigation (PBN) Capability

- **Goal:** Increase airspace flexibility, efficiency and access through aircraft's ability to accurately fly within precise containment boundary

- **Past Environment**
  - Navigation relied on 1950's era ground based infrastructure and associated route structure that bottlenecked traffic

- **Future Environment**
  - Provide vertically optimized flight profiles to improve fuel efficiency
  - Allow deconflicted operations within dense or geographically constrained environments
  - Provide increased access to airports that previously needed airport infrastructure like ILS

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Performance-Based Navigation

- Over 10 years of dedicated effort resulting in many lessons learned

- We have significant industry input – and are using that input to evolve the way we are doing business and we will continue to collaborate

- We need to shift from a focus of adding large numbers of new procedures to a focus on improving use policies and the usability of procedures to deliver increased benefits

- Focus for the next one to three years:
  - Enhanced use policies and operational procedures for systems and decision support tools that are available today (TMA/TBFM)
  - Review, Revise, Remove Instrument Flight Procedures
  - National Route Plan and VOR Minimum Operating Network (MON)
  - OAPM1 completion by 2017
Surface Capability

• Goal: Increase schedule predictability and efficiency

• Past Environment
  - Focused on runway incursion prevention in tower cab
  - Lacked ability to monitor movement area or departure queue
  - Decision Support Tools did not have access nor leverage improved surface surveillance data
  - Lack of shared situational awareness resulted in poor collaborative decision making by both FAA and airlines

• Future Environment
  - Focus on both runway incursion and better surface management
  - Emphasis on “two-way” information sharing information about predicted and actual aircraft movement to better manage runway demand and queues
  - Feed time based information into FAA/Airline Decision Support Tools to improve schedule
Surface

- Surface Surveillance
- Data distribution to Users
- Data distribution within the FAA
- Two way information sharing to improve Surface Management

Evolutionary Changes

- ASDE-3 / AMASS
- ASDE-X / ASSC*

1985 - 2001

2000 - 2035

* Estimated Total Lifecycle Investment: $ 1.14B
Surface Surveillance
ASDE-X and ASSC Sites

- ASSC Waterfall
- San Francisco (SFO) November 2014
- Cleveland (CLE) FY2015
- Cincinnati (CVG) FY2016
- Kansas City International (MCI) FY2016
- Pittsburgh (PIT) FY2016
- Portland (PDX) FY2017
- Andrews Air Force Base (ADW) FY2017
- New Orleans (MSY) FY2017
- Anchorage (ANC) FY2017

44 Locations Total

SWIM Terminal Data Distribution by TRACON
As of February 12, 2014
### Current SWIM Consumers

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<tr>
<th>Type</th>
<th>Description</th>
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<td>WARP Enhanced WINS</td>
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</table>

### Terminal Flight Data Manager (TFDM)

- **Base Program:** Expect Contract Award Mid FY15 / Initial Operating Capability Mid FY18
- **Deploy Early Operational Capability to SCT, FY14**
Multiple Runway Operations Capability

• Goal: Provide relief from current separation standard constraints to improve capacity and throughput

• Past Environment
  - Depending on runway configuration additional separation added to safety
  - Wake separation standards largely unchanged since the 1990’s

• Future Environment
  - Allow concurrent operations to runways that are more closely spaced in geographically constrained airports and allow for increased capacity
  - Change wake separation standards to account for new aircraft types reducing separation margins
  - Provide decision support to ATC towers that notifies controllers when favorable wind conditions cold reduce spacing for departures

Multiple Runway Operations

• Closely Spaced Parallel Operations (CSPO)

• Wake Recategorization (Wake Recat)

• Wake Turbulence Mitigation – Approach (WTMA)

• Wake Turbulence Mitigation – Departure (WTMD)
**CSPO Independent Separation Standards**

- **SIPIA no HUR**
  - Notice Published: August 2013
  - Approval FY16
  - Candidate Airports: FLL, STL, MKE, ATL

- **SIPIA Triples no HUR**
  - Notice Published: August 2013
  - Approval FY16

- **SIPIA Offset no HUR**
  - Approval FY16

- **SIPIA with HUR**
  - Approval FY16

- **SIPIA Offset with HUR**
  - Approval FY16

**CSPO Dependent Separation Standards**

- **Dependent Approaches for CSPRs**
  - Notice Available: End of FY15
  - Candidate Airports: JFK, MSP, SEA, PDX

- **Dependent Approaches**
  - Approval FY17

- **Paired Approach Phase I & II**
  - Phase I Approval FY20
  - Phase II Approval FY23

**Notes:**
- SIPIA – Simultaneous Independent Parallel Instrument Approaches; HUR – High Update Rate radar (PRM) or surveillance (PRM-A)
NAC Recommendations
Performance-Based Navigation
Procedures Prioritization Criteria

Presented to: NextGen Advisory Committee
Presented by: Dennis E. Roberts, Director, AJV-1
Date: February 20, 2014

RNAV and RNP Implementation in the National Airspace System

- RNAV SIDs/STAR: 580+
- RNAV En route (T/Q/AR): 140+
- RNAV / RNP approaches: 4550+

Map showing the implementation of RNAV and RNP in the national airspace system.
Conventional Implementation in the National Airspace System

Conventional SIDs/STAR: 780+
Conventional approaches: 4110+

PHASE 1: PROPOSED INPUT
PHASE 1: BASELINE ANALYSIS REPORT
PHASE 2: CORE WG DEVELOPMENT
PHASE 3: OPERATION PREPARATION
PHASE 4/5: IMPLEMENTATION/POST-ANALYSIS

NAC Recommendations vs. PBN Order

Prerequisite Recommendations

1) What is the goal or aim of the procedure being proposed or amended?
2) What is the new policy to be used to measure success?
3) What are the implementation hurdles?
4) Will PBN training, recommended in the NAC at their June 2013 meeting, be accomplished?
5) Does the procedure require an EIS?
6) Was the procedure developed in a collaborative process with appropriate representation of navigation equipment suppliers?
7) Does the procedure have controller aids, such as similar fix names to other procedures, to promote application and usage?

Benefit/Access Recommendations

1) To what degree is capacity or efficiency increased?
2) Does it provide access or lower minima to a particular runway that did not have previous access?
3) How many operations are impacted by the procedure?
4) Does the procedure supply redundancy in case of a NAVAID outage?
5) Does the procedure reduce terminal or approach flight time?
6) Are conflicts between adjacent airports resolved?

NOTE: If these and other pre-requisites are not present, they are not disqualifiers but they certainly limit the success of implementation and thus should warrant a lower priority of implementation.
# NAC Recommendations vs. PBN Order

## PHASE 1: PROPOSENT INPUT

1) **What is the goal or aim of the procedure being proposed or amended?**

2) **Does it provide access or lower minima to a particular runway that did not have previous access?**

## PHASE 1: BASELINE ANALYSIS REPORT

## PHASE 2: CORE WG DEVELOPMENT

## PHASE 3: OPERATION PREPARATION

## PHASE 4/5: IMPLEMENTATION/POST-ANALYSIS

### Prerequisite Recommendations

1. What is the goal or aim of the procedure being proposed or amended?
2. What PBN Order will be used to measure success?
3. What is the implementation hurdle? Will PBN training, recommended in the NAC at their June 2013 meeting, be accomplished?
4. Does the procedure require an EIS?
5. Was the procedure developed in a collaborative process with appropriate representation of navigation equipment in simulator trials?
6. Does the procedure have controller aids, such as similar fixes names to other procedures, to promote application and usage?

**NOTE:** If these and other pre-requisites are not present, they are not disqualifiers but they certainly limit the success of implementation and thus should warrant a lower priority of implementation.

### Benefit/Access Recommendations

1. To what degree is capacity or efficiency increased?
2. How many operations are impacted by the procedure?
3. Does the procedure supply redundancy in case of a NAVAID outage?
4. Does the procedure reduce terminal or approach flight time?
5. Are conflicts between adjacent airports resolved?
NAC Recommendations vs. PBN Order

**PHASE 1: BASELINE ANALYSIS REPORT**

1) What is the goal or aim of the procedure being proposed or amended?
2) What PBN Order will be used to measure success?
3) What are the implementation hurdles?
4) Does the procedure require an EIS?

**PREREQUISITE**

**BENEFITS/ACCESS**

1) To what degree is capacity or efficiency increased?
2) Does the procedure supply redundancy in case of a NAVAID outage?

**PHASE 2: CORE WG DEVELOPMENT**

3) Will PBN training, recommended in the NAC at their June 2013 meeting, be accomplished?
4) Does the procedure require an EIS?
5) Was the procedure developed in a collaborative process with appropriate representation of navigation equipment in simulator trials?
6) Does the procedure have controller aids, such as similar fix names to other procedures, to promote application and usage?

**PHASE 3: OPERATION PREPARATION**

7) Are conflicts between adjacent airports resolved?

**PHASE 4/5: IMPLEMENTATION/POST-ANALYSIS**

**Benefit/Access Recommendations**

3) How many operations are impacted by the procedure?
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**NAC Recommendations vs. PBN Order**

**PHASE 1: PROPONENT INPUT**

1) What is the goal or aim of the procedure being proposed or amended?
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**PHASE 4/5: IMPLEMENTATION/POST-ANALYSIS**

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NAC Recommendations vs. PBN Order

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**NAC Recommendations vs. PBN Order**

**Prerequisite Recommendations**

4) Will PBN training, recommended in the NAC at their June 2013 meeting, be accomplished?

**Benefit/Access Recommendations**

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**PHASE 2: CORE WG DEVELOPMENT**

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**PHASE 3: OPERATION PREPARATION**

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**PHASE 4/5: IMPLEMENTATION/POST-ANALYSIS**
NAC Recommendations vs. PBN Order

**PHASE 3: OPERATION PREPARATION**

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PHASE 4/5: IMPLEMENTATION/POST-ANALYSIS

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Implementation of Categorical Exclusion in FAA Reauthorization, Section 213(c)(2)
February 20 2014

Presented by: Carl Burleson
Introduction

FAA Modernization and Reform Act of 2012 included two legislative Categorical Exclusions (Catex) to accelerate environmental reviews of NextGen procedures.

- Catex 1: FAA issued implementing guidance on Dec. 6, 2012.
- Catex 2: Technical noise challenges have hindered guidance.

FAA tasked the NAC for advice in Sept. 2012. The NAC provided a recommendation on June 4, 2013. FAA advised the NAC to expect a response at the Feb. 20, 2014 meeting.

Legislative Text of Catex 2

FAA Modernization and Reform Act of 2012

Sec. 213(c)(2): "(2) NEXTGEN Procedures. - Any navigation performance or other performance based navigation procedure developed, certified, published, or implemented that, in the determination of the Administrator would result in measurable reductions in fuel consumption, carbon dioxide emissions, and noise, on a per flight basis, as compared to aircraft operations that follow existing instrument flight rules procedures in the same airspace, shall be presumed to have no significant affect on the quality of the human environment and the Administrator shall issue and file a categorical exclusion for the new procedure."

Conference Committee Report text: “…to require the FAA to provide a categorical exclusion for RNP/RNAV procedures that would lead to a reduction in aircraft fuel consumption, emissions and noise on an average per flight basis…”
Issues with Catex 2 Statutory Provision

- Catex 2 offers limited expediting capability for PBN:
  - Applies only to PBN; not mix of PBN and existing procedures (i.e., not to projects like SeaTac Greener Skies)
  - 95+% of PBN already catexed, with Catex 2 filling small niche
- Catex 2 can override an EA or EIS based on unique approach to noise; community controversy may outweigh process streamlining benefits.
- No methodology to date enables FAA to quantify noise reduction on a per flight basis, or on an average per flight basis.
- Is the statutory noise reduction determination supportable when there are noise increases in communities as well as reductions?
- Does the statutory presumption of no significant impacts allow a determination of significance by FAA to override use of Catex 2?

