Meeting Summary, September 19, 2013

NextGen Advisory Committee (NAC)

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

List of attachments:

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

Welcome and Introductions

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

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

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

**Designated Federal Official Statement**

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

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

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

**Chairman’s Remarks**

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

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

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

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

**FAA Report**

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

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

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

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

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

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

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

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

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

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

Fuel Data Sharing for Measuring NextGen Performance

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

Mr. Lohr outlined the specific elements of the recommendation.

The FAA should:

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

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

NextGen Prioritization

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Prioritization of Performance Based Navigation (PBN) Procedures

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

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

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

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

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

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

**Chairman Closing**

In his concluding remarks, Chairman Ayer made following observations:

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

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

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

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

**Other business**

None was offered.

**Adjourn**

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

**Next Meeting**

The next meeting of the NAC is February 20, 2014, in Phoenix, AZ.
Attendees:  
September 19, 2013 Meeting of the NextGen Advisory Committee  
Washington, DC  

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Welcome to the Meeting of the NextGen Advisory Committee

September 19, 2013
RTCA Headquarters
Washington, DC

Welcome

NAC Chairman Bill Ayer
Chairman
Alaska Air Group
Introductions

Meeting
NextGen Advisory Committee
September 19, 2013
Washington, DC

PUBLIC MEETING ANNOUNCEMENT
Read by: Designated Federal Official Michael Whitaker
NextGen Advisory Committee
September 19, 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:
September 4, 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.
Review and Approval of:

June 4, 2013 Meeting Summary
Revised NAC Terms of Reference

Agenda

- NAC Chairman’s Report
- FAA Report – The Honorable Michael Whitaker, Deputy Administrator, FAA
- Fuel Data Sharing for Measuring NextGen Performance
- Recommendation for NextGen Prioritization
- Lunch
- Featured PBN Implementation – PHX & DCA
- Performance Based Navigation
- Recommendation for Future Metroplex Optimization
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
- Work on the key foundational elements at FAA’s request
- Make timely recommendations through collaboration and consensus
- Share successes and lessons learned
25 Recommendations/Rpts Aimed at NextGen Implementation

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

We Are At a Tipping Point

NEXTGEN Technology Policies Procedures ROI

Momentum will help overcome future hurdles

BARRIERS:
- Sequestration
- Integration
- Automation
- Environment
- Lack of Confidence

Prioritization Collaboration Commitment Consensus
NextGen Capabilities Prioritization

- Landmark Moment
- Commitment by the aviation community
- Demonstrates value of NAC:
  - Develop Consensus Based Recommendations
  - Apply Real World Experience to Overcome the Barriers
Beyond NextGen Prioritization

FAA Response to June Recommendations

- PBN Barriers
- Cat Ex 2
- Interim Fuel Burn
- Future Taskings
DISCUSSION
DISCUSSION

http://www.faa.gov/about/plans_reports/operational_metrics/
Federal Aviation Administration

PBN Public Dashboard
http://www.faa.gov/nextgen/pbn/dashboard/

Attachment 2 Presentations
Questions?

FAA Response to the NAC
PBN Obstacles to Utilization

September 19, 2013
Summary of June NAC Report

• September 2012, the FAA issued a tasking letter to the NextGen Advisory Committee (NAC) of the RTCA requesting:
  - Input from NAS users and stakeholders obstacles to Performance Based Navigation (PBN) implementation and utilization, including remedies and actions from both FAA and industry

• June 2013, the NAC delivered a report that identified barriers across five categories: Automation, Design, Environmental, Regulations, Training
  - The NAC report recommended 15 specific mitigation actions covering the 19 obstacles or barriers. These recommendations focused on FAA actions

Automation Mitigation Actions

• Actions focus on Time-Based Flow Management (TBFM) capabilities to support Optimized Profile Descents (OPDs) and PBN

• FAA Response:
  - Adaptation resources being deployed to local facilities as necessary, in coordination with PBN and OAPM schedules
  - National training is being developed and should be complete by Sep 2014
  - Additional TBFM capabilities are under development, including Interval Management and Terminal Sequencing and Spacing
Design Mitigation Actions

