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June 12, 2013

Meeting Summary, June 4, 2013
NextGen Advisory Committee (NAC)

The ninth meeting of the NextGen Advisory Committee (NAC) was held on June 4, 2013 at the Headquarters of RTCA, 1150 18th Street, Suite 910, Washington, DC. The meeting discussions are summarized below.

List of attachments:

- Attachment 1 - Attendees
- Attachment 2 - Presentations for the Committee - (containing much of the detail about the content of the material covered)
- Attachment 3 - Approved February 7, 2013 Meeting Summary
- Attachment 4 – NAC Chairman's Report
- Attachment 5 - Remarks from The Honorable Frank A. LoBiondo, Chairman, House Subcommittee on Aviation, Transportation and Infrastructure Committee
- Attachment 6 - FAA Report from The Honorable Michael Huerta, FAA Administrator
- Attachment 7 - Report "Data Sources for Measuring NextGen Fuel Impact"
- Attachment 8 - "Recommendation for Implementing Categorical Exclusion Contained in the FAA Modernization Act of 2012"
- Attachment 9 - "Recommendation for Increased Utilization of Performance Based Navigation (PBN) in the National Airspace System (NAS)"
- Attachment 10 - Outcome of the Committee's discussion "Recommendation for 2013-2014 Proposed Taskings"

Welcome and Introductions

Bill Ayer, Chairman of Alaska Air Group and Chairman of the NextGen Advisory Committee 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 three new Committee members: Mario Diaz from Houston Airports; Rob Maruster of JetBlue Airways; and Mike Whitaker the new FAA Deputy Administrator and Chief NextGen Officer, who will also assume the Designated Federal Official (DFO) role for the Committee at the completion of the June meeting.

Mr. Ayer also expressed his appreciation to Patrick Ky, Executive Director of SESAR and Sue Baer of the Port Authority of New York and New Jersey for their service on the NAC. Mr. Ky is leaving SESAR to become the Executive Director of the European Aviation Safety Agency starting Sept 2013 and Ms. Baer is retiring from the PANYNJ.

Designated Federal Official Statement
In his role as the DFO, The Honorable Michael Huerta, FAA Administrator read the Federal Advisory Committee Act notice governing the open meeting.

Approval of February 7, 2013 Meeting Summary
Chairman Ayer asked for consideration of the written Summary of the February 7, 2013 meeting. The Committee approved the Summary (Attachment 3) with no revisions or objections.

US DOT Executive
Chairman Ayer welcomed The Honorable John Porcari, Deputy Secretary for the US Department of Transportation, to the meeting of the NAC. He thanked him for attending and pointed out that the Deputy Secretary has a deep interest in NextGen and the work of the NAC having also participated in the meeting last fall in Dayton and has been active in helping make the case for aviation priorities.

Mr. Porcari stressed that NextGen is the nation's single largest infrastructure investment, pointing out that, unlike other modes of transportation such as highways, the less physical nature of the technology makes it difficult to show the tangible outcomes. He challenged the NAC to help translate NextGen into understandable principles. He also stated that Administrator Huerta and new Deputy Administrator Mike Whitaker head a strong team at the FAA that is positioned to lead the organization through the challenges that lie ahead. He concluded by expressing the Administration's commitment to accelerating the benefits of NextGen.

Chairman's Remarks
In his remarks, Chairman Ayer (Attachment 4) explained that NextGen is at a "tipping point". We are facing the "mountain" of potential barriers including sequestration and budget constraints, diversity of demand, integration challenges, including the need to deploy communications, navigation, surveillance and ATM capabilities in an integrated fashion that deliver both local and nationwide performance improvements. He stressed the importance of continuing to build trust among the many and diverse stakeholders involved in NextGen implementation by setting and delivering on joint commitments. Only then will we build the momentum needed to scale the mountain and carry us to get over future hurdles.

He noted that, in these challenging economic times, an important element of NextGen implementation is to prioritize, which means selecting fewer priorities, taking action, achieving outcomes and promoting success, documenting and sharing lessons learned and applying these to improve future implementation of NextGen procedures and capabilities. He referred to this as a virtuous cycle where success leads to increased confidence that fosters investment and leads to continued implementation of new capabilities.

In comments from Committee members about the Chairman's Report, it was noted that the NAC provides policy makers with a "gift" of industry consensus on how best to move forward with NextGen and we should leverage that advantage. Another NAC member commented that sequestration forces the industry to be focused even more on the return on investments in NextGen, since such investments are evaluated against other investment that are not dependent on outside influences to deliver a return. It was also stated that one way industry can help is through communication and promotion of the benefits and success. Related to this point, several Committee members emphasized the need to translate the benefits of NextGen into plain English that can be understood by the general public. It was also suggested that a script or talking points that can provide a common voice to promote successes would be helpful.

Multiple members commented that as we near the "tipping point," we are moving from planning to implementation and that prioritization will be an important element of getting over the barriers.

Special Remarks – Member of Congress

The Honorable Frank A. LoBiondo, Chairman, House Subcommittee on Aviation, Transportation and Infrastructure Committee, also provided brief remarks (Attachment 5). He explained that he and Subcommittee Ranking Member, Representative Rick Larsen (D-WA) enjoy a close and constructive working relationship and he expressed his interest in moving NextGen forward, emphasizing the critical role of the NAC and the aviation community in communicating the benefits of NextGen to Congress as it faces tough decisions on spending priorities. He also explained that the Subcommittee has held two listening sessions as opportunities for engaging the industry on NextGen and is planning to conduct the next one in October, and invited NAC members to meet with him and his staff to discuss issues and ideas that they have about NextGen issues.

FAA Report

The Honorable Michael Huerta, Administrator, participated in the meeting for his final time as Designated Federal Official (DFO) for the Committee and presented the FAA report (Attachment 6).

Mr. Huerta highlighted the budget challenges the Agency faces under the sequester and the potential effects these have on NextGen implementation. The Agency has also cut the spare parts inventory and suspended training of new air traffic controllers, shutting down a large part of the FAA Academy in Oklahoma City. He explained that Congress has provided flexibility in its spending that allows the FAA to restart the previously suspended Metroplex work in Washington DC, North Texas, Charlotte, Northern and Southern California, Houston and Atlanta.

He also introduced the new Deputy Administrator, Mike Whitaker, who will serve as the FAA's Chief NextGen Officer and the NAC DFO.

Mr. Huerta concluded his remarks and introduced Pam Whitley, Acting Assistant Administrator for NextGen. Ms. Whitley provided an overview of the FAA's NextGen Performance metrics interactive website and played a video that explains the NextGen Performance Snapshots (NPS). In response to a question from a Committee member, she explained that the NPS landing page is the second most popular area of the FAA's website, and it has been used by the media to develop stories on NextGen.

Mr. Huerta also noted that the website links to local implementation that has been fostering interest in NextGen at specific locations.

Dennis Roberts and Gary Powell from the FAA and Jeff Formosa, The MITRE Corporation, provided a briefing highlighting a NextGen capability success with the implementation of new Equivalent Lateral Spacing Operation (ELSO) Standard PBN procedures in Atlanta. These procedures provide for more precise departure paths thereby reducing fuel burn and the number of individuals exposed to noise.

NAC members from the FAA's Air Traffic and Aviation Safety Organizations highlighted the cooperation among their respective organizations in developing and implementing the procedures. In response to a question from a Committee member, Mr. Roberts explained that integration of the new procedures was an important part of the process along with controllers and pilots adapting to the new means of operating at ATL. PBN requires controllers to "think differently" about how they do their job. He also stated that FAA intends to facilitate "peer-to-peer" conversations between controllers and pilots involved in the Atlanta project at subsequent locations to help each understand the other's perspectives.

At the invitation of the Chairman, Steve Dickson from Delta Air Lines, reflected on his experience from the ELSO implementation. Captain Dickson stressed the importance of working across the involved lines of business within the FAA, and between the FAA and the aviation industry.

NAC Subcommittee Co-Chairs
Chairman Ayer formally introduced the Co-Chairs of the NAC Subcommittee (NACSC), Steve Dickson, Delta Air Lines and Melissa Rudinger, AOPA. Mr. Ayer recognized former NAC Co-Chair Steve Brown, NBAA for his hard work and outstanding leadership and welcomed Ms. Rudinger as his successor.

Data Sources for Measuring NextGen Fuel Impact
Mr. Dickson 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 report designed to identify and obtain critical data sources to track and analyze the impacts of NextGen on fuel usage.

The report includes the following findings (statements of principles and basis of understanding) and associated recommendations:

Finding 1: Fuel trends are impacted by aircraft weight classes flown, accurate metrics depend on valid sample sizes and the availability of "representative" traffic data. Methods to aggregate data may include by city pair, by region, and by aircraft weight class.

Sample city pair data from six air carriers are supporting prototyping of public metrics using existing OOOI (out, off, on, in) ground and flight time data. In addition, an Ad Hoc group of airlines and other users has been created to consider options and recommend a data sharing governance and infrastructure program.

Recommendation 1: To formalize routine sharing of fuel and weight data by flight, FAA should designate and fund a data steward to set up routine OOOI (out, off, on, in) based fuel and weight data sharing.

Finding 2: Use of the Aviation Safety Information Analysis and Sharing (ASIAS) infrastructure is not appropriate for understanding and isolating specific NextGen impacts on fuel usage.

Recommendation 2: FAA should collaborate with the aviation community to identify the specific data elements that are most useful to support a "calibrate and count" approach to estimate achieved NextGen fuel use impacts.

Following the briefing, several Committee members asked whether the WG had considered the viability of using modeling data, rather than collecting actual fuel use data. It was also noted that reductions in fuel use can be affected by factors other than NextGen. In response, the Co-Chairs explained that the direction from the legislation related to fuel use between city pairs, pointed to the need for actual, rather than modeled data. However, they suggested that having data for a sampling of carriers operating in specific city pairs with NextGen procedures may be acceptable to perform the required analysis. At this stage in the work of the BCPMWG, they are unable to provide a definitive answer. In additional conversation and comments by the Committee members, the issue of FAA funding a data steward was also discussed. It was agreed that more specific details about the parameters of a data steward should be included in the recommendation for consideration by the NAC at its September meeting. Finally, an FAA member of the Committee expressed appreciation that the BCPMWG is not seeking the use of ASIAS data and that the issue is resolved.

Committee Action: The Committee agreed by consensus to approve the report **Data Sources for Measuring NextGen Fuel Impact** (Attachment 7) for submission to the FAA.

CatEx 2 Task Group - Recommendation for Implementing Categorical Exclusion Contained in FAA Modernization Act of 2012

Mr. Dickson, along with the Co-Chairs of the CatEx 2 Task Group, Katherine Preston from Airports Council International North America and Nancy Young from Airlines for America, provided a review of the recommendation for implementing Congressional authority for Categorical Exclusions under the National Environmental Policy Act requirements (CatEx2).

The FAA requested that the NAC explore how to implement Section 213(c)(2) of Public Law 112-95 for CatEx2 that requires measuring environmental impacts on a per flight basis. Ms. Preston and Ms. Young explained that the legislative authority is designed to foster the implementation of RNP but presents challenges in the requirements for identifying measurable reductions in fuel consumption, carbon dioxide emissions and most significantly, noise on a per-flight basis presents a challenge.

The CatEx 2 Task Group developed a recommendation that the FAA implement a system for noise analysis titled the "Net Noise Reduction Method," as the means to meet the requirements of Section

213(c)(2) of Public Law 112-95. It is anticipated this system would take approximately 4-months to complete.

The recommendation provides for the computation of net reduction in noise as measured by the number of people who would experience a reduction in noise compared to the number of people who would experience an increase in noise, at noise levels greater than Day/Night Average Sound Level (DNL) 45 dB, with a proposed PBN procedure implemented, as compared with the existing instrument procedure in place. This method also includes a recommended step to assess whether, despite a projected reduction in the net number of people exposed to noise under a PBN procedure, there might be an increase in the DNL 65 dB population that would pose a significant impact (DNL 1.5 dB or greater) that could call into question the use of CatEx 2, to enhance the acceptance of this method by the community.

The Co-Chairs also explained that the Task Group believes that community outreach is very important to community acceptance of new procedures and meeting CatEx2 criteria doesn't reduce the importance of a proactive community communication effort.

Chairman Ayer complemented the Co-Chairs for the work of the Task Group and an FAA staff member expressed appreciation for use of DNL as the noise measurement as well as the recommendation related to community engagement. Several Committee members, including Mr. Huerta commented on the necessity for community outreach emphasizing that a CatEx doesn't preclude the need to engage with the community.

Committee Action: The Committee agreed by consensus to approve the **Recommendation for Implementing Categorical Exclusion Contained in FAA Modernization Act of 2012** (Attachment 8) for submission to the FAA.

Obstacles to Performance Based Navigation (PBN) Utilization

Chairman Ayer recognized Steve Dickson to present the recommendation developed by the Operational Capabilities Work Group (OCWG) in response to the request to identify obstacles to PBN utilization, both technical and non-technical, and recommendations to mitigate these barriers. Mr. Dickson also introduced Tom Bock from the Port Authority of New York and New Jersey and Bill Murphy of the International Air Transport Association (IATA), Co-Chairs of the OCWG, and thanked them for leading the Work Group through the process of developing the recommendation.

Five categories of barriers were identified as major obstacles to utilization of PBN procedures:

- Automation
- Design
- Environmental
- Regulations
- Training

The mitigation actions to address the identified barriers are:

- Short-Term: prioritize, align and apply Time Based Flow Management adaptation to Metroplexes with near-term PBN implementation.
- Longer-Term: identify and address the barriers to time based flow management, coordinating all stakeholders.
- Define a clear objective communicated with all participating stakeholders.
- Develop a robust national simulation capability for high percentage of the aviation fleet:
  Use a standard process incorporating lessons learned to account for broader operator participation in an environment of limited resources.
- Rewrite FAA Order 7110.65 and other associated documents, and update on a more frequent cycle.
- Develop and maintain a national training program that standardizes local procedural training.
  Local PBN training should include all operational stakeholders.
  Use Greener Skies 3 phase model of baseline.

A Committee member expressed support for the recommendations and interest in receiving feedback from the FAA on actions they will be taking in response to the document. There was also a discussion about the importance of time-based metering capabilities being available to manage PBN implementation and use.

Committee Action: The Committee agreed by consensus to approve the **Recommendation for Increased Utilization of Performance Based Navigation (PBN) in the National Airspace System (NAS)** (Attachment 9) for submission to the FAA.

NAC Taskings Discussion

Chairman Ayer introduced the final agenda item for Committee action by explaining that the FAA was seeking input on potential Taskings that could be assigned to the NAC. Some members of the NAC met on May 13th and developed a preliminary list of potential new Taskings. While ultimately the FAA makes the decision about the Taskings, the Chairman reflected the views from the call that the NAC members value the FAA's eagerness to solicit input from the industry.

Margaret Jenny, President, RTCA was then requested to outline the potential Taskings identified by the NAC:

1. **NextGen Activity Prioritization** – responding to budget pressures and sequestration, review current FAA plans and activities that have an effect on the implementation of NextGen and develop a prioritized list of Tier 1 (consensus on activities that should continue no matter what) and Tier 2 (consensus on things that should continue, resources permitting) recommendations.
2. **Revised Prioritized List of NextGen Integrated Capabilities and Locations** - develop a shorter (i.e., 3-5) list of locations for deployment of selected capabilities in the near-term.
3. **Blueprint for Success of Performance Based Navigation** - develop a checklist for planning and executing new procedures (including all necessary technical and non-technical aspects) that can be used to guide future PBN initiatives.

4. **Minimum Performance Requirements for Selected Integrated NextGen Capabilities** - using the output from the Revised Prioritized List of NextGen Integrated Capabilities and Locations Task, including both cockpit avionics and ground automation across domains (e.g., PBN, time-based metering, ATC Automation, Optimized Profile Descents (OPDs), surface traffic management), identify minimum performance requirements, determine applicability of Best-Capable, Best-Served for the capabilities and consider the capabilities as defined in the ICAO Aviation System Block Upgrades (ASBU).
5. **Develop goals associated with the NextGen Performance Metrics** as appropriate to measure the effectiveness of NextGen implementation.

Several Committee members commented that it was important for the aviation community to assist the FAA in prioritizing its NextGen investments. The preferred approach (according to the commenters) is to focus the investment in a smaller number of locations and capabilities rather than attempting to make wide spread investments at a larger number of locations. Another Committee member stated the significance of bringing the NAC "into the mix" of helping the FAA with the challenge of sequestration.

The Committee also engaged in a discussion about the concept of implementing a Best Capable, Best Served (BCBS) system at a limited number of airports, with the possibility of using time of day or runway limits to determine the most effective way to implement this policy principle. It was noted that the NAC had previously focused on not disadvantaging any operator. A discussion then ensued about fostering efficiency while also providing some level of service for those not equipped. Committee members also pointed out that Task Force 5 recommended airport specific application of BCBS and that mixed equipage is not equal to BCBS because a highly equipped aircraft may not be the most efficient in traffic flow and procedures. Mr. Huerta stated that global policy discussion is difficult and it is important to look at operational trials to get real world experience at selected sites.

Representatives from NBAA, ALPA and NATCA volunteered to help edit the Taskings to reflect the theme of the discussion. These will be circulated among the NAC members prior to being submitted to the FAA.

Committee Action: The Committee agreed by consensus to approve the **Recommendation for 2013-2014 Proposed Taskings** (Attachment 10) for submission to the FAA with the edits discussed previously.

Chairman Closing

Chairman Ayer offered his closing remarks expressing his appreciation for the great work of all the volunteers engaged on the NAC, the Subcommittee, Work Groups and Task Group. He reiterated that we are at a tipping point and it is imperative for everyone to continue to work together and deliver on commitments. Other Committees members also highlighted the significance of Deputy Secretary Porcari and Chairman LoBiondo attending the meeting, and their interest in the work of the NAC.

Other business

Chairman Ayer thanked Mr. Huerta for his dedication to work with the NAC and on behalf of the RTCA organization. Ms. Jenny then presented Mr. Huerta with an RTCA gavel in appreciation of his continued dedication to, and leadership of the NAC since its inception.

Adjourn

Chairman Ayer ended the meeting of the Committee at 2:35 p.m.

Next Meeting

The next meeting of the NAC is September 19, 2013 in Washington, DC.

Attendees:
June 4, 2013 Meeting of the NextGen Advisory Committee
Washington, DC

Name[1]	Company
Alexander, David	SAE International
Ayer, Bill	*Alaska Airlines*
Bachelier, Pierre	Airbus
Baer, Sue	*Port Authority of New York & New Jersey*
Batchelor, David	SESAR JU
Baum, Chris	ALPA
Beck, Gary	Alaska Airlines
Becker, Darby	GE Aviation
Belger, Monte	Metron-Airbus
Benich, Chris	Honeywell
Bertapelle, Joe	JBL
Bertenthal, Laurie	Rockwell Collins
Bock, Tom	Port Authority of NY & NJ
Bolen, Ed	*National Business Aviation Association*
Brenner, Frank	*EUROCONTROL*
Brown, Lee	Landrum & Brown
Caflisch, Michael	Boeing
Carbary, Sherry	*The Boeing Company*
Carey, Bill	AIN
Cassidy, Sean	ALPA
Cebula, Andy	*RTCA, Inc.*
Challan, Peter	Harris
Cohen, Roger	RAA
Dalton, Rick	Southwest Airlines
Davis, Melvin	NATCA
Deleon, Benito	FAA
Delibes, Didier	Airbus
Denning, Jana	Lockheed Martin
Diaz, Mario	*Houston Airport System*
Dickson, Steve	Delta
Dupon, Duane	Raytheon
Ellen, Mary	HMMH
Elwell, Dan	A4A
Esposito, Carl	*Honeywell International, Inc.*
Feix, Laura	SAE International

[1] Committee member names appear in italics.

Formes, Jeff	MITRE
Fornarotto, Christa	*Federal Aviation Administration*
Fritz, Trish	FAA
Fuller, Craig	*Aircraft Owners and Pilots Association*
Fuller, Daphne	FAA
Fulton, Steve	GE Aviation
Gomez, Pamela	FAA
Gray, Bob	*ABX Air*
Greco, Kristie	FAA
Grizzle, David	*Federal Aviation Administration*
Hagy, Keith	ALPA
Harris, John	*Raytheon Systems Company*
Hickey, John	*Federal Aviation Administration*
Hill, Stephanie	*Lockheed Martin Corporation*
Holden, Lisa	FAA
Huerta, Michael	*Federal Aviation Administration*
Jenny, Margaret	*RTCA, Inc.*
Joly, Pascal	Airbus
Jones, James	*U.S. Air Force*
Kalinowski, Nancy	FAA
Kearns, Kathleen	SITA
Kirkman, Deborah	MITRE
Koch, Robin	OIG-DOT
Lohr, Ed	Delta Air
Mahone, Bruce	SAE
Manville, David	US Army
Maruster, Rob	*JetBlue Airways*
Matousek, Mike	Aviation Subcommittee
Moak, Lee	*Air Line Pilots Association*
Mohler, Gisele	Federal Aviation Administration
Murphy, Bill	IATA
Nadarski, Nick	USGAO
Narvid, Colonel Juan	DoD Policy Board on Federal Aviation
Newton, David	Southwest Airlines
Ocelmec, James	OIG-DOT
Ocens, Cruis	DOT OIG
Oettinger, Julie	Federal Aviation Administration
Pack, Thomas	ACR Electronics
Perrone, Mike	*Professional Aviation Safety Specialists*
Ply, Will	Boeing
Porcari, John	US DOT
Powell, Gary	FAA
Preston, Katherine	ACI-NA

[1] Committee member names appear in italics.

Rankin, Jim	*Air Wisconsin*
Ray, Elizabeth	FAA
Rinaldi, Paul	*National Air Traffic Controllers Association*
Roberts, Dennis	FAA
Rocheleau, Chris	FAA
Romanowski, Michael	OSTP
Roy, Alan	Southwest Airlines Pilots' Association
Rudinger, Melissa	AOPA
Ryals, Lillian	*The MITRE Corporation*
Samuel, Sandra	Lockheed Martin
Sears, Bill	Beacon Management
Shellabarger, Nan	FAA
Smith, Molly	Federal Aviation Administration
Sypniewski, Jeff	FAA
Treakle, Coletta	DOT OIG
Whitaker, Mike	FAA
White, Beth	FAA
Whitley, Pamela	*Federal Aviation Administration*
Williams, Heidi	AOPA
Wright, Dale	NATCA
Young, Nancy	A4A

[1] Committee member names appear in italics.

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Welcome to the Meeting of the NextGen Advisory Committee

June 4, 2013
RTCA Headquarters
Washington, DC

Welcome

NAC Chairman Bill Ayer

Chairman

Alaska Air Group

RTCA

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Introductions

Meeting
NextGen Advisory Committee
June 4, 2013
Washington, DC

PUBLIC MEETING ANNOUNCEMENT
Read by: Designated Federal Official Michael Huerta
NextGen Advisory Committee
June 4, 2013

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

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

May 16, 2013

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.

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Review and Approval of:

February 7, 2013 Meeting Summary

Agenda

- The Honorable John Porcari, Deputy Secretary US DOT
- NAC Chairman's Report
- The Honorable Frank A. LoBiondo, Chairman, House Subcommittee on Aviation, Transportation and Infrastructure Committee
- FAA Report – The Honorable Michael Huerta, Administrator, FAA
- NextGen Performance Snapshots
- Featured PBN Implementation Location - ATL
- Data Sources for Measuring NextGen Fuel Impact

Agenda (Cont.)

- Recommendation for Implementing Categorical Exclusion Contained in FAA Modernization Act of 2012
- Lunch
- Recommendation for Increased Utilization of Performance Based Navigation (PBN) in the National Airspace System (NAS)
- NAC Taskings Discussion
- Adjourn

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The Honorable John Porcari,
Deputy Secretary
U.S. Department of Transportation

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Chairman's Report

NAC Chairman Bill Ayer

Chairman

Alaska Air Group

The Value of the NAC

Unique Group

- Highly capable and broadly representative
- A shared vision and a single mission to accelerate the deployment of NextGen into the NAS

The Approach

- Working on the key foundational elements at FAA's request
- Making timely recommendations through collaboration and consensus
- Share successes and lessons learned

The Value of the NAC (cont.)