NAC Recommendation: Net Noise Reduction Method

Simplified Summary: PBN procedures would measurably reduce noise under Catex 2 if people that would receive less noise outnumber people that would receive more noise (i.e., net noise benefit).

Additional step at FAA discretion: Following net benefit calculation, exercise option to rule out Catex 2 if a net increase in people at higher noise levels (DNL 65+ dB) would be a significant noise impact using FAA’s traditional significance threshold of DNL 1.5 dB or more.
Key Focus Areas of FAA’s Review of NAC Recommendation

- Consistency of technical methodology with statutory noise determination
- Whether net population reduction equals net noise reduction
- Extent to which a mix of noise increases and decreases supports a determination of noise reduction, esp. when reductions at lower noise levels outweigh increases at higher noise levels
- Whether and how FAA might exercise discretion to use/not use Catex 2 based on a significant impact test (issue raised by NAC Task Group)
- Adverse community reaction that could undermine expediting of PBN procedures (also concern of NAC Task Group)
- Extent to which a net noise methodology, as potentially adjusted with a significant impact test, comports with Congressional intent

FAA Response to NAC Recommendation (Informed by Congressional outreach)

- Seek public comment via F.R. notice on possible FAA implementation of Catex 2 using the Net Noise Reduction Method (60-day comment period is usual)
- Include Catex 2 in FAA’s NEPA order (Order 1050.1F), pending implementing guidance following FAA’s consideration of public comments
- Democratic and Republican Congressional staff noted Catex 2 issues, supported F.R. notice and comment, and raised prospect of amending the Catex 2 provision
Fuel Data Sharing Response
February 20 2014

Presented by: Nancy Kalinowski

Fuel Data Sharing

- NextGen Advisory Committee (NAC) recommended that FAA collect fuel burn data to measure NextGen performance
  - Recommended FAA capitalize on operator willingness to share aircraft weight and fuel consumption information on a per flight basis to generate metrics, improve fuel modeling performance, and gain additional operational insights
  - Approved at September 2013 meeting
  - Recommendation developed by RTCA Business Case and Performance Metrics Working Group
  - Section 214 of FAA’s authorization also requires FAA to report fuel burn
- FAA created cross-agency working group to create response to the recommendation
  - Composed of representatives from Environment and Energy (AEE), NextGen (ANG), and Air Traffic (ATO)
  - ATO is leading effort
Fuel Data Collection Status

- **A4A**
  - Met with A4A, including economics, flight operations, and environmental affairs groups
  - FAA is working through A4A for data collection from A4A members
    - A4A members are willing to work directly with FAA
    - Talks between A4A and its members are productive – no discussions yet with cargo members
    - Carriers may be willing to provide historical data, in addition to data going forward
    - Carriers would prefer to confine reported data to key city pairs
    - A4A preference is that activity run through end of calendar year 2015, and be treated as a pilot program
    - Data reporting potentially could start in Summer 2014

- **RAA**
  - RAA would consider participating in voluntary fuel data collection if:
    - Proprietary fuel data could be protected from FOIA and other public release (A4A concurs)
    - 100% of mainline carriers participated in fuel data collection
    - The administrative burden of fuel data collection could be minimized (A4A concurs)

- **DOT**
  - Met with Bureau of Transportation Statistics Office of Airline Information
    - Discuss how OAI could collect voluntarily reported data, and preserve confidentiality
    - Carriers are also considering reporting data directly to FAA

- **FAA**
  - Internal discussions on protecting data under FOIA exemption 4
    - Voluntarily reported data only FOIA-able if “customarily” released to public
  - Draft MOU submitted to AGC for review
Summary

• FAA is pursuing collecting data directly from carriers
  • Trade associations (in particular A4A) have provided significant assistance
• Data collection will support NextGen metrics and modeling needs, as well as FAA authorization metrics
  • Proposed data elements are designed to meet both needs, and are consistent with NAC recommendations
  • Data collection may begin in Summer 2014, and include historical data
• FAA is working to address carrier concerns about data confidentiality
  • Draft MOA submitted to FAA Chief Counsel’s office

Backup Slides
Fuel Data Sharing for Measuring NextGen Performance - Recommendations

Recommendation 1:

- FAA should capitalize on operator willingness to share aircraft weight and fuel consumption information on a per flight basis to generate metrics, improve fuel modeling performance, and gain additional operational insights supporting improved business case visibility for NextGen initiatives.
- To enhance the usefulness of this data, the NAC encourages the FAA to report back regularly on the progress being made in the area of fuel metrics and data collection.

Recommendation 2:

- Where specific NextGen implementations require more detailed operational data to discern impacts, FAA should;
  - Collaborate with the aviation community to identify the finite data elements that create a solid baseline from which to project ongoing benefits (e.g., “calibrate and count”).
  - As part of this effort, FAA should explore the use of this shared data to improve modeling capabilities and robustness.
Lunch

DISCUSSION
NAC Subcommittee Co-chairs:
Steve Dickson, Delta Air Lines
Melissa Rudinger, AOPA

Industry Barriers to PBN Utilization

Steve Dickson, Delta Air Lines

Operational Capabilities Work Group
Co-Chairs:
Bill Murphy, IATA
Tom Bock, PANYNJ
Approach and Methodology

- FAA Request: August 2013 Letter to Mr. Ayer: [ref OCWG June Report]:
  - “…what appears to be missing is an analysis of industry’s barriers to utilization.”

- OCWG reviewed June report:
  - Clarify industry barriers and actions
  - Added perspectives based on PBN experiences learned subsequent to the report

Approach and Methodology (cont)

- Key areas industry can work to improve PBN utilization:
  - Automation
  - Design
  - Training

- All recommendations based on Mid-Term Implementation timeframe (2018)
PBN Industry Barriers - Discussion Areas

- Define success criteria between stakeholders and communicate from beginning to ensure everyone is working toward same goal.
- Stress importance of the “goal” and benefit of the procedures to achieve success.
- “Sweet spot” between capacity and efficiency
- Most procedures need “technical revision” after experience flying the procedure in NAS
- Cost of developing test databases for simulator flying is expensive for most systems.
- Differences in minimums for similar procedures are not easily understood by many in the industry & FAA

Industry Barriers and Mitigation Automation

- Tech Pilots and planners need a shared view on how PBN procedures fit and operate in a system of TBFM.
- Need to collaborate with the FAA on investment decisions, timelines and priorities related to PBN initiatives.
- Industry will make SME’s available to facilitate this collaboration.
- Industry can partner with the FAA to develop test criteria and make aircraft available to be equipped with the latest TSS tools for testing in the NAS.
Industry Barriers and Mitigation
Design

- Not possible to “sim check” all new PBN procedures – this may increase the risk of poorly designed procedures.
- Sim Checks require the use of a navigational database. Navigational databases are not a “no cost” option to the operators and are difficult to obtain.
- Recent improvements in new flight evaluation tools have shown promise.
  - Industry can provide subject matter expertise to support updates and improvements to these tools and help with simulation, noting possible resource limitations.

Industry Barriers and Mitigation
Training

- Lack of consistent and comprehensive training is a barrier for both industry and FAA.
- Industry should use available resources to develop training materials for use in a variety of industry forums and where possible partner with the FAA for joint training.
- Train on the differences among RNAV approach procedures, minimums, aircraft capability required for VNAV, LNAV, LPV, etc. and local user community capabilities at an airport or in a Metroplex.
Recommendations

- The original [June] recommendations reflected efforts required by both FAA and Industry to work jointly to improve PBN utilization.
  - Efforts should continue to adopt all the recommended mitigation actions. **Priority should be placed in addressing the top five set of recommended mitigation actions.**

Recommendations (cont)

- Tech pilot participants and planners need a shared view on how PBN procedures fit and operate in a system of TBFM.
- Industry stresses need to collaborate with the FAA on investment decisions, timelines and priorities related to PBN initiatives. Industry will make SME’s available to facilitate this collaboration.
- Industry would like to play an active and constant role in the design of PBN procedures.
Recommendations (cont)

Industry and FAA should emphasize simplicity in design, with identical key segments/fixes on the procedures where allowable by criteria, and with transparency to the controller.

Industry to be given access to lessons learned, improved simulation capabilities and test databases. Industry can provide SME’s to support updates and improvements to flight evaluation and simulation capabilities (e.g. – TARGETS).

Recommendations (cont)

Industry and the FAA should incorporate system level modeling and analysis of PBN procedures as part of the design phase.

Industry should use available resources to develop training materials that can be used in a variety of industry forums and also in partnership with the FAA for joint training.

Training on the differences among RNAV approach procedures, minimums, aircraft capability, required for VNAV, LNAV, LPV, etc and local user community capabilities at an airport or in a Metroplex are a necessity.
Recommendations (cont)

- Subsequent to the tasking that prompted this report, the FAA has tasked the NAC to develop a Blueprint for ensuring successful PBN procedure implementations.

- The NAC recommends that the PBN Blueprint Task Group consider the recommendations of this report, previous NAC recommendations addressing PBN along with the work of the PARC to inform its deliberations and development of mitigation strategies for known barriers to PBN implementation.
NAC Action

Consider:

Recommendation for Industry Barriers to NextGen Utilization

and Transmit to FAA

Presented to
NextGen Advisory Council
February 5, 2014

Presented by
Victoria Wei
Director, NextGen Performance & Outreach
NPS Landing Page

1. Success Stories
2. NAS Wide Performance Metrics
3. Airport Metrics
4. Metroplex Metrics
5. City Pair Metrics

Success Stories

Latest Success Stories

Links to Stories by Portfolio

Previous Release Stories
(Grouped by Portfolio)
Airport Performance

Airport Background Information

Capacity/Efficiency Scorecard

Airport Diagram

NextGen Portfolio Icons

Metroplex Landing

Map of 21 Metroplexes (Each Links to Individual Page)
D.C. Metroplex Page

- Aerial Map
- Average Daily Metroplex Traffic (in graph layout)
- Average Daily Scheduled Flight Data (in table layout)
- Projected Annual Benefits

City Pair Performance

- Spring 2014 NPS Additions:
  - JFK – SFO
  - DFW – ATL
  - DFW – LAX
  - DFW - ORD

Metroplex Location List (D.C. Selected)
Please share any questions or feedback with us:

- Victoria Wei
  - victoria.wei@faa.gov
  - 202-385-7293

- Tony Diana
  - tony.diana@faa.gov
  - 202-385-7311
### NPS Metrics

#### as of January 10, 2014

<table>
<thead>
<tr>
<th>KPA</th>
<th>Metric</th>
<th>NAS</th>
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<td>Access</td>
<td>Percent of Qualified General Aviation Airports with LPV Access</td>
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<td>Access</td>
<td>LPV Access at General Aviation Airports without ILS</td>
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<tr>
<td>Efficiency</td>
<td>Taxi-in Time</td>
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<td>Efficiency</td>
<td>Average Number of Level-offs per flight</td>
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**Note:** All KPIs are based on fiscal year except the Environment KPA, which uses calendar year.
DISCUSSION

New Tasking
PBN Implementation: Blueprint for Success

Margaret Jenny, President
RTCA
PBN Blueprint Tasking from FAA

- Identify key stakeholders – welcome NAC member organization participation
- Describe needed outreach
- Describe outcomes and metrics for success
- Incorporate lessons learned from previous and current processes
- Develop methodology for capturing lessons learned in future efforts

Preparing for Task

- Gather background information
  - Task Force 5 Dashboard & background info
  - Previous NAC recommendations, e.g.:
    - Build on work of OCWG, BCPWG, and Cat Ex 2 TG
    - OCWG PBN Barriers Report
  - Lentini Report
  - Other…
PBN Blueprint Task Group

Co-Chairs selected:
- Jim Crites, DFW
- Brian Townsend, American Airlines/US Airways

Identifying TG Members
- Leverage expertise NACSC & Work Groups
- Augment with additional SMEs from FAA and industry

NAC Working Session on Outcomes & Metrics
- Provide as input to TF

First Meeting February 25th @ RTCA
Work toward June interim report

NAC Breakouts Task

What are most important performance outcomes expected from PBN implementation?