- Actions focus on better definition of objectives and guidance materials, sharing of lessons-learned, and comprehensive analysis capabilities

- FAA Response:
  - FAA PBN Implementation Order is being updated to require scoping efforts including the definition of expected benefits
  - PBN Tracking Tool has been deployed to share experience and broaden access to expertise
  - PARC is developing guidance recommendations
  - FAA has enhanced its internal simulation capability and continues to update FMS capabilities

Environmental Mitigation Actions

- Actions focus on expediting CATEX2 efforts

- FAA Response:
  - FAA released guidance on CATEX 1 in December 2012
  - Work continues on CATEX 2 guidance
Regulation Mitigation Actions

- Actions focus on rewriting orders, streamlining RNP AR regulatory approvals, and disseminating procedure design criteria changes
- FAA Response:
  - 7110.65 rewrite will include new ATC procedures intended to enable increased utilization of PBN
  - Established the RNP AR Consultant program to expedite applicants through the RNP AR regulatory approval process
  - United States Instrument Flight Procedures Panel is the focal point for new and revised criteria, and AFS distributes new criteria with focus on safety to flying public

Training Mitigation Actions

- Actions focus on standardized training across ATC and stakeholders, training for design teams, and training about complexity of real-time changes
- FAA Response:
  - Informational packages on PBN have been developed and distributed to facilities
  - Detailed PBN indoctrination occurs at the initiation of the PBN design process
  - Developing standardized educational material for a national joint pilot/controller training effort, training materials should be completed by March 2014
  - Leveraging the experience of controllers and pilots with extensive PBN expertise to quickly spread knowledge
Future Efforts with RTCA

• Two additional reports expected at Sep NAC meeting to address remaining requests from 2012 tasking letter:
  - Criteria for prioritizing production of PBN procedures
  - Criteria for prioritizing future OAPM sites
• In correspondence with RTCA, FAA noted that the RTCA report primarily identified FAA mitigation actions and we await potential industry mitigation actions

Questions?
## FAA Response to the NAC Data Comm Roadmap Recommendations

**September 19, 2013**

### Program Overview – Services

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### Segment 1 Phase 1
- **Tower Services**
  - Departure Clearances (DCL)
  - Transfer of Communications
  - Initial Check-In
  - Altimeter Settings
  - Go Button / Airborne Reroutes
  - Tailored Arrivals
  - Controller Initiated Routes
  - Direct-to-Fix
  - Crossing Restrictions
  - Advisory Messages
  - Speed and Headings
  - Beacon Codes
  - Stuck Microphone
  - Departure Clearance

### Segment 1 Phase 2
- **En Route Services**
  - Initial En Route Services
    - En Route IOC
  - 4D Trajectories
  - D-TAXI
  - 4D Trajectories
  - TFM Data Comm
  - Data Comm Routine Communications

### Segment 2
- **Advanced Services**
  - Future Air Navigation System (FANS)
  - Aeronautical Telecommunications Network (ATN)
  - FANS 1A+ over VDL-2 transitioning to ATN

### Avionics

### Ground System

---

[NextGEN logo]
Original Request to NAC

• Discussion and Direction from NAC – May 19, 2011 Meeting
• FAA Tasking Letter(s) – revised after consultation with industry
• NACSC Created the Data Comm “Roadmap” Task Group
• Consideration of Draft Recommendations by Feb NAC Meeting

Questions to NAC

What is the industry’s recommendation on the need for and timing of harmonization of US DataComm capabilities with those capabilities being implemented in Europe and other parts of the world?