Results In

- Delivering near-term benefits using existing equipage
- Continuous improvement in planning and execution of each new procedure and capability
- Increased confidence by stakeholders in FAA's processes
- Solid business cases for future investments to gain new benefits

11

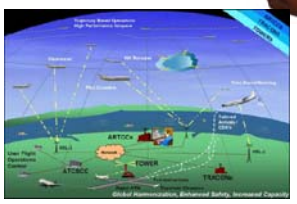
Quick Refresher: Goals of NextGen

- Increase capacity
- Increase efficiency
- Increase safety
- Decrease environmental impact

12

20 Recommendations Aimed at NextGen Implementation

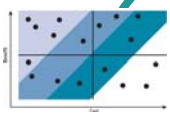
- Best-Capable, Best-Served
- Financial/Opns Equipage Incentives
- Prioritized Deployment Locations
- NAS Performance Metrics
- Environmental Review Process
- Trajectory Operations
- DataComm



13

The Evolution to NextGen
It's About…

IMPLEMENTATION
Delivering benefits will lead to increased trust



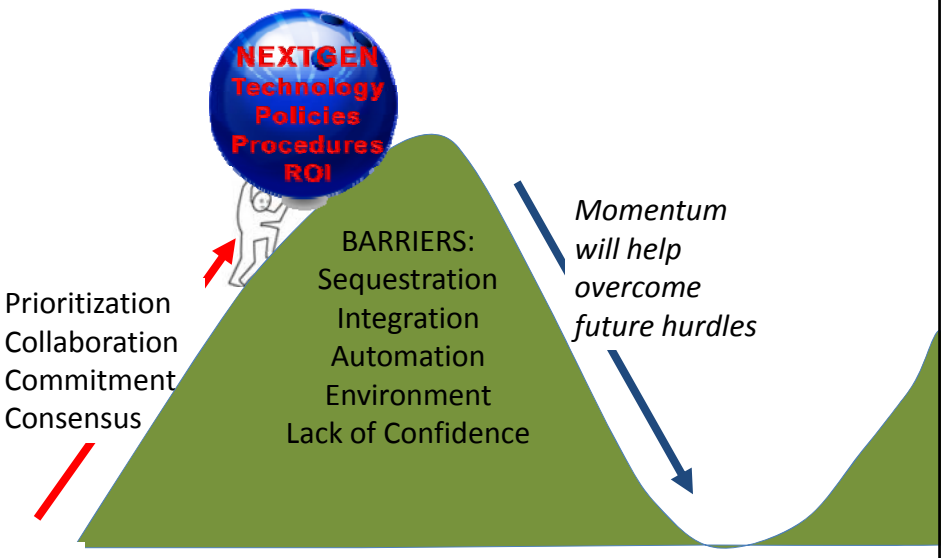
FINANCES
Justification for investments strengthened by early benefits

BUILDING CONFIDENCE

TRANSITION
Planning is easier than execution

COMMITMENT
On part of ALL stakeholders

We Are At a Tipping Point



15

DISCUSSION

16

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The Honorable Frank A. LoBiondo, Chairman, House Subcommittee on Aviation Transportation and Infrastructure Committee

DISCUSSION

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FAA NextGen Performance Snapshots

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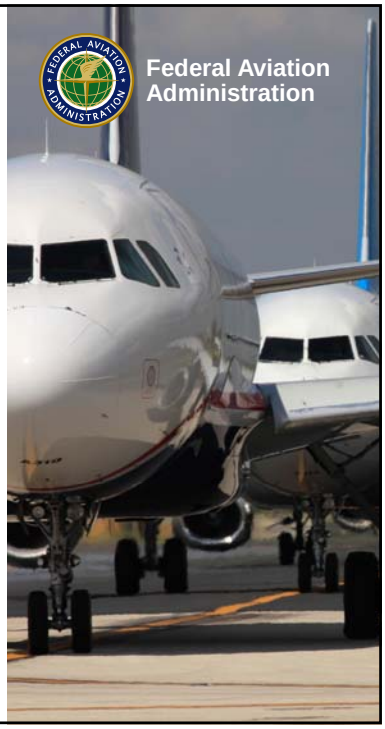
Featured PBN Implementation Location
Atlanta, GA

Equivalent Lateral Spacing Operation Standard (ELSO)

Reduced Divergence Standard for Improved Departure Operations



Presented to: **The NextGen Advisory Committee (NAC)**

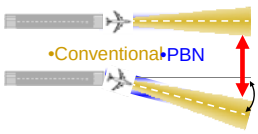
By: Gary Powell - Assistant Division Manager, AFS-401
Jeff Formosa,MITRE

Date: Tuesday, June 4, 2013

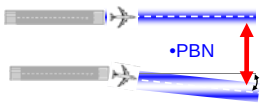
Reduced Divergence Concept

- **Equivalent Lateral Spacing Operation Standard (ELSO)**
  - Capitalizes, on improved navigational precision of (PBN) operations
  - Enables reduced-divergence departure operations

•Departure Operations*
•Today:



•ELSO:



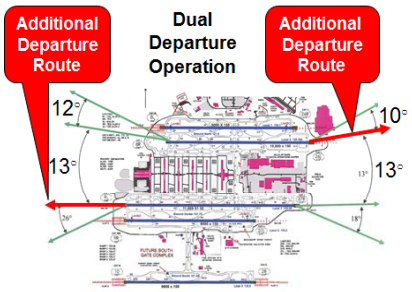
- **Reduced Divergence Benefits**

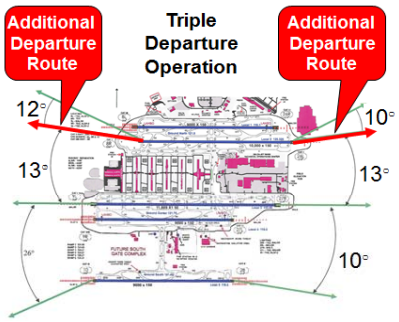
⇒ **Procedure design options**

⇒ **Increased departure efficiency**

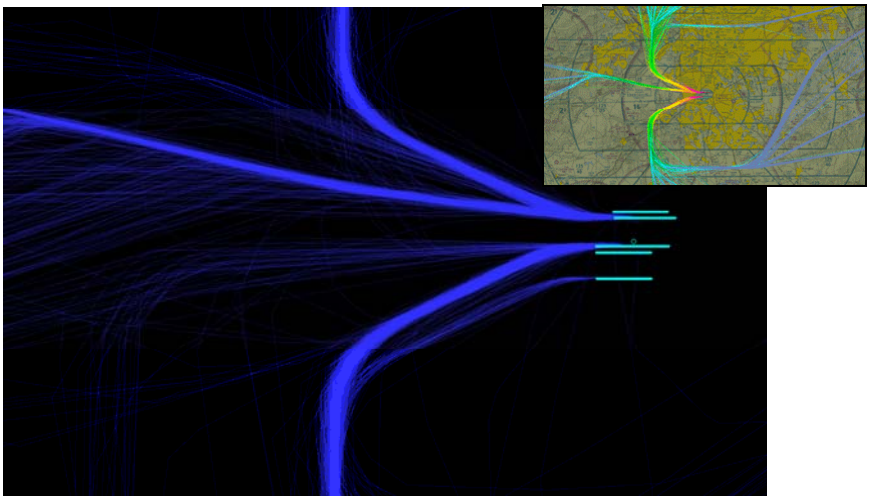
ATL Implementation

- **Operational Change**
  - One additional ELSO-enabled departure path in both East and West operation (Improves both Dual and Triple flows)
- **Expected Initial Benefit**
  - $20M for ATL operators

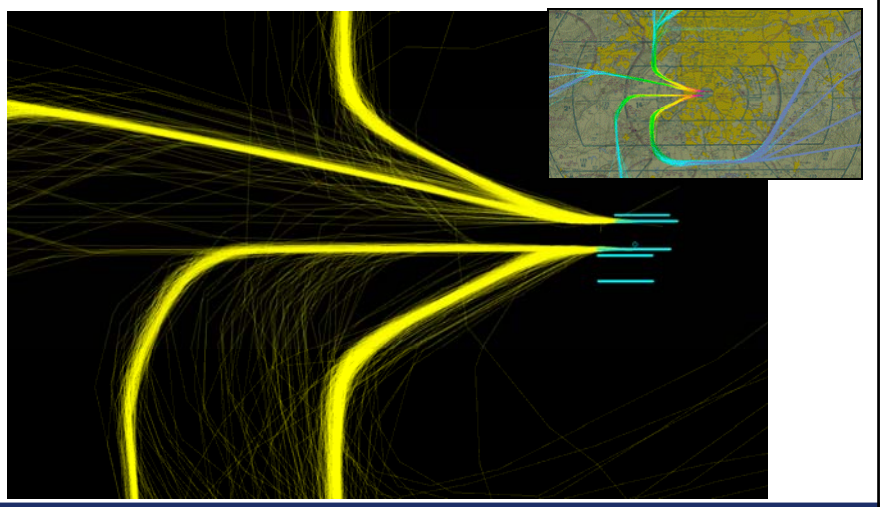




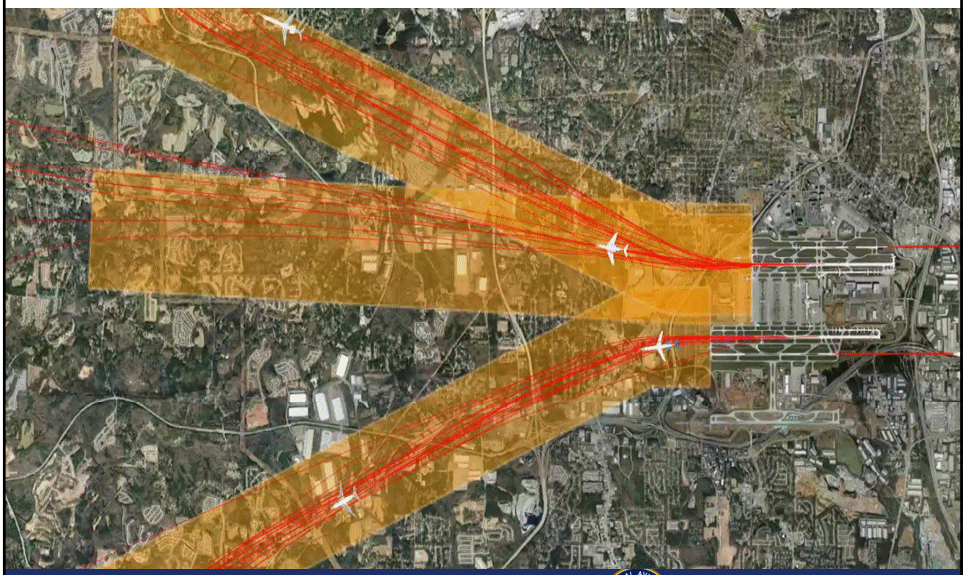
Pre-Implementation



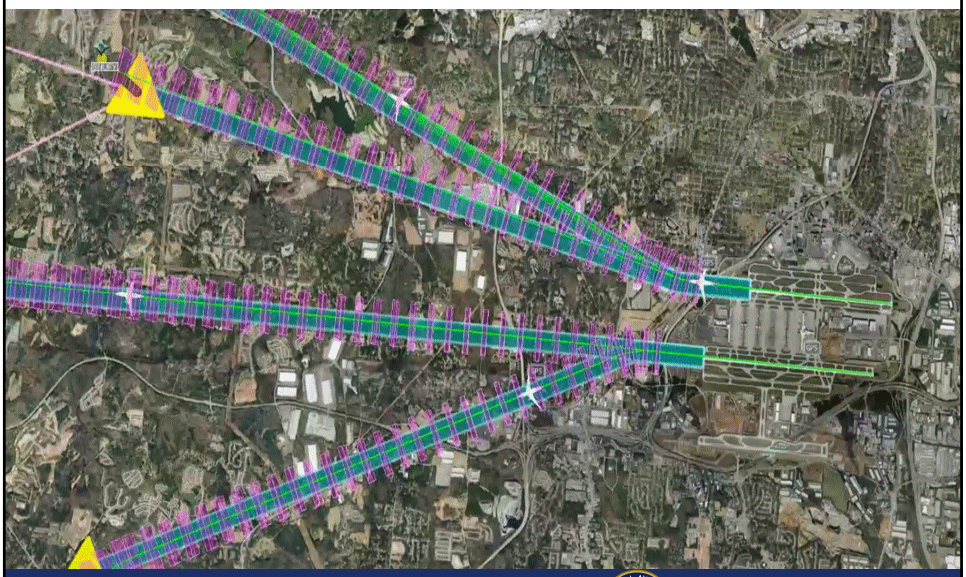
Post-Implementation



Before ELSO



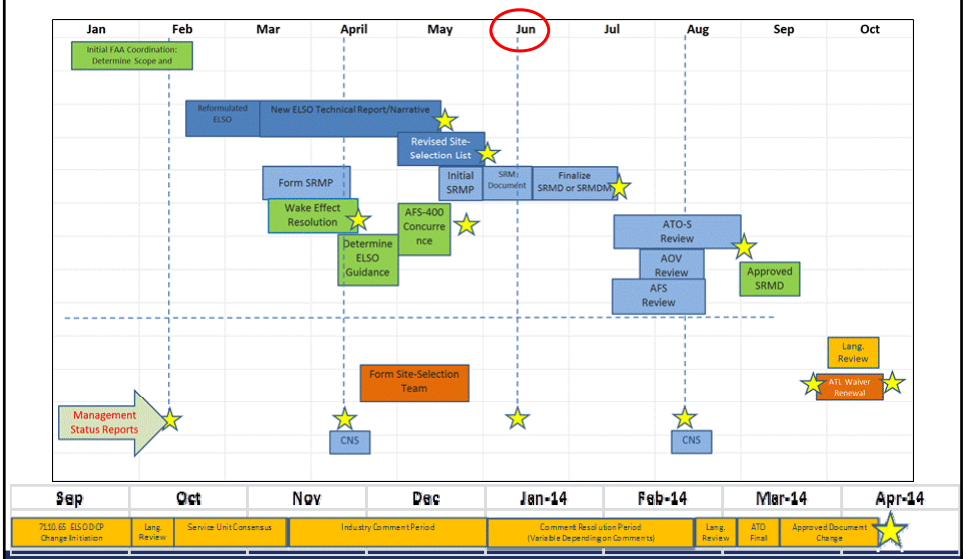
After ELSO



Summary

- **Runway 27R Departures**
  - Observed efficiency benefit: about 8 additional departures per hour
- **Runway 8R Departures**
  - Observed efficiency benefit: about 12-13 additional departures per hour
- **Runway 10-28 Departures**
  - Observed 42-percent reduction in runway use
    - Decreases taxi-out time / increased use for arrival operations
- **~$20M saving annually based on empirical data**
- **Next Steps**
  - Assessing empirical data for further improvement
  - Advance ELSO as a national standard application -2013/14
  - AVS/ATO has directed ELSO implementation at the next site or sites.
  - AFS-400/AJV directed to stand-up a FAA/MITRE cross cutting team to expedite a NAS wide standard change. The team includes AFS, AJV, ATO-T, and ATO-S, others as needed.

Advance ELSO as a National Standard



Federal Aviation Administration

DISCUSSION

Federal Aviation Administration

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Data Sources for Measuring NextGen Fuel Impact

Business Case & Performance Metrics WG

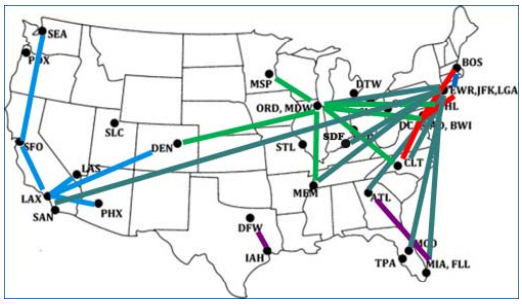
Co-chairs:
Ed Lohr, Delta Air Lines
Debby Kirkman, The MITRE Corporation

Business Case & Performance Metrics WG: 2013 Goals

- Focus: Mature and prototype fuel data sharing mechanism(s) to inform Congressional, NAC, and other NextGen metric analyses and tracking.
- Timeline:
  - By October 2013: Establish data sharing of fuel-related data supporting high-level metrics.
  - Long term goal: Establish data sharing that supports analysis of specific NextGen operational improvement impacts on fuel use.

35

Key High-Level Metrics



- Fuel Used between City Pairs
- Fuel normalized to weight and distance (ton-miles/gallon)

36

Progress Report

- Sample city pair data was provided by six flight operators.
  - Thanks to Air Wisconsin, Alaska Airlines, Delta, JetBlue, NetJets, and UPS
  - 50K records including aircraft weights, flight times, and fuel use between specific airport pairs
- Data was used to generate average fuel use statistics and the normalized fuel efficiency metric for eight city pairs
  - Insights on effects of different weight classes, sample sizes, and the need for "representative" traffic data
  - Options for aggregation include by city pair, by region, aircraft weight class, etc

Data Sharing of OOOI Fuel- and Weight Reports

- Data in these reports supports metrics for fuel use between city pairs (as mandated by Congress) and the NAC fuel efficiency metric
  - Several airlines have confirmed that sharing this data is relatively low in effort and are willing to generate periodic reports
  - Data will also be helpful in improving the performance of fuel use models
- BCPMWG is refining the requirements for data sharing and management based on lessons learned to date.
- **Finding 1:** Fuel trends are impacted by aircraft weight classes flown, accurate metrics depend on valid sample sizes and the availability of "representative" traffic data. Ways to aggregate data may include by city pair, by region, and by aircraft weight class.
- **Recommendation 1:** To formalize routine sharing of fuel and weight data by flight, FAA should designate and fund a data steward to set up routine OOOI-based fuel and weight data sharing.

Understanding and Isolating NextGen Impacts on Fuel use

- City-pair metrics provide trending information, additional metrics (and supporting data) may be required to understand the underlying causes
- BCPMWG explored the use of the ASIAS infrastructure as a data source
  - There are strong institutional reasons to maintain the safety focus of ASIAS
  - Duplicating the ASIAS infrastructure is not cost-justified
- **Finding 2:** Use of the ASIAS infrastructure is not appropriate for understanding and isolating specific NextGen impacts on fuel usage.

Understanding and Isolating NextGen Impacts on Fuel use (cont'd)

- Flight operators have indicated the desire to have greater insights of specific NextGen impacts on fuel information
  - Selected Flight Data Recorder data elements, in combination with other data, will be needed for accurate measurements that can isolate specific NextGen impacts
  - Flight operator willingness to share will be shaped by the specificity of data requests
- Understanding these data elements will require research on what detailed data is needed to isolate NextGen impacts – balancing sensitivity and cost of data generation against benefits gleaned.
- **Recommendation 2:** FAA should collaborate with the aviation community to identify the specific data elements that are most useful to support a ' calibrate and count' approach to estimate achieved NextGen fuel use impacts.

Next Steps

- BCPMWG is refining both metrics calculation guidance and data definitions
  - Continuing to explore criteria for data validity and minimum data reporting requirements
- Needs for data and publicly shared metrics will evolve;
  - A formal oversight group, consisting of industry and government stakeholders, will be helpful in facilitating consensus within the community on these evolving needs.
- Continuing outreach to GA & DOD communities on fuel data sharing
- BCPMWG will continue to explore sharing of detailed data to support understanding of specific NextGen impacts on fuel use

DISCUSSION

NAC Action

Consider Report on:

Data Sources for Measuring NextGen Fuel Impact

and Transmit to FAA

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Recommendation for Implementing Categorical Exclusion Contained in FAA Modernization Act of 2012

CatEx2 Task Group

Co-Chairs:
Nancy Young, Airlines for America
Katherine Preston, Airport Council International, North America

"CatEx 2" Tasking – September 2012

- Explore means of implementing Section 213(c)(2) in the FAA Reauthorization Legislation (Public Law 112-95)
- Section 213 seeks to accelerate NextGen elements by adding legislatively-mandated "Categorical Exclusions" under NEPA review requirements
  - FAA has issued guidance for implementing 213(c)(1) ("CatEx 1") covering FAA-identified RNAV & RNP procedures at core airports and others in vicinity
- Section 213(c)(2) would cover other airports (in addition to those covered by CatEx 1) and does not require consideration of "extraordinary circumstances"
  - But does require showing of noise reduction of a "per-flight" basis

45

CatEx2 Task Group Members

Mix of expertise and backgrounds

Dan Allen, Federal Express
Fred Bankert, MITRE
Andy Cebula, RTCA
Perry Clausen, SW Airlines
Mel Davis, NATCA
Mary Ellen Eagan, HMMH
Margaret Jenny, RTCA
Nate Kimball, PANYNJ
Sandy Lancaster, DFW
Chad Leqve, MSP
Robert Luhrs, Raytheon Systems
Lourdes Maurice, FAA (SME)
Dennis McGrann, NOISE
Dan McGregor, The Boeing Company
Glenn Morse, United Airlines
Katherine Preston, ACI - NA
Leslie Riegle, AIA
TJ Schulz, Airport Consultants Council
Bill Sears, FAA (Observer)
Ken Shapero, GE Aviation
Scott Tatro, Los Angeles World Airports
Emily Tranter, NOISE
Travis Vallin, jviation
Nancy Young, A4A

46

Key Issue – How to Assess "Measurable Reductions" in Noise on a "Per-Flight" Basis

The Categorical Exclusion in Section 213 (c)(2), Acceleration of NextGen Technologies:

"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."

47

Congressional Language and Input from Hill Staff

1) Overall Purpose – Facilitate implementing RNAV/RNP approaches

2) "Per Flight Basis" further defined in *Conference Report* accompanying the bill

House bill modified to change language to separate OEP and non-OEP airports to establish separate timelines and milestones, 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 …**

3) Confirmed that CatEx2 does not require consideration of "extraordinary circumstances"

48

Task Group Work Plan to Develop Recommendation

1. Determined and reached consensus agreement on the scope of the task that guided the process of deliberations and subsequent outcome of Task Group recommendation.
2. Reviewed Congressional language and associated reports and met with key Congressional staff, considered the intent of the CatEx 2 language and what it was designed to achieve.
3. Developed baseline, high level understanding of NEPA and FAA noise modeling and assessment.

Task Group Work Plan (cont.)

4. Reviewed analysis work conducted by the FAA on implementation of the CatEx 2 language.
5. Evaluated other possible approaches to implementing “per flight” noise measurement techniques to implement CatEx 2 provision: Development of a method to implement CatEx 2.
6. Developed recommendation: “Net Noise Reduction Method”

Key Observation, Findings & Outcomes – Most Relevant to Recommendation

- Aircraft "noise" does not only involve sound energy, it involves the exposure and experience of people to the sound energy
- Transparency and defensibility of a solution are important to effective implementation of CatEx 2
- FAA provided important and proficient technical analysis setting out the options with a focus on the "per flight" element of the legislation
- Legislative history (conference report) allows for averaging the noise impact on a representative basis over flights undertaking a particular procedure (congressional staff concur)

51

Key Findings – Most Relevant to Recommendation (continued)

- There are other CatExs that can and do apply to PBN procedures – these are unaffected by the CatEx 2 Task Group work
  - Pre-existing CatExs for procedures are spelled out in Section 311 of FAA Order 1050.1E
  - Also, CatEx 1 now is available
- While not compelled by or specific to CatEx 2, the Task Group notes that community outreach can be important to community acceptance of new procedures

52

Recommendation

- The CatEx 2 Task Group recommends that the FAA implement a system for noise analysis described in this document, referred to as the "Net Noise Reduction Method," as the means to meet the requirements of Section 213(c)(2) of Public Law 112-95.

NOTE: Unanimous recommendation from diverse Task Group membership!

53

Summary of Approach

Step 1. Determine noise-sensitive "area of concern", Day/Night Average Sound Level (DNL) 45 decibels (dB) and above:

- FAA Order 1050.1E calls for noise screening to evaluate changes in DNL down to DNL 45 dB
- FAA also suggests DNL 45 dB is lower limit of FAA noise models/tools computational reliability

Step 2. Determine change in number of people exposed to noise in DNL bands on an average per-flight basis, by Detailed Grid Computations, comparing existing procedure to proposed procedure at noise-exposed locations

- Uses DNL as metric (i.e., consistent with FAA policy), to construct a "procedure-specific DNL" (reflecting noise from particular procedures)

54

Summary of Approach Applying Steps 1&2

	Number of people exposed to DNL Level with new PBN procedure versus existing procedure		
DNL Level	Number of People Exposed under New Procedure INCREASES	Number of People Exposed under New Procedure DECREASES	Number of People Exposed under New Procedure UNCHANGED
>65			
60-65			
45-60			
Total			

55

Summary of Approach (continued)

Step 3. If **net number of people** exposed to noise overall **decreases** **and number of people in the DNL 65 dB contour band decreases (or does not increase)**, the PBN procedure **qualifies for CatEx 2**

- If the **net number of people** exposed to noise overall **decreases, but the number of people in the DNL 65 dB contour increases**, FAA should consider also whether the increase in noise exposure in the DNL 65 dB contour has a "significant impact"
- "Significant impact" is considered to be a 1.5 dB noise increase or greater in the DNL 65 dB contour

Key Findings for Implementation: (1) FAA Noise Screening Tools Can Be Used to Implement This Method; (2) Can Be Applied to a Single Procedure or Multiple Procedures

56

Analysis Used to Develop, Demonstrate and Refine Net Noise Reduction Method

- Theoretical Approach at Seattle Tacoma International Airport
- Greener Skies over Seattle Environmental Assessment
- Midway Environmental Assessment

Additional Observation and Comments:

- EAs used because available, existing FAA tools would be used in its application
- Special thanks to Mary Ellen Eagan and HMMH for analysis work and support!