What should be the top 3 metrics for measuring performance improvements?

Share any insights into:
- How to collect performance data
- Challenges of measuring performance impacts of PBN
- Local vs. system-wide performance measures

Breakout development of responses 25 min
Report-outs 25 min
Discussion 20 min
REPORT OUTS

NAC High Level Metrics Suite
Approved by NAC Oct 2012

- Safety
- Efficiency
- Capacity
- Fuel Efficiency
- Cost-Effectiveness
- Access
FAA Snapshot Metrics

- **PBN:**
  - Number of procedures
  - % Usage
  - A/C Equipage

- **City-Pairs**
  - Gate-to-gate Time
  - G2G Time Predictability

- **NG – Airports**
  - Ave. Gate Arrival Delay
  - Ave. # Level-offs
  - Distance in Level Flight from TOD
  - Gate-to-Gate Time
  - Taxi-in / Taxi-out Time
  - Ave. Capacity Arrv/Dept)

- **Metroplex**
  - Fuel Savings
  - Carbon Savings

- **NAS-Wide**
  - Emissions
  - Noise Exposure
  - KVP Access at GA airports

---

**High Level Metrics**

<table>
<thead>
<tr>
<th>Performance Area</th>
<th>NextGen High-Level Outcome Metric</th>
<th>Where Measured</th>
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<tr>
<td>Flight Safety</td>
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<td>Key City Pairs</td>
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<td>Fuel Efficiency</td>
<td>Fuel Efficiency Normalized by Weight and Distance</td>
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<td>Metroplex Peak Allowable Throughput</td>
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<td>Metroplex Access</td>
<td>Metroplex Achieved Utilization</td>
<td>OAPM Metroplexes</td>
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DISCUSSION

Anticipated Issues for NAC consideration and action at the next meeting
Chairman’s Closing Comments
Meeting Wrap-up

NAC Chairman Bill Ayer
Chairman
Alaska Air Group

Other Business/Anticipated Issues for NAC
Consideration and Action

Bill Ayer
Chairman
Alaska Air Group
Next Meeting
June 3, 2014
Washington, DC

Adjourn
### NAC Agenda Topics

- **NAC Chairman’s Report**
- **FAA Report**
  - FAA/SESAR Presentation (Include update on DataComm)
- **FAA Responses to Previous Recommendations**
  - NextGen Prioritization
  - PBN Implementation
  - CatEx 2
  - Fuel Data Sharing for Measuring NextGen Performance
- **PBN Industry Barriers Recommendation**
- **NextGen Performance SnapShots**
- **Blueprint for PBN Implementation**
Meeting Summary, September 19, 2013

NextGen Advisory Committee (NAC)

The tenth meeting of the NextGen Advisory Committee (NAC) was held on September 19, 2013 at the Headquarters of RTCA, 1150 18th Street NW, Suite 910, Washington, DC. The meeting discussions are summarized below.

List of attachments:

- Attachment 1 - Attendees
- Attachment 2 - Presentations for the Attachment 3 - Approved June 4, 2013 Meeting Summary
- Attachment 4 – Approved revised NAC Terms of Reference
- Attachment 5 – NAC Chairman’s Report
- Attachment 6 - FAA Report from The Honorable Michael Whitaker, FAA Deputy Administrator
- Attachment 7 - Recommendation “Data Sources for Measuring NextGen Fuel Impact”
- Attachment 8 - Recommendation “NextGen Prioritization” Recommendation
- Attachment 9 - Recommendation “Prioritization of PBN Procedures”

Welcome and Introductions

NAC Chairman, Bill Ayer (Chairman of Alaska Air Group) called the meeting to order and welcomed the NAC members and others in attendance. All NAC members and attendees from the general public were asked to introduce themselves (attendees are identified in Attachment 1). Chairman Ayer recognized two new Committee members: Jeff Hamiel (Metropolitan Airports Commission) who oversees Minneapolis-St. Paul International Airport as well as several general aviation airports in the twin cities area, and Florian Guillermet (SESAR Joint Undertaking) who will serve in an interim capacity until a new Executive Director is in place.

Mr. Ayer expressed his appreciation to Craig Fuller (President and CEO of AOPA) for his service on the NAC as he departs AOPA. He also thanked FAA’s David Grizzle (Air Traffic Organization COO) for his service on the NAC as he is leaving the FAA later this year, along with Pam Whitley who represented the NextGen Office on the Committee during an interim time period. Mr. Whitaker then introduced...
Ed Bolton as the new Assistant Administrator for NextGen. Mr. Bolton will join the NAC following the meeting.

Mr. Ayer commented on the continued interest by Congress in the work of the NAC reflected by the pre-meeting visit and discussion with the Committee by The Honorable Frank A. LoBiondo, Chairman, House Subcommittee on Aviation, Transportation and Infrastructure Committee.

**Designated Federal Official Statement**

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

**Approval of June 4, 2013 Meeting Summary/Revised NAC Terms of Reference**

Chairman Ayer asked for consideration of the written Summary of the June 4, 2013 meeting. The Committee approved the Summary (Attachment 3) with no revisions or objections. He also asked for and received approval of an updated Terms of Reference for the Committee to reflect Mike Whitaker as the new Designated Federal Official (Attachment 4).

**Chairman’s Remarks**

In his remarks, Chairman Ayer (Attachment 5) reviewed the principle that NextGen is at a “tipping point” that he originally outlined at the June meeting. He emphasized that the aviation community must remain together and focused on overcoming challenges and building up the momentum to tackle the next set of challenges the industry will surely face. The NAC members are doing their part by remaining committed to the goal of implementing NextGen through the evolutionary, benefits-driven approach articulated by Task Force 5. The aviation community will continue to be called upon to resolve the barriers to achieving the much needed benefits of NextGen. Delivering operational capabilities using existing equipage will help accomplish two critical outcomes: (1) increase the confidence in our collective ability to implement a program as complex as NextGen; and (2) set the stage for the future investments in more sophisticated NextGen capabilities.

He noted that critical to getting over the tipping point is setting priorities for NextGen investments. He stressed that the Prioritization recommendation represents a “landmark moment” in the life of the Committee and expressed his appreciation for the willingness of the aviation community to participate in this effort over the last two months and how critical that participation is to the success of NextGen.

The Chairman reviewed the key principles that are outlined in the prioritization section on the meeting summary.
He concluded by complimenting the Committee in identifying top priorities for NextGen and highlighting some important principles that, if followed, will greatly enhance our collective ability to turn the corner on NextGen.

In comments from Committee members about the Chairman’s Report, one of the members pointed out that in his aircraft flying experiences, the National Airspace System (NAS) is running smoother. The Committee referenced that general aviation has also received benefits of new procedures.

**FAA Report**

Mr. Whitaker presented the FAA report (Attachment 6), highlighting the uncertainty about the Agency’s budget and the potentially damaging cuts imposed by the sequester. He thanked everyone for working on the prioritization task that provides the FAA with valuable input in the current budget environment.

Mr. Whitaker explained the CatEx 2 recommendation is still under review and the FAA will respond in February. He also reviewed the current state of DataComm expressing that the FAA reached a common understanding for convergence on ATN Baseline 2 and that trials are underway on departure clearances at Memphis and Newark.

**Metrics and Obstacles to PBN Utilization** - Mr. Grizzle then provided an update on the FAA metrics website ([http://www.faa.gov/about/plans_reports/operational_metrics/](http://www.faa.gov/about/plans_reports/operational_metrics/)), highlighting the PBN dashboard that includes outcomes from the Metroplex initiatives. He also provided the FAA’s response to the Committee’s recommendations on the PBN Obstacles to Utilization, this included Automation, Design, Environmental, Regulation and Training Mitigation Actions. During his briefing, Mr. Grizzle volunteered that the FAA would provide an overview for the NAC Subcommittee on what the FAA is doing in PBN simulation, agreeing with the NAC recommendation that procedure design must include what the aircraft Flight Management Systems (FMS) routinely fly.

He concluded his remarks by noting that the PBN recommendations primarily identified FAA mitigations and the Agency is requesting additional response from the Committee on industry mitigation actions.

A committee member emphasized that the training component is vital – both at the FAA and training organizations for aircraft operators. Building understanding will enhance confidence and contribute to future use. Several Committee members commented on Time Based Flow Management (TBFM); one raising a concern about the length of time (5 years) it takes to implement and another that interim phases for TBFM help build confidence. This section concluded with a Community Representative explaining that better technology is making communities quieter.
DataComm - Mr. Bruce DeCleene of FAA’s Aviation Safety organization (AVS) provided the organization’s response to the February 2012 NAC approved DataComm Roadmap.

FAA Responses to the NAC-Recommended Roadmap (Summary of Presentation)

- **FANS-1/A** - FAA has re-evaluated requirement for latency timer and determined that FANS-1/A satisfies the requirements
- **ATS ACARS** - Will continue to support initial departure clearance, but does not meet system requirements for revised departure clearance (aircraft and ground requirements).
- **ATN Baseline 1** - ATN development in the near term is not affordable and ATN development in mid-term will be prioritized for new capabilities of ATN B2. FAA will not deploy ATN B1.
- **VDL mode 0 for Tower Services** - VDL mode 0 can be supported for tower services.
- **FMS Autoload Capabilities** -
  1. Push-to-load capability will be required for FANS-1/A(+) and ATNB2
  2. Existing FANS aircraft provide this capability and we want to maximize benefits
  3. ATN Baseline 2 requires integration for complex dynamic clearances and for downlink of intended flight path
  4. Additional automation/controller complexity to manage differing levels of capability cannot be justified
- **Mixed Capabilities and Equipage** -
  1. Mixed data communications are planned using FANS-1/A(+) and ATNB2
  2. Continue to provide voice services
- **Achieving Harmonization** –
  1. **US/EU Agreement on ATN B2 convergence**
     - Final ATN B2 will be backward compatible to Initial ATN B2 ground systems
     - European planning for Initial ATN B2 in 2018; no intention to mandate or impose penalty
     - Any mandates with regard to ATN B2 will be predicated on the final standards
  2. Trials and incremental deployments are part of the program plan

The FAA is also planning additional ATN Baseline 2 capabilities, and requesting that RTCA develop the standards for these capabilities.

- **4D Trajectory Operations**
  1. Uplink clearances with location, altitudes, speeds, or a required time of arrival
     - Include RNP value associated with the route, ability to define curved path
     - Include uplink of current winds to improve time of arrival control
  2. Downlink intended flight path for enhancements to flow management
- **ADS-B-based Advanced Interval Management**
  1. Uplink clearance to follow, merge or cross another aircraft
     - Include flight path of other aircraft to improve estimate of crossing times
     - Include uplink of current winds to improve time of arrival control
At the completion of Mr. DeCleene’s briefing, one Committee member endorsed the need for a common understanding with the European community. Several others questioned whether the common understanding between the FAA and the SJU had been fully vetted with all stakeholders and expressed concern that the use of an interim ATN B2 performance standard that will not be invoked by the US (FAA) will result in two standards – one for the US and another for Europe. Mr. DeCleene responded that these will ultimately be harmonized with the final ATN B2 that incorporates additional functionalities in the beyond 2025 timeframe. The Committee member cautioned that there could be a harmonization problem and still needs to be resolved. Another stated that the agreement was a first step towards harmonization, but there is a need to reconcile the issue of certification against an interim US standard.

Mr. Whitaker thanked Mr. DeCleene and Mr. Grizzle for their presentations.