NAC Recommendation:
• Full global harmonization will occur with ATN B2 services/technologies (i.e. for IOC 2025+)
• The proposed roadmap would offer an initial level of harmonization through operational use of ATN B1 (Link 2000+ subset) for IOC 2018 – 2022
**NAC-Recommended Data Comm Roadmap**

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**ENROUTE**

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<td>• Airborne Reroutes</td>
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<td>• Altitude/Heading</td>
<td>• Stuck Mic</td>
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<td>• Speed</td>
<td>• Uplink RNAV/RNP</td>
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<td>• published arrivals</td>
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<td>• Tailored Arrivals</td>
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<tr>
<td>Link</td>
<td>VDL-2</td>
<td>VDL-2</td>
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**FAA Response**

- **FANS-1/A**
  - FAA has re-evaluated requirement for latency timer and determined can accommodate FANS-1/A aircraft
- **ATS ACARS**
  - Will continue to support initial departure clearance
  - ATS ACARS does not meet system requirements for revised departure clearance (aircraft and ground requirements)
- **ATN Baseline 1**
  - ATN development in the near term is not affordable
  - ATN development in mid-term will be prioritized for new capabilities of ATN B2
- **VDL mode 0 for Tower Services**
  - VDL mode 0 can be supported for tower services

Red indicates differences from FAA proposed program.
**RTCA NAC Response**

For each service, what is the industry’s recommendation on the need for FMS autoload capability?

**NAC Recommendation:**
- FMS autoload (data message coupling between onboard communication and navigation systems) is not required in the near- or mid-term for most Tower and En route Services
- FMS autoload will be required for advanced trajectory-based services (IOC 2025+), particularly in support of LAT/LONG clearances which would exceed safe crew data entry working environments

**FAA Response:**
- Push-to-load capability will be required for FANS-1/A(+) and ATNB2
- Existing FANS aircraft provide this capability and we want to maximize benefits
- ATN Baseline 2 requires integration for complex dynamic clearances and for downlink of intended flight path
- Additional automation/controller complexity to manage differing levels of capability cannot be justified

---

**Mixed Capabilities & Equipage**

Overarching: The Task Group recommends that the FAA support operations embracing mixed DataComm capabilities and equipage for the long-run

**NAC Recommendation:**
- Existing US Fleet will persist and evolve naturally with new acquisitions and retrofit opportunities based on market offerings
- Changing landscape of aircraft deliveries for U.S. airlines – “strategic forward fit” equipage for en route services during current fleet renewal cycle with a demonstrated FAA commitment to offer capability in the mid-term
- Some users may never equip with Data Comm – must accommodate voice services in perpetuity

**Proposed FAA Response:**
- Mixed data communications are planned using FANS-1/A(+) and ATNB2
- Continue to provide voice services
Achieving Harmonization

• NAC Recommendation: Codify Tower/Enroute Roadmap by RTCA SC-214 / EUROCAE WG-78
  • Long-term convergence supporting full TBO
    • SC 214 -ATN B2 for Enroute IOC in 2025+
  • Near-term convergence
    • Link 2000+ ATN B1
      - subset to be implemented in two steps for IOC in 2018 and 2022
  • ATN B2 must be backward compatible with Link 2000+ ATN B1
  • Existing equipage (ATS ACARS & FANS 1/A+) should be accommodated
  • Trials/incremental deployments are encouraged for validation and confidence-building

• FAA Response
  • US/EU Agreement on ATN B2 convergence
    • Final ATN B2 will be backward compatible to Initial ATN B2 ground systems
    • European planning for Initial ATN B2 in 2018; no intention to mandate or impose penalty
    • Any mandates with regard to ATN B2 will be predicated on the final standards
  • Trials and incremental deployments are part of the program plan

ATN Baseline 2 Additional Capabilities

• 4D Trajectory Operations
  • Uplink clearances with location, altitudes, speeds, or a required time of arrival
    • Include RNP value associated with the route, ability to define curved path
    • Include uplink of current winds to improve time of arrival control
  • Downlink intended flight path for enhancements to flow management

• ADS-B-based Interval Management
  • Uplink clearance to follow, merge or cross another aircraft
    • Include flight path of other aircraft to improve estimate of crossing times
    • Include uplink of current winds to improve time of arrival control
Additional NAC Recommendations

- Include SatCom for tower service, and consider it for en route
  - FAA can accommodate SatCom for departure clearances if operator pays for SatCom link
  - FAA does not plan to support SatCom for domestic en route operations
- Consider UAT (ADS-B link) as an alternative data link for general aviation
  - FAA does not have any work to support addressable aircraft communications on UAT