57

Additional Implementation Considerations

- Time to Implement: Because Section 213(c)(2) requires a demonstration of noise reduction (as well as fuel burn and carbon dioxide emissions reduction), undertaking the analysis to support CatEx 2 might take more time than the analysis to support other Categorical Exclusions
  - Analysis to support other Categorical Exclusions averages approximately 2 months
  - The Task Group believes that analysis to support CatEx 2 could take, on average, approximately 3-4 months – but much less time than a typical EA (18 months)
- Stakeholder coordination important

58

DISCUSSION

NAC Action

Consider Recommendation on:

Implementing Categorical Exclusion Contained in FAA Modernization Act of 2012

and Transmit to FAA

BACKUP SLIDES

Illustration – Overall Net Decrease & Decrease/No Increase in DNL 65 dB

DNL Level	Number of people exposed to DNL Level with the new PBN procedure versus existing procedure		
	Number of people exposed INCREASES	Number of people exposed DECREASES	Number of people exposed UNCHANGED
45-50	16,823	38,384	264,717
50-55	7,251	56,061	129,290
55-60	91	11,293	94,649
60-65	0	0	46,660
65-70	0	0	8,672
70-75	0	0	4
75-80	0	0	0
Total	24,418	105,738	543,992

In this case, the terms of the CatEx 2 would clearly be satisfied

Illustration – Overall Net Decrease but INCREASE in DNL 65 dB

	Number of people exposed to DNL Level with the new PBN procedure versus existing procedure		
DNL Level	Number of people exposed INCREASES	Number of people exposed DECREASES	Number of people exposed UNCHANGED
45-60	114,678	305,653	488,047
60-65	16,436	5,469	48,536
> 65	1,370	0	14,806
Total	132,484	311,122	551,389

In this case, to ensure that noise in the DNL 65 dB contour would not increase to a degree that would call the use of CatEx 2 into question, FAA could confirm that the noise increase experienced in the 65 DNL dB contour is not 1.5 dB or higher (NOTE: in this case, the analysis showed the noise increase in DNL 65 dB was below 1.5 dB – thus, CatEx 2 would be satisfied)

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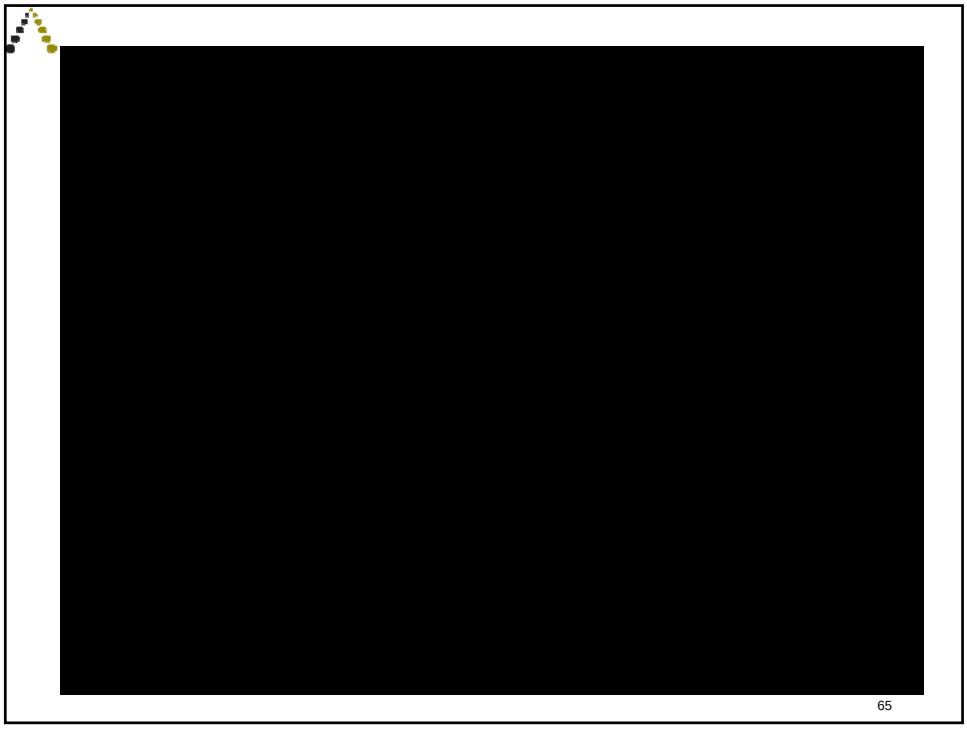
Lunch



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Performance Based Navigation (PBN)

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Operational Capabilities Work Group

Steve Dickson, Delta Air Lines (A4A)
NACSC Co-Chair

OCWG Co-Chairs:
Tom Bock, Port Authority of New York & New Jersey
Bill Murphy, International Air Transport Association

FAA Tasking: Obstacles & Mitigations to PBN Utilization

- 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.

Methodology and Structure of Analysis

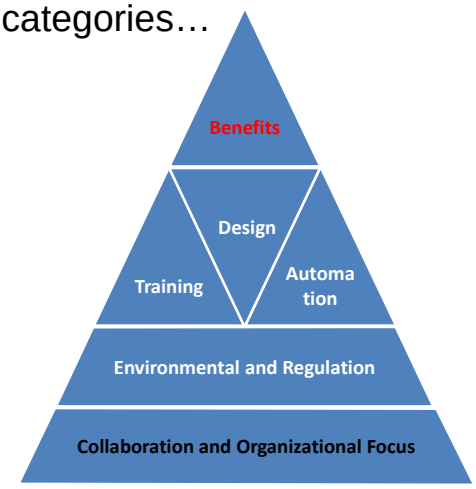
- Reviewed FAA Lentini Report
- Reviewed ICAO and PARC documents
- Discussions with various stakeholders
- Identified additional obstacles to PBN
- Organized obstacles into categories
- Developed priorities obstacles from industry position

Findings

- The OCWG has identified five categories that characterize the obstacles to utilization of existing procedures and successful implementation of new PBN (PBO) procedures.
  - Automation; Design; Environmental; Regulations; Training.
- This categorization has used as a framework for the OCWG's initial efforts in developing technical and non-technical actions for the FAA and Industry to take to resolve identified obstacles.

Comprehensive List of Obstacles

- Five inter-related categories…
- Automation
- Design
- Environmental
- Regulations
- Training



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Prioritization of Obstacles

- All New Obstacles Identified and Analyzed
- Identified Impacts Resulting from Obstacle
- Determined Obstacle Impact - Current, Future of Both
- Developed a Ranking Strategy
  - High, Medium, Low - Both Cost and Benefits
- Developed Mitigation Actions

72

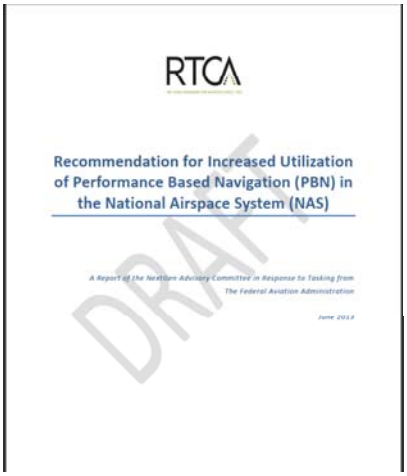
Top Mitigation Actions

- Short-Term: prioritize, align and apply Time Based Flow Management adaptation to Metroplexes with near-term PBN implementation;
- Longer-Term: identify and address the barriers to time based flow management, coordinating all stakeholders.
- Define a clear objective communicated with all participating stakeholders.
- Develop a robust national simulation capability for high percentage of the aviation fleet.
  - Use a standard process incorporating lessons learned to account for broader operator participation in an environment of limited resources.
- Rewrite the 7110.65 and other associated documents and update on a more frequent cycle.
- Develop and maintain a national training program that standardizes local procedural training.
  - Local PBN training should include all operational stakeholders.
  - Use Greener Skies 3 phase model of baseline.

73

Outcomes

- 19 Recommendations
  - 15 Mitigation Actions Identified
    - 5 Top Mitigation Actions Prioritized
      - High Benefits



74

Recommendation

Based on this analysis, the OCWG recommends the following:

- The FAA should adopt all of the recommended mitigation actions contained in this report. Priority should be placed in addressing the top five set of recommended mitigation actions.
- The FAA should provide regular updates to the NAC on progress and status of its actions to address these recommendations.

75

DISCUSSION

76

NAC Action

Consider:

Recommendation for Increased Utilization of Performance Based Navigation (PBN) in the National Airspace System (NAS)

and Transmit to FAA

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NAC Taskings Discussion

Recommended Taskings

- NextGen Prioritization
- Prioritized Capabilities and Locations
- Checklist
- Performance Requirements for Ground Automation
- Performance Goals

Taskings Discussion #1

- **NextGen Activity Prioritization:**
- In light of budget pressures and possible sequestration impacts - review current FAA plans and activities that have an effect on the implementation of NextGen and develop a prioritized list of Tier 1 (consensus on activities that should continue no matter what) and Tier 2 (consensus on things that should continue, resources permitting) recommendations. This task would include the following activities:
  - Identify relevant activities within FAA that have an impact the NextGen implementation
    - Review the NextGen Implementation Plan (NGIP) as well as previous NAC recommendations for integrated capabilities and non-technical barriers to NextGen and other relevant information
  - Establish criteria for prioritizing activities into Tiers 1 and 2
    - Criteria to consider benefits, costs and risks, ripple effects/interrelationships along programs and activities
  - Apply criteria to list of relevant activities and complete prioritization
  - Produce Tier 1 and Tier 2 list

Taskings Discussion #2

- **Revised Prioritized List of NextGen Integrated Capabilities and Locations**
  - Starting from previous NAC integrated capabilities recommendations (May 2012 NAC), and taking into account reduced budgets and current FAA NGIP, develop a shorter (i.e., 3-5) list of locations for deployment of selected capabilities in the near-term.
  - Selection criteria to include, among others: (1) risk assessments, (2) costs, (3) benefits, (4) network/system-wide effects

Taskings Discussion #3

- **Blueprint for Success of Performance Based Navigation (PBN): A Checklist**
  - With the goal of achieving maximum benefit from implementation of PBN procedures, develop a **checklist** for planning and executing new procedures (including all necessary technical and non-technical aspects) that can be used to guide future PBN initiatives. Checklist would include, at minimum, the following:
    - Identify all stakeholders in the process and define roles and interest(s)
    - Indentify stakeholder outreach strategies
    - Incorporate lessons learned from previous and ongoing PBN initiatives both domestic and international (e.g., Greener Skies, OAPM-1)
    - Identify method of transferring expertise and lessons learned from previous PBN implementation efforts to next set

Taskings Discussion #4

- **Minimum Performance Requirements for Selected Integrated NextGen Capabilities**
  - Consider the output of Task 2 (integrated NextGen capabilities that will require coordinated design, development, deployment and training of both cockpit avionics and ground automation across domains (e.g., PBN, time-based metering, ATC Automation, Optimized Profile Descents (OPDs), surface traffic management)
  - For the prioritized set of operational capabilities, identify minimum requirements for requisite ground automation and decision support tools (i.e. what will be needed to ensure delivery of user benefits)
    - Develop scenarios for each set of capabilities to aid in identifying minimum performance requirements
  - Consider capability modules defined in the ICAO Aviation System Block Upgrades (ASBUS) and incorporate as appropriate
  - Specify application of Best-Capable, Best-Served for the selected capabilities in the identified locations

Taskings Discussion #5

- **Develop goals associated with the NextGen Performance Metrics**

  Details TBD

  For each high-level NextGen performance metric, suggest where to set the target on performance goals

Current/Ongoing NAC Taskings

- **Fuel Data Sharing for Measuring System Performance**
  - Complete work underway in BCPMWG of the NAC
- **Performance Based Navigation (PBN) Procedures**
  - Criteria for prioritizing PBN procedures
  - Criteria for selection & prioritization of Optimization of Airspace & Procedures in Metroplexes (OAPM) sites
- **DataComm Roadmap**
  - Re-engage NAC (DataComm Roadmap Task Group) to complete work on DataComm roadmap. Include all stakeholders who chose to abstain from previous effort due to ongoing FAA acquisition.

85

NAC Action

Consider:

Recommendation for 2013-2014 Proposed Taskings

and Transmit to FAA

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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

Wednesday/Thursday

September 18/19, 2013

Washington, DC

Adjourn

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RTCA Paper No. 044-13/NAC-20

February 27, 2013

Meeting Summary, February 7, 2013
NextGen Advisory Committee (NAC)

The eighth meeting of the NextGen Advisory Committee (NAC) held on February 7, 2013 at the Hotel Monaco Ballroom, Salt Lake City, UT convened at 9:00 a.m. The meeting discussions are summarized below. Attendees are identified in Attachment 1; the presentations for the Committee is Attachment 2 (containing much of the detail about the content of the material covered); the revised Terms of Reference approved by the Committee is Attachment 3; the Chairman's Report is Attachment 4; the FAA Report from The Honorable Michael Huerta, FAA Administrator is Attachment 5; the revised final report "Key City Pairs for Measuring NextGen Performance", approved by the Committee during the meeting is Attachment 6; and the outcome of the Committee Group Exercise is Attachment 7.

Welcome and Introductions

Mr. Bill Ayer, Chairman of Alaska Air Group and the Chairman of the NextGen Advisory Committee called the meeting to order and welcomed the NAC members and others in attendance. All NAC members and attendees from the public were asked to introduce themselves. (NAC and General Public Attendees are identified in Attachment 1) Chairman Ayer recognized new Committee members Frank Brenner from EUROCONTROL, Lillian Ryals of The MITRE Corporation, Mike Perrone of the Professional Aviation Safety Specialists (PASS), and Pamela Whitley from the FAA NextGen Office.

Designated Federal Official Statement

Designated Federal Official (DFO), The Honorable Michael Huerta, FAA Administrator read the Federal Advisory Committee Act notice governing the open meeting.

Approval of October 4, 2012 Meeting Summary

Chairman Ayer asked for consideration of the written Summary of the October 4, 2012 meeting. The Committee approved the Summary with no revisions or objections. He also asked for and received approval for a revised NAC Terms of Reference that reflect the new Chair and DFO changes, along with editorial clean-ups.

Chairman's Remarks

Mr. Ayer began his comments by stating his desire to build on the leadership of previous committee chairman Dave Barger; being optimistic as well as realistic. He acknowledged that there are doubters of NextGen and he wants to highlight implementation successes to keep grounded on the realities of what is occurring in the aviation industry. Reflecting on the previous

day's tour of the FAA En Route Center and the Tracon and tower facilities, he complimented the air traffic controllers and the FAA for the collaborative effort to implement the En Route Automation Modernization (ERAM), the new platform for managing air traffic and a key technology for NextGen. He also emphasized the need to use plain language when communicating about NextGen and that this would be the goal for the Committee Group exercise later in the meeting.

In his comments, he reviewed the goals of NextGen (increasing safety, capacity, and efficiency along with decreasing environmental impact) and the history of RTCA Task Force 5 (TF5). That initiative brought the aviation community together to provide the FAA with a prioritized list of operational capabilities, strategies to close the business case and coordinated implementation strategies. These recommendations have been integrated into the FAA's plans providing transparency in how the Agency has addressed each recommendation. He reminded the members of the Committee that the NAC was established at the recommendation of TF5 to provide the FAA with continued FAA-industry collaboration and consensus building on NextGen implementation, where FAA and all NextGen stakeholders would plan, execute and track NextGen, holding all accountable to commitments and tracking progress.

Mr. Ayer summarized the 19 recommendations delivered by the NAC to the FAA covering:

- Best-Capable, Best-Served
- Financial Equipage Incentives
- Prioritized Deployment Locations
- National Airspace System (NAS) Performance Metrics
- Environmental Review Process
- Trajectory Operations
- DataComm

He concluded this section by providing the following summary of the recurring themes from the Committee's recommendations to the FAA that build on the principles from TF5:

Capabilities – NextGen is about more than technologies. Policies and procedures must also be implemented along with requisite training and other components required to deliver the full benefits of NextGen**.**
Investment – more than any preceding modernization effort, NextGen will require substantial investment on the part of the operators.
Business Case – since NextGen requires unprecedented investments on the part of not only the FAA, but the operators and industry, there must be a positive business case for that investment.
Benefits – to encourage equipage, operators must be assured of realizing benefits within an agreed upon period of time.
Commitment – a key part of closing that business case is confidence that the FAA will deploy NextGen capabilities when and where promised, and that all stakeholders will adhere to commitments.

Metrics – Much of the work of the FAA and its NextGen stakeholders has revolved around defining the appropriate metrics against which we can collectively and transparently measure the success of NextGen.
Efficiency – A major goal of NextGen is to improve the efficiency of the Air Traffic Management System**.**
Transition – NextGen is not an end-state; it is a journey, with increasing capabilities delivering benefits and increasing stakeholder confidence along the way.

Gary Beck, Vice President of Flight Operations for Alaska Airlines, was then asked to provide an update on the Seattle Greener Skies implementation effort, including the Flight Trials, Environmental Study, Instrument Procedures Production and Post Implementation review. Mr. Beck emphasized that collaboration among the FAA, air traffic controllers, Port of Seattle, airlines, and The Boeing Company was necessary to make this work. An outcome is increasing arrival rates and deconflicting traffic with Boeing Field. In response to a question from a Committee member about the acceptance of the new procedures, he stated that the controllers and pilots were involved in the development process and are now working through the implementation. He commended the National Air Traffic Controllers Association (NATCA) for its support of the initiative. FAA officials commended Alaska Airlines for its work on the three-plus year Greener Skies project and helping to work through issues of pilot and controller involvement in the design and implementation process.

Concluding his remarks, Chairman Ayer outlined lessons learned from Alaska Airlines business transformation that could be instructive to the work of the Committee.

FAA Report
The Honorable Michael Huerta, Administrator, FAA presented the FAA report covering the following areas (details of his report are contained in Attachment 5):

- FAA/DOT Personnel Update – recent announcement by DOT Secretary LaHood that he will be leaving his position; the FAA is working on naming a new Deputy Administrator that will serve as the Agency's champion for NextGen as the Chief NextGen Officer; with the retirement of Vicki Cox, Pamela Whitley has been named as Acting Assistant Administrator for NextGen.
- Boeing 787 – addressed recent developments with the Boeing 787 aircraft.
- Budget/Sequestration – the FAA faces across the board budget cuts of 5% on March 1 (unless Congress acts) that will force the reduction of core services. (The original estimate of an 8.2 percent across-the-board cut has been reduced now to a 5 percent across-the-board cut for FAA.) In addition to the sequestration, the FAA does not have a budget approved for FY2013, currently funded by a Continuing Resolution that expires after March 27, 2013. After March 27, the agency will need an approved budget or another continuing resolution to keep operating.
- Update on DataComm – the FAA has committed to DataComm as the way of the future, awarding a contract in September to integrate DataComm into ground automation, telecommunications, security firewalls, air-ground network services and aircraft avionics. The FAA is considering the recommendations from the NAC as it determines how to move forward with

DataComm - a team of experts from across the agency, all of whom have a role in implementing DataComm, is analyzing and debating those recommendations in an orderly manner.

- NextGen Implementation Plan (NGIP) – the 2013 plan will be released in March.
- Harmonized Metrics – David Grizzle, Chief Operating Officer for the FAA Air Traffic Organization explained that the FAA has implemented the recommendations provided by the NAC at the October, 2012 meeting on City Pairs into its metrics reporting. The Agency is also incorporating recommended high-level metrics into its metrics harmonization process addressing various sources of performance metrics. Nancy Kalinowski, Vice President Systems Operations Services, FAA ATO provided the briefing of this initiative that will result in 26 metrics that will be presented on FAA's website.
- NextGen Optimized Profile Descents (OPDs) in metro Washington, DC – Lynn Ray, Vice President Mission Support, FAA ATO and David Surridge from US Airways explained the implementation of OPDs that were designed to improve the efficiency of operations by minimizing level-offs and track miles. The annual projections are for $2.3M in savings, $760K savings in fuel, a reduction of 7,300 metric tons of CO2 emissions and a reduction of 285K NM flight distance.

In response to a question from an FAA official about pilot acceptance of the procedures, Mr. Surridge commented that it is important to explain to pilots why the procedures are being implemented as well as identifying and resolving any issues that need to be mitigated and to add the procedures as a part of recurrent training. Another committee member asked about whether the new procedures required additional or new equipage, in reply it was stated that no new equipment was required. Subsequently, it was pointed out by a committee member that this principle of making use of existing equipment was a foundation of the TF5 recommendations. Other Committee members emphasized the culture changes by pilots and controllers that are necessary for successful implementation.

NextGen Implementation Metrics

Chairman Ayer introduced the co-chair of the NAC Subcommittee (NACSC), Steve Brown, Chief Operating Officer, National Business Aviation Association, who presented a briefing on the recommendation for key city pairs evaluation of Transcon/Regional City Pairs that can be used for NextGen metrics. Mr. Brown explained that at the request of the NAC during the last meeting, the NACSC reconvened the Key City Pairs Task Group to evaluate city pairs for transcontinental traffic and key city pairs for regional carriers.

Mr. Brown explained that the Task Group evaluated adding transcontinental city pairs to capture additional NextGen benefits in En Route airspace and concluded that it is relevant to include one representative Transcon city pair. There was a caution against overweighting Transcon pairings based on relevance for NextGen measurements. This includes the following characteristics of Transcon operations:

- Low operations numbers
- Low delay hours
- Variations of flight paths

The recommendation was to include New York - Southern California Transcon City Pair.

The Task Group also analyzed the possibility of adding one or more city pairs that have a significant representation by regional airline operators. The NAC had expressed a desire to capture city pairs in which aircraft spend most of the time on the surface and in arrival/departure phases of flight. In evaluating the list of 24 city pairs recommended to the FAA, it became apparent that these capture significant regional operations that include both short-lengths as well as long-haul regional flights.
For example, regional operations account for 50% or more of total operations in the following Key City Pairs:

- Chicago – Memphis
- Memphis – New York
- Charlotte – Chicago
- Charlotte – New York
- Six other city pairs included in the recommended list also include a significant percentage (nearly fifty percent) of regional operations.

It was recommended to the NAC that no additional regional city pairs are necessary.

Committee Action: The Committee agreed by consensus to approve the recommendation adding a transcontinental City Pair to its initial recommendation of 24 Key City Pairs (Metroplex Pairs) between which the FAA is measuring the impact of NextGen on NAS performance. The agreement to include the New York - Southern California Transcon City Pair helps capture additional NextGen benefits in En Route airspace. The revised version of the **Key City Pairs for Measuring NextGen Performance** will be submitted to the FAA.

In follow-on comments, Chairman Ayer encouraged the Committee members to visit the FAA NextGen website: <http://www.faa.gov/nextgen/snapshots/ to see the use of performance metrics from recommendations that have been made by the Committee.

Fuel Burn Data Source
Ed Lohr, Delta Air Lines and Debby Kirkman, The MITRE Corporation the co-chairs of the Business Case and Performance Metrics Work Group (BCPMWG) were asked by Chairman Ayer to review the initiative to identify and obtain critical data sources to track and analyze the impacts of NextGen on fuel usage. This work includes:

1) Establishing a team of Subject Matter Experts from the aviation industry and the FAA to establish detailed requirements for airline fuel and aircraft weight reports in support of high-level fuel efficiency metrics.
2) The continued research into the use of the Aviation Safety Information Analysis & Sharing (ASIAS) infrastructure to support both high-level and diagnostic-level metrics.

The BCPMWG is developing data sharing agreements with air carriers to support prototyping of public metrics using existing OOOI (out, off, on, in) ground and flight time data. In addition, an Ad Hoc group of airlines and other users has been created to consider options and recommend a data sharing governance and infrastructure program.

In response to a question from Mr. Huerta and subsequent comments from other Committee members, the co-chairs explained that the outreach and exploratory work is to determine if the data sources provided to ASIAS could be used, or if an ASIAS like structure should be developed. As an outcome of the discussion, it is apparent that members of the NAC would prefer deriving data from sources not directly provided to ASIAS.

A recommended course of action will be proposed for consideration at the June meeting of the Committee.

CatEx 2 Task Group

Mr. Brown, along with the co-chairs of the CatEx 2 Task Group, Nancy Young from Airlines for America and Katherine Preston from Airports Council International – North America provided a review of the work underway to develop a recommendation for implementing Congressional authority for Categorical Exclusions under the National Environmental Policy Act requirements (CatEx2). The FAA requested that the NAC explore how to implement Section 213(c)(2) of Public Law 112-95 for CatEx2 by reviewing the FAA's internal analysis, developing recommendations for measuring impacts on a per flight basis and determining whether additional recommendations for streamlining environmental reviews are needed. The briefers explained that the legislative authority is designed to foster the implementation of RNP but presents challenges in the requirements for identifying measurable reductions in fuel consumption, carbon dioxide emissions and most significantly, noise on a per-flight basis presents a challenge.

In response to questions from Mr. Huerta and other Committee members, the co-chairs outlined that the potential noise assessment, while effective for evaluating singular procedures, must be "scalable" in complex airspace and in locations with multiple procedures. The Task Group is doing additional analysis to make this determination and will be meeting with FAA environmental experts to outline the technical approach under development by the Task Group. In response to a question from Committee members, the co-chairs committed to briefing Congressional staff on the direction that the Task Group was taking in its recommendation.

Mr. Huerta emphasized the importance of having a "tool" that enabled the CatEx 2 provision to be implemented in Metroplex areas. Another Committee member from the FAA commented that the Congressional language should prompt people to look at the issue by aircraft flight – asking if the Task Group was not being open to a new way to do so. Ms. Young replied that the process to determine the impact must not be too complex (not require significant time), but the Task Group included experts on evaluating noise and has determined that the proposed modified noise contour was workable. She pointed out that the issue to be resolved is the application beyond "simple procedures."

Numerous members of the Committee commended the Task Group leaders for the work of the Group. A representative from the FAA commented that they were impressed by the level of work and the broad group of stakeholders that have been assembled with the right type of expertise – their hope is the Task Group can work through the identified issues.

The co-chairs specifically recognized Mary Ellen Egan of HMMH for her work in developing the noise analysis framework. Chairman Ayer concluded the discussion by thanking the Task Group, encouraging them to "keep up the good work" and expressing his enthusiasm for the recommendation that will be presented at the NAC June 4, 2013 meeting.

Obstacles to Performance Based Navigation (PBN) Utilization

Chairman Ayer introduced Steve Dickson, Sr. Vice President, Flight Operations, Delta Air Lines, NAC Subcommittee co-chair who reviewed the status of the Operational Capabilities Work Group (OCWG) efforts to identify obstacles to PBN utilization, both technical and non-technical, and recommendations to mitigate these barriers. He also called on Tom Bock from the Port Authority of New York and New Jersey to respond to questions as well. Tom serves as the co-chair of the OCWG along with Bill Murphy of the International Air Transport Association (IATA).