**Fuel Data Sharing for Measuring NextGen Performance**

Chairman Ayer formally acknowledged the contribution of the Co-Chairs of the NAC Subcommittee (NACSC) -- Steve Dickson (Delta Air Lines) and Melissa Rudinger (AOPA) for the work of the NACSC in developing recommendations. Ms. Rudinger subsequently introduced Ed Lohr (Delta Air Lines) and Debby Kirkman (The MITRE Corporation), the Co-Chairs of the Business Case and Performance Metrics Work Group (BCPMWG), to provide an overview of the recommendation designed to identify and obtain fuel use data to measure NextGen implementation in specific areas. This approach was developed by the BCPMWG over the course of the last year during which they researched numerous approaches to measuring fuel usage, recognizing that many factors can influence fuel consumption.

Mr. Lohr outlined the specific elements of the recommendation.

The FAA should:

- Capitalize on operator willingness to share aircraft weight & fuel consumption data
- Collaborate with the aviation community to identify the finite data elements that create a solid baseline from which to project ongoing benefits (e.g., “calibrate and count”)
- Explore the use of this shared data to complement and enhance modeling capabilities and robustness

Following the presentation, a committee member commented that, in addition to the fuel savings from the new procedures, an associated benefit is reducing the amount of fuel needed for each flight thereby saving weight that directly impacts fuel use. In response to a question from Chairman Ayer, an FAA official stated that the suggested mechanism is promising and the FAA will evaluate how to incorporate the specific data into its metrics.
Committee Action: The Committee agreed by consensus to approve the recommendation, Data Sources for Measuring NextGen Fuel Impact (Attachment 7) for submission to the FAA.

NextGen Prioritization

Chairman Ayer, Margaret Jenny (President of RTCA) and Ms. Rudinger reviewed the process the NAC used to develop a prioritized list of NextGen Capabilities. Drawing heavily on the expertise of the members of the NACSC and NAC WGs, they employed an analytic, transparent process resulting in a comprehensive set of Tier 1 and Tier 2 priorities for NextGen investments that are intended to help shape the future of NextGen and ensure its long term viability. These were based on a list of 36 aggregated capabilities derived from the FAA’s 2013 NextGen Implementation Plan (NGIP) and the NextGen Segment Implementation Plan (NSIP).

The Committee’s NextGen Prioritization report identified eleven Tier 1 interdependent capabilities that should continue regardless of budget constraints. They also noted that these capabilities are consistent with previous NAC recommendations and the Task Force 5 final report (issued 2009), even though a different process was used. Another eight Tier 2 capabilities were deemed to be of medium benefit and high readiness with the Committee recommending strongly that these stay on track, budget permitting. The report also lists the remaining 17 capabilities that were not ranked in the top two tiers.

Chairman Ayer emphasized principles recommended by the NAC that should guide the FAA’s implementation of NextGen:

- Setting priorities is always good business practice, but is imperative in times of declining and uncertain budgets.
- Success breeds success and dates matter affecting the business case, industry investments and increasing confidence.
  - If we can jointly set and deliver on commitments, the business case will then close for the next set of capabilities.
- All eleven capabilities included in Tier 1 are equally important and implementing the full set is essential to maintaining the consensus of the NAC.
- Apply laser-like focus on a manageable set of capabilities that will deliver tangible benefits and are well down the implementation path (Tier 1A).
- Accelerate a manageable set of capabilities that will deliver tangible benefits but are not currently ready to implement (Tier 1B).
- FAA needs to be given the flexibility to move funds and resources among projects as necessary to implement Tier 1 capabilities.

Following the briefing, a Committee member asked if the costs of the program (capabilities) were evaluated or measured. Ms. Jenny responded that while the Committee did not have cost data
available, the assumption is that the FAA would have sufficient financial resources to pay for Tier 1 capabilities under any likely budget scenario. In addition, the Committee members are willing to conduct a review based on cost data if requested to do so by the FAA.

Mr. Whitaker commented that the Tasking wasn’t a budget exercise, but rather, an opportunity to obtain valuable input from the industry. He is pleased with the result, it was the right thing to do and the FAA will ask for further information, a deeper dive and ideas for improvements and accelerating in the identified areas.

In response to a question from an FAA Committee member about separating Tier 1 capabilities (i.e. funding Tier 1A and 1B at different rates), Chairman Ayer responded that they were all a high priority and should all be funded. Another Committee member emphasized that the FAA should invest in all the near term Tier 1 capabilities. A NACSC Member from an air traffic automation provider involved in developing the recommendation, stated that the industry came together to develop a good list recognizing that the committee did not have the capability to conduct a cost analysis.

Another FAA Committee member welcomed the opportunity for future follow-up with a representative group from the Committee/NACSC to develop a deeper understanding of the recommendation. A Committee member also commented that the traceability of the capabilities into the FAA planning documents should help in this process.

The final remark came from Mr. Whitaker who commented that perhaps the cost/benefit could be applied only to the Tier 1 capabilities.

Committee Action: The Committee agreed by consensus to approve the recommendation for NextGen Prioritization (Attachment 8) for submission to the FAA.

Featured Performance Based Navigation (PBN) Implementation Location -- Phoenix, AZ and Washington, DC

Brian Townsend (Tech Pilot for US Airways) and Dennis Roberts (FAA Director, Airspace Services) briefed the Committee about PBN procedures in Phoenix and the Washington DC area and the benefits that these are enabling. Mr. Townsend emphasized the teamwork and commitment by the pilots, air traffic controllers and the FAA necessary to implement these procedures. The procedures are reducing emissions and saving approximately 300 lbs of jet fuel per flight.

He also explained the development of the Flight Path Angle solution for use by regional jet aircraft that enables them to fly the procedures even though the aircraft are not fully equipped. This solution
illustrates the benefit of industry-government partnerships to develop creative approaches to implementing NextGen in a mixed equipage environment.

Mr. Roberts commented that the FAA is using the outcomes (i.e. successes and lessons learned) from the Phoenix and Washington DC implementation of PBN procedures for application in other Metroplex areas. Chairman Ayer observed that he is impressed by the Tech Pilots monthly calls to share their experiences and build on the lessons learned by the industry. A committee member highlighted the importance of celebrating successes of PBN implementation and specifically mentioned that the Committee consider discussing Denver at a future meeting.

Ms. Rudinger then commented that the previous discussion of PBN procedures was a good example of the issues being addressed in the next two areas for NAC consideration on PBN Procedures and Metroplex optimization. She then introduced Tom Bock from the Port Authority of New York and New Jersey and Bill Murphy of the International Air Transport Association (IATA), the co-chairs for the Operational Capabilities Work Group (OCWG) that developed the PBN and Metroplex recommendations.

Prioritization of Performance Based Navigation (PBN) Procedures

Mr. Bock and Murphy outlined the recommendation developed in response to the FAA’s request for determining prioritization of new, or the revision or elimination of existing, Performance Based Navigation (PBN) procedures. The core of the recommendation is revising the FAA’s Order for Regional Airspace Procedures Teams to include a standardized checklist to aid in quantifying projected benefits (i.e. objectives and goals) for procedures. These would include opportunities for collaboration with aircraft operators, airport officials and controllers.

Mr. Ayer raised a comment received from a Committee member who was unable to attend the meeting that the outlined process include target completion dates as part of the procedures checklist. Mr. Bock and Murphy replied that including this would be consistent with the discussion by the OCWG during development of the recommendation.

Committee Action: The Committee agreed by consensus to approve the Recommendation for Prioritization for Performance Based Navigation (PBN) Procedures (Attachment 9) for submission to the FAA with additional wording related to targeted completion dates.

Future Use of Optimization of Airspace and Procedures in the Metroplex (OAPM) Criteria

Mr. Bock and Murphy outlined a recommendation that builds on the current FAA-aviation industry efforts to maximize procedures in Metroplex areas. This would expand the next round of Metroplex work to include surface and Time Based Flow Management (TBFM) improvements and other
NextGen capabilities. Mr. Bock remarked that the recommendation is consistent with many of the top priorities identified in the NextGen Prioritization recommendations.

Committee Action: The Committee agreed by consensus to approve the recommendation for Future Metroplex Optimization (Attachment 9) for submission to the FAA.

Chairman Closing
In his concluding remarks, Chairman Ayer made following observations:

- Regardless of financial circumstances prioritization of NextGen capabilities is important.
- All 11 of the Tier 1 capabilities are necessary to deliver near term benefits and because these are integrated they should not be separated.
- NextGen near-term capabilities represent the best investments of FAA and industry resources, and successful deployment will instill confidence in the NextGen program.
- Collaboration of Brian Townsend (US Airways) and Dennis Roberts (FAA) is a good illustration of the industry and the FAA working in partnership.
- It is important to communicate and share the experiences and lessons learned in implementing PBN procedures in other locations.
- The Fuel Burn metric is a good addition to the FAA’s portfolio and will support the messaging and outreach in the education process of the benefits of NextGen.

Mr. Whitaker thanked NAC members and members of the NACSC and work groups for all of their work in developing recommendations. He commented that he views the prioritization as more than simply a budgetary exercise, but a process of receiving important stakeholder input and he felt it has provided, “good feedback.”

Mr. Bolton commented that consensus is important and a powerful action.

A committee member from the European community remarked that the focus on implementation is good and there is typically close working together between the US and Europe but that the new approach on DataComm is a concern. Related to this, a request was made for the NAC to receive a briefing on the alignment of SESAR and NextGen.

Other business
None was offered.

Adjourn
Chairman Ayer ended the meeting of the Committee at 2:50 p.m.

Next Meeting
The next meeting of the NAC is February 20, 2014, in Phoenix, AZ.
This is the eleventh meeting of the NAC, since its inception in 2010. It has been five months since we last met and I am enthusiastic about the opportunity we have to hear back from the FAA on a number of previous recommendations. Before doing so, I wanted to reflect on some of the founding principles of this Committee that the FAA sought when it requested RTCA to form the NAC and quickly review today’s agenda.

For a good part of the early 2000’s, the focus was on the "what" of NextGen – defining the vision and the long term concepts. There remains much about the promise of the long-term concept that needs to be validated.

But, starting with Task Force 5 in 2009, the aviation community came together and emphasized several key drivers defining the “how” for a successful NextGen program:

- It is an evolution, not a revolution
- It begins by delivering benefits from existing equipage and capabilities
- It builds confidence and momentum
- It delivers capabilities, not programs, when and where they are most needed
- It is a joint undertaking requiring investment on the part of the FAA and the industry
- Implemented successfully, it will ensure US continued global leadership in air transportation

The NAC took up the mantle of NextGen implementation through an evolutionary, benefits-driven approach.
The May 2010 letter from former NAC member David Grizzle, who was Acting Deputy Administrator at the time, stated that, “the role is to advise the FAA as we continue to foster a shared vision of NextGen in the domestic and global arenas.” This included the purpose, “to develop a common understanding of NextGen priorities in the context of overall NextGen capabilities and implementation constraints.” The prioritization that we completed last September was very much a part of the original vision of the NAC.

This Committee, the NAC Subcommittee and the associated Work and Task Groups have done a tremendous job responding to this vision, including the need for industry participation in implementing NextGen. I thank the hundreds of volunteers who continue to offer their time and expertise to work on these issues.

NAC Committed to help the FAA slide

The NAC continues to move from a focus on "What" to focus on “How."

"How" requires leadership from the FAA and industry and a commitment to achieving jointly agreed to deadlines at specific locations.

Members of the NAC are here because NextGen matters to us. Air transportation drives the economy. A robust air transportation system depends on a modern air traffic management system. Our organizations have and will continue to commit significant resources to ensuring a timely and continued modernization of the National Airspace System (NAS).

The NAC is here to help the FAA achieve the promise of NextGen, and the conversation that Margaret, Andy and I have with the FAA often begins by asking how we can be most helpful in the implementation of NAC recommendations.

NAC Morning Agenda Topics slide

As you can see, the morning agenda contains FAA responses to prior recommendations and hopefully provides a clear path for implementation, as well as the means to evaluate the quality of the implementation.
Today’s meeting reflects the consensus based process to bring the aviation community together.
Previous NAC Recommendations

FAA Prioritization Task slide

Prioritization of NextGen Capabilities

I want to reemphasize a principle from the September meeting that the NAC strives to be a supportive and positive force in the implementation of NextGen. The response to the FAA’s Tasking on Prioritization is illustrative of the partnership necessary to make NextGen a reality.