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

Data Sources for Measuring NextGen Fuel Impact

Business Case & Performance Metrics WG
Co-chairs:
Ed Lohr, Delta Air Lines
Debby Kirkman, The MITRE Corporation
Fuel Data Sharing Timeline

<table>
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<th>FY11</th>
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<td>FAA letter to RTCA requesting performance metrics WG</td>
<td>Approved BCPMWG TORs include data sharing product</td>
<td>BCPMWG report identifies fuel data gap &amp; recommends fuel reduction goal</td>
<td>FAA response includes request for fuel data</td>
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<tr>
<td></td>
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<td>Reauthorization metrics includes fuel use</td>
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<td>FAA letter to RTCA reiterates request for fuel data</td>
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<td>BCPMWG finding that OOOI fuel reports are widely collected</td>
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<td>BCPMWG finding that ASIAS is not suitable for isolating NextGen impacts on fuel usage</td>
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<td>BCPMWG recommends OOOI data collection, a &quot;calibrate &amp; count&quot; approach, &amp; exploration of diagnostic data needs</td>
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<tr>
<td></td>
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<td>BCPMWG final report to NAC</td>
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FAA Needs for Fuel Metrics & Data

- Flight-specific fuel, weight, and time data
- NextGen Office (ANG)
  - Report post-implementation NextGen impacts
  - Model future NAS-wide fuel savings from NextGen
- Office of Environment (AEE)
  - Improve environmental impact modeling (AEDT)
  - Report CO2 inventories to ICAO
- Air Traffic Operations (ATO)
  - Report on reauthorization metrics
  - Report fuel savings associated with PBN
  - Identify opportunities for improved operations
  - Airport and surface impacts, benefits
OOOI-based Fuel Data Sharing Prototype Examined Eight City Pairs, 2010-2012

Participants:
- Air Wisconsin
- Alaska Airlines
- Delta Air Lines
- FedEx
- JetBlue
- NetJets
- United Airlines
- UPS

City Pairs:
- Northern California – Southern California
- Charlotte – New York
- Boston – New York
- Charlotte – Washington, DC
- Chicago – Memphis
- Memphis – New York
- Louisville – New York
- Phoenix – Southern California

Flight Data Table:

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"OOOI+" Data Report

Example Fuel Sensitivity Analysis

Data provided by Delta Air Lines
Fuel Measurement and Modeling are Complementary Approaches

- Controlled Environment
- Model fidelity limitations
- Ability to better isolate effects from a change

- Dynamic Environment
- Data collection limitations
- Trust in measured data vs data sensitivities

Modeled Performance

- Measured data can drive or calibrate models

Measured Performance

- Modeling needed to address data gaps

New Data Elements can provide additional performance insights

BCPMWG Prototype Data Elements:

- Aircraft ramp weights: Calculated by dispatch and/or flight crew
- Aircraft fuel use at key points
  - Measured taxi-in and taxi-out fuel
  - End-to-end fuel used
- OOOI times: Expands block time insights beyond the list of operators that contribute to the DOT’s national airline performance data system**
- Future data candidates might include limited sharing of flight data recorder and other information to identify key drivers for efficiency analysis (e.g., FMS efficiency settings, fuel flow data, etc)

**The Airline Service Quality Performance database is based on data filed with the DOT
**BCPMWG Findings**

- **Finding 1:** Shared fuel data will improve fuel consumption insights and metrics
  - Support FAA NextGen analysis needs
  - Improve Operator business case analysis

- **Finding 2:** Modeling and operational data collection will be complementary methods for generating fuel and other metrics indefinitely
  - Eg, Identification of data trends, periodic recalibration

- **Finding 3:** Many airlines are ready to share fuel consumption and weight information by flight to improve visibility of NextGen impacts
  - Relatively low cost to generate initial data; relatively small storage/aggregation costs
  - Third party to aggregate metrics for the FAA & public use

- **Finding 4:** DoD and GA are interested in seeking meaningful ways to contribute to increased fuel insights.
  - Data collection and potential sharing mechanisms are less developed in comparison to airlines