The following seven categories of barriers have been identified:

- Design
- Regulatory
- Automation
- Environmental
- Training
- Organization/Collaboration
- Mixed Equipage

A committee member from the FAA pointed out that the current work to revise and update the controller handbook was consistent with the areas identified and supports the efforts to address barriers to PBN implementation. Another Committee member explained that the Commercial Aviation Safety Team (CAST) had done work on safety enhancements and that the OCWG should coordinate with the FAA to ensure consistency and build on the existing data available. Jay Pardee was identified as the individual from the FAA to contact.

Mr. Dickson concluded the discussion by noting that from an operator perspective, the top three barriers were regulatory/policy, automation for the air traffic controllers and environmental issues.

A recommendation on the barriers and mitigations will be presented to the NAC at the June 4, 2013 meeting.

Open Discussion: Issues Associated with Implementing RNAV/RNP

Chairman Ayer introduced Margaret Jenny, President, RTCA who outlined the "workshop" portion of the meeting. Ms. Jenny introduced Jim Bowman, Vice President, Flight Operations and Dan

Allen, Senior Manager, Air Traffic Operations from FedEx Express who provided a "real world" operator's experience and perspective on implementing RNP including the opportunities for fuel savings, emissions reductions, improvements in efficiency, and the challenges to achieving the benefits needed to close the business case for equipping.

They explained that FedEx began using OPDs in 2009, emphasizing the importance of collaboration between controllers and pilots, as well as FAA certification/flight standards and air traffic organizations. Controller tools for timing and sequencing are vital to smooth operations of multiple streams of aircraft.

Ms. Jenny then explained that the various briefings and discussions during the day set the stage for a Committee group exercise with the assignment of developing a press release outcome associated with implementing PBN in a community. The output of the breakout groups (Attachment 7) emphasized the messages of concentrating on what matters to a traveler (enhanced safety, reduced delays, shorter flight times, fewer delays) and the community (less noise, lower emissions, maximizing existing physical infrastructure, improved access).

During review of the draft releases, Committee members commented that there must be a dialogue and outreach to the community and this must capture the positive aspects of RNP and the use of GPS technology including the benefits of dependability and reliability. The FAA has a role to play in explaining the aviation industry to the community and the value of the industry in a specific region/locale. Other members identified the need to engage and educate the community early in the process; include those outside of the traditional aviation industry (businesses, community leaders, etc.) and tailor the strategy for the community. It was also suggested that the outreach be timed to match the implementation of the procedures.

In concluding remarks, Committee members stated that the NAC "feels like a partnership"; hearing about successes is important and they look forward to this being a feature of future meetings; we should celebrate success, communicate success and be certain to connect success to what matters to communities and policy makers.

Chairman Closing

Chairman Ayer offered his closing remarks by thanking the NAC members for supporting him as chairman and stating that "collaboration" was the critical word for the meeting and for the future.

Other business

No other business was raised.

Adjourn

Chairman Ayer ended the meeting of the Committee at 2:45 p.m.

Next Meeting

The next meeting of the NAC is June 4, 2013 in Washington, DC.

Bill Ayer, NAC Chairman's Report

June 2013

Intro

We have come a long way since the first meeting of the NAC in the Fall of 2010. In a highly competitive aviation industry, the NAC stands out as a beacon of what can be accomplished when we set aside our differences and work toward the common good. We have accomplished a great deal, but as we face the truly daunting challenges of implementation, it will be incumbent upon us to work hard to hold the coalition together.

Remaining committed to the goal of implementing NextGen through an evolutionary, benefits-driven approach as clearly articulated by Task Force 5, we will continue to be called upon to identify and resolve the barriers to achieving the much needed benefits of NextGen.

Delivering near- and mid-term operational capabilities leveraging existing equipage will help accomplish a couple of 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 investment in future, more sophisticated NextGen capabilities.

Equally important is that we celebrate our successes. We have worked in collaboration with the FAA to define performance metrics, and now we must set goals for those metrics and measure performance against those goals. If we work together, the outcomes will speak for themselves.

Review NAC efforts

During our last meeting we saw firsthand the great effort underway by the FAA-Controllers and Lockheed Martin to implement ERAM; we approved final recommendations on City-Pairs that the FAA between which the FAA can measure the effects NextGen; and we discussed progress on the work of the Operational Capability Work Group in identifying barriers to PBN implementation and the mitigations to those roadblocks. At out June meeting, we will be considering the final recommendations in three areas,:

(1) PBN barriers and solutions

(2) The streamlined environmental review process referred to as CatEx 2

(3)A an interim report on sources for measuring fuel burn

During our February 2013 meeting press release exercise we emphasized the need to concentrate on what matters to a traveler (enhanced safety, reduced delays, shorter flight

times, fewer delays) and the airport communities (lower emissions, maximizing existing physical infrastructure, improved access).

Our workgroups are passionate about finding ways to ensure that the ATM system meets the needs of the flying public in a cost-effective manner. We have worked shoulder to shoulder with the FAA to search for win-win solutions to some of the most vexing challenges to modernizing the air transportation system. This difficult work has been conducted under the shadow of budget pressures and sequestration. We have great momentum now and it is my goal to leverage that energy and good will to overcome the barriers to NextGen implementation.

Reaching a Tipping Point

Simply put, we are at a "Tipping Point" (Graphic Projected)

NextGen is more than technology, it is also :

- Policies – that enable more creative and efficient use of existing capabilities and the introduction and implementation of new technology
- Procedures – the virtual infrastructure and practices that move the industry forward with capabilities enabled by technology and policies
- Return on Investment – the all important assurance for operators and the FAA that investments in NextGen will lead to savings and operational improvements

Our path to full NextGen deployment is replete with potential roadblocks, including:

- Sequestration and budget constraints
- Complexity– Increasing size, complexity and diversity of demand
- Integration - need to deploy communications, navigation, surveillance and ATM capabilities in an integrated fashion that deliver both local and nationwide performance improvements. This includes the automation decision support tools required by pilots and controllers.
- Lack of Confidence – the all important issue of trust among the various stakeholders involved in NextGen implementation that commitments will be met by all parties involved and that we will receive a positive return on our investments.

Next Steps

Momentum will help overcome future hurdles. Nothing breeds success, like success. The NAC members are poised to be the catalyst to help us over the tipping point toward successful implementation of NextGen.

My goal as Chairman of the NAC is for us to be constructive in our recommendations – not antagonistic.

We will reach that summit by concentrating our collective efforts in high priority areas:

- Prioritizing - select a smaller number of things – take action – promote success
- Document and share lessons learned and apply to improve future implementation of NextGen procedures and capabilities
- Ensure an integrated solution where the C, N, S and ATM components of each operational capability work in concert to provide benefits.

We must set reasonable expectations. If we have learned nothing over the past few years, we have learned that planning is relatively easy, implementation is hard. We must acknowledge that we will face difficult and unforeseen challenges as we turn our sights from planning to implementation and resist the reflex to assign blame when we hit roadblocks. We must continue to work together to identify and overcome the roadblocks we are certain to encounter on our path to NextGen.

I thank you for your commitment to serve with me on this Committee.

- I'm honored to be here today and would like to thank the NextGen Advisory Committee (NAC) for giving me this opportunity. And thank you Bill for that introduction.

- The NAC obviously plays an important role in bringing together a diverse group of stakeholders to advance NextGen. All of you understand the benefits of a safe, efficient, and reliable aviation system.

- Aviation is important. It means good, high paying American jobs, the free flow of commerce, and huge advantages to our economy, and I want to thank each of you for your contributions.

- The United States air transportation system transports roughly 730 million passengers each year, resulting in more than 70,000 flights each day.

- These operations are supported by a vast network of airlines, pilots, air traffic controllers, airports, and many other aviation professionals, supporting more than 10 million good-paying jobs and contributing more than a trillion dollars to the United States economy.

- Most importantly, it's an industry that operates ***safely*** 7 days a week, 365 days a year.

- Future air traffic predictions underscore the importance of NextGen. The FAA predicts that around 2027 our air traffic system will need to handle *roughly 1 billion passengers* per year and 79,000 flights per day.

- It is widely acknowledged that our current system simply can't meet the demands of future air traffic.

- Congress will continue to hold the FAA and stakeholders accountable using our oversight authority. But listening is equally important.

- This Congress we have held two listening sessions focused entirely on Performance Based Navigation, or PBN (April 10 and May 22) Listening sessions are very informal, don't involve the media, and allow for a more candid conversation.

- We have been fortunate to have participation from the airlines, airports, controllers, the FAA, and of course RTCA. The listening sessions were timely, especially considering part of today's NAC agenda is identifying barriers to implementing PBN and mitigation strategies.

- And Congress is interested because PBN is here now and can deliver benefits now, rather than promises for something that's 10 or 20 years down the road. The goal is to make it better.

- A little more than a year ago Congress enacted the FAA Modernization and Reform Act (Reform Act) after nearly 5 years and 23 stop gap extensions. It certainly wasn't an easy process, but at the end of the day everyone came together and got the job done.

- The Reform Act provides more certainty for the FAA to fund long term projects and implement NextGen. The series of extensions made it extremely difficult for the FAA and industry to plan and invest long term.

- The Reform Act includes several NextGen provisions, including the:

    - Establishment of a Chief NextGen Officer;
    - Acceleration of PBN procedures;
    - Tracking of performance metrics; and
    - Identification of operational incentives.

- FAA has made incremental progress in some areas, although admittedly some of the Reform Act mandates are more complex than others. But with the enactment of a long term bill, and most recently with the appointment of a Chief NextGen Officer, Congress will expect to see more measurable progress.

- Again, I want to thank the NAC for hosting me this morning. As we begin to work on the next reauthorization bill we'll certainly look to everyone in this room for input. It's important that we work together to create the right environment that allows for a healthy aviation industry that can create jobs and compete globally, and NextGen is a big part this.

- We are all in this together and the goal is a bipartisan effort. Consensus recommendations from the NAC provide both the FAA and Congress with important information and helpful input in this critically important NextGen effort.

- I'm happy to answer any questions you might have.

DRAFT – NOT FOR RELEASE **06/03/2013 2:00 PM**

Michael Huerta
NextGen Advisory Committee
FAA Report
Washington, D.C.
June 4, 2013

Sequester and budget update

Good morning and thank you, Bill, for that update. Thank you all for coming today. And special thanks to Representative LoBiondo and Deputy Secretary Porcari for their continued support of NextGen.

As you know, we have had an extremely busy year. We're working on many important projects, but at the same time, we're dealing with the sequester and all that it entails.

We have had to make sizeable budget cuts that affect our operations and our future.

As the Deputy Secretary said, the sequester is not over. But, Congress gave us the financial flexibility to avoid the furloughs for the remainder of this fiscal year—through September 30. We were able to transfer $253 million from the airport grant program – which was exempt from the sequester.

With this flexibility, we are also able to keep open the 149 low activity contract towers through September. And we're putting $10 million towards NextGen, to reduce cuts and delays in core programs; and $11 million to maintain equipment and infrastructure that is so necessary for the system.

Metroplex

As part of this flexibility, we are able to restart the Metroplex work that had been put on hold. As you know these projects are highly collaborative and must include our operational air traffic control personnel. Furloughs under the sequester required us to recall air traffic controllers and managers back to their duty stations. Last week, we started the coordination efforts to get these air traffic controllers back on the Metroplex work. They are experts in their airspace, and we will restart the collaborative process with airlines and the many other stakeholders who are all working to improve congested airspace over busy cities. We are able to do this in seven Metroplex cities where the work will continue, including: Washington, D.C., Northern

Texas, Charlotte, Northern and Southern California, Houston and Atlanta.

Sequester not over

Keep in mind however, that the sequester is still in place and that the FAA must still cut a total of $637 million from our budget by Sept. 30.

We've also cut our spare parts inventory, which may increase restoration time during outages and reduce system efficiency. And as an interim measure, we're not training new air traffic controllers or technicians to maintain and operate new technologies, which has led to a shut down of a large part of the FAA Academy in Oklahoma City.

NextGen under sequester

Because the sequester is designed to last ten years, we have conducted an initial assessment of how a long term sequester would impact our current NextGen Implementation Plan. Today, we have seven programs in the implementation phase. These programs are current contract commitments that will deliver new capabilities for all phases of flight by 2018.

The budget profile even under sequester would provide the capital funding required to meet most of those commitments. But, to make this happen we must have the operations funds to maintain our active workforce participation in key activities like procedures design, onsite testing, and training. And, if we are not able to keep the workforce engagement, we simply will not be able to meet all of our current commitments and the associated timelines.

Introduce Mike Whitaker

Nonetheless, there are bright spots. And we are delighted that the President has appointed Mike Whitaker to be the Deputy Administrator of the FAA. Mike has more than 20 years of experience in the airline industry and he will be the Chief NextGen Officer. He'll be in charge of everything NextGen and will be doing these reports from now on with all of you. He just came on board yesterday, and I'm looking forward to a very productive relationship. Please join me in welcoming Mike. He'll be leading our NextGen efforts, focused on delivering benefits now, and

will be taking over at the NAC's Designated Federal Official going forward. He may need a few more days to get fully immersed in all our acronyms, but I'm confident that in working with all of you, he will make a difference. Please join me in welcoming Mike. (*Mike stands up and waves and nods*).

Congratulate Jim Crites

I would also like to congratulate Jim Crites, Executive Vice President for Operations at Dallas Fort Worth Airport. Jim has received this year's White House Champions of Change award in the category of Transportation Technology Solutions.

Jim has demonstrated a powerful personal and professional commitment to the advancement of NextGen. He has been an effective, vocal advocate, and he has actively participated in the testing and demonstration of key NextGen technologies and programs. As a champion of collaboration, he has brought representatives of various communities to the table when necessary to collaborate on

NextGen planning and implementation, and to overcome challenges.

Please join me in congratulating Jim Crites.

City Pairs

Now, I would like to talk about some of the work the FAA has been doing as a result of our collaboration here at the NextGen Advisory Committee.

As you know, Congress has asked us to measure NextGen performance in the context of key city pairs. This was part of reauthorization.

Last summer we asked for your help in identifying these city pairs and we received your suggestions in February. I am pleased to say that the FAA accepts those recommendations for 25 city pairs. We are going to begin to report the benefits we realize between these cities as part of our metrics web page and the NextGen Performance Snapshots.

Also, we plan to release the NextGen Implementation Plan within the month. We wanted to make sure that everything in the plan lines up with the President's 2014 budget. It will be available online this year. We're trying to reduce printing costs.

Controller Handbook

Despite the difficulties of the sequester, we are making progress on important work that the NAC has helped to guide and that will make our airspace safer and more efficient.

We are updating our air traffic control handbook, which sets the standards that controllers use to ensure safety and properly separate aircraft. It was published long before the use of performance based navigation, and we've identified 15 updates that would allow air traffic controllers to take full advantage of the benefits of NextGen. While these changes are complicated, we are determined to publish many this year.

ELSO

For example, we're going to expand the use of equivalent lateral spacing operations, or ELSO. You'll hear more about this later today. The precision of NextGen navigation means we can safely allow jets to take off on headings that are slightly closer together. This small change has been used in Atlanta and we're seeing an increase of 8 to 12 planes departing per hour. Last year we estimate that this saved customers 700,000 minutes of waiting, or 1.3 years of waiting in line to take-off in Atlanta. It's better for the environment too. All those jets spend less time on the ground with their engines running. So we're burning less fuel and decreasing pollution. ELSO saved $20 million last year in Atlanta alone. We want other major airports to be able to use ELSO, so we are changing the handbook.

Closely spaced parallel operations

We're also working very diligently to increase the number of aircraft that can land at an airport each hour, while maintaining safety. That is why we have put so much effort into closely spaced parallel operations and will

change the controller handbook to make these operations more common.

We are working on improvements to staggered approaches for runways that are very close together – closer than 2,500 feet. About 17 of our busiest 35 airports have runways this close together.

You can't do simultaneous operations on these runways, but we can still safely lower the separation standard for aircraft that are coming into these close runways.

This is because our entire airspace system has undergone extensive advances over the years. We have the ability to collect and analyze better radar data. Our aircraft have better avionics, and we have more effective training for both pilots and controllers. Technology across the board has improved to such an extent that we are extremely confident that we can operate aircraft at a closer proximity to one another and still be just as safe.

These reduced separation standards of three miles down to one-and-a-half nautical miles for staggered approaches have already been approved for specific runways at eight airports right now. They are: Boston, Newark, St. Louis, Cleveland, Seattle, Memphis, Philadelphia and San Francisco. Before airports can use these new separation standards, the FAA must first train the controllers.

These changes will help the entire air space system by safely increasing capacity at major hubs when the weather prohibits visual approaches. It will decrease the ripple of delays that spreads across the system when one hub is experiencing weather conditions.

Conclusion

We have a lot of good work going on at the FAA and a very dedicated workforce. I've really enjoyed working with everyone on the NAC over the past few years. Thank you very much for all of the work you are doing and your dedication to NextGen and to improving flight today and for future generations.

Now I'd like to introduce Pam Whitley, who is Acting Assistant Administrator for NextGen. She'll introduce the next agenda item which is on the NextGen performance snapshots website. We established this website a year ago to report NextGen specific metrics and to publish NextGen success stories.

Turn it over to Pam.

Approved by the NextGen Advisory Committee June 2013

Interim Report: Fuel Data Sharing for Measuring NextGen Performance

A Report of the NextGen Advisory Committee in Response to Tasking from

The Federal Aviation Administration

June 2013

Contents

Background - Fuel Consumption Data Tasking

In 2010, the RTCA Business Case and Performance Metrics Work Group (BCPMWG) charter included the task to "secure commitments from participants to provide data currently not available to the FAA". One of the major data gaps that the FAA identified was the availability of fuel use information. In a June 4, 2012 letter from then Acting FAA Administrator, Michael Huerta[1], the FAA identified a need to identify sources for fuel burn data that could support the FAA's efforts to assess the impacts of NextGen on fuel usage. Further, Congress has directed the FAA to report on fuel use between city pairs in the FAA Modernization and Reform Act of 2012. The NextGen Advisory Committee has also recommended that the FAA report on fuel efficiency, using a metric that normalizes fuel usage to weight and distance between city pairs in response to an initial report titled, "Measuring NextGen Performance" presented at the October 2012 meeting and subsequently forwarded to the FAA[2]. Also forwarded to the FAA was a companion document, "Data Sources for Measuring NextGen Fuel Impact", which identified several potential sources for fuel use data.

The BCPMWG has been addressing this range of needs for fuel-related data and is facilitating a process to routinely share users' fuel consumption data and/or reports generated from analysis of fuel data.

Supporting High-level Metrics

We are on a path to sharing data that supports high-level metrics

There is general agreement by the airspace user community about the importance of sharing data to inform NextGen fuel metrics and better understand the value of NextGen investments. The BCPMWG has focused the initial efforts on the airline community where data availability and accessibility is greatest while General Aviation and Department of Defense continue to explore options to participate meaningfully in the future. Overall, the community endorses a fuel data sharing model that includes a data steward to aggregate sensitive fuel data before metrics are shared with the FAA or with the public, per the figure below:

[1] June 4, 2012 letter from Acting FAA Administrator, The Honorable Michael Huerta to Dave Barger, Chair NextGen Advisory Committee.

[2] Recommendation included in the official meeting summary that was transmitted to the FAA as an attachment to a letter dated October 31, 2012 from Bill Ayer, Chair NextGen Advisory Committee to Acting FAA, The Honorable Michael Huerta.

Since the February NAC meeting, six flight operators (Air Wisconsin, Alaska Airlines, Delta Air Lines, JetBlue, NetJets, and UPS) have executed Non-Disclosure Agreements with MITRE (acting as secure data steward ad hoc) to provide actual per flight fuel and weight data to MITRE for testing and analysis. The collaborative effort is informing our recommendations for the Data Steward role as well as providing insights on how to manage and aggregate fuel and weight-related data.

Finding 1: Initial analysis of fuel and weight data by flight indicates that this data can be useful to better understand the impacts of different aircraft weight classes, valid sample sizes and the availability of "representative" traffic data on fuel trends. The outcome of the analysis may provide options for aggregation including by city pair, by region, and by aircraft weight class.

Based on the analysis of the test data, BCPMWG is recommending that parameters and data elements for ongoing, routine data sharing be refined and that evergreen NDAs be drafted and executed with willing users once a data steward is designated. BCPMWG has also found that this data may be useful in improving fuel model performance, both in terms of validating outputs as well as providing data not previously available as inputs to the models, such as aircraft weight.

Recommendation 1: To formalize routine sharing of fuel and weight data by flight, FAA should designate and fund a data steward to set up routine out, off, on, in (OOOI)-based fuel and weight data sharing.

Refining NextGen Post-implementation Analyses

Lower-level metrics and NextGen post-implementation analyses will require more granular data for which users will require stronger data protections

While fuel and weight data by flight can inform metrics and NextGen impacts at a high-level, lower-level metrics including post-implementation analysis of discrete initiatives require more detailed data to discern NextGen impacts from other influencing factors.

Flight Data Recorder (FDR) data is the current "gold standard" of flight information providing dozens of parameters recorded continuously during aircraft operations. This data, in combination with other data such as surveillance information, can provide detailed insights on NextGen impacts.

BCPMWG has also been exploring whether the Aviation Safety Information Analysis and Sharing (ASIAS) infrastructure could be leveraged. In response to discussions that occurred at the February 2013 NAC meeting and concerns raised[3], outreach and exploratory work was undertaken by the BCPMWG to determine if the FDR data sources provided to ASIAS should be used, or if a separate ASIAS like structure should be developed. As an outcome of this outreach to NAC and NACSC members, and subsequent exploratory task group level work by the BCPMWG has determined that there are strong institutional reasons to maintain the safety focus of ASIAS. In addition, the de-identified FDR data, which is

[3] Discussions included in the official meeting summary that was transmitted to the FAA as an attachment to a letter dated March 15, 2013 from Bill Ayer, Chair NextGen Advisory Committee to FAA, The Honorable Michael Huerta.

maintained in ASIAS, also makes the information less useful for evaluating efficiency impacts. After interviews with subject matter experts on ASIAS operating cost, history, governance charter, and legal construct, BCPMWG believes that the cost / benefit case does not yet exist to warrant the establishment of a duplicative entity that routinely captures FDR data for performance metric analysis.

Finding 2: Use of the ASIAS infrastructure is not appropriate for understanding and isolating specific NextGen impacts on fuel usage.

Flight operators have expressed to the BCPMWG, however, the value that FDR data can bring in understanding and isolating specific NextGen improvement impacts on fuel use. BCPMWG has previously observed that "targeted" uses of FDR data, in combination with other data and information sources, can be used to calibrate models of fuel use in for specific procedures or domains. This approach would result, for example, in collection of FDR data for a limited time period before and/or after a NextGen improvement is implemented or modified. Once calibrated, future savings can be estimated by using previous measurements and counting the additional utilization of a procedure. BCPMWG refers to this as a "calibrate and count" approach.

Users' sensitivity to sharing data increases as the breadth and volume of data requested increases – so care needs to be taken to request only the highest-value data elements needed to inform NextGen analysis. Specifically, FDR data can also be used to improve the general performance of fuel models, as well. Flight operator willingness to share this information, however, will depend on a greater understanding of the specific data elements that are most useful for fuel data efficiency analyses. Understanding these data elements will require collaboration between the FAA and the aviation community to research what detailed data is needed to isolate NextGen impacts – balancing sensitivity and cost of data generation against benefits gleaned.

Outcomes from a collaborative approach between FAA and the aviation community will provide the scope and detail required from both routine data sharing and a more diagnostic calibrate and count effort. This effort will still likely require the use of a data steward, however. Even with a targeted approach to detailed data collection, there may still be issues related to the cost of collecting and sharing detailed information.

Recommendation 2: FAA should collaborate with the aviation community to identify the specific data elements that are most useful to support a "calibrate and count" approach to estimate achieved NextGen fuel use impacts, leveraging the use of a data steward to collect FDR and other information as needed.

Next Steps

The aviation community has expressed support for increased insights in fuel data sharing and is moving forward with initial sharing of flight-based fuel and weight reports.

Needs for data and publicly shared metrics will evolve; continued government-industry dialog will be needed to agree on future changes to data that is collected and reported. A formal oversight group, consisting of industry and government stakeholders, will be helpful in facilitating consensus within the community on these evolving needs.

BCPMWG is continuing its outreach to the GA and military communities to improve understanding of NextGen on these communities. In addition, BCPMWG will continue to research the opportunities and obstacles to more granular data sharing, if the NAC and FAA agree that such data sharing is a priority objective and commit to support the research, time, and resources required.