The Committee’s NextGen Prioritization report developed in response to the FAA’s request and based on a review of FAA’s plans, identified eleven Tier 1 interdependent capabilities with high benefit that should continue with a targeted focus, regardless of current or future budget constraints. Another eight Tier 2 capabilities were deemed to be of medium benefit and high readiness with the Committee recommending strongly that these stay on track, budget permitting. The report also lists the remaining 17 capabilities that were not ranked in the top two tiers.

NextGen Prioritization Recommendation Slide

Reviewing the overall principles from our recommendation:

- Setting priorities is always good business practice, but is imperative in times of uncertain budgets
- Success breeds success; ROI required, dates matter
- If we set and deliver on commitments, confidence will build and business case will close
- Apply laser-like focus on Tier 1 capabilities and complete regardless of budget
- Give FAA the flexibility to move resources among projects to implement Tier 1 capabilities

Many of the Tier 1 operational capabilities leverage existing equipage and will help accomplish two critical outcomes: (1) increase the confidence in our collective ability to implement a
program as complex as NextGen; and (2) set the stage for the future investments in more sophisticated NextGen capabilities.

I look forward to hearing from Mike and Ed and the FAA team on how these priorities affect timing, integration and the overall investments in capabilities.

The NAC is in a unique position of providing a single voice of consensus among all the key organizations who have a stake in the performance of the air transportation system. We are intent on ensuring a continuing constructive partnership with the FAA. To achieve success in any endeavor, it is imperative to set bold, yet reasonable targets, and not falter in achieving those targets.

NextGen snapshots slide

I am encouraged by the FAA’s latest move to publish on their website up-to-date performance snapshots and metrics related to deployments of early NextGen capabilities. I want to talk more about this at the end.

PBN Prioritization

Dennis Roberts from the FAA will outline the response to our recommendation from September for establishing new procedures, or revising or eliminating them. It would assist the FAA by providing industry perspective on how the Agency manages its resources to efficiently provide PBN procedures. The core of the recommendation is revising the FAA’s Order for Regional Airspace Procedures Teams to include a standardized checklist to assess the benefits (i.e. objectives and goals) and develop target completion dates for procedures. The new process would ensure collaboration with aircraft operators, airport officials and controllers.

Cat Ex 2
You may recall that last June we approved a recommendation for implementing Congressional authority for Categorical Exclusions under the National Environmental Policy Act requirements (CatEx2) contained in the FAA Reauthorization bill.

The FAA requested that the NAC explore how to implement the section of the law that requires measuring environmental impacts on a per flight basis. While the legislative authority is designed to foster the implementation of RNP, it presents challenges for identifying measurable reductions in fuel consumption, carbon dioxide emissions and most significantly, noise on a per-flight basis.

Our recommendation was for the FAA to implement a system for noise analysis titled the “Net Noise Reduction Method,” as the means to meet the per-flight basis requirement. There is also an emphasis that a proactive community communication effort is very important to community acceptance of new procedures.

Carl Burleson will explain the FAA’s plans on this issue.

**Fuel Data Sources**

**Fuel Data Sources slide**

Culminating over a year’s worth of analysis and discussion, in September we approved a recommendation for an effective method for obtaining fuel use data to measure NextGen implementation in specific areas. The Committee had specially encouraged the FAA to capitalize on operator willingness to share aircraft weight & fuel consumption data; collaborate with the aviation community to identify the finite data elements that create a solid baseline from which to project ongoing benefits (e.g., “calibrate and count”) and explore the use of this shared data to complement and enhance modeling capabilities.
As we have all recognized, having metrics that effectively analyze the impact of NextGen implementation is vital. The FAA has specifically requested our assistance in this area and I look forward to hearing their briefing on action underway.

**Afternoon Topics Slide**

**Industry Barriers to PBN Utilization**

Following lunch, we will consider a new NAC recommendation that identifies industry barriers to implementing PBN. This is a follow up to the NAC’s previous report that focused on FAA barriers. This underscores the required partnership between the FAA and aircraft operators – we both have implementation barriers to overcome.

**NextGen Snapshots**

Late last year Margaret and I participated in the Airlines For America (A4A) Board meeting U.S. airline CEOs. This provided the opportunity to share many of the consensus recommendations that we have made to the FAA. In our discussions the CEOs made it very clear that achieving near term measurable outcomes is required for the investments in NextGen they have already made. Any follow-on investment in equipage will be contingent on delivering on current investments. They made a point of the need for clear performance metrics to monitor progress.

We added to today’s agenda a briefing on their “NextGen Performance Snapshots” webpage.

**Blueprint for PBN**

We will then review the FAA’s new Tasking on the Blueprint for PBN Implementation. The Committee asked for this Tasking to capture lessons learned from prior PBN implementations and to develop a blueprint or checklist for future ones.

This will be followed by a breakout discussion to provide a perspective for the PBN Blueprint Task Group. We will divide into small groups to address the following questions:
• What are the most important performance outcomes expected from PBN implementation?
• What should be the top three metrics for measuring performance improvements?

Conclusion

The FAA has asked RTCA (through the Air Traffic Management Advisory Committee, Task Force 5 and the NAC) to help it refine the definition and plans for NextGen. The FAA has listened to and acted upon our input. We remain committed to working in partnership with the FAA to achieve the goals we have worked together to set and importantly to continue the move from the “what” to the “how.”

Before we open it up for discussion.

FAA Data Comm Video slide

While perusing the FAA’s website, I also came across an excellent video on DataComm, one of the NAC’s Tier 1 capabilities. Not only does the video explain the capability in layman’s terms, it also highlights the benefits that will accrue to operators and controllers once it is fully deployed.

Play video

Here is a proposal why don’t we select the DataComm capability (Tier 1) so straightforwardly characterized in the video, and work jointly to establish a plan with clearly defined milestones and dates, and strive to achieve those milestones through to a nation-wide deployment. Such a deployment of the DataComm capability would increase confidence in NextGen, enhance US global leadership, and provide much needed benefits to the FAA, operators and industry.

I’ll open up for discussion.

Discussion slide
Introduction

• It’s great to see all of you again. Thanks to our host Honeywell Aerospace.

• Lot has happened since we last met – I have a feeling I will be saying that at each NAC meeting from now on!

• I want to cover a few topics today
  o the budget situation;
  o the NAC prioritization recommendations;
  o an update on some major NextGen programs;
  o Administrator Huerta announced his strategic initiatives for the FAA for the next four years;
  o and my meeting with some of our European counterparts last month.
Budget

In October we had a 16-day government shutdown. This of course caused the suspension of many NextGen activities. But beyond the actual 16 days of delay, we do not anticipate any knock-on delays to the NextGen programs.

Congress then passed a compromise spending bill in December that provides a framework that lends stability for the next two years. This compromise has still left us at historically low funding levels. We are in an extremely tight fiscal environment, though we anticipate we will have adequate funding to remain on track with NextGen and provide focus to the priorities identified by the NAC – as we will be discussing today. But we are still in a situation where we need to find ways to operate more efficiently.

Two years from now, it will be time to reauthorize the FAA again. We are beginning to look at what changes we want to allow us to operate more efficiently.

We rely upon Congress for a substantial portion of our budget and that is a fundamental challenge. With that reliance, we are subject to politics and gridlock, which is
especially challenging when trying to run a complex endeavor like NextGen. Providing air traffic service is a fundamental and important job for our economy, and modernizing our system is a critical investment for our future. We can best do both with stable funding so that we can predictably plan and build our nation’s infrastructure.

**NAC Prioritization**

Since our last meeting we continue to engage with the NAC subcommittee on the NextGen priorities. I want to again thank everyone who worked on the recent NextGen prioritization task. I know it was very challenging, and a lot of work and thought went into that project in a very short time frame. Going through the entire NextGen Implementation Plan, and giving recommendations for what work we should prioritize is not easy, but it’s very useful. We want and need industry feedback. Coming from a career in the airline industry, I understand that we need to align our efforts to obtain the maximum benefit, so thank you again.
Today we’ll hear from Ed Bolton and Paul Fontaine with more details on the FAA’s response to this prioritization work. Also:

- Dennis Roberts will share our response on PBN priorities.
- Carl Burleson will share our response on categorical exclusions.
- And Nancy Kalinowski will share with you our fuel data sharing response and plans going forward.

**Update on Major NextGen Programs**

I am also pleased to report that we continue to make substantial progress on key NextGen foundational programs – including ERAM and ADS-B. As Bill as said in the past, we are reaching a tipping point with many NextGen programs, and we are starting to see the final stages of some key initiatives.

Right now, 18 of our 20 en route centers have started running ERAM. More than half are using it exclusively to control air traffic, instead of the legacy system of the
1960s. All 20 en route centers are expected to be running ERAM exclusively by March of 2015, which will allow us to pull down the legacy host system.

As for ADS-B, we have installed nearly 90 percent of the ground transceivers needed to track airplanes using satellite-based information. As you know, ADS-B will transmit aircraft location to controllers with a dramatically faster update than radar. It provides surveillance where radar cannot, such as in mountainous regions and over water. All of this enhances safety and saves operators time, fuel and money. We’ll complete the nationwide deployment of the ground transceivers this year.

Also, this year we plan to make some important investment decisions on the next stages of DataComm, SWIM and NAS Voice System. We are on track to validate the business case and make a final investment decision, which means that the FAA will plan to roll out the next phases of these technologies and use them in our everyday work.

For SWIM, we’re planning to go from sharing limited surface and weather data information to providing full
flight data publication services. For NVS, we’re going from the demonstration phase to full production of dynamically reconfigurable voice services, with the new internet protocol voice system for air traffic. For DataComm, we’re going to the second phase, from tower departure clearances to using DataComm for en route services.

We have a lot to look forward to in 2014.

**Strategic Initiatives**

Yesterday, Administrator Huerta announced four strategic initiatives for his tenure. These are the areas where we can make the most impact and will focus our efforts in the next few years to shape the FAA and aviation for years to come. These are:

- Deliver benefits through technology and infrastructure
- Make aviation safer and smarter
- Enhance FAA’s global leadership
- Empower and innovate with FAA’s people
This first initiative – what we call the NAS initiative – is one that I am leading. It involves three areas of work. First is delivering the benefits of NextGen. This involves keeping NextGen on schedule and on budget, but also encompasses the delivery of benefits to users – the work that the NAC has been engaged in with us.

The NAS initiative also focuses on the integration of new users into the NAS – specifically UAS and Commercial Space flight. Both of these growing technologies present technological and process challenges for us.

The NAS initiative also acknowledges that we remain in a constrained budget environment, so we’re taking a serious look at the services that the FAA provides. We will look at streamlining and becoming more efficient.

We need to match the services we provide and the facilities we maintain with the demand from our stakeholders—an effort that we are calling right-sizing the NAS.

Right now, there is a mismatch. The aviation industry as a whole is going to have to have a thoughtful
conversation about what it makes sense for the FAA to continue doing, and what we might be able to stop doing, or do differently.

We have traditionally provided a variety of services to our airspace users in addition to air traffic control. We are increasingly being asked to do more with less.

Our industry has many segments and interest areas. Each segment promotes the parts of the system that are most important to its constituency, of course. But what we have seen with the sequester, and what we have seen with the government shutdown, is that we need to have a comprehensive view of our priorities. And that conversation needs to involve all of us. We must come together to decide what kind of system we want and need. The NAS initiative is an important one and I look forward to working with all of you on this.

That is a summary of the NAS initiative.

Our second initiative builds on safety management principles to proactively address emerging safety risk. We want to make smarter, system-level, risk-based decisions.
This initiative is being led by our Associate Administrator for Aviation Safety, Peggy Gilligan.