---

**OOOI Fuel & Weight Reports can provide new insights**

...but are not sufficient to support causal analysis

- **Recommendation 1:** FAA should capitalize on operator willingness to share aircraft weight and fuel consumption information on a per flight basis and report regularly on progress

- **Recommendation 2:** FAA should collaborate with the aviation community to identify the finite data elements that create a solid baseline from which to project ongoing benefits (eg, “calibrate and count”). As part of this effort, FAA should explore the use of this shared data to improve modeling capabilities and robustness.
Next Steps

- Refining the methodology for generating and publishing high-level metrics
  - Including the development of baselines and a method to compare year-to-year performance
- Exploration of new uses of the data being shared and expansions of data sharing as appropriate.
  - For example, new metrics such as a fuel use index may provide insights to the aviation community.
  - Additional exploration and research is needed to identify the most useful data elements that can support insights on the impacts of specific NextGen initiatives.
- Continue outreach to the GA and military to improve understanding of NextGen fuel impacts for these communities.

DISCUSSION
NAC Action
Consider Recommendation on:

Data Sources for Measuring NextGen Fuel Impact

and Transmit to FAA
NextGen Prioritization

FAA Task July 2013

- Response to NAC’s offer to assist FAA address the challenge of sequestration

  In light of budget pressures and possible sequestration impacts …

- Review current FAA plans and activities that have an effect on the implementation of NextGen

  Develop prioritized list of:
  - Tier 1 - consensus on activities that should continue no matter what
  - Tier 2 - consensus on activities that should continue, resources permitting recommendations
Industry Commitment

- Aviation community extremely responsive to the FAA request
- Participating in numerous, lengthy meetings and spending time independently ranking the criteria and the capabilities
- Providing “robust” feedback and discussion on the capabilities and assessing and analyzing the outcomes of the application of the criteria to the capabilities

Assumptions

- Sequestration will affect budgets for the foreseeable future.
- Prioritized list of capabilities can inform the FAA no matter which financial option occurs.
- Community consensus on NextGen investments is critical.
- The implementation of NextGen capabilities should have a business case with a positive ROI regardless of budget circumstances.
- Aircraft operators continue to invest in updated aircraft/equipage based on a positive ROI and anticipate the removal of barriers to gain their return on investment in these new capabilities.
- NextGen should leverage forward fit (purchase of new generation aircraft) & equipage modernization underway by aircraft operators & expedite delivery of relevant capabilities accordingly.
Assumptions (Cont.)

- Mixed equipage will remain for many capabilities – it is an on-going process and a reality that must continually be addressed.
- Expanding the use of PBN is foundational and will become the norm for aircraft operations.
- Scope of this prioritization task is limited to NextGen capabilities. It is assumed that the FAA will decommission unused or obsolete infrastructure or consolidate existing facilities as required to achieve maximum fiscal benefit without degrading system safety or access.
- Subject matter experts will transfer the lessons learned from one NextGen implementation experience to subsequent ones, most notably from one Metroplex implementation to the next.

Guiding Principles

- NextGen investments enhance safety.
- Delivering tangible, measureable benefits is crucial to encouraging NextGen investments.
- It is better to fund capabilities at an appropriate level to deliver benefits & drive to 100% completion than to cut x% from everything and/or delay everything. Funding must include all necessary resources: personnel, training, etc.
- It is imperative that all high priority initiatives are not only fully funded, but also have all the necessary resources allocated, including participation of the key stakeholders including controllers.
- Those initiatives with a validated operational concept and a positive business case that are in critical stages of implementation should be considered for continued investment.
Guiding Principles (cont.)

- Timing matters – infrastructure investments directly related to timing of operator equipage investments.
- Right size investments – deploy capabilities at locations where measureable benefits can be achieved.
- Important to have “scalability” of capabilities across the NAS.
- Metrics is an overarching issue, critical to define goals associated with the key NextGen metrics, establish baseline measures, continue to track and report progress on these metrics in a public forum.