Appendix A: Members of Business Case & Performance Metrics Work Group

Juan Amezcua	The MITRE Corporation
Christopher Benich	Honeywell International, Inc.
Joe Bertapelle	JetBlue Airways
Joel Booth	United Airlines, Inc.
Steve Brown	National Business Aviation Association
Richard Buergel	NetJets
Alex Burnett	United Airlines, Inc.
Sean Cassidy	Air Line Pilots Association
Andy Cebula	RTCA, Inc.
Carlos Cirilo	International Air Transport Association
Ric Coleman	NetJets
Forrest Colliver	The MITRE Corporation
Robert Creek	CockpitApps
Jim Crites	Dallas/Fort Worth International Airport
Tony Diana	Federal Aviation Administration
William Dunlay	LeighFisher
Rob Eagles	International Air Transport Association
Ken Elliott	Jetcraft Avionics, LLC
Steve Fulton	GE Aviation
Steve Giles	The MITRE Corporation
Ron Hawkins	ARINC, Inc.
Richard Heinrich	Rockwell Collins, Inc.
Jens Hennig	General Aviation Manufacturers Association
Curtis Holsclaw	Federal Aviation Administration
Mimi Hoover	Alaska Airlines
Randy Howard	FedEx Express
Rose Hsu	JetBlue Airways
Margaret Jenny	RTCA, Inc.
Pascal Joly	Airbus Americas, Inc.
Christian Kast	United Parcel Service
Deborah Kirkman, Co-Chair	The MITRE Corporation
Dana Knight	Sabre Airline Solutions
Ron LaMarche	The Boeing Company
Ed Lohr, Co-Chair	Delta Air Lines, Inc.
Tony Neely	Air Wisconsin
David Newton	Southwest Airlines
Arturo Parra	FedEx Express
Ricardo Parra	Federal Aviation Administration
David Parry	Lufthansa Systems FlightNav, Inc.
Almira Ramadani	Federal Aviation Administration
Mark Raymond	Air Wisconsin
Kirk Rummel	Houston Airport System
Tim Ryan	ARINC, Inc.
Bill Sears	Beacon Management Group
Geoff Shearer	The Boeing Company
Rico Short	Beacon Management Group

Stephen Smothers	Cessna Aircraft Company
E.J. Spear	The MITRE Corporation
Caleb Stephenson	United Airlines, Inc.
Patrick Stovall	Department of Defense
Bobbi Wells	FedEx Express
Brian Will	American Airlines
Heidi Williams	Aircraft Owners and Pilots Association
Eunsuk Yang	International Air Transport Association

Appendix B: June 4, 2012 Letter from Acting Administrator Michael Huerta to NAC Chair Dave Barger

U.S. Department
of Transportation

**Federal Aviation
Administration**

Office of the Administrator

800 Independence Ave., S.W.
Washington, D.C. 20591

June 4, 2012

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

Dear Mr. Barger:

Thank you for sending us the NextGen Advisory Committee's (NAC's) recommendations as approved at the February 2012 meeting. Work is already underway within the Federal Aviation Administration (FAA) to address them. Teams are now assessing the Integrated Capabilities recommendations as part of our portfolio management process and will have a report prepared in time for the NAC's September 2012 meeting.

I offer special thanks to the Data Communications Task Group for completing its task on an expedited timetable. Our new Air to Ground Enhanced Operational Capabilities team will use the roadmap as the team gains closure on plans for initial data communications services and develops the evolutionary path in support of the Agency's longer term commitment to trajectory based operations.

Going forward, we have asked that the Business Case and Performance Metrics Working Group focus on better defining metrics for the key performance areas of Access and Flexibility, as well as identifying data sources for fuel burn and equipage. These activities are the extensions of the original tasking.

I would like to conclude with an update on a new, tangible success for our partnership with the NAC. We have launched the Web-enabled NextGen Performance Snapshot (NPS), available online at www.faa.gov/nextgen. The Web-NPS provides a "rear-view mirror" look at NextGen performance, as demonstrated through a set of metrics approved by the NextGen Management Board with input from the NAC's September 2011 recommendations. It has a geographic, metroplex focus with an emphasis on the 30 Core FAA Airports. It also highlights key NextGen success stories, including qualitative and quantitative benefits and impacts of these important operational capabilities. The Web-NPS will help the aviation community understand the real world benefits of NextGen, and we look forward to working with the community to make this tool even more robust over time.

I appreciate the partnership between the FAA and the NextGen Advisory Committee. Thanks for your leadership.

Sincerely,

Michael P. Huerta
Acting Administrator

Enclosure

cc: Margaret Jenny, President, RTCA, Inc.

RTCA

THE GOLD STANDARD FOR AVIATION SINCE 1935

Approved by the NextGen Advisory Committee June 2013

CatEx 2: Recommendation for Implementing the Categorical Exclusion in Section 213(c)(2) of the FAA Modernization and Reform Act of 2012

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

June 2013

CatEx 2 Task Group Recommendation

Contents

Background/Introduction

In September 2012, the Federal Aviation Administration (FAA) asked the NextGen Advisory Committee (NAC) to develop recommendations for implementing Section 213(c)(2) of the "FAA Modernization and Reform Act of 2012" (Public Law 112-95), which seeks to accelerate the introduction of certain NextGen technologies and attendant procedures by legislating a new Categorical Exclusion (CatEx) under the National Environmental Policy Act (NEPA) requirements.[1] That provision provides that

> 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.

In particular, the FAA reference to the NAC called for guidance on how "measurable reductions" in noise from performance-based navigation (PBN) procedures "on a per flight basis" might be assessed consistent with the legislative language, given that FAA typically uses methods that aggregate noise, which take into account the noise exposure of people on the ground from aircraft flights in the vicinity over an average daily period. FAA had undertaken an initial assessment on how its noise assessment methods might be used to implement Section 213(c)(2), but had not been able to reconcile its traditional methods of noise analysis with the apparent requirement from Section 213(c)(2) that noise reductions be assessed per flight.

In response to the FAA request, the NAC created the "CatEx 2 Task Group"[2] to address the following areas:

- Provide views on the FAA analyses done to date:
  - Views on the analyses to determine noise reduction on the ground on a per-flight basis; and
  - Views on the analyses considering source noise independently of the receiver. Views should include screening methods that might need to be developed to implement this approach.[3]
- Provide technical suggestions on any other possible approaches for determining measurable reductions in noise on a per flight basis – a technical issue that must be solved to enable CatEx 2 to be used.

[1] See Letter from Michael P. Huerta (FAA, then Acting Administrator) to Ms. Margaret Jenny (President, RTCA) (Sept. 21, 2012).

[2] The group was dubbed the "CatEx 2 Task Group" because the CatEx under its review is the second of two Categorical Exclusions mandated by Congress in the FAA Modernization and Reform Act of 2012.

[3] Subsequent to the passage of PL 112-95, the FAA issued additional guidance on noise screening tools that was helpful in the analysis and development of the recommendation to implement the CatEx 2 provision.

- To the extent the CatEx 2 Task Group believes CatEx 2 cannot be implemented effectively and/or even if implemented would not have a desired impact, provide practical and/or legislative recommendations that would help streamline environmental reviews for PBN procedures; and

- Provide both an interim and a final report. The interim report should include a timeline for completing the task.

The FAA request noted that an appropriate representation of both operators (airlines and airports) and community stakeholders interested in noise would need to be engaged in the work for it to be successfully completed. The FAA offered to make subject matter expertise available to the NAC, but confirmed that it would not participate in deliberations.

The CatEx 2 Task Group, comprised of a broad range of relevant stakeholders,[4] was formed by the NAC in November 2012. In addressing the remit from the NAC and developing this recommendation, the Task Group met in plenary session six times, while various sub groups and analysis teams met in between plenary sessions to further the work.

Executive Summary

The CatEx 2 Task Group recommends that the FAA implement a method for noise analysis described in this document, referred to as the "Net Noise Reduction Method," as the means to meet the requirements of Section 213(c)(2) of Public Law 112-95. This recommendation provides for the computation of net reduction in noise as measured by the number of people who would experience a reduction in noise compared to the number of people who would experience an increase in noise, at noise levels greater than DNL 45 dB, with a proposed PBN procedure implemented, as compared with the existing instrument procedure in place. This method also includes a recommended step to assess whether, despite a projected reduction in the net number of people exposed to noise under a PBN procedure, there might be an increase in the DNL 65 dB population that would pose a significant impact (DNL 1.5 dB or greater) that could call into question the use of CatEx 2, to enhance the acceptance of this method by the community.

The CatEx 2 Task Group notes that its recommendation relates only to the Categorical Exclusion in Section 213(c)(2). The recommendation should not be deemed to apply to or to affect in any way FAA's approach to determining qualification for or applying other Categorical Exclusions.

[4] Members of the Task Group are identified in Appendix A.

Methodology and Structure of Analysis

The Task Group took the following steps in creating the recommendation:

1. Determined and reached consensus agreement on the scope of the task that guided the process of deliberations and subsequent outcome of Task Group recommendation.

2. Reviewed Congressional language and associated reports and met with key Congressional staff, considered the intent of the CatEx 2 language and what it was designed to achieve.

3. Developed baseline, high level understanding of NEPA and FAA noise modeling and assessment.

4. Reviewed analysis work conducted by the FAA on implementation of the CatEx 2 language.

5. Evaluated other possible approaches to implementing "per flight" noise measurement techniques to implement CatEx 2 provision. The Task Group was directed to develop a recommendation for an approach to measuring noise on a "per flight" basis, as required by the legislative language, if possible. Otherwise, the Task Group was directed to suggest revisions to statutory language or another way FAA could move forward.

6. Developed recommendation.

Key observations and findings from each step of the work of the CatEx 2 Task Group are identified in the following section of this Report.

Key Observations, Findings and Outcomes

1. Determined and reached consensus agreement on the scope of the task that guided the process of deliberations and subsequent outcome of Task Group recommendation.

At its initial meeting, the CatEx 2 Task Group confirmed that there was consensus on the tasking. In summary terms, it was agreed that the task was to review FAA's analysis of the various noise analysis methods and metrics, determine if any of them are sufficient to meaningfully measure per-flight noise in the manner intended in Section 213(c)(2), or suggest another metric/method that would be sufficient to measure noise on a per-flight basis. Beyond that, it was understood that if there is no technical and/or meaningful way to do so, the group was to recommend possible policy or legislative solutions.

2. Reviewed Congressional language and associated reports and met with key Congressional staff, considered the intent of the CatEx 2 language and what it was designed to achieve.

From the text of the legislative language and from discussions with relevant Congressional staff[5], the CatEx 2 Task Group confirmed the intent of Congress to speed the approval of Area Navigation (RNAV) and Required Navigation Performance (RNP) and other performance-based navigation (PBN) procedures relative to more extensive NEPA analysis (in the form of an Environmental Assessment or Environmental Impact Statement) if the terms of the CatEx are met. The Task Group recognized that Section 213 of the FAA Reauthorization legislation, in which Section 213(c)(2) is found, is titled "Acceleration of NextGen Technologies," evidencing the intent of Congress to accelerate the deployment of technologies and associated air traffic procedures in the Next Generation Air Transportation System (NextGen).

With respect to the demonstration required by Section 213(c)(2) that a procedure would need to "result in measurable reductions" of "noise, on a per flight basis" in order to qualify for the CatEx, the Task Group made specific reference to the Conference Report describing the final legislative language for CatEx 2. The Conference Report states the intent of CatEx 2 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 <u>average</u> per flight basis."[6] It is the view of the CatEx 2 Task Group, which was confirmed with relevant Congressional staff, that this language allows for averaging the noise impact on a representative basis over flights undertaking a particular procedure. As discussed in greater detail below, this observation and finding fundamentally informed the Task Group's work on a method to implement Section 213(c)(2).

In considering the legislative language in Section 213(c)(2), the Task Group also noted that the language differs from that in the other Categorical Exclusion established by the FAA Modernization and Reform Act of 2012, referred to as "CatEx 1," in that CatEx 1 requires the consideration of "extraordinary circumstances" that might obviate the application of CatEx 1, while CatEx 2 has no such provision.[7] Congressional staff confirmed the Task Group's sense that the omission of "extraordinary circumstances" from Section 213(c)(2) reflected the intent of Congress that CatEx 2 not be subject to consideration of such circumstances.[8] The Task Group also observed that CatEx 2 differs from all other

[5] The Chairs of the CatEx 2 Task Group and RTCA staff met with staff of the Senate Committee on Commerce, Science & Transportation, House Transportation & Infrastructure Committee and with staff that had been on the House Transportation & Infrastructure Committee at the time the relevant statutory language was adopted.

[6] Conference Report to Accompany H.R. 658, FAA Modernization and Reform Act of 2012, Report 112-381, at page 177 (emphasis added).

[7] Section 213(c)(1) of the FAA Reauthorization Act, which establishes CatEx 1, reads as follows:

> Navigation performance and area navigation procedures developed, certified, published, or implemented under this section shall be presumed to be covered by a categorical exclusion (as defined in section 1508.4 of title 40, Code of Federal Regulations) under chapter 3 of FAA Order 1050.1E unless the Administrator determines that extraordinary circumstances exist with respect to the procedure.

[8] FAA guidance on and description of "extraordinary circumstances" appears in Paragraph 304 of FAA Order 1050.1E. That guidance enumerates specific circumstances, for Categorical Exclusions other than CatEx 2, under

Categorical Exclusions employed by FAA in that none of the existing Categorical Exclusions require showing noise reduction as a prerequisite to qualifying for the CatEx. In light of these observations, the Task Group noted that its work, observations, findings and recommendations with respect to CatEx 2 should not be interpreted to affect the other Categorical Exclusions in any way. Specifically, the Task Group observed that those Categorical Exclusions would still be fully available and used by FAA when the terms of those Categorical Exclusions are met and the methods/metrics suggested for CatEx 2 should not be deemed applicable to other Categorical Exclusions.

3. Developed baseline, high level understanding of NEPA and FAA noise modeling and assessment.

As part of focusing on how CatEx 2 might be successfully implemented, the group confirmed the role that Categorical Exclusions play under NEPA, the approach FAA has taken in implementing other Categorical Exclusions and the approaches FAA typically has used in conducting noise screening analysis when considering other Categorical Exclusions or undertaking noise analysis for other purposes.

With respect to the role of Categorical Exclusions under NEPA, the Task Group confirmed its understanding that NEPA requires environmental review of projects and actions requiring federal approval to determine if there are potentially significant environmental impacts, and that air traffic procedure approvals and revisions by FAA typically trigger that review requirement. The Task Group confirmed its understanding that there are three levels of environmental review, which are progressively more in depth and time consuming: Categorical Exclusions, Environmental Assessments (EA) and Environmental Impact Statements (EIS). While the review required for a Categorical Exclusion is minimal compared to that required for an EA or EIS, the CatEx 2 Task Group recognized that some review and analysis is required even under a Categorical Exclusion. Specifically, for all Categorical Exclusions, review is undertaken to confirm that the terms of the Categorical Exclusion are met.[9] With specific respect to Categorical Exclusions involving air traffic procedures other than the new CatEx 2, FAA undertakes noise screening analysis to confirm that there is no significant noise impact with the procedures (i.e., FAA screens for potential noise increases) and to inform FAA's understanding of whether there might be "extraordinary circumstances."

The CatEx 2 Task Group noted that a number of Categorical Exclusions that can be applicable to air traffic procedures are currently listed in FAA Order 1050.1E and that the availability of those Categorical Exclusions and the approach FAA takes with respect to them would not be affected by the Task Group's recommendation with respect to CatEx 2. The Task Group noted the guidance that FAA uses for noise screening analysis for the CatExs already covered by FAA Order 1050.1E, titled "Guidance for Noise Screening of Air Traffic Actions, Revision 2" (December 2012).

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which "actions that would normally be categorically excluded could require additional environmental analysis to determine the appropriate NEPA documentation."

[9] The terms of Categorical Exclusions employed by FAA typically are spelled out in FAA Order 1050.1E. At this stage, the terms of CatEx 2 are spelled out only by statute, although FAA may choose to reflect CatEx 2 in a future revision of FAA Order 1050.1E.

The Task Group recognized that CatEx 1, and FAA's issuance of guidance on it in December 2012, should provide some expediency for procedures at the airports covered by that Categorical Exclusion.[10] CatEx 1 applies at the set of airports designated as "core airports" as well as to those in the same Metroplex.[11] At the same time, the CatEx 2 Task Group recognized that CatEx 2 would have particular use at airports not covered by CatEx 1 and/or in situations when questions about "extraordinary circumstances" might otherwise preclude the use of a Categorical Exclusion currently listed in FAA Order 1050.1E.

4. Reviewed analysis work conducted by the FAA on implementation of the CatEx 2 language.

The CatEx 2 Task Group reviewed the work that FAA had undertaken, which had been summarized in the FAA referral of the matter to the NAC and also was presented by FAA at the first plenary meeting of the Task Group. The Task Group made three key observations that informed the Task Group's review of FAA's work:

- The Task Group recognized that aircraft "noise" does not only involve sound energy, it involves the exposure and experience of people to the sound energy.

- The Task Group recognized that transparency and defensibility of a solution are important to effective implementation of CatEx 2. If implementation is not based on sound technical grounds and/or communities do not understand or accept what FAA is doing, the communities would be more likely to raise objections, which could defeat Congressional intent to accelerate PBN procedures.

- Understandably, FAA's analysis of implementation options appeared to focus on a fairly literal interpretation of the "per flight" element of the requirement in Section 213(c)(2). The Task Group found that further focus on the averaging concept suggested by the language in the legislative history was important to finding means to implement CatEx 2.

With these observations in mind, the CatEx 2 Task Group found that the FAA provided important and proficient technical analysis setting out the options for measuring noise with the recognition that aircraft "noise" does not only involve sound energy, it involves the exposure of people to the sound energy. The Agency analysis also assisted the Task Group in identifying the questions regarding the degree to which each option would capture peoples' exposure to aircraft noise. As detailed below, the Task Group concurred with FAA's findings based on the assumptions FAA used in considering per-flight noise exposure. While finding that FAA had reasonably concluded that none of the metrics the Agency

[10] The guidance appears as FAA Order 1050.1E, Change 1, Guidance Memo #5 (December 6, 2012). The guidance also provides a reference to a website listing the navigation procedures and airports covered by CatEx 1. See http://www.faa.gov/air_traffic/flight_info/aeronav/procedures/reports/.

[11] When Section 213(c)(1) was adopted, the sets of covered airports were referred to as the "Operational Evolution Partnership" (OEP) airports, others in the same Metroplex as those, and 35 non-OEP airports. FAA moved away from the OEP terminology, instead using "core airports" and "non-core airports" as descriptors under NextGen. FAA explains this change in terminology and the scope of CatEx 1 in FAA Order 1050.1E, Change 1, Guidance Memo #5 (December 6, 2012).

had considered could reasonably be used to implement CatEx 2 under FAA's interpretation of the requirement to capture noise exposure on a per-flight basis, the FAA analysis formed a solid foundation for the discussions by the Task Group that subsequently resulted in the creation of a different method named by the Task Group as the Net Noise Reduction Method (discussed in the next section of this Report).

The following section outlines the Task Group's review of the FAA analysis on each option the Agency considered:

a. Day/Night Average Sound Level (DNL) Metric Option

The CatEx 2 Task Group concurs with the FAA finding that DNL, which is a well-established metric reflecting aircraft noise impacts on communities, is a cumulative measure and that logarithmic DNL calculations cannot be divided by the number of aircraft to produce noise "per flight" values.[12]

The Task Group noted the work that FAA did to consider the construction of DNL for a particular flight (i.e., a "partial DNL") and FAA's questions about whether such an approach would reasonably reflect the noise exposure of the broader population on the ground or provide means for demonstrating changes in noise exposure. As discussed in greater detail below, the Task Group ultimately built upon the partial DNL concept for the method it developed and recommends, including means of reflecting noise exposure of people on the ground and means for demonstrating changes in such noise exposure.

b. Aircraft Noise Certification Levels

The CatEx 2 Task Group concurs with the FAA finding that noise certification data cannot be used to compare noise exposure from different air traffic procedures.

Noise certification levels are measured at three fixed points under specified test conditions designed for the aircraft certification test. These levels are fixed for a given aircraft. As the levels would not change based on the navigation procedure employed, there is no way to use certification levels to determine if there is a reduction in noise based on navigation procedure.

Accordingly, the Task Group concurs with FAA that noise certification levels cannot reasonably be used to implement CatEx 2.

c. Time Above Threshold

The CatEx 2 Task Group concurs with FAA that this measures duration of noise event, but not the level of noise. While the duration of noise could decrease on a per-flight basis, the maximum sound level could increase.

[12] DNL (Day-Night Sound Level) is based on sound levels measured in relative intensity of sound, or decibels (dB), on the "A" weighted scale (dBA). This scale most closely approximates the response characteristics of the human ear to sound. The higher the number on the scale, the louder is the sound. DNL represents noise exposure events over a 24-hour period. To account for human sensitivity to noise between the hours of 10 p.m. and 7 a.m., noise events occurring during these hours receive a "penalty" when the DNL is calculated. Each nighttime event is measured as if ten daytime events occurred.

If FAA were to take this approach, it would have to make a determination that a shorter duration of noise with a PBN procedure (as opposed to without a PBN procedure) was a reasonable proxy for the population's noise exposure, without respect to the noise level(s) at different points of exposure. This would represent a departure from FAA's current methods of modeling noise exposure for NEPA purposes, which consider both duration and noise level. The CatEx 2 Task Group recognizes that an approach that looks only at duration of noise likely would not be accepted by the community.

d. Maximum Sound Level (LAMAX)

The CatEx 2 Task Group concurs with FAA that this metric reflects the level of noise, but not the duration. Focusing on maximum noise level alone without regard to duration would represent a departure from FAA's current methods of modeling noise exposure for NEPA purposes, which, as noted above, consider both duration and noise level. Further, while it is technically feasible to model LAMAX on a per-flight basis, the results would not be the same for each point on the receptor grid, raising the question of what noise threshold to employ. The CatEx 2 Task Group recognizes that this approach likely would not be accepted by the community.

e. Sound Exposure Level (SEL)

The CatEx 2 Task Group concurs with FAA that this is the best of the options FAA studied if noise is to be captured on a literal per-flight basis, as it captures both duration and noise level and, as a building block for DNL, is a recognized metric.

However, there is no accepted criterion or threshold for evaluating noise impact using SEL. While it is technically feasible to use SEL on a per-flight basis, the predicted noise would not be the same for each point on the receptor grid. To the extent that noise exposure is required to be captured literally on a per-flight basis, selection of points on the ground and a question of what noise threshold to employ would present a problem for this metric. Also, SEL has not been used for decision-making under NEPA in the past, so likely would be problematic from a community acceptance perspective.

5. Evaluated other possible approaches to implementing "per flight" noise measurement techniques to implement CatEx 2 provision: Development of a method to implement CatEx 2

After reviewing the methods FAA had considered for implementing CatEx 2, the CatEx 2 Task Group began considering whether there might be other means for undertaking the required noise analysis. Based on its work and findings, the CatEx 2 Task Group determined that whatever method that would be used needs to reasonably represent a change in noise exposure on the ground from a PBN procedure versus the existing procedure. As previously noted, the Task Group also determined that CatEx 2 did not require that noise be captured on a literal per-flight basis (such as the noise from a particular N-number aircraft), but that the legislative language allows for averaging the noise impact on a representative basis over flights undertaking a particular procedure. Accordingly, the means the Task Group developed for implementing CatEx 2 involves a three-step process: (1) identification of an area in the vicinity of an airport where people might be impacted by noise due to an PBN procedure (referred to as a "noise area of concern,") as reflected in DNL bands down to DNL 45 dB; (2) determine the change in number of people exposed to noise in DNL bands on an average per-flight basis, comparing the existing procedure

to proposed procedure; and (3) apply a two-part test to determine whether the PBN procedure results in noise reduction deemed to meet the terms of CatEx 2. The CatEx 2 Task Group refers to this as the "Net Noise Reduction Method."

a. Description of the "Net Noise Reduction Method"

- Step 1 – Determine noise-sensitive "area of concern," with a threshold down to DNL 45 dB:

The first step in the Net Noise Reduction Method is to identify the area in the vicinity of the airport exposed to aircraft noise under the existing procedure and the area potentially exposed under the proposed procedure so analysis can be done regarding the effect of the new procedure on noise exposure in the vicinity of the airport. To do this, the CatEx 2 Task Group recommends computing noise exposure in areas (or "bands") of noise exposure down to the DNL 45 dB threshold in the vicinity of the airport for the existing procedure (i.e., the procedure under "existing instrument flight rules," as contemplated by CatEx 2) for average noise levels (annual average day). Relevant noise exposure bands for this analysis would be DNL 45-60 dB, DNL 60-65 dB and DNL greater than 65dB. Population data in the vicinity of the airport must also be obtained to compute DNL at census block centroids.

The CatEx 2 Task Group decided to use DNL as the noise metric. As previously noted (and affirmed by FAA's analysis), DNL is a metric that represents noise exposure on an aggregate basis, i.e., it is the summation of all aircraft noise events over a 24-hour period. As previously noted, the CatEx 2 Task Group recognized the work that FAA did to consider the use of a "partial DNL" as potential means of reflecting noise on a per-flight basis. Building on that concept, the Task Group determined that a "procedure-specific DNL" could be generated reflecting the noise exposure from a particular procedure or multiple procedures. The Task Group then determined that using this metric, applied on the specific procedures at issue to generate a " procedure-specific DNL," reflecting the noise exposure from the procedures and comparing the noise exposure from the existing procedure versus that from a PBN procedure satisfies the legislative intent for CatEx 2. Specifically, this approach provides for an evaluation of noise exposure – and potential noise reduction – on a "per-flight" basis, particularly given that the legislative history confirms that this analysis can be done on an average basis.

The CatEx 2 Task Group recommends a noise analysis threshold of DNL 45 dB for a number of reasons: (1) first, it is consistent with other FAA screening methods for evaluating air traffic actions, as described in FAA Order 1050.1E; (2) second, FAA suggests DNL 45 dB is within the limits of FAA noise models' computational reliability; and (3) legal challenges to air traffic actions have included noise levels as low as DNL 45 dB (thus, a method using a threshold down to DNL 45 dB arguably is conservative and responsive to potential community concern). The CatEx 2 Task Group believes that use of DNL, which is a well-recognized metric that is commonly used by FAA, and the application of DNL as low as 45 dB, should enhance the likelihood of community acceptance of this method for CatEx 2.