Third, it’s important for the FAA to play a leadership role globally. We want to improve safety, air traffic efficiency, and environmental sustainability across the globe. We’ll do this through shaping global standards and enhancing collaboration and harmonization. This initiative is being led by our Acting Assistant Administrator for Policy, International Affairs and Environment, Carl Burleson.

And finally, we need to prepare for the future by improving how we recruit and train our workforce. We need the leadership, technical, and functional skills to ensure the U.S. has the world’s safest and most productive aviation sector. This initiative is being led by our Assistant Administrator for Human Resource Management, Carrolyn Bostick.

These are the areas where we feel we can make the greatest contributions in the next four years, and where we can best serve the public and improve our nation’s airspace.
Finally, and speaking of the global leadership initiative, I’d like to say a little about meetings we had with our European counterparts last month. *(January 21-24, 2014)*

Ed Bolton and I met with our government counterparts and industry representatives in Brussels to get a sense of where we are in our cooperative efforts with SESAR, Europe’s modernization program. We were pleased to see that many of our joint modernization programs are working well under the existing agreement between the FAA and Europe. We also discussed areas where we can conduct further cooperative efforts, and we pledged to continue to engage at senior levels across the Atlantic. Ed, Teri, and David Batchelor, SESAR’s representative based in Washington, will give a more detailed review of the trip later this morning.

This concludes the FAA report. I’m happy to answer questions.
Approved by the NextGen Advisory Committee February 2014

Addendum to Recommendations for Increased Utilization of Performance Based Navigation (PBN) in the National Airspace System (NAS) – Industry Barriers

A Report of the NextGen Advisory Committee in Response to Tasking from The Federal Aviation Administration

February 2014
Operational Capabilities Work Group Recommendation

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Background/Introduction

In June 2013, the RTCA NextGen Advisory Committee (NAC) approved a set of recommendations responding to the September 2012 FAA’s tasking letter that requested “Input on the Obstacles to Performance Based Navigation (PBN) Utilization.” The June 2013 Report documented the findings and recommendations of the Operational Capabilities Working Group (OCWG). Specifically, it included:

- The OCWG’s examination, expansion, and prioritization of the list of obstacles to the utilization of PBN. With respect to the second subtask,
- A list of recommended mitigation actions associated with the identified obstacles.

In August 2013, the FAA Deputy Administrator sent a response letter to the RTCA NAC, acknowledging all of the NAC’s reports and recommendations from June 2013. With respect to the report “Recommendations for Increased Utilization of PBN in the NAS,” Deputy Administrator Whitaker’s letter identified a perceived omission from the previous work, specifically the letter stated “…what appears to be missing is an analysis of industry’s barriers to utilization.”

Based on this statement and subsequent discussions with the FAA, the NAC and the NAC Subcommittee (NACSC) tasked the OCWG to revisit its original effort, with specific emphasis on identifying industry obstacles and mitigation actions.

This report is an addendum to the June 2013 report “Recommendations for Increased Utilization of PBN in the NAS,” and documents the findings and recommendations of the OCWG concerning the follow-on tasking.

Executive Summary

These OCWG deliberations centered on a step-by-step review of the obstacles and recommended mitigation actions from the June 2013 report. The OCWG discussed each recommendation, looking to clarify the specific intent of each recommendation, to provide additional perspectives based on experiences with PBN implementations over the last six months, and subsequently identifying Industry barriers and mitigation actions.

The list of identified Industry barriers and mitigation actions include:

- Tech pilot participants and planners need shared view on how PBN procedures fit and operate in a system of Timed Based Flow Management (TBFM). Procedure and aircraft centric views need to be merged with views of how the procedure will impact the system. A mutual understanding of the aircraft and system impacts will improve the design and ultimately the use of PBN procedures.

- Industry stresses the value of collaboration with the FAA on investment decisions, timelines and priorities related to PBN initiatives, including TBFM tools and related automation capabilities.

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1 A full list of OCWG membership is included in Appendix 1.
2 Copies of the original FAA tasking letter and the FAA response letter are included in Appendix 2.
- Not having the capability to “sim check” all new PBN procedures may increase the risk of poorly designed procedures and thus be a barrier to utilization. Recent PBN endeavors involved many new procedures and “sim checking” this volume of procedures for many types of aircraft and Flight Management Computers, results in an excessive level of sim resources. When “sim checks” for general/business aviation aircraft types are included, this type of validation is difficult, if not impossible. However, recent improvements in new flight evaluation tools (e.g. TARGETS) have shown promise. Industry can provide additional subject matter expertise to support updates and improvements to these flight evaluation tools. They can also help where actual simulation capabilities are required, but potential resource limitations may make achievement of this increased level of participation difficult.

- “Sim checks” require the use of a navigational database for the Flight Management Computer in the simulator. Navigational databases are not a “no cost” option to the operator\(^3\) and are difficult to obtain\(^4\). Lack of consistent and comprehensive training is a barrier for Industry in the same way that it is a barrier for the FAA. Industry should use available resources to develop training materials that can be used in a variety of Industry forums and also in partnership with the FAA for joint training. Training on the differences among RNAV approach procedures, minimums, aircraft capability required for VNAV, LNAV, LPV, etc and local user community capabilities at an airport or in a metroplex is a necessity. This includes training stakeholders, pilots and controllers, in integrated PBN and TBFM functions.

- Lack of benefits from certain procedures and data base limitations may cause some operators to defer operational approvals and training for some elements of PBN.

While this report documents a list of Industry barriers and actions, the OCWG feels that collaborative actions by both FAA and Industry are needed to increase utilization of PBN in the NAS. It is recommended that efforts continue to adopt all of the recommended mitigation actions contained in the June 2013 report, with priority placed on addressing the top five set of recommended mitigation actions.

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\(^3\) Operator stakeholders include commercial airlines, business aviation and general aviation.

\(^4\) For example, there is some capability to create a database for procedures using a GE Flight Management Computer, but none exists for the Honeywell boxes. This further impedes any type of effective system testing on a regular basis.
Methodology and Structure of Analysis

The OCWG received tasking for this follow-on effort on November 25, 2013, and conducted one meeting and four teleconferences\(^5\) between November 2013 and January 2014 in support of this work. These OCWG deliberations centered on a step-by-step review of the obstacles and recommended mitigation actions from the June 2013 report. Deliberations were organized around the same five obstacle categories: Automation, Design, Environmental, Regulations, and Training.\(^6\) Formal response from the FAA on the June 2013 recommendations is expected at the February 2014 NAC meeting. For the purpose of this analysis and review, the OCWG assumed that the FAA would adopt the June 2013 recommendations, as delivered. This report is meant to provide further clarification to Industry barriers and mitigation strategies to promote a mutual willingness to improve the overall use of PBN procedures in the NAS.

Obstacles and mitigation actions in all five categories were discussed holistically, encompassing FAA and Industry outlooks. The OCWG discussed each recommendation, looking to clarify the specific intent of each recommendation, to provide additional perspectives based on experiences with PBN implementations over the last six months, and subsequently identifying Industry barriers and mitigation actions. The Findings and Recommendations sections of this report include the Industry barriers and mitigation actions in the three obstacle categories where barriers could be addressed by actions of the Industry that were viable in the near-term and would have the greatest impact: Automation, Design and Training.

It is important to note that there is a high level of consistency between the recommendations in the June 2013 report and the recommendations identified in the FAA’s “Obstacles to Performance Based Navigation Implementation” report from March 2012. While many of the action items included in the RTCA report were under the FAA’s purview to implement, at no time during the OCWG’s original or follow-up deliberations, did the group solely focus on FAA-only actions. The OCWG feels that the original recommendations reflected efforts required by both the FAA and Industry to work jointly to improve PBN utilization.

Findings

Each of the three subsections below includes the following:

- A recap of the recommended near-term, high-benefits mitigation action(s)
- A synopsis of the discussion items

\(^5\) As part of its review of the Automation obstacles, the OCWG received a briefing from the FAA with updated information on Time-Based Flow Management (TBFM) and Terminal Sequencing and Spacing (TSS) on January 17, 2013. The OCWG also received a briefing from Rebecca Guy and Sheri Callon on Decision Support Tools and Metering. Dennis Roberts participated in a telecon to help clarify the tasking. Lynn Ray participated in a meeting by phone to provide clarification and give FAA perspective to the requested work on Industry Barriers including issues associated with operations, philosophies of operations and training.

\(^6\) For reference, the top five obstacle/mitigation action pairs are included in Appendix 3.
• A listing of the identified Industry Barriers and Mitigation.

**Automation**
For reference, the near-term, high-benefit Automation recommended action was:

- In the short-term, prioritize, align and apply TBFM/TMA adaptation to metroplexes where PBN implementation has recently occurred or is planned in the next 18 months, specifically to support benefits from OPDs and dual OPDs. Initial priority should be on recently added procedures (e.g., Denver) or ones that will be added in the next 6 months (e.g. OAPM at Houston). In the longer-term, in the same vein as the "barriers to PBN" efforts, establish a concerted effort to identify and address the barriers to time based flow management. These efforts should be collaborative, including all appropriate stakeholders.

**Discussion**
The NACSC and OCWG both received briefings from the FAA on Time Based Flow Management (TBFM) and Terminal Sequencing and Spacing (TSS). The TBFM system currently enables the use of time-based metering (TBM) to efficiently manage the flow of aircraft in en route airspace into congested terminal airspace and airports. TBFM (TMA and ACM) is a key enabler for PBN. This technology is available today and should be integrated into arrival operations. Successful integration requires cooperation between FAA and Industry, with emphasis on diverse operator perspectives (e.g. tech pilots and planning/dispatch) to provide expected throughput and efficiency benefits. Recent experiences in Atlanta (eg. RAPTR OPD STAR) have illustrated how disconnected perspectives can lead to implementation and usage challenges.

In addition to TBFM, TSS tools need to be incorporated (within the FAA’s mid-term timeframe) to extend the aircraft’s trajectory plan into terminal airspace (to the runway) to enable better predictability and accuracy for support of advanced PBN procedures, including Optimum Profile Descents (OPDs). In addition, exploring potential TBFM accuracy improvements for near-term implementation could unlock efficiency and capacity benefits in advance of the TSS mid-term implementation. These benefits would require less of a trade-off of capacity versus efficiency and enable the PBN procedures to be utilized more often. Industry Subject Matter Experts (SME) including financial analysts can help determine the benefits of certain procedures when used at various cycles in high-density airspace. These experts can often help improve the ratio of mixed equipped aircraft through their benefits metrics.

As these emerging tools are integrated into the NAS during the NextGen Mid-Term timeframe (2018), Industry would encourage a close working relationship with the FAA to develop and test complimentary procedures, ensure accommodation of varied aircraft with different trajectory and aircraft characteristics, and take steps to seek an optimum balance between capacity and efficiency benefits. Furthermore, Industry would find value in collaborating with the FAA on investment decisions, timelines and priorities related to PBN initiatives, including Time-Based Flow Management tools and related automation capabilities, which reduce obstacles related to the use of PBN in the National Airspace System.
Industry Barriers and Mitigation Actions

- Tech pilot participants and planners need shared view on how PBN procedures fit and operate in a system of Timed Based Flow Management. Procedure and aircraft centric views need to be merged with views of how the procedure will impact the system. A mutual understanding of the aircraft and system impacts will improve the design and ultimately the use of PBN procedures.

- Industry stresses the need to collaborate with the FAA on investment decisions, timelines and priorities related to PBN initiatives, including TBFM tools and related automation capabilities. In order to facilitate and foster this collaboration, Industry will make Subject Matter Experts available.

- Industry can partner with the FAA to develop test criteria and make aircraft available to be equipped with the latest TSS tools for testing in the NAS. These tests could help speed acceptance and procedure development, which ultimately will lead to certification.

Design

For reference, the near-term, high-benefit Design recommended actions were:

- Define a clear objective communicated with all participating stakeholders prior to design. Carefully construct procedures considering the constraints of the operating environment. This may require the use of altitude windows and speed assignments for increased airport capacity or efficiency.