NAC AdHoc – Analytic, Repeatable, Defensible Approach

1. Define Underlying Assumptions
2. Define Guiding Principles
3. Agree on Criteria
4. Weight Criteria
5. Agree on Candidate List of Capabilities
6. Apply Criteria to List
7. Refine with Subject Matter Expertise
8. Determine Tiers
Prioritization Criteria

- Benefits (monetizable) – 46%
- Benefits (non-monetizable) – 13%
- Implementation Readiness – 28%
- Other Considerations – 13%
  - Global Harmonization
  - Confidence Building
  - Foundational Critical Infrastructure

Creating the Candidate Capabilities List

- List of 36 Capabilities (not programs)
- Source (directly traceable):
  - 2013 NGIP
  - 2013 NSIP Lite (pre-publication version)
- Putting the List Together
  - Arranged by NGIP Implementation Portfolios
  - Aggregation of Operational Improvements
  - Identifies NextGen Core Infrastructure
  - Identifies Key enablers (NGIP/NSIP)
- FAA to determine programmatic implications
Initial Weighting of the Capabilities

- NACSC developed common understanding of capabilities
- Use of Decision Lens decision support model to rank all 36 capabilities against criteria
- Outcome consist with previous NAC and TF5 recommendations
- Focused on benefits and readiness criteria
- To ensure recommendations not too heavily weighted on low hanging fruit - considered high benefit/medium to low readiness

RTCA Recommendations at-a-Glance

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<th>NAC 09-2013</th>
<th>NAC 2011/2012</th>
<th>TF5 2009</th>
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<td>Separation Services (reduced separation) (ADS-B Out)</td>
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<td>Access low alt, non radar a/s</td>
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<td>DataComm CPDLC Weather reroute FANS 1/A</td>
<td>DataComm CPDLC Weather reroute FANS 1/A</td>
<td>DataComm CPDLC Weather reroute FANS 1/A</td>
</tr>
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Priorities

- Tier 1 to be completed regardless of budgets
- Tier 1A (high benefit, high readiness)
  - Performance Based Navigation (PBN)
  - Multiple Runway Operations (CSPO)
  - Surface Operations – Data Sharing
  - Time-Based Flow Management
  - Wake Recategorization
  - OAPM*
- Many of these capabilities are interdependent

Priorities

- Tier 1B: (high benefit, medium to low readiness, to be accelerated regardless of budget)
  - CATM, Flight Planning Feedback, Collaborative Decision Making
  - ADS-B Out with Reduced Separation
  - DataComm - CPDLC, Weather Reroutes
  - Enroute PBN (reduced separation of routes)
Priorities

- **Tier 2**: (medium benefit, high readiness – to be completed, budgets permitting)
  - Revised PDC via DataComm
  - Airborne Rerouting - TFM
  - Terminal Controller Proximity Alerting
  - In Trail Procedures (ITP) (ADS-B)
  - Enhanced Conflict Detection
  - Oceanic User Requests
  - On Demand NAS Info - Near Term
  - SWIM Ground Based

- All other candidate capabilities (17 remaining)

Summary

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

NAC Action
Consider:

Recommendation for NextGen Capability Prioritization

and Transmit to FAA
Lunch

Featured PBN Implementation Location Phoenix, AZ and Washington, DC
Optimization of Airspace and Procedures for the D.C. Metroplex

One Year Later

Initial Implementation

08/07/12

- Optimized Profile Descents
  - DCA
    - FRDMM
    - TRUPS
  - IAD
    - GIBBZ
- Conventional underlying STARs and RNAV SIDs
Operator Concerns

- Number of constraints
- Chart complexity
- Complex for Non-VNAV operators
  - MD 8X's
  - CRJ
  - E135/145
- Non-GPS MD’s have limited FMS capability
- B-717 FM leg coding issues

Controller Feedback

- Noticeable reduction in communications
- Increased effective airspace
  - Predictability and bounding of constraints permits unimpeded traffic flow above and below OPD vertical profile
  - Procedure becomes an efficient, effective traffic management tool
Refinement of Procedures Meeting

• November 2012
  - Two day meeting at MITRE with several operators
• Pinpoint trouble spots on FRDMM & TRUPS
• Lower vertical profile of GIBBZ
• Modifications to Conventional STARs to prevent map drop on AAL & DAL MD’s
• Additional simulator analysis conducted