- Step 2 – determine the change in number of people exposed to noise in DNL bands on an average per-flight basis, comparing the existing procedure to proposed procedure

To compare the noise exposure of people when the PBN procedure is employed as compared to the existing procedure, the DNL must also be computed at census block centroids with noise levels greater than DNL 45 dB for average noise levels (annual average day) with the PBN procedure. Then, the

number of people exposed to noise due to the proposed PBN procedure (from Step 2) should be compared to the number of people exposed under the existing procedure (from Step 1).

The following Table sets forth the data fields that would be expected to be filled in analysis supporting CatEx 2 under Steps 1 and 2 of this method:

	Number of people exposed to DNL Level with new PBN procedure versus existing procedure		
DNL Level	Number of People Exposed under New Procedure INCREASES	Number of People Exposed under New Procedure DECREASES	Number of People Exposed under New Procedure UNCHANGED
>65			
60-65			
45-60			
Total			

- Step 3 – apply a two-part test to determine whether the PBN procedure results in noise reduction deemed to meet the terms of CatEx.

Under the Net Noise Reduction Method, if the overall number of people exposed is reduced, the CatEx 2 Task Group believes this reasonably demonstrates noise reduction as intended in CatEx 2. If the overall number of people exposed is reduced, but the net number of people exposed within the DNL 65 dB noise exposure band increases, this may call into question whether it is reasonable to conclude that noise has been reduced. Arguably, the fact that there is a net reduction in the number of people exposed to noise should satisfy the terms of CatEx 2. However, the CatEx 2 Task Group observes that in such a case FAA might also consider whether the noise exposure in the DNL 65 dB noise exposure band for the proposed PBN procedure has a significant impact.[13] If the noise increase in that noise exposure band does not exceed 1.5 dB and overall there is a net reduction in the number of people exposed to noise across the noise exposure bands, this would appear to further confirm that use of CatEx 2 is reasonable. The CatEx 2 Task Group observes that if noise analysis completed by FAA in the course of

[13] The definition of "significant impact" in the DNL 65 dB noise exposure area appears in existing FAA guidance on the application of NEPA to actions requiring FAA approval. As stated there, "a significant noise impact would occur if analysis shows that the proposed action will cause noise sensitive areas to experience an increase in noise of DNL 1.5 dB or more at or above DNL 65 dB noise exposure when compared to the no action alternative for the same timeframe. For example, an increase from 63.5 dB to 65 dB is considered a significant impact." FAA Order 1050.1E (Paragraph 14.3).

determining eligibility for CatEx 2 indicates an increase in noise within the newly exposed DNL 65 dB noise exposure band that would be described as significant under current NEPA criteria, the community opposition could delay implementation and negate Congressional intent of expedited PBN procedures. The CatEx 2 Task Group further observes that this potential check – to be applied if the overall number of people exposed is reduced under the PBN procedure, but the net number of people exposed within the DNL 65 dB noise exposure band increases – appears consistent with the legislative intent of Section 213(c)(2) to have demonstrated noise reduction and to make CatEx 2 available as means to speed the approval and implementation of PBN procedures.

b. Analysis Used to Develop, Demonstrate and Refine the Net Noise Reduction Method[14]

The CatEx 2 Task Group analyzed a number of theoretical and proposed PBN procedures to test the applicability of the proposed methodology, which are described in detail in Appendix C. These are summarized here[15]:

- *Theoretical Approach at Seattle Tacoma International Airport*: the CatEx 2 Task Group first applied the proposed Net Noise Reduction Method to the theoretical implementation of a single approach procedure at Seattle Tacoma International Airport (SEA). The procedure was meant to reflect the initial intent of the Alaska Airlines' "Greener Skies" arrival to SEA for aircraft arriving from the south that would turn over Elliott Bay instead of over North Seattle residential areas. The noise modeling analysis showed that there would be a net reduction in the total number of people exposed to DNL greater than 45 dB: an estimated 24,418 people would have increased DNL as a result of the single change, while an estimated 105,738 would see noise levels reduced as a result of the change in procedures, resulting in a Net Noise Reduction for 81,320 people.

- *Greener Skies over Seattle Environmental Assessment*: The CatEx 2 Task Group recognized that often more than one change in procedures is proposed for air traffic actions and that most procedure changes would affect an entire airspace, necessitating evaluation of procedures in combination. As means of considering how the Net Noise Reduction Method might apply in such a situation, the CatEx2 Task Group reviewed the recently completed Seattle Greener Skies EA,[16] which addressed a number of air traffic actions, including two new Standard Terminal Arrivals (STARS) and 24 new Required Navigational Performance (RNP) procedures, all with Optimized Profile Descents. The noise analysis was re-evaluated

[14] The CatEx 2 Task Group wishes to especially recognize and commend the contribution of Task Group member Mary Ellen Eagan and HMMH for undertaking analysis to help demonstrate the Net Noise Reduction Method.

[15] The data from EAs at Seattle and Midway were used because it was readily available for analysis purposes. While already available data were used for purposes of advancing the work of the CatEx 2 Task Group, as discussed below, the Task Group believes that the FAA has tools available that can be used for implementing the Net Noise Reduction Method.

[16] *Final Environmental Assessment for Greener Skies Over Seattle; Proposed Arrival Procedures to Seattle-Tacoma International Airport* Volume 1 – Main Document, 1 November 2012.

with the Net Noise Reduction Method and showed that there would be an estimated 132,484 people for whom noise levels (DNL) would increase with the proposed changes, and an estimated 311,122 people for whom noise levels would decrease, for a Net Noise Reduction of 178,638.

- *Midway Environmental Assessment*: The CatEx 2 Task Group also reviewed the recently completed Midway International Airport Air Traffic Procedural Changes Environmental Assessment.[17] The Proposed Action evaluated in the Midway EA is the implementation of new initial departure headings off MDW to the existing SIDs, and new RNAV arrival procedures (inclusive of RNP), in order to help improve overall efficiency at MDW. RNAV/RNP capable aircraft would use the new RNAV and RNP procedures. Additionally, existing procedures would be retained for non-RNAV/RNP capable aircraft. The Net Noise Reduction Method was applied to the Midway proposal, and resulted in an estimated 1,421,159 people for whom noise level would be reduced as compared with 989,090 people for whom noise levels would be expected to increase. However, the Midway EA also documented that there would be 892 people with noise levels greater than DNL 65 dB who would experience a 1.5 dB or more increase in DNL and be exposed to aircraft noise at or above DNL 65 dB under the Proposed Action, meeting the FAA's existing criteria for significant impact under FAA Order 1050.1E.

Based on these test cases, the Seattle Greener Skies EA would have been deemed to meet the CatEx 2 test proposed by the CatEx 2 Task Group, whereas the Midway EA would not have been deemed to meet it should FAA choose to implement the second part of the test, because at Midway there would be an increase in noise at the DNL 65 dB level and that increase would be significant, i.e., DNL 1.5 dB or greater.

c. Noise Analysis Tools for Implementing the Method

FAA's "Guidance for Noise Screening of Air Traffic Actions, Revision 2" (December 2012) describes a series of tools that an analyst can use to screen for noise impacts. The Guidance considers a range of potential procedure actions from simply moving a waypoint on an existing procedure through evaluating noise impacts of proposed new procedures. Of relevance to the CatEx2 Task Group are two screening tools addressed in the Guidance – the NIRS Screening Tool (NST) and the TARGETS Noise Plug-in.[18] Both tools allow an analyst to evaluate changes in noise exposure at census block centroids between two design alternatives, typically the current condition and some proposed change, such as a new PBN procedure, that could alter the route of flight or altitude of aircraft from the current condition.

An analyst also has the option to employ the FAA's Aviation Environmental Design Tool (AEDT) for evaluating noise impacts. However, either of the two screening tools should provide similar results, but require less set-up effort on the analyst's part.

[17] *Chicago Midway International Airport Air Traffic Procedural Changes Draft Environmental Assessment*, February 21, 2013.

[18] The TARGETS Noise Plug-in with the Aviation Environmental Design Tool was approved by FAA for noise screening and analysis as of March 15, 2013. *See* Memorandum from Rebecca Cointin and Ralph Iovinelli (FAA, Office of Environment & Energy) to Donna Warren (FAA, Air Traffic Office), March 15, 2013.

d. Additional Implementation Considerations

The CatEx 2 Task Group believes that use of the Net Noise Reduction Method will meet the intent of Section 213(c)(2) of the FAA Modernization & Reform Act of 2012 to help speed approval and implementation of PBN procedures. The Task Group observes, however, that because Section 213(c)(2) requires a demonstration of noise reduction (as well as fuel burn and carbon dioxide emissions reduction), undertaking the analysis to support CatEx 2 might take a bit more time than the analysis to support other Categorical Exclusions. While the amount of time required for the analysis to support any Categorical Exclusion or other NEPA documentation varies significantly depending on the complexity of the action requiring federal approval and the availability of data to support the analysis, FAA observed in a presentation to the CatEx 2 Task Group that the average time for processing a typical Categorical Exclusion (not including CatEx 2) is approximately two months. FAA also observed that the average time for processing a typical Environmental Assessment (EA) is approximately 18 months. Based on the work it did to develop the Net Noise Reduction Method and its understanding that FAA noise screening tools can be used to support the analysis for this method, the CatEx 2 Task Group observes that it might expect the analysis supporting CatEx 2 to take more time than analysis to support other Categorical Exclusions – perhaps on average, approximately three to four months – but much less time than a typical EA.

While the issues of stakeholder coordination and community outreach with respect to the introduction of new air traffic procedures and associated NEPA analysis was not part of the CatEx 2 Task Group's remit, the Task Group notes that stakeholder coordination is critical to the introduction of any new procedure and that NEPA and FAA guidance for implementing NEPA have provisions for community outreach appropriate to particular actions. The Task Group observes that early coordination with relevant stakeholders, particularly including airports and airlines that may be an interface with the community, is important to facilitating the introduction of new air traffic procedures. In the case of CatEx 2, the CatEx 2 Task Group expects such coordination will help by providing relevant stakeholders with information about planned PBN procedures. Further, the provision to such stakeholders of data generated to support CatEx 2 will help with transparency and facilitate implementation of the procedures.

Recommendation

Task Group Recommendation:

The CatEx 2 Task Group recommends that the FAA implement a method for noise analysis described in this document, referred to as the "Net Noise Reduction Method," as the means to meet the requirements of Section 213(c)(2) of Public Law 112-95.

Appendix A

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Appendix B

FAA Modernization and Reform Act of 2012

(Public Law 112-95)

The Categorical Exclusion in Section 213 (c)(2), Acceleration of NextGen Technologies states:

"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."

Appendix C

Noise Analysis in Support of the CatEx 2 Task Group Work and Net Noise Reduction Method

This appendix provides additional detail on the noise analysis prepared to evaluate the applicability of the proposed Net Noise Reduction Method. The CatEx 2 Task Group notes that in the course of its work, the Task Group considered some metrics and data fields that go beyond the scope of its final recommendation. The scope of that work is presented below. However, the method as presented in the final recommendation and the data fields suggested therein should be considered the final work of the Task Group.

1. Theoretical Approach at Seattle Tacoma International Airport

The CatEx 2 Task Group first applied the proposed Net Noise Reduction Method to the theoretical implementation of a single approach procedure at Seattle Tacoma International Airport (SEA). The procedure was meant to reflect the initial intent of the Alaska Airlines' "Greener Skies" arrival to SEA for aircraft arriving from the south that would turn over Elliott Bay instead of over North Seattle residential areas. Figure 1 below shows a nominal approach procedure over Elliott Bay as well as one that follows the existing instrument arrival procedure.

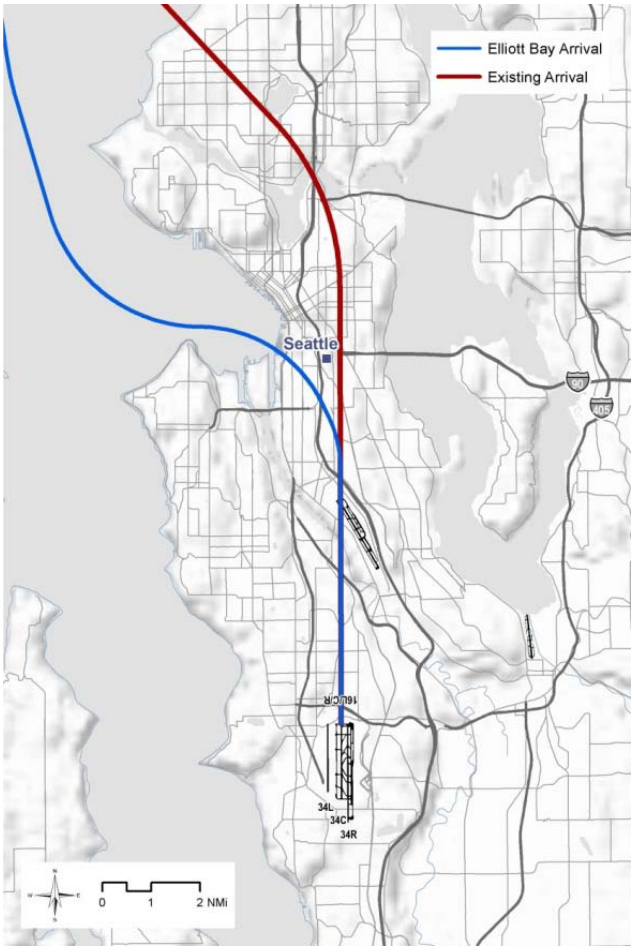

Figure 1. Nominal "Greener Skies" procedure over Elliott Bay compared with existing arrival procedure (Source: HMMH, 2013)

DNL was computed using the Integrated Noise Model[19] at all census block centroids with DNL values greater than DNL 45 for existing conditions, as shown in Figure 2. DNL values were similarly computed for the proposed procedures. Then, for each population point (census block centroid), a comparison was made as to whether the DNL value increased, decreased, or stayed the same. These results are summarized in Table 1.

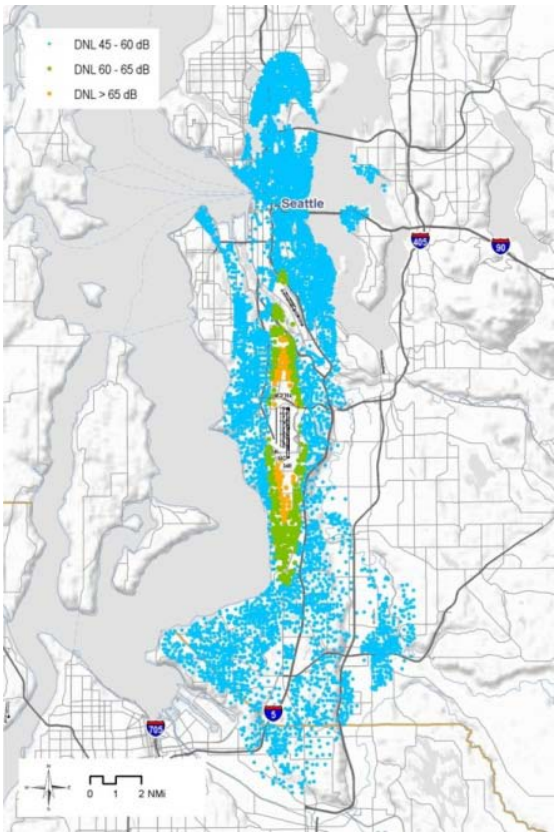

Figure 2. Existing noise levels at census block centroids (Source: HMMH, 2013).

[19] The Integrated Noise Model (INM) is FAA's preferred noise model for airport noise analysis. It has recently been replaced by the Aviation Environmental Design Tool (AEDT), but noise computations and procedures are essentially the same for purposes of this discussion.

DNL Level	Number of people exposed INCREASES	Number of people exposed DECREASES	Number of people exposed UNCHANGED
45-50	16,823	38,384	264,717
50-55	7,251	56,061	129,290
55-60	91	11,293	94,649
60-65	0	0	46,660
65-70	0	0	8,672
70-75	0	0	4
75-80	0	0	0
Total	24,418	105,738	543,992

Table 1. Number of people exposed to DNL Level in PBN procedure versus existing procedure (Source: HMMH, 2013)

As shown in Table 1, the noise modeling analysis demonstrates that there would be a net reduction in the total number of people exposed to DNL greater than 45 dB: an estimated 24,418 people would have increased DNL as a result of the proposed procedure change, while an estimated 105,738 would see noise levels reduced as a result of the change in procedures, resulting in a Net Noise Reduction for 81,320 people.

2. Greener Skies Over Seattle Environmental Assessment

The CatEx 2 Task Group recognized that most procedure changes affect an entire airspace and would need to be evaluated in combination with other actions in order to avoid segmentation concerns under NEPA . The CatEx2 Task Group reviewed the recently completed Seattle Greener Skies Environmental Assessment, which addressed a number of air traffic actions, including two new Standard Arrivals (STARS) and 24 new Required Navigational Performance (RNP) procedures, all with Optimized Profile Descents. These procedures are shown in Figure 3.

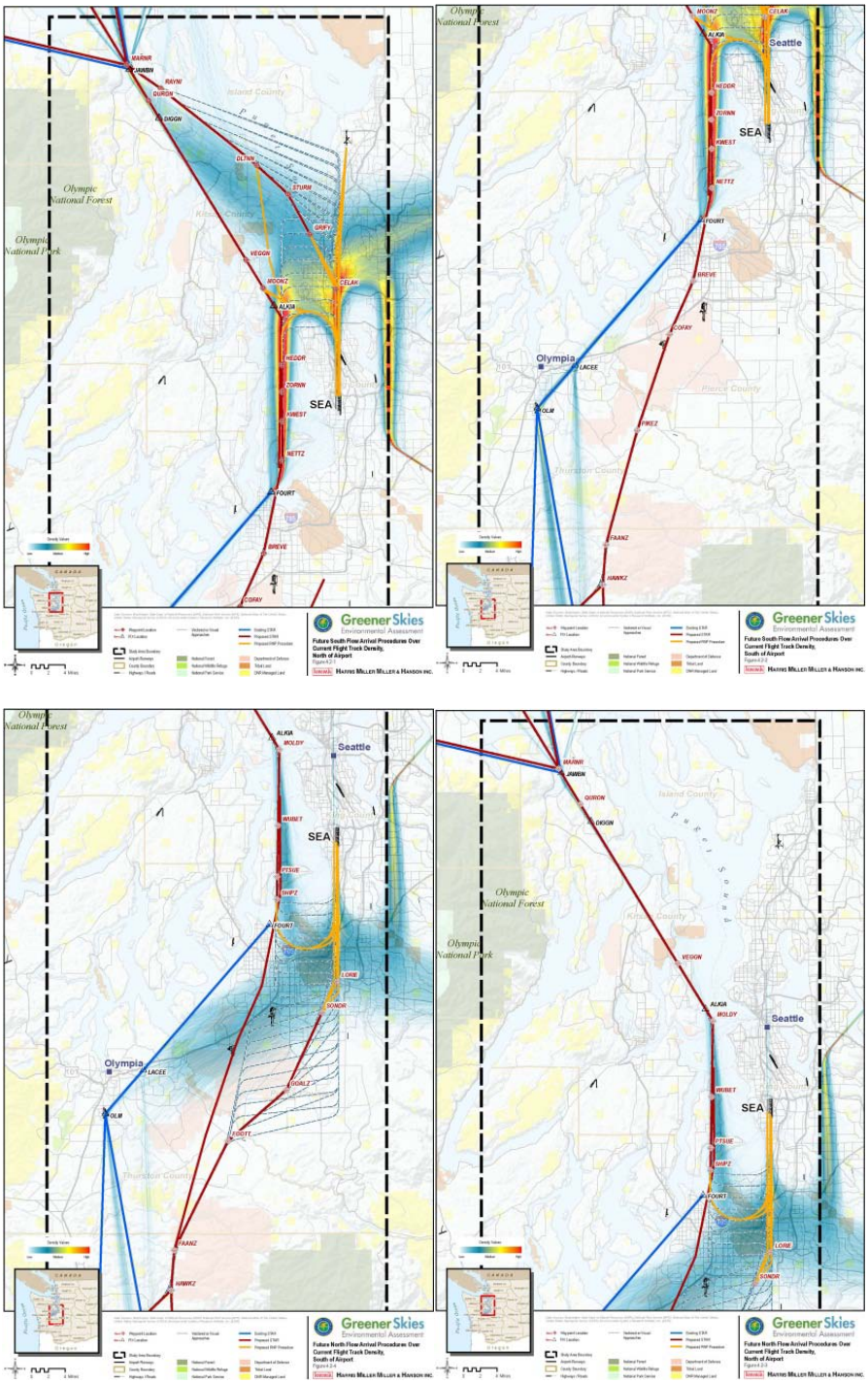

Figure 3. Greener Skies Proposed Arrival Procedures (Source: FAA, 2012)

A summary table of the noise analysis presented in the EA is repeated as Table 2 below.

Study Year	Greatest Change in DNL Relative to No Action		Population Experiencing Change		Population Exceeding FAA Order 1050.1E Criteria			Population Newly Exposed to DNL 65 or above
	Increase	Decrease	In-crease	Decrease	>1.5dB, DNL 65 or above	>3dB from DNL 60 - 65	>5dB from DNL 45 - 60	
2014	0.9dB	-0.8dB	120,386	277,754	0	0	0	396
2018	0.9dB	-0.8dB	123,081	290,391	0	0	0	43
2023	1.1dB	-0.7dB	132,484	311,122	0	0	0	214

Table 2. Summary of Noise Results from Greener Skies EA (Source: FAA, 2012)

The noise analysis was re-evaluated in the context of the Net Noise Reduction context and is shown in Table 3 below for 2023 (the final year of implementation). The analysis shows that there would be an estimated 132,484 people for whom noise levels (DNL) would increase with the proposed changes, and an estimated 311,122 people for whom noise levels would decrease, for a Net Noise Reduction of 178,638.

	Number of people exposed to DNL Level with new PBN procedure versus existing procedure		
DNL Level	Number of people INCREASES	Number of people DECREASES	Number of people UNCHANGED
45-60	114,678	305,653	488,047
60-65	16,436	5,469	48,536
> 65	1,370	0	14,806
Total	132,484	311,122	551,389

Table 3. Number of people exposed to DNL Levels: Greener Skies (PBN) procedures versus existing procedures, 2023 (Source: HMMH, 2013)

3. Midway Environmental Assessment

The CatEx 2 Task Group also reviewed the recently completed Midway International Airport Air Traffic Procedural Changes Environmental Assessment. The Proposed Action evaluated in the Midway EA is the implementation of new initial departure headings off MDW to the existing Standard Instrument Departures (SIDs), and new RNAV arrival procedures (inclusive of RNP), in order to help improve overall efficiency at MDW. RNAV/RNP capable aircraft would use the new RNAV and RNP procedures. Additionally, existing procedures would be retained for non-RNAV/RNP capable aircraft. These procedures are shown in Figure 4.

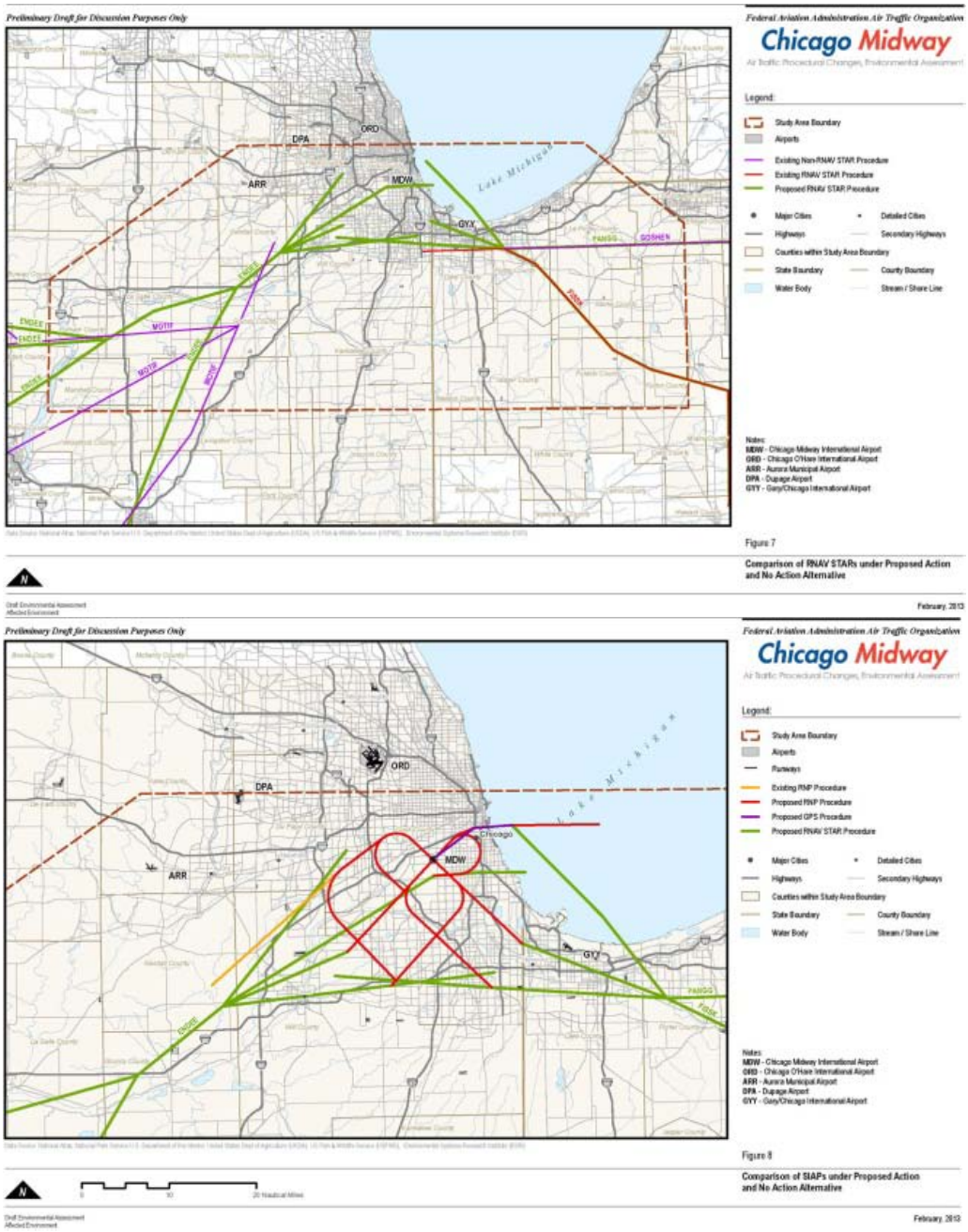

Figure 4. Proposed STARS and Standard Instrument Arrival Procedures at Midway International Airport (Source: FAA, 2013)

A summary table of the noise analysis presented in the EA is repeated as Table 4 below.