- Develop a robust national simulation capability for high percentage of the aviation fleet. Develop a standard process incorporating lessons learned to account for broader operator participation in an environment of limited resources. FMS databases should be provided by the FAA for the primary testing of various aircraft types and operators in that location. Recognize that initial design will not be perfect, and will need some time and experience being used by multiple operators before it can be improved or perfected. Schedule a placeholder for possible revisions post implementation. Provide immunity for operators and controllers during initial 90 days. (Pilots and controllers).

Discussion

The OCWG identified several points of clarification under the Design obstacle category. Industry plays a critical role in the design of PBN procedures. The level of Industry participation is often the critical component as to whether a procedure is used successfully. Specific observations included:

- Stakeholders include the broadest set of constituents. This includes, but is not strictly limited to, pilots, controllers, traffic managers, dispatchers, procedure designers, airspace designers, airport managers and operators.

- Clearly defining the purpose for new procedures is paramount. All stakeholders should have a clear understanding of the rationale for new procedures. All stakeholders must know the intent and purpose for the procedure. A philosophy of “do no harm” should be paramount when
considering any proposed development. If a significant benefit cannot be realized using current criteria, the project should be rejected. Quantifiable metrics should be used whenever possible to measure the post-implementation impacts. Use of percentages should be managed carefully, because simple use of terms such as “the procedure was used X% of the time” can be interpreted many ways, and sometimes in ways that are inconsistent with the original purpose of the procedure.

- Well-designed procedures should enhance efficiency and capacity (examples include DFW RNAV SIDs and ATL RNAV SIDs using Equivalent Lateral Spacing Operation (ELSO)). Again, stakeholder involvement in the design process is crucial. The emphasis should be placed on obtaining industry collaboration and engagement (the Denver process was cited as a positive example). Where operational advantages exist at an airport or between or among airports in a metroplex, FAA and Industry can work together to establish operating criteria to maximize throughput and minimize delay.

- Experience has shown that no design activity can perfectly identify all of the operational nuances associated with implementation of PBN procedures. There must be an opportunity to “tweak” a procedure. Amendment slots or amendment priority should be included in the production lists to support incorporation of Industry and operator feedback after the first few months of operation of a new procedure.

- Unlike an ILS approach, which works on a signal in space that every aircraft locks in and flies that signal path, an RNAV approach is made up of an interpretive set of instructions that each aircraft’s Flight Management Computer must calculate in order to define the path. Variations in flight trajectories are caused by the performance differences in the way the aircraft interprets these instructions.

- There is a wide variety of aircraft performance envelopes\(^7\) that can affect procedure design. Such differences in performance envelopes simply reflect the realities of mixed equipage and FMS capabilities. They are not, however, an industry barrier to PBN implementation. Allowances need to be built into PBN procedures to ensure that the flight paths can work for a myriad of aircraft/hardware/software combinations. It is recognized the resultant design will not be optimized for all operators and all aircraft. Additionally, consideration should be given to permit aircraft without equipped avionics to fly similar procedures in order to reduce operational complexity as seen by the controller.

- Strive for consistency between conventional and PBN procedures to each runway, to the extent permitted by criteria, so that all key segments/fixes on the procedures are identical. This should provide transparency for the controller, providing path predictability, and making the controller

\(^7\) On November 20, 2013, the NACSC was provided a presentation by the FAA on the differences between optimal descent paths of different aircraft and the added complexity such differences introduced into the design of PBN operations. NACSC members to the OCWG at its December meeting shared the gist of this briefing.
indifferent to which procedure is being flown by the aircraft, unless operating near the minimums of the individual approach types. This consistency will also address scope clutter and controller workload.

- Simulation cannot be done for every aircraft type. There must, however, be a level of reasonable confidence that simulations of new procedures incorporate the majority of hardware/software on aircraft that will fly the procedure at each airport. Simulating airframes (or even a single airframe) will not necessarily provide adequate results insuring all likely operators will be able to successfully fly procedures to ATC expectations in all weather conditions. While it is a lead operator responsibility, extensive simulation may be unachievable or cost prohibitive, depending on the diversity of the operation. A national capability that will host most of these Flight Management Computer configurations will help fill some of the simulation gaps. Upcoming vertical guidance criteria, incorporation of lessons learned from the last decade and other enhancements to FAA tools (i.e. TARGETS) will enhance flight evaluation. However, today individual high fidelity flight simulators using test databases offer more accurate and robust results than the broad-brush results of flight evaluators. With respect to test databases, the original recommendation said the databases should be “provided by the FAA.” The intent of the recommendation was that test databases should be available from a reputable source. If test databases are made available, Industry can use them to broaden evaluation, while balancing the need to make better use of limited flight simulator resources.

- It should be noted that no matter what level of simulation, flight evaluation or FMS testing is done, once a procedure moves from conceptual design into operational use in the NAS, the resulting performance may not exactly match simulation results. Additional system level modeling, that involves both FAA and Industry resources, should better estimate the operational impact of new procedures, identifying concerns that can be addressed early to increase implementation success and procedure utilization.

Industry Barriers and Mitigation Actions

- Not having the capability to “sim check” all new PBN procedures may increase the risk of poorly designed procedures and thus be a barrier to utilization. Recent PBN endeavors involved many new procedures and “sim checking” this volume of procedures for many types of aircraft and Flight Management Computers results in an excessive level of sim resources. When “sim checks” for general/business aviation aircraft types are included, this type of validation is difficult, if not impossible. However, recent improvements in new flight evaluation tools (eg. TARGETS) have shown promise. Industry can provide additional subject matter expertise to support updates and improvements to these flight evaluation tools. They can also help where actual simulation capabilities are required, but potential resource limitations may make achievement of this increased level of participation difficult.

- “Sim checks” require the use of a navigational database for the Flight Management Computer in the simulator. Navigational databases are not a “no cost” option to the operator and are
difficult to obtain. For example, there is some capability to create a database for procedures using a GE Flight Management Computer, but none exists for the Honeywell boxes. This further impedes any type of effective system testing on a regular basis.

**Training**

For reference the near-term, high-benefit Training recommended action was:

- Develop and maintain a national training program that standardizes local procedural training. Local PBN training should include all operational stakeholders to foster partnership to provide common understanding and to overcome cultural barriers. Use Greener Skies 3 phase model of baseline, design and comprehensive implementation training phase; extensive controller training, pilot/controller interaction.

**Discussion**

Training is important for all parties and is an obvious place for collaboration between FAA and Industry. Specific observations included:

- As stated earlier in the Design section of this report, the rationale and the goals for the procedure need to be communicated to stakeholders so they understand the intent of the procedure and work towards achieving the goals. Industry can partner with FAA early in the PBN procedure development process to execute this type of joint training. Industry can also play a key role is educating procedure designers on the differences in flight paths due to aircraft and Flight Management Computer differences.

- From both Industry and ATC perspectives, wide variations in aircraft and aircrew capabilities and performance are significant obstacles to PBN utilization. These variations have different implications in the departure, en route, approach and arrival phases of flight. These implications range from the ability to safely and efficiently fly specific procedures in each of these domains to widely different minimums for multiple approach procedures with identical generic naming conventions (LPV, LP, LNAV, LNAV/VNAV, and RNP). More extensive training for controllers on these aircraft and procedural nuances would be helpful and could be incorporated into academy training. Effective use of PBN procedures at the “Core 30” airports will require more intensive collaboration, training and coordination between FAA and Industry.

- Industry and FAA can work together to develop and implement enhanced coordination and training on the differences among RNAV approach procedures, minimums and local user community capabilities at an airport or in a metroplex. Minimums differences, coupled with aircraft and flight crew certifications will determine if a PBN procedure is usable on a runway in a given weather condition. Similarly, more clarity and standardization on foreign carrier authorizations and minimums are needed. In today’s busy metroplexes, most air carriers cannot
fly LPV approaches and many regionals cannot fly LNAV/VNAV approaches. These limitations need to be clearly understood by airspace designers and front-line pilots and controllers.

**Industry Barriers and Mitigation Actions**

- Lack of consistent and comprehensive training is a barrier for Industry in the same way that it is a barrier for the FAA. Industry should use available resources to develop training materials that can be used in a variety of Industry forums and also in partnership with the FAA for joint training. Training on the differences among RNAV approach procedures, minimums, aircraft capability required for VNAV, LNAV, LPV, etc. and local user community capabilities at an airport or in a metroplex are a necessity. This includes training stakeholders, pilots and controllers in integrated PBN and TBFM functions.

**Recommendation**

**Work Group Recommendation:**

Based on its review of the previous recommendations, the OCWG recommends that the following actions be considered:

- The original recommendations reflected efforts required by both the FAA and Industry to work jointly to improve PBN utilization. Efforts should continue to adopt all of the recommended mitigation actions contained in the June 2013 report. Priority should be placed in addressing the top five set of recommended mitigation actions.

In addition to restating the importance of the initial recommendations, the following items are identified as areas where Industry can play a primary or an enhanced role in addressing obstacles to PBN utilization:

- Tech pilot participants and planners need shared view on how PBN procedures fit and operate in a system of Timed Based Flow Management. A mutual understanding of the aircraft and system impacts will improve the design and ultimately the use of PBN procedures.

- It is important for Industry to collaborate with the FAA on investment decisions, timelines and priorities related to PBN initiatives, including TBFM tools and related automation capabilities.

- Industry should play an active and constant role in the design of PBN procedures, and should partner with the FAA in developing and articulating the purpose for PBN procedures at any specific airport, TRACON, or metroplex.

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It is important that these capabilities exist and be utilized to attain lower minimums (LPV) and stabilized approaches (LNAV/VNAV) for business and general aviation.
• Industry and FAA should emphasize simplicity in design, with identical key segments/fixes on the procedures where allowable by criteria, and with transparency to the controller.

• Industry should be given access to lessons learned, improved simulation capabilities and test databases. Industry can provide subject matter expertise to support updates and improvements to flight evaluation and simulation capabilities (e.g. TARGETS).

• Industry and the FAA should incorporate system level modeling and analysis of PBN procedures as part of the design phase.

• Industry should use available resources to develop training materials that can be used in a variety of Industry forums and also in partnership with the FAA for joint training. Training on the differences among RNAV approach procedures, minimums, aircraft capability required for VNAV, LNAV, LPV, etc and local user community capabilities at an airport or in a metroplex are a necessity. This includes training stakeholders, pilots and controllers in integrated PBN and TBFM functions.

• Subsequent to the tasking that prompted this report, the FAA has tasked the NAC to develop a Blueprint for ensuring successful PBN procedure implementations. The NAC recommends that the PBN Blueprint Task Group consider the recommendations of this report, previous NAC recommendations addressing PBN along with the work of the PARC to inform its deliberations and development of mitigation strategies for known barriers to PBN implementation.