Steep path after BRVRY corrected
Modifications to constraints and waypoints

Conventional STAR simplified

- All windows removed
- All “At” and “At or Above”
- Three altitude constraints removed
- Goal: Provide relief for MD-8X’s
GI BBZ profile lowered

MGW Transition Individual Sample Profiles

UAL677 A320
SFO-IAD July 21, 2013

SWA3851 B737-700
MDW-IAD August 2, 2013

JBU202 A320 LGB-IAD
August 2, 2013

ASH3726 CRJ7
IND-IAD August 2, 2013
Initial pilot feedback - GIBBZ - IAD

Pilot Controller communications: How was the arrival? any issues? have to use speed brake? he says in a voice that really sounded surprised or shocked “surprisingly good both altitude and speed worked perfectly.”

GIBBZ2 Pilot Feedback: “Just flew into IAD, didn’t have to touch the speed brakes at all! Very Smooth!”

Captain Mark Simms: “I flew the latest version of GIBBZ last week with a steady 45-50 knot tailwind. It was really nice! Airbus hit all windows with room to spare, and the radio was pleasantly quiet. Just wanted to let you know.”

FRDMM2 RNAV - DCA

Individual Sample Profiles

SWA1541 B737-700 STL-DCA August 5, 2013
AWE498 A320 PHX-DCA August 5, 2013
All FRDMM2 Flights August 5, 2013

AAL532 B737-800 ORD-DCA August 5, 2013
AWI3760 CRJ200 DTW-DCA August 5, 2013
TRS691 B712 MKE-DCA August 5, 2013
DAL1744 B737-800 DTW-DCA August 5, 2013
AWE 498 landed with 9000 lbs. FOB.
Total Fuel burn from 155 NM out = 1150 lbs. 170 Gallons.
27 minutes flying time

In comparison, on average at major US Airways hubs - Fuel Burn average is 2000 lbs. at 150 NM out, except PHX where average fuel burn is 1500 lbs.
Preliminary Fuel Analysis

• US Airways – FRDMM & TRUPS
  - 300 lbs. average savings per flight
• PSA Airlines
  - 5%-10% reduction in fuel consumption depending on landing runway
  - PSA has initiated use of Flight Path Angle guidance, adding to fuel savings

How many get to use the OPDs?

• Initial analysis for the first two months yielded over 80% of arrivals were allowed to fly the procedures without ATC intervention.

• How are we doing now?
FRDMM 2 Lateral Profile

85% of the traffic is left on the procedure

August 5, 2013 FRDMM2 RNAV OPD
112 Total Tracks FRDMM 2 RNAV OPD
17 Tracks off FRDMM2 RNAV OPD

Note: 24 hour snapshot

GIBBZ2 MGW Transition

89% of the traffic is left on the procedure

August 2, 2013 GIBBZ2 RNAV OPD MGW TRNS
105 Total Tracks GIBBZ2 RNAV OPD MGW TRNS
12 Tracks off GIBBZ2 RNAV OPD MGW TRNS

Note: Includes late night shortcuts with no traffic congestion
Mixed Equipage Mitigations

- Modifications to procedures may improve MD-xx FMS issues
  - Delta and American conducting analysis
- Non-VNAV Aircraft
  - Flight Path Angle solution
    - CRJs, E135/145, NBAA aircraft
    - Improved efficiency for E190

Variability without vertical guidance
Continuous, predictive profile with FPA guidance

Successes and Lessons

• Remove artificial cultural barriers
  - Educate the team
  - Empower the team to make change
  - Train and educate in advance
  - Do this everywhere, all the time

• Remain as a team, always
Going forward

- Industry Tech Pilot Group
  - Working closely with AFS and ATO to improve procedures development, validation and coordination
- PARC VNAV Action Team
  - Developing improved design guidance for Optimized Profiles
- MITRE
  - Developing and evaluating Flight Evaluation TARGETS plug-in tool

“Coming together is a beginning, staying together is progress, and working together is success” - Henry Ford