DNL Noise Exposure Level under Proposed Action	Increase in DNL with Proposed Action	Population Exposed to Threshold Increase
DNL 65 dB and higher	DNL 1.5 dB or greater	892
DNL 60 dB to 65 dB	DNL 3.0 dB or greater	0
DNL 45 dB to 60 dB	DNL 5.0 dB or greater	3,944

Table 4. Summary of Noise Results from Midway EA (Source: FAA, 2013)

The Net Noise Reduction methodology was applied to the Midway proposal, and is shown in Table 5 below. As shown in the table, the results show an estimated 1,421,159 people for whom noise level would be reduced as compared with 989,090 people for whom noise levels would be expected to increase. However, as shown in Table 4, the Midway EA also demonstrated that there would be 892 people with noise levels greater than DNL 65 dB who would experience a 1.5 dB or more increase in DNL, meeting the FAA's existing criteria for significant impact under FAA Order 1050.1E.

	Number of people exposed to DNL Level in new PBN procedure versus existing procedure		
DNL Level	Number of people INCREASES	Number of people DECREASES	Number of people UNCHANGED
45-60	961,579	1,405,952	445,074
60-65	16,436	5,469	48,536
> 65	11,075	9,738	3,964
Total	989,090	1,421,159	497,574

Table 5. Number of people exposed to DNL Levels: Proposed procedure, Midway EA, 2018, versus existing procedure (Source: HMMH, 2013)

4. Summary

Table 6 below summarizes the results of the CatEx 2 Task Group's review of applicability of the proposed CatEx 2 Net Noise Reduction Method against recent Environmental Assessments prepared by FAA.

Project	Net Noise Reduction	Result of Potential for Significant Impact in DNL 65 dB (from Actual FAA NEPA Analysis)	CatEx2 Eligible?
Seattle Greener Skies EA	Net reduction in number of people with a decrease in noise and exposed to DNL 45 or greater of 178,638.	"The proposed action does not result in significant noise impact over noise sensitive areas. There are no noise sensitive areas exposed to DNL 65 dB or higher that experience a 1.5 dB or greater increase in exposure."[20]	Yes
Midway EA	Net reduction in number of people with a decrease in noise and exposed to DNL 45 or greater of 432,069.	"The Proposed Action would result in aircraft noise exposures that exceed the FAA's significance threshold for noise impacts in 2018."[21]	No (based on significant impact)

Table 6. Summary of Noise Results Using Net Noise Reduction Method and Noting Significant Impact Analysis in DNL 65 dB from Actual NEPA Analysis

[20] Federal Aviation Administration *Finding of No Significant Impact (FONSI) & Record of Decision (ROD) for the Implementation of RNAV/RNP Procedures at Seattle-Tacoma International Airport (Greener Skies over Seattle)*, 1 November 2012.

[21] *Chicago Midway International Airport Air Traffic Procedural Changes Draft Environmental Assessment*, February 21, 2013.

Approved by the NextGen Advisory Committee June 2013

Recommendation for Increased Utilization of Performance Based Navigation (PBN) in the National Airspace System (NAS)

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

June 2013

Contents

Background/Introduction

In September 2012, the FAA asked the RTCA NextGen Advisory Committee (NAC) to develop recommendations to assist them in their efforts to implement and manage Performance Based Navigation (PBN) procedures and the Optimization of Airspace and Procedures in Metroplexes (OAPM) process. The September 12, 2012 tasking letter is contained in Appendix 1. The FAA's letter identified three separate and distinct tasks related to PBN and OAPM:

1. Input on the Obstacles to Performance Based Navigation Utilization

2. Input on the Criteria for Prioritizing Production of PBN Procedures

3. Review and revalidate the criteria used to select and prioritize the current OAPM sites.

To respond to the FAA tasking letter, the NAC subsequently created the Operational Capabilities Work Group (OCWG) with the following responsibilities:

- Provide views on the areas identified by FAA in their internal analyses as obstacles to the use of Performance Based Navigation.

- Provide technical and non-technical suggestions on any other possible approaches for how to best encourage the use of PBN procedures – technical and non-technical issues that must be solved to enable maximum use of PBN procedures.

- To the extent the NAC believes PBN utilization is not being fully exploited, provide specific remedies and incremental action steps, including both technical and non-technical, for industry to relieve these obstacles in the near-term.

- Review and revalidate the criteria used to select and prioritize the current OAPM sites.

In its tasking letter to the NAC, the FAA acknowledged the issues identified in their internal study and advised that they are working to resolve them. However, since the internal FAA review did not include the NAS stakeholders, and in fact, some of the obstacles evolve from issues within the diverse operator community, the FAA determined that collaboration on identifying and addressing these impediments to full realization of benefits was essential. The FAA's tasking letter breaks Task 1, "Input on the Obstacles to Performance Based Navigation Utilization," into two subtasks:

- (1A)" 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…"

- (1B) "Provide specific remedies and incremental action steps…the FAA can take as well as specific remedies and incremental action steps…for industry to take in order to relieve these obstacles in the near-term."

This report documents the findings and recommendations of the OCWG concerning these subtasks. With respect to the first subtask (1A), the report documents the OCWG's examination, expansion, and

prioritization of the list of obstacles to the utilization of PBN. With respect to the second subtask (1B), the report includes a list of recommended mitigation actions associated with the obstacles.

Executive Summary

Since the first publication of the "Roadmap for Performance Based Navigation" in 2003, many groups and organizations have worked to realize the safety and efficiency benefits of PBN procedures and operations. These groups include but are not limited to the PARC, CNS Task Force, ASIAS/CAST, DOT OIG, and national, regional and local FAA Workgroups. The predominant, overarching theme that must be emphasized is the need for government and industry collaboration and organizational focus. Proper and efficient coordination and cooperation amongst the many stakeholders is the foundational requirement to addressing any of the other obstacles. The need for organizational focus on the part of the FAA is identified as a top concern in the majority of studies, most prominently the Lentini Report, "Obstacles to Performance Based Navigation Implementation."

The primary result of this comprehensive review is that these previous efforts all have several elements in common, and the OCWG concurs with the findings of these efforts. The OCWG understands that the FAA is following-up on the recommendations of the Lentini Report. The OCWG has also refined and augmented an additional set of reviewed obstacles. The OCWG then grouped the augmented set of obstacles into five categories (presented here alphabetically) to describe the major obstacles to utilization of PBN procedures:

- Automation
- Design
- Environmental
- Regulations
- Training

The OCWG considered prioritization of both the obstacle categories and recommended mitigation actions associated with each of the individual obstacles. The OCWG examined the obstacles in each category and developed proposed mitigation actions associated with each obstacle. The OCWG focused on development of mitigation actions that could be achieved in the near-term, although in some cases actions that require additional time were also proposed. Each proposed mitigation action was assessed for potential benefit and cost.

The top five mitigation actions resulting from this effort are presented below. Each of the top five mitigation actions had an assessed benefit of "High" and was top ranked within each of the obstacle categories. The OCWG notes that all 15 distinct recommended mitigation actions (listed in Appendix 4) are important to increasing utilization of PBN and all should be pursued.

- 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.

- 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.

- No existing system can test the procedures for all fleet types; therefore, work is necessary to evaluate how to close this gap. One solution could be to 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 the evaluation period. (Pilots and controllers).

- Rewrite the 7110.65 and other associated documents with respect to PBN and update on a more frequent cycle. Include provision for "RNP Established", "Guided Visual Flight Procedures", and RNAV/RNP to ILS/GLS.

- 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.

An additional observation of the OCWG concerns the use of “PBN” with respect to the current tasking. During group deliberations, the OCWG identified concerns with the use of “PBN.” The term “PBN” is often used as a surrogate for a broader operational concept, one that goes beyond navigation technologies. To address the obstacles that have been identified, the solution space must encompass the full spectrum of CNS/ATM, or Performance Based Operations (PBO).

Based on this analysis, the OCWG recommends that the following actions be considered:

- The FAA should adopt all of the recommended mitigation actions contained in this report (see Appendix 4 for complete details). Priority should be placed in addressing the top five set of recommended mitigation actions.
- The FAA should provide regular updates to the NAC on progress and status of its actions to address these recommendations.

Methodology and Structure of Analysis

The OCWG's initial meeting was on December 5, 2012. Subsequently, the OCWG determined the scope and deliberation process that was used to develop findings and recommendations for the first subtask. The OCWG began its deliberations with a review of the FAA's internal analysis, including the report "Obstacles to Performance Based Navigation Implementation" produced in March 2012, along with follow-on analyses, also conducted by the FAA. The OCWG received additional background material including:

- "Concepts and Benefits for Terminal RNP Procedures," report by Performance-Based Operations Aviation Rulemaking Committee
- "Challenges in Implementing Performance-Based Navigation in the U.S. Air Transportation System," testimony from the DOT IG
- "Challenges in Implementing Performance-Based Navigation in the U.S. Air Transportation System," presentation by the DOT IG
- "Minimum Aviation System Performance Standards: 19 Required Navigation Performance for Area Navigation," draft from RTCA SC-227
- "SES Mandate on Performance Based Navigation Informal Consultation," briefing from Eurocontrol
- "PBN Implementation Report," plan from Australia
- ICAO PBN Manual

Using this robust set of background materials, the OCWG collected individual member inputs and began to characterize these inputs into common "bins". These bins represent the primary categories of obstacles concerning implementation and utilization of PBN procedures. The obstacle categories are described in the next section, "Findings". Throughout the review process, the OCWG encountered several ongoing efforts, some with pertinent information (e.g. the ASIAS work on PBN, the NAC CATEX WG, and the Seattle Greener Skies Project).

Following the categorization of the identified obstacles, the OCWG analyzed the obstacles in each category, developed a set of recommended mitigation actions associated with each of these obstacles, and prioritized the recommended mitigation actions. As part of the prioritization activity, the OCWG assessed the impact of each obstacle, determining if the obstacle impacted the use of published procedures, if the obstacle impacted the implementation of future procedures, or if the obstacle impacted both. Each proposed mitigation action was also assessed for cost and benefit. This assessment was largely qualitative, informed by the operational expertise available from the OCWG membership.

To successfully complete Task 1, an appropriate representation of stakeholders interested in PBN procedures implementation and utilization was engaged in the work. The full roster of OCWG membership is included Appendix 2. While the FAA did not participate in the deliberations, they provided subject matter expertise to the OCWG. The OCWG provided update briefings to the NACSC throughout early 2013 and an interim briefing to the NAC in February 2013.

Findings

Obstacle Categories

Since the first publication of the "Roadmap for Performance Based Navigation" in 2003, many groups and organizations have worked to realize the safety and efficiency benefits of PBN procedures and operations. These groups include but are not limited to the PARC, CNS Task Force, ASIAS/CAST, DOT OIG, and national, regional and local FAA Workgroups. The OCWG acknowledges and applauds the efforts of these groups. The observations, findings, and recommendations of these groups were reviewed along with others produced by ICAO and Eurocontrol that identify and address technical and non-technical obstacles to PBN utilization.

The predominant, overarching theme that must be emphasized is the need for government and industry collaboration and organizational focus. Proper and efficient coordination and cooperation amongst the many stakeholders is the foundational requirement to addressing any of the other obstacles. The need for organizational focus on the part of the FAA is identified as a top concern in the majority of studies, most prominently the Lentini Report, "Obstacles to Performance Based Navigation Implementation."

The primary result of this comprehensive review is that these previous efforts all have several elements in common, and the OCWG concurs with the findings of these efforts. The OCWG understands that the FAA is following-up on the recommendations of the Lentini Report. The OCWG has also refined and augmented an additional set of reviewed obstacles. The OCWG then grouped the augmented set of obstacles into five categories (presented here alphabetically) to describe the major obstacles to utilization of PBN procedures:

- Automation
- Design
- Environmental
- Regulations
- Training

These five categories are intended to organize the Task 1A work as well as serve as a framework for the OCWG's efforts under Task 1B.

These five categories have individual impacts and integrated impacts. For example, there are several individual issues concerning Regulation or Environmental obstacles. But the individual Environmental Category impacts are often driven by specific laws, and Regulatory issues are also interconnected with environmental constraints. In order to increase utilization, and ultimately achieve the benefits, of PBN procedures, the aviation community must collaborate, provide organizational focus, and address all of these obstacles in an integrated manner. Figure 1 shows the interconnectivity of the obstacle categories.

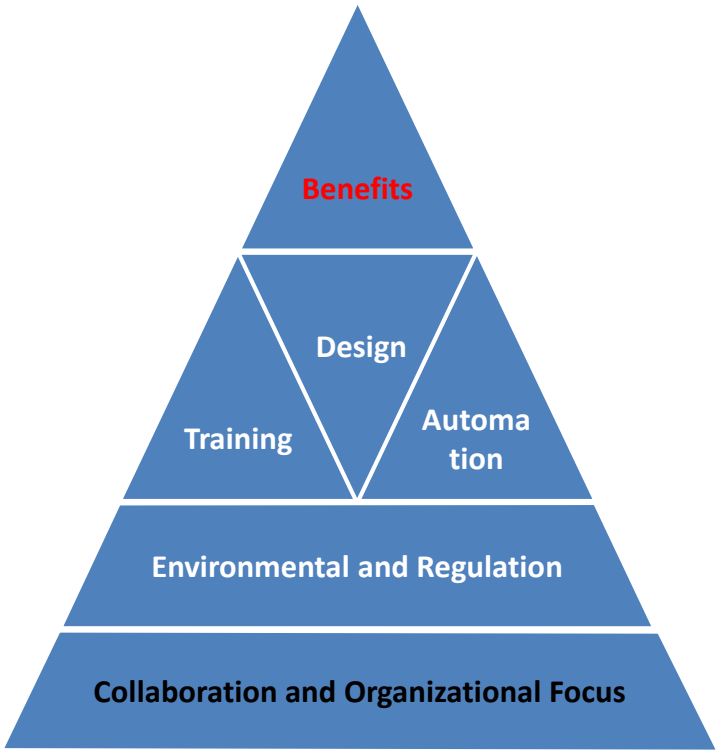

Figure 1: Interrelationship of Obstacle Categories

The remainder of this section includes descriptions of the types of issues to be contained in each of the five categories. Select examples of specific obstacles are included in Appendix 3.

Automation

Merging and sequencing in terminal and transition airspace is a critical piece in utilization of PBN procedures. There is currently a lack of a terminal traffic sequencing and separation automation tool.

Mixed equipage is an ongoing and ever present reality. Lack of decision support tools that will enable the ability to handle mixed equipage is a longstanding concern. Development and utilization of enhanced automation, allowing controllers to identify and concurrently manage aircraft with different capabilities and procedures is needed. Without controller decision support tools to handle mixed equipage, even high percentages of similarly performing aircraft can produce an underutilization of PBN procedures. Any time an air traffic controller is asked to blend traffic and one is on a defined trajectory, the other aircraft must be well timed in order to assure proper separation.

There is also an interdependency of PBN procedures on traffic flow management applications. This interdependency requires a thorough review and adaptation/modification allowing system benefits to be realized.

Design

There is a 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

to those that can meet the goal and also provides a foundation for measuring procedure effectiveness after implementation. Directly related to the proper definition of the operational goal, is determining how to measure success or impact of procedures.

PBN development, design, and implementation span several FAA organizations. There is no national repository for "lessons learned" or easily identified source to answer user and airport questions concerning PBN. There is a wealth of information and lessons learned around previous design efforts, but it is not easily available. Lack of a consolidated knowledge base causes errors to be repeated and potential benefits are delayed. Design and implementation costs are subsequently increased, and system benefit is reduced.

Users have limited knowledge of FAA organizational structure and nomenclature, or where to proceed to get assistance or explanations concerning PBN requirements. This is especially true of users who do not have a formal relationship with FAA Flight Standards. The web version of the FAA Directory is confusing and does not promote communication.

Stakeholder participation and collaboration are crucial during design. Too many procedures have been suspended or modified via NOTAM due to some late breaking awareness identified by a critical stakeholder who was not part of original design/implementation team, or simply something new being uncovered in the implementation phase.

Mixed equipage and fix naming are also key issues associated with Design. Designers must consider whether there should be optimal profile and conventional trajectories along same ground path. The designs should optimize the simultaneous use of various types of equipage. Another issue is that RNAV Approach fix names are different when overlaying existing instrument approach procedures. This increases application difficulty, controller workload, and controller display clutter.

The proliferation of RNAV waypoints is a major issue for operators, due to the limitation of fixed memory on aircraft Flight Management Computers. This database memory limitation can hinder some aspects of the design of PBN procedures, and directly impacts the utilization of some procedures.

There is a lack of design engineering for vertical optimization to accommodate the wide range of aircraft performance. Consequences of this lack of guidance are difficulty in development of procedures and that poorly designed procedures either are not used or are inconsistently used by operators and controllers.

As stated above, criteria and guidance associated with the development and publication of PBN procedures changes frequently. It is essential that the stakeholders (e.g. Service Center specialists, airspace designers) involved in the design and development of these procedures receive regular training on the latest criteria and guidance.

Environmental

The environmental process begins when the design process begins and should be a consistent consideration throughout design. This process should involve all affected stakeholders, including aircraft operators, the FAA (both management and controllers), and airport operators.

The environmental review process is relatively lengthy, too long even for administrative issues including adding or deleting comments. The process then gets even longer when vertical/lateral changes are requested. There have been instances in the current design and development processes where problems are discovered after publication and implementation. There should be a process to quickly amend or update published procedures, without waiting for months or years. Industry has raised concerns about procedure amendments via FDC NOTAM when what is needed is a revised procedure. Changes to processes should also ensure airport operators are not left "holding the bag" with respect to adverse environmental consequences, particularly in the event that modifications need to be made close in to the airport (within 5-10 nm and under 3000 ft AGL).

Regulation

RNP and RNP AR criteria for Initial and Recurring Qualifications are difficult and expensive. The expense compared against today's benefit makes the business case for RNP / RNP AR difficult to justify. Cost of RNP AR validation of navigational database along with cost of training exceeds benefit gained by utilizing an RNP at many airports.

The current Navigation Database Validation process is cumbersome and hinders the ability to keep large numbers of RNP approaches in the operator's inventory. The requirement to validate RNP AR procedures is costly, and often leads to an Operator choice to exclude the use. This is particularly true when the procedure is not likely to be used often. The larger inventory of RNP procedures requires more administrative overhead validating procedures and requires duplication of effort, with multiple operators doing the same checks on the same procedures. Out-sourcing the checks is costly, and again duplicates efforts, but is the only practical way to comply with the current process while maintaining a large inventory of RNP approaches by operators. The check process needs a major overhaul, being shifted upstream and automated. As a consequence, operators do not subscribe to some RNP approaches as they are redundant and may not provide significantly lower minimums over other conventional or RNAV procedures. In some cases, it relates to the FMS database size limitations – adding one procedure may require operators to delete another to make it fit.

In the past, FAA has excluded some operators from utilizing specific PBN procedures i.e. RNAV Visual and (VNAV) utilizing DA (H) Op-Spec C073 approach procedures for part 91 operators based on internal administrative workload issues. This exclusion contributes to mixed procedure utilization issues. FAA AFS is now working with industry to remove this artificial barrier but progress is slow.

In addition, FAA design criteria and operational documentation (i.e. 7110.65) are not able to change/adapt fast enough to keep up with technology and required procedure changes. This inability of the FAA to adapt timely results causes the procedures' value to diminish.

Training

Today there is no standardized training between FAA and stakeholders (pilot and controller). There are many misunderstandings of what PBN is and what it can do. When training PBN technical and regulatory capabilities and requirements, the concept needs to be expanded and trained to all stakeholders concurrently. Standardized training is applied in other FAA/stakeholder endeavors. For example, training between FAA and stakeholders exists in the Collaborative Decision Making (CDM) structure.

A holistic understanding of system interdependency along with aircraft and flight management system (FMS) characteristics needs to be the foundation of any PBN design and implementation. All stakeholders need to understand the difference and requirements between RNAV, RNP, and RNP AR. The FAA is currently developing criteria for Advanced RNAV procedures. Creating common awareness and understanding of different characteristics associated with various aircraft and FMS equipment is needed. Standardization (performance, coding, database memory size, etc.) in the use of the FMS is critical to the successful integration of the procedures into the NAS.

Prioritization of Obstacles and Mitigation Actions

The OCWG considered prioritization of both the obstacle categories and recommended mitigation actions associated with each of the individual obstacles. In some cases, a proposed mitigation action will address multiple obstacles.

Regarding the obstacle categories, the OCWG has two perspectives on prioritization. First, the wording of Task 1A requests that the OCWG examine "potential obstacles to PBN utilization." With respect to utilization of procedures that are published and available currently, the OCWG has preliminarily identified the Automation and Training categories as top priorities. With respect to ensuring that future procedures are used to the fullest extent, the OCWG has preliminarily identified the Design category as a top priority. Environmental and Regulations both significantly impact the utilization of existing and implementation of future procedures, but also appear to have some efforts that are ongoing to address these obstacles.

Regarding the recommended mitigation actions, the OCWG examined the obstacles in each category and developed proposed mitigation actions associated with each obstacle. The OCWG focused on development of mitigation actions that could be achieved in the near-term, although in some cases actions that require additional time were also proposed. Each proposed mitigation action was assessed for potential benefit and cost. Benefit was delineated at three levels, depending on the likelihood that the benefit was achievable within the next 18 months. Cost was delineated at the following three levels:

- Low: Requires little or no new infrastructure investment from operators and the FAA; may require reallocation of existing resources
- Medium: Requires new infrastructure investment from either the operators or the FAA, but not both
- High: Requires significant new infrastructure investment from operators and the FAA

The top five obstacle/mitigation action pairs resulting from this effort are presented below. Each of the top five obstacle/mitigation action pairs had an assessed benefit of "High" and were top ranked within each of the obstacle categories. The top five are presented alphabetically by category, and represent the top priority recommended actions. While they are listed separately by category, each of these five items is interconnected and the group should be considered in that integrated manner. The OCWG notes that all 15 distinct recommended mitigation actions (listed in Appendix 4) are important to increasing utilization of PBN and all should be pursued.

Automation Obstacles and Mitigation Action Recommendations	
Obstacle Description	Mitigation Action Recommendations
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.

Design Obstacles and Mitigation Action Recommendations	
Obstacle Description	Mitigation Action Recommendations
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.	No existing system can test the procedures for all fleet types; therefore, work is necessary to evaluate how to close this gap. One solution could be to 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 the evaluation period. (Pilots and controllers).

Regulation Obstacles and Mitigation Action Recommendations	
Obstacle Description	Mitigation Action Recommendations
FAA operational documentation (i.e. 7110.65 and AIM) lags design criteria and technology.	Rewrite 7110.65 and other associated documents with respect to PBN and update on a more frequent cycle. Include provision for "RNP Established", "Guided Visual Flight Procedures", and RNAV/RNP to ILS/GLS.

Training Obstacles and Mitigation Action Recommendations	
Obstacle Description	Mitigation Action Recommendations
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.	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.

The full list of obstacles and recommended mitigation actions, along with the assessment of the impact, cost, and benefit, is included in Appendix 4.

Performance Based Operations

During group deliberations, the OCWG identified concerns with the use of “PBN”. The term “PBN” is often used as a surrogate for a broader operational concept, one that goes beyond navigation technologies. To address the obstacles that have been identified, the solution space must encompass the full spectrum of CNS/ATM, or Performance Based Operations. PBO more appropriately captures the complex, integrated world of technical and non-technical obstacles that must be addressed.

Performance-based operations are defined as the operational use of performance-based navigation flight procedures by aircraft operators and air traffic controllers. This term is different than PBN, which defines a navigational capability and/or procedure type, but does not necessarily encompass its use.

The scope of Task 1B will include the full scope of PBO, as defined above, to include addressing the CNS/ATM elements of the five obstacle categories: Automation, Training, Design, Environmental and Regulations.

Recommendations

The OCWG has identified five categories that characterize the obstacles to utilization of existing procedures and successful implementation of new PBN (PBO) procedures. This categorization has been used as a framework for the OCWG's initial efforts in developing technical and non-technical actions for the FAA and Industry to take to resolve identified obstacles.

Based on this analysis, the OCWG recommends that the following actions be considered:

- The FAA should adopt all of the recommended mitigation actions contained in this report (see Appendix 4 for complete details). Priority should be placed in addressing the top five set of recommended mitigation actions.
- The FAA should provide regular updates to the NAC on progress and status of its actions to address these recommendations.