The OCWG also notes that there are a number of items that must be explored further, and it intends to continue these efforts to further develop and refine several proposed mitigation actions where appropriate.
## Appendix 1

### Members of Operational Capabilities Work Group

<table>
<thead>
<tr>
<th>Member Name</th>
<th>Organization</th>
</tr>
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<tbody>
<tr>
<td>Dan Allen</td>
<td>FedEx Express</td>
</tr>
<tr>
<td>Philip Basso</td>
<td>DoD Policy Board on Federal Aviation</td>
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<td>Joe Bertapelle</td>
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<td>Tom Bock</td>
<td>Port Authority of New York &amp; New Jersey – Co-Chair</td>
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<td>Mosaic ATM</td>
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<td>Landrum &amp; Brown</td>
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<td>Mark Cato</td>
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<td>Bill Cranor</td>
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<td>Brad Culbertson</td>
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<td>Steve Dickson</td>
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<td>Sylvan Drakes</td>
<td>U.S. Air Force</td>
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<tr>
<td>Brett Easley</td>
<td>U.S. Navy</td>
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<td>Bob Everson</td>
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<td>Scott Foose</td>
<td>Regional Airline Association</td>
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<td>Jeff Formosa</td>
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<td>Rob Goldman</td>
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<td>Pamela Gomez</td>
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<td>Jim Hamilton</td>
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<td>Mike Hines</td>
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<td>Jennifer Iversen</td>
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<td>Pascal Joly</td>
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<td>Christian Kast</td>
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<td>Tom Kramer</td>
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<td>Bob Lamond</td>
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<tr>
<td>George Ligler</td>
<td>Project Management Enterprises Inc.</td>
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<tr>
<td>Angela Martin</td>
<td>Wood Consulting Services</td>
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</table>
Paul Meyer, Hartsfield-Jackson Atlanta International Airport

Joe Miceli, Airline Dispatchers Federation

Jeffrey Miller, International Air Transport Association

Glenn Morse, United Airlines

Bill Murphy, International Air Transport Association – Co-Chair

David Newton, Southwest Airlines

Mark O'Neil, National Air Traffic Controllers Association

Chris Oswald, Airports Council International - North America

Wilson Riggan, Allied Pilots Association

David Rinehart, Sensis Corporation

Mike Sammartino, Metron Aviation

Bill Sears, Beacon for Federal Aviation Administration (Observer)

Rico Short, Beacon for Federal Aviation Administration (Observer)

Molly Smith, Federal Aviation Administration (Observer)

Chris Stephenson, National Air Traffic Controllers Association

David Strand, Strand Aviation Solutions

Chris Sutherland, Harris Corporation

Ron Thomas, US Airways

Steve Vail, Mosaic ATM
Appendix 2
September 2012 FAA Tasking Letter and FAA Response Letter to Chairman Bill Ayer

September 21, 2012
Ms. Margaret Jenny
President, RTCA, Inc.
1150 18th Street NW.
Washington, DC 20036

Dear Ms. Jenny:

As you know, the predecessor of the NextGen Advisory Committee (NAC), the Air Traffic Management Advisory Committee, helped the Federal Aviation Administration (FAA) determine the criteria for our current Optimization of Airspace and Procedures in Metroplexes (OAPM) effort. As we look toward the conclusion of Round One of OAPM, the Agency would like to consider ways to build on the gains we are making through airspace and procedures. Therefore, we would like to task the NAC with addressing the following, with the suggestion that they be worked jointly by the Airspace and Procedures and the Integrated Capabilities Work Groups, to benefit from the knowledge and experience of experts from both groups.

Task 1: Obstacles to Performance Based Navigation Utilization

An internal FAA work group was commissioned to provide an overview of obstacles to Performance Based Navigation (PBN) utilization that have been encountered throughout the National Airspace System. The results were relayed in three areas: PBN accountability and responsibility; Instrument Flight Procedures design and amendments; and PBN Instrument Flight Procedures Utilization. The FAA has been aware of some of the identified issues and has been actively working at the national and local levels to resolve them. To assist in this effort, we request that the NAC:

- Examine and expand, if necessary, on the potential obstacles to PBN utilization already identified by the FAA’s internal analysis, including both technical and non-technical obstacles (e.g., training, culture, and varying business/operational models). FAA will provide information from our internal review; and

- Provide specific remedies and incremental action steps, including both technical and non-technical, the FAA can take as well as specific remedies and incremental action steps, including both technical and non-technical, for industry to take in order to relieve these obstacles in the near term.
Task 2: Input on the Criteria for Prioritizing Production of PBN Procedures

For some time, the FAA has been working diligently to produce PBN procedures. Now that we have reached a "critical mass" of published procedures, we have an opportunity to evaluate our approach to developing and managing our inventory of procedures. Our intent is to make the best use of our resources while ensuring the most effective, efficient, and useful routes and RNP procedures for both the FAA and operators. As input to this effort, the FAA would like the NAC’s recommendations on criteria for:

- prioritizing requests for new PBN procedures;
- modifying existing PBN procedures; and
- eliminating PBN procedures that do not provide measurable benefits.

Task 3: Revalidate OAPM Criteria for Future Use

The FAA would like industry’s assistance in validating criteria for selection and prioritization of OAPM sites, specifically:

- Review and revalidate the criteria used to select and prioritize the current OAPM sites. This task could result in modifications, additions, and/or deletions of the original criteria so the OAPM process continues to meet the needs for an expedited and systematic analysis of airspace and procedures in designated metropolitan areas.

The FAA will make subject matter expertise available to the NAC, but would not participate in deliberations. The FAA appreciates RTCA’s many past contributions and looks forward to a continued long and productive relationship that serves the best interests of the public. If I can be of further assistance, please contact me or our point of contact for this activity.

Mr. Dennis Roberts, Director of Airspace Services, by phone at (202) 267-9205 or email at dennis.roberts@faa.gov.

Sincerely,

[Signature]

Michael P. Huerta
Acting Administrator

cc: Victoria Cox, Assistant Administrator, NextGen
    David Grizzle, Chief Operating Officer, Air Traffic Organization
    Elizabeth Ray, Vice-President, Mission Support Services
    Dennis Roberts, Director, Airspace Service
August 9, 2013

Mr. Bill Ayer
Chairman, NextGen Advisory Committee
RTCA, Inc.
1828 L Street, NW,
Washington, DC 20036

Dear Mr. Ayer:

Thank you for your letter to Administrator Huerta about the June NextGen Advisory Committee (NAC) meeting. I look forward to working with you as the designated federal official on the NAC. We were encouraged also by The Honorable Frank A. LoBiondo’s attendance as well as Deputy Secretary Porcani’s attendance and continued interest in the NAC. The Deputy Secretary said it best when he noted that “the NAC is a big force multiplier” in the aviation community and we are encouraged with the recommendations at this most recent NAC meeting particularly as the Agency is experiencing significant fiscal challenges.

The Federal Aviation Administration (FAA) NAC members and I are pleased with the productive work being made by the Subcommittee and Work Groups. We thank the Business Case and Performance Metrics Work Group for the interim report they have provided to help us find a way to report on fuel burn metrics with actual data. We are encouraged with the results of the interim report showing the viability of using data sources for measuring NextGen fuel use and look forward to their final recommendations at the September NAC meeting.

We are in receipt of the recommendations from the CatEx 2 Task Group, which was formed to help us find a way to implement the congressional authority for Categorical Exclusions under the National Environmental Policy Act requirements. We understand the Task Group developed a recommendation that the FAA implement a system for noise analyses titled the “Net Noise Reduction Method” as a potential method for evaluating noise, as required by legislation. Work is underway within the FAA to understand and evaluate the recommendation. The FAA will formally respond to the CatEx Report at the subsequent NAC meeting.

We understand the Operational Capabilities Work group has identified an initial set of recommendations under Task 1 to identify and overcome barriers to implementing Performance Based Navigation. Work has already been underway within the FAA to understand and evaluate barriers to utilization, and we look forward to examining these recommendations to ensure that the FAA’s risk mitigation strategies address those that we previously identified. The FAA will formally respond to the Obstacles Report at the subsequent NAC meeting. In the meantime, what appears to be missing is an analysis of industry’s barriers to utilization.
The work of the NAC and its Subcommittees has been of great value to FAA, and I hope to the industry as well. The ability to have open dialogue with key industry partners is helpful to us as an Agency. These meetings and opportunities often help us all to stay energized and engaged in the work at hand.

Finally, I have enclosed our written response to the City Pairs Report that the NAC delivered to the FAA in February 2013. This report is consistent with the discussion of these metrics at the February NAC meeting in Salt Lake City. Again, I would like to reiterate our gratitude to the NAC for their effort and thoughtfulness in developing the Key City Pairs recommendations.

I look forward to our next meeting in September.

Sincerely,

Michael Whitaker
Deputy Administrator

Enclosure
## Appendix 3
### The Top Five Obstacle/Mitigation Action Pairs

<table>
<thead>
<tr>
<th>Automation Obstacles and Mitigation Action Recommendations</th>
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<tbody>
<tr>
<td><strong>Obstacle Description</strong></td>
<td><strong>Mitigation Action Recommendations</strong></td>
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</table>
| The limited support for PBN procedures in traffic flow management applications requires a thorough review and adaptation/modification of those applications to allow full system benefits to be realized. | Short-term: Prioritize, align and apply TBFM/TMA adaptation to metroplexes where PBN implementation has recently occurred or is planned in the next 18 months, specifically to support benefits from OPDs and dual OPDs. Initial priority should be on recently added procedures (e.g., Denver) or ones that will be added in the next 6 months (e.g. OAPM at Houston).  
Long-Term: In the same vein as the "barriers to PBN" efforts, establish a concerted effort to identify and address the barriers to time based flow management. Should be collaborative, including all appropriate stakeholders. |

<table>
<thead>
<tr>
<th>Design Obstacles and Mitigation Action Recommendations</th>
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<tbody>
<tr>
<td><strong>Obstacle Description</strong></td>
<td><strong>Mitigation Action Recommendations</strong></td>
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</table>
| Need to define the problem being solved and the operational goal of the PBN procedure(s). Clear definition of these goals would help to narrow the range of PBN procedures under consideration. | Define a clear objective communicated with all participating stakeholders prior to design. Carefully construct procedures considering the constraints of the operating environment.  
This may require the use of altitude windows and speed assignments for increased airport capacity or efficiency. |
| Multiple PBN projects have started without proper representation of all stakeholders which resulted in suspension or redesign. | Develop robust national simulation capability for high percentage of the aviation fleet.  
Develop a standard process incorporating lessons learned to account for broader operator participation in an environment of limited resources. FMS databases should be provided by the FAA for the primary testing of various aircraft types and operators in that location. Recognize that initial design will not be perfect, and will need some time and experience being used by multiple operators before it can be improved or perfected. Schedule a placeholder for possible revisions post implementation. Provide immunity for operators and controllers during initial 90 days. (Pilots and controllers). |
### Regulation Obstacles and Mitigation Action Recommendations

<table>
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<tr>
<th>Obstacle Description</th>
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<tbody>
<tr>
<td>FAA operational documentation (i.e. 7110.65 and AIM) lags design criteria and technology.</td>
<td>Rewrite 7110.65 and other associated documents with respect to PBN and update on a more frequent cycle.</td>
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<tr>
<td></td>
<td>Include provision for &quot;RNP Established&quot;, &quot;Guided Visual Flight Procedures&quot;, and RNAV/RNP to ILS/GLS.</td>
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### Training Obstacles and Mitigation Action Recommendations

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<tr>
<th>Obstacle Description</th>
<th>Mitigation Action Recommendations</th>
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<tr>
<td>There is insufficient and no standardized training between FAA and stakeholders (controllers and pilots). There are many misunderstandings of what PBN can accomplish and the uses of PBN. This understanding is needed for effective procedure design and application.</td>
<td>Develop and maintain a national training program that standardizes local procedural training.</td>
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<td></td>
<td>Local PBN training should include all operational stakeholders to foster partnership to provide common understanding and to overcome cultural barriers.</td>
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<td></td>
<td>Use Greener Skies 3 phase model of baseline, design and comprehensive implementation training phase; extensive controller training, pilot/controller interaction.</td>
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</table>

The full list of obstacles and recommended mitigation actions, along with the assessment of the impact, cost, and benefit, is included in Appendix 4 of the June 2103 report, “Recommendations for Increased Utilization of Performance Based Navigation (PBN) in the National Airspace System (NAS).”

### Appendix 4

#### Acronyms

<p>| ACM | Airport Certification Manual |
| AFS | Flight Standards Service    |
| AGL | Above Ground Level          |
| ASIAS | Aviation Safety Information Analysis and Sharing |
| ATC | Air Traffic Control         |
| ATM | Air Traffic Management      |
| CAST | Commercial Aviation Safety Team |
| CATEX | Categorical Exclusion       |
| CDM | Collaborative Decision Making |
| CNS | Communication, Navigation and Surveillance |</p>
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<tr>
<th>Term</th>
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