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: Tasking Letter

U.S. Department
of Transportation

**Federal Aviation
Administration**

Office of the Administrator

800 Independence Ave., S.W.
Washington, D.C. 20591

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,

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

Appendix 2: Members of Operational Capabilities Work Group

Dan Allen, FedEx Express
Philip Basso, DoD Policy Board on Federal Aviation
Joe Bertapelle, JetBlue Airways
Tom Bock, Port Authority of New York & New Jersey – Co-Chair
Grady Boyce, Delta Air Lines
Chris Brinton, Mosaic ATM
Lee Brown, Landrum and Brown
Steve Brown, National Business Aviation Association
Mark Cato, Air Line Pilots Association
Perry Clausen, Southwest Airlines
Bill Cranor, JetBlue Airways
Brad Culbertson, Lockheed Martin Corporation
Steve Dickson, Delta Air Lines
Sylvan Drakes, U.S. Air Force
Brett Easler, U.S. Navy
Bob Everson, Southwest Airlines
Scott Foose, Regional Airline Association
Jeff Formosa, MITRE Corporation
Rob Goldman, Delta Air Lines
Pamela Gomez, Federal Aviation Administration (Observer)
Jim Hamilton, United Parcel Service
Aslaug Haraldsdottir, The Boeing Company
Richard Heinrich, Rockwell Collins
Jens Hennig, General Aviation Manufacturers Association
Mike Hines, Metropolitan Washington Airports Authority
Mark Hopkins, Delta Air Lines
Carol Huegel, Metron Aviation
George Ingram, Airlines for America
Jennifer Iversen, RTCA
Pascal Joly, Airbus Americas
Christian Kast, United Parcel Service
Paul Kinstedt, Republic Airways Holdings
Tom Kramer, Aircraft Owners and Pilots Association
Bob Lamond, National Business Aviation Association
George Ligler, Project Management Enterprises Inc.
Angela Martin, Wood Consulting Services
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
Susan Pfingstler, International Air Transport Association
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
Heidi Williams, Aircraft Owners and Pilots Association

Appendix 3: Examples of Obstacles

Automation Example (1)

A key example of an automation issue is wind prediction based on real-time measurements. The Flight Management system (FMS) installed on most aircraft can detect and measure the winds at the current aircraft position and adjust navigation accordingly. In addition, the FMS has the ability to adjust for predicted winds by loading them into the FMS either by pilot action or via data-link to the airplane. Once the winds along the flight profile are loaded into the FMS, the airplane will be able to predict the most energy-efficient trajectory, thus mitigating the effects of the varying winds.

The use of predicted winds applies on an aircraft-by-aircraft basis (i.e. only those flights making use of the data), rather than on a group of aircraft converging on a point. In order to allow a group of FMS-equipped aircraft to fly the most efficient trajectory, converging flights must be “metered” into sequence prior to the merge point. The most efficient metering technique is by time. This metering is accomplished by ground systems predicting ETAs at a merge point with time adjustment information relayed to the controller for action. At present the information and resulting actions required are too crude to produce the sequence desired in an orderly manner. Miles-in-trail or other traffic management initiatives are therefore used to reduce or spread congestion or convergence. These lateral restrictions waste airspace as they only ensure spacing between flights rather than efficient metering.

To produce the most efficient sequence, while allowing for the most efficient flight trajectory, wind collaboration and ATM decision support tools are required to assist in achieving the optimum arrival schedule. Ground metering and aircraft FMS systems must utilize the most accurate wind information available to mitigate this external variable. The most efficient metering that can be commonly collaborated (and even swapped among flights) is time either to a fix or between aircraft, as appropriate. For effective time interval metering to occur, wind forecasts and the resulting time estimates to the metering point must be highly accurate.

Automation Example (2)

To gain full benefits from PBO, its relationship with other automation tools needs to be reviewed and use/procedures of those tools needs to be modified. In some cases additional merging and spacing tools will be needed.

OPD's allow the flight to fly the most optimized profile during the descent phase of flight. This inherently implies that the aircraft FMS should determine the profile to be flown. Since desired descent profiles of various aircraft will differ, hard single altitude crossing restrictions, fixed speed restrictions, etc. must be modified to allow for "window" crossing restrictions and speed constraints. This conflicts with the controllers’ function of orderly spacing using tools such as Traffic Management Advisor (TMA). TMA freeze horizons, where TMA spacing needs are determined, are often in proximity to Top of Descent (TOP). Thus the desired profile and controller actions begin in proximity. To allow for OPD's in the current system, traffic management initiatives, usually miles in trail, are employed. In short capacity reducing initiatives are employed to allow for PBO operations. To allow for PBO OPD's to exist in

harmony with traffic management, metering into the OPD, or some type of controller decision support is needed.

TMA does not project time to the runway end on a defined path. That is what terminal controllers need for sequencing and separation. Currently now sequencing and separation usually occurs by vectoring. A terminal traffic sequencing and separation automation tool needs to be implemented before effective sequencing and separation can occur in terminal airspace.

One planned benefit of PBO is reduced low altitude "dirty" flying which will reduce fuel burn, emissions and exposure to noise. To achieve this benefit, a different path will need to be flown to the runway than conventional approaches with radar vectoring. The result is air traffic controllers will be merging separate streams close to the runway threshold. To enable this, the controller will need decision support as mixed equipage will exist for decades to come. Some airports are considering isolating specific runways to PBO procedures. This will most likely limit the capturing of all capacity in terms of total operations.

These are just instances of integration issues between individual PBO operations and capturing all available capacity. The integration must be considered jointly with PBO implementation, not separately.

Training Example

Effective training for PBO should involve local operational personnel in the development of training programs to secure buy-in and acceptance of the new procedures. Simple briefings are not adequate. Human-in-the-loop (e.g., off-line simulation on identical equipment) and/or on-the-job hands on training at the facility adapted for the local site is a must. Simulations, if used, need to be as realistic as possible. For controllers, they need to access to the same scopes, same communications equipment, keyboards, lighting, etc. For training sessions to be truly beneficial to the controller, focus should be on the new procedures, not on realism of the training environment. The same goes for pilots. They have very impressive and sophisticated cockpit and aircraft simulators to teach them. At Philadelphia, during the most recent airspace change, controllers were able to run the new airspace and procedures using the STARs operations environment. Many simulations on all runway configurations were run. Controllers exiting the training felt prepared for the change and the actual implementation went very successfully.

Regulation Example (1)

FAA has set validation and training standards to such an extremely high level that the vast majority of Part 91 fight departments have come to the conclusion it is simply not cost effective for them to go through RNP/AR certification. This, in spite of the fact that equipage is easily equal to any Part 121 aircraft in the much of the Part 91 fleet. The economic cost of database validation (initial and recurring costs) is simply prohibitive for most Part 91 flight departments. Bear in mind that RNP/AR procedures were originally designed to allow for access to terrain challenge airports where no other options existed and no operations were possible in other than VMC conditions. Now, RNP/AR procedures have proliferated throughout the NAS. To date, of the 4,000+ Part 91 NBAA member flight departments, only about three dozen have made a positive cost/benefit case to become RNP/AR certified. While the FAA has committed to working a solution to mitigate this inequity (Advanced RNP), we are likely years away

from seeing a solution implemented. The impact of this can be seen in places such as Midway and Dekalb Peachtree airports. At both locations, under certain conditions, RNP/AR is the only approach that can be utilized for the vast majority of business aircraft to land at these airports. NBAA requests that Advanced RNP certification standards be accelerated and made available to operators as soon as practical.

Regulation Example (2)

FAA has overtly excluded Part 91 operators from utilizing RVFP in FAA Order 7260.55. The central reason for this exclusion centers on the inability of FAA/AFS to have adequate oversight over the Part 91 community. Qualified operators are required to obtain letters of approval from their POI's and AFS has stated they simply cannot manage the administration of approval letters for potentially hundreds and hundreds of Part 91 operators. This limitation on the part of AFS is an inequitable limitation on the Part 91 operator community to take advantage of a NextGen tool that is based on a decision not in control of the operator, but rather an arbitrary decision on the part of the FAA. (The validity of the decision reference the impact on AFS is not being questioned here, rather the fact that an internal limiting factor of the FAA has resulted in an arbitrary decision to exclude otherwise qualified operators from having equitable access to airports using RVFP.) Further, it should be noted that this impacts the ability of controllers in the ATO to provide the most efficient air traffic service to those airport utilizing RVFP.

Design Example

Many PBN procedures have been developed collaboratively with industry to solve problems or enhance the operation:

- RNAV SID's and STAR's – reduced radio transmissions, clearer understanding of procedure, at ATL and PHX. Repeatable and predictable flight paths.
- RNP procedures to provide access – Examples: Juneau, Sun Valley, Palm Springs, MDW 13C approach to de-conflict ORD traffic
- Optimized Profile Descents (RNAV STARS) provide fuel savings and emission reductions
- RNP Procedures to promote efficiency – RNP AR procedures at DEN, ABQ, BNA, MCI, OKC, SJC, SMF, etc
- RNP Procedures to reduce environmental impact – Example: Greener Skies at SEA
- LPV procedures promote safety and access at airports without ILS installations by replacing much less accurate NDB approaches and providing vertical guidance unlike VOR or LOC approaches.

Some procedures, however, have been designed with little or no collaboration thus the cost benefit analysis for equipage is usually not present. Procedure development needs to address a goal, aim or some type of "shared vision" for a common understanding of the end result. Understanding of a shared vision will promote understanding and usage.

Many resources go unused because of poor initial design, e.g. T-routes in CLT that conflicted with existing procedures, so controllers just declined pilot requests for them. Pilots are routinely denied use of some T-routes which causes apathy and a lack of future requests. This could be attributed to an

initial design flaw that makes the routes/procedure unusable by controllers, or apathy on the value and benefit of using such routes.

Appendix 4: List of Obstacles and Mitigation Actions

Automation Obstacles and Mitigation Actions

Obstacle/Barrier Description	Impact of Obstacle/Barrier	Barrier to [C]urrent, [F]uture, or [B]oth	Recommended Mitigation Action(s)	Cost of Mitigation [H, M, L]	Benefit of Mitigation [H, M, L]
Lack of a terminal traffic sequencing and separation automation tool.	Results in less optimal design; Reduced capacity; Limits utilization.	B	FAA should expedite implementation of decision support tools for sequencing aircraft on PBN procedures in an integrated approach. (Eg., RPI, TSS, TBFM). OCWG review of the tools under development, to provide additional prioritization recommendations to supplement FAA funding decisions.	M	H
Lack of decision support tools and information that will enable the ability to handle mixed equipage.	Even with high percentages of similarly performing aircraft, this barrier hinders utilization of PBN procedures. Results in less optimal design; Reduced capacity; Limits utilization.	B	FAA should expedite implementation of decision support tools for sequencing aircraft on PBN procedures in an integrated approach. (Eg., RPI, TSS, TBFM). OCWG review of the tools under development, to provide additional prioritization recommendations to supplement FAA funding decisions.	M	H

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.	Results in less optimal design; Reduced capacity; Limits utilization.	B	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 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.	L	H

3 Design Obstacles and Mitigation Actions

Obstacle/Barrier Description	Impact of Obstacle/Barrier	Barrier to [C]urrent, [F]uture, or [B]oth	Recommended Mitigation Action(s)	Cost of Mitigation [H, M, L]	Benefit of Mitigation [H, M, L]
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.	Procedures are designed without any strategic focus, resulting in the development of PBN procedures that are not compatible with existing traffic flows and procedures. Also, the lack of a	B	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.	L	H

	coherent, well communicated goal results in failure to achieve operational support.				
Procedure development timeline is excessive. There is no national repository for "lessons learned" or easily identified source to answer user and airport questions concerning PBN. Users have limited knowledge of FAA organizational structure and nomenclature, or where to proceed to get assistance or explanations concerning PBN requirements Criteria and guidance associated with the development and publication of PBN procedures changes frequently. The proliferation of RNAV waypoints is a major issue for operators, due to the limitation of fixed memory on aircraft Flight Management Computers.	Inefficient implementations as mistakes are repeated. Contributes to mixed procedure utilization. Limits operator benefits.	F	Develop and deploy a lessons learned database and process of guidance and information for stakeholders. Develop standardized design process and single information source, with appropriate customization for each metroplex. Create a single point of accessibility to various pieces of information needed to develop effective procedures. Limit, as much as practical, the proliferation of waypoints on PBN procedures.	L	M

Due to limited resources there is a need for a more efficient method to gain broad stakeholder collaboration. The current design process is very time consuming for stakeholders and results in limited or no participation by needed participants.	Procedures often result in complex/ inefficient traffic flows overwhelming intended benefits. Many procedures have had to be re-designed due to lack of key participants in initial design.	B	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.	M	H
Increased procedure complexity results in inefficient operations and a lack of usage. Designers must consider whether there should be optimal profile and conventional trajectories along same ground path. Another issue is the high volume of fix names and mapping requirements when overlaying existing instrument approach procedures.	Memory limitations in FMS, video mapping and controller familiarity.	B	Limit the number of approach procedures for each metroplex and use common ground track/fixes when feasible. The designs should optimize the simultaneous use of various types of equipage.	L	M
There is a lack of design engineering criteria for vertical optimization to accommodate the wide range of aircraft performance. (speed and altitude)	Procedures tend to be efficient for a limited number of users, limiting usage.	B	Provide improved vertical procedure design guidance via FAA orders, ACs or other materials.	L	M

Multiple PBN projects have started without proper representation of all stakeholders which resulted in suspension or redesign.	Some carriers are reluctant to participate.	B	No existing system can test the procedures for all fleet types, therefore, work is necessary to evaluate how to close this gap. One solution could be to 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 the evaluation period. (Pilots and controllers).	M	H

4 Environmental Obstacles and Mitigation Actions

Obstacle/Barrier Description	Impact of Obstacle/Barrier	Barrier to [C]urrent, [F]uture, or [B]oth	Recommended Mitigation Action(s)	Cost of Mitigation [H, M, L]	Benefit of Mitigation [H, M, L]

Stakeholder involvement including aircraft operators, the FAA (both management and controllers), and airport operators are not included throughout the whole process.	Procedures need additional tweaking after implementation and if the environmental process needs to be repeated a development timeline will increase in an associated manner.	F	Mitigation actions are already underway as part of FAA NavLean effort and as part of the CATEX WG tasking. Recommend that the FAA expedite implementation of recommendations that support CATEX2.	L	M
The environmental review process is relatively lengthy, too long even for administrative issues including adding or deleting comments.	If subject to a lengthy environ-mental review, procedure will become "stale" and irrelevant, and result in under utilization.	B	Mitigation actions are already underway as part of FAA NavLean effort and as part of the CATEX WG tasking. Recommend that the FAA expedite implementation of recommendations that support CATEX2.	L	M

5 Regulation Obstacles and Mitigation Actions

Obstacle/Barrier Description	Impact of Obstacle/Barrier	Barrier to [C]urrent, [F]uture, or [B]oth	Recommended Mitigation Action(s)	Cost of Mitigation [H, M, L]	Benefit of Mitigation [H, M, L]
Compliance with the RNP and RNP AR criteria for Initial and Recurring Qualifications (aircrew and aircraft) is difficult and expensive.	Significantly limits the number of RNP AR Operators. The by product is lower utilization of RNP AR	C	Implement Radius-to-Fix (RF) legs for advanced RNP (e.g. AC 90-105A). Retain RNP AR for terrain avoidance where beneficial. Identify RNAV(RNP) Standard Instrument Approach Procedures as requiring AR or RF leg capability, as appropriate. Streamline the process for RNP AR Regulatory Approvals.	L	H

	procedures.				
The current Navigation Database Validation process is cumbersome and expensive. This results in either inability of operators to keep large numbers of RNP approaches in the operator's inventory or an ability to equip due to the cost.	In some cases operators selectively choose which RNP AR procedures to keep. In other cases it is a barrier to certifying for RNP AR both of which hinder utilization and can cause confusion for ATC.	B	Eliminate the need for Operator Validation of databases required for RNP AR. Advocate for Advance RNP procedures (not AR) with RF legs.	L	M
FAA operational documentation (i.e. 7110.65 and AIM) lags design criteria and technology.	Controller rules (7110.65) do not support practical use of some PBN procedures, thus limiting utilization.	B	Rewrite 7110.65 and other associated documents with respect to PBN and update on a more frequent cycle. Include provision for "RNP Established", "Guided Visual Flight Procedures", and RNAV/RNP to ILS/GLS.	L	H
FAA procedure design criteria are not able to change/adapt fast enough to keep up with technology and required procedure changes. When	Confusion exists on what criteria is most current, slowing procedure design	B	Widely disseminate procedure design criteria changes. Repeatedly used waivers should become part of the procedure design criteria.	L	M

procedure design criteria are changed, the modifications are not widely communicated. Procedure waivers are used often to obtain desired level of benefits.	and sometimes resulting in procedures nearing publication to fail criteria tests.				

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8 ## Training Obstacles and Mitigation Actions

Obstacle/Barrier Description	Impact of Obstacle/Barrier	Barrier to [C]urrent, [F]uture, or [B]oth	Recommended Mitigation Action(s)	Cost of Mitigation [H, M, L]	Benefit of Mitigation [H, M, L]
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.	Lack of usage; Lack of consistency among flight crews; Lack of confidence and interest.	B	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.	L	H

Insufficient knowledge by many stakeholders of the differences between and requirements associated with different types of PBN (GPS, LPV, RNAV, Advanced RNAV, RNP, and RNP AR).	Confusion; Poor procedure design and flyability issues; Unmet procedure expectations.	C	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.	L	H
Air Traffic procedure designers and airspace staff must have an understanding of the fleet mix of the target PBN area. This includes understanding of the FMS capability, RNP AR certification, leg types FMS database issues and what level of application is needed for the desired outcome of the procedure.	Non-participants; Under utilization; Lack of confidence; Un-necessary complexity.	B	Train procedure design teams, including multiple operators, involved early and on-going in the design process. Early "flight check" involvement/analysis using simulations. Make navigation databases available for flight simulators to accommodate multiple variant of equipment type.	L	H

Pilots and controllers are reluctant to use procedures due to the complexity of PBN procedures and the variations on how the procedures are used or flown.	Lack of usage; Misapplication of procedure box loading errors.	B	Provide a high level of training for pilot, controller and traffic management personnel on the complexities of real time changing complicated PBN procedures, such as RNP and RNP AR and the associated heads down time and other distractions. Train traffic management personnel in proper terminology of restrictions when certain levels of RNP are required. Increase the utilization of jump seat familiarity (FDT) for controllers.	L	H

Appendix 5: Acronyms

ABQ	Albuquerque International Sunport
AFS	Flight Standards Service
AGL	Above Ground Level
ASIAS	Aviation Safety Information Analysis and Sharing
ATM	Air Traffic Management
BNA	Nashville International Airport
CAST	Commercial Aviation Safety Team
CATEX	Categorical Exclusion
CDM	Collaborative Decision Making
CLT	Charlotte/Douglas International Airport
CNS	Communication, Navigation and Surveillance
DA (H)	Design Approval Holders
DEN	Denver International Airport
DOT IG	Department of Transportation Inspector General
ETA	Estimated Time of Arrival
FAA	Federal Aviation Administration
FDT	Flight Deck Training
FMS	Flight Management System
GLS	Global Navigation Satellite System Landing System
ICAO	International Civil Aviation Organization
ILS	Instrument Landing System
LOC	Localizer
LPV	Localizer Performance with Vertical
MCI	Kansas City International Airport
NAC	NextGen Advisory Committee
NACSC	NextGen Advisory Committee Sub-Committee
NAS	National Airspace System
NBAA	National Business Aviation Association
NDB	Non-Directional Beacon
NextGen	Next Generation Transportation System
NOTAM	Notice to Airmen

54	OAPM	Optimization of Airspace and Procedures in the Metroplex
55	OCWG	Operational Capabilities Work Group
56	OKC	Will Rogers World Airport
57	OPD	Optimal Profile Descent
58		
59	PARG	Performance Based Operations Aviation Rulemaking Committee
60	PBN	Performance Based Navigation
61	PBO	Performance Based Navigation
62	POI	Principal Operations Inspector
63		
64	RF	Radius to Fix
65	RNAV	Area Navigation
66	RNP AR	Required Navigation Performance Authorization Required
67	RNP	Required Navigation Performance
68	RPI	Relative Position Indicator
69	RVFP	Area Navigation (RNAV) visual flight procedures
70		
71	SIDs	Standards Innstrument Departures
72	SJC	Norman Y. Mineta San Jose International Airport,
73	SMF	Sacramento International Airport
74	STARs	Standard Terminal Arrival Routes
75		
76	TBFM	Time Based Flow Management
77	TMA	Traffic Management Advisor
78	TSS	Terminal Sequencing and Spacing
79		
80	VNAV	Vertical Navigation
81	VOR	Very High Frequency (VHF) Omnidirectional Radio

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NextGen Advisory Committee
Recommendation for 2013-2014 Proposed Taskings

Background

The NAC was established by the FAA to *"… provide(s) a venue where the FAA can solicit a consensus-based set of recommendations on issues that are critical to the successful implementation of NextGen. It is also a forum to obtain a commitment of resources and/or synchronized planning between government and industry that will support and, when necessary, identify opportunities for industry participation in NextGen implementation. In conducting its work, the Committee will foster a common understanding of success with joint performance objectives and development milestones to be reviewed as implementation progresses. The Committee will primarily focus on implementation issues including prioritization criteria at a national level, joint investment priorities, location and timing of capability implementation…"* (Source: NAC Terms of Reference, Purpose and Scope Section).

The NAC members value the FAA's eagerness to solicit input from the industry on some of the most vexing challenges to NextGen, and believe we have established a very effective and constructive partnership for moving NextGen forward. With the goal of building on the momentum, and considering the current fiscal challenges we all face, the NAC believes that the following tasks would enable us to continue our affective partnership and make positive strides in implementing NextGen.

Potential Taskings:

1. **NextGen Activity Prioritization:**

   In light of budget pressures and possible sequestration impacts - review current FAA plans and activities that have an effect on the implementation of NextGen and develop a prioritized list of Tier 1 (consensus on activities that should continue no matter what) and Tier 2 (consensus on things that should continue, resources permitting) recommendations. This task would include the following activities:

   - **a.** Identify relevant activities within FAA that have an impact the NextGen implementation
     - **i.** Review the NextGen Implementation Plan (NGIP) as well as previous NAC recommendations for integrated capabilities and non-technical barriers to NextGen and other relevant information
   - **b.** Establish criteria for prioritizing activities into Tiers 1 and 2
     - **i.** Criteria to consider benefits, costs and risks, ripple effects/interrelationships along programs and activities
   - **c.** Apply criteria to list of relevant activities and complete prioritization
   - **d.** Produce Tier 1 and Tier 2 list

2. **Revised Prioritized List of NextGen Integrated Capabilities and Locations**

a. Starting from previous NAC integrated capabilities recommendations (May 2012 NAC), and taking into account reduced budgets and current FAA NGIP, develop a shorter (i.e., 3-5) list of locations for deployment of selected capabilities in the near-term.
b. Selection criteria to include, among others: (1) risk assessments, (2) costs, (3) benefits, (4) network/system-wide effects

3. Blueprint for Success of Performance Based Navigation (PBN): A Checklist

a. With the goal of achieving maximum benefit from implementation of PBN procedures, develop a **checklist** for planning and executing new procedures (including all necessary technical and non-technical aspects) that can be used to guide future PBN initiatives. Checklist would include, at minimum, the following:
    i. Identify all stakeholders in the process and define roles and interest(s)
    ii. Identify stakeholder outreach strategies
    iii. Incorporate lessons learned from previous and ongoing PBN initiatives both domestic and international (e.g., Greener Skies, OAPM-1)
    iv. Identify method of transferring expertise and lessons learned from previous PBN implementation efforts to next set

4. Minimum Performance Requirements for Selected Integrated NextGen Capabilities

a. Consider the output of Task 2 (integrated NextGen capabilities that will require coordinated design, development, deployment and training of both cockpit avionics and ground automation across domains (e.g., PBN, time-based metering, ATC Automation, Optimized Profile Descents (OPDs), surface traffic management)
b. For the prioritized set of operational capabilities, identify minimum requirements for requisite ground automation and decision support tools (i.e. what will be needed to ensure delivery of user benefits)
    i. Develop scenarios for each set of capabilities to aid in identifying minimum performance requirements
c. Consider capability modules defined in the ICAO Aviation System Block Upgrades (ASBUs) and incorporate as appropriate
d.

5. Validating Best Capable, Best Served (BCBS) at Selected Locations

To gain experience on the practical implications of applying BCBS, select 1-3 airports where BCBS would be applied for PBN procedures during certain hours and/or on specific runways.

a. Develop and apply criteria for selecting airports for BCBS pilot implementation, Identify metrics for evaluating outcome and determine appropriate goals for determining success
b. Develop high level design and parameters of actual trial, including but not limited to: hours of operation, segregated airspace or runways, operators participating, length of trial

6. Develop goals associated with the NextGen Performance Metrics

Current/Ongoing NAC Taskings

1. **Fuel Data Sharing for Measuring System Performance**
    - **a.** Complete work underway in BCPMWG of the NAC

2. **Performance Based Navigation (PBN) Procedures**
    - **a.** Recommendations for obstacles to PBN utilization, both technical and non-technical, and mitigation strategies
    - **b.** Criteria for prioritizing PBN procedures
    - **c.** Criteria for selection & prioritization of Optimization of Airspace & Procedures in Metroplexes (OAPM) sites

3. **DataComm Roadmap**
    a. Re-engage NAC (DataComm Roadmap Task Group) to complete work on DataComm roadmap. Include all stakeholders who chose to abstain from previous effort due to ongoing FAA acquisition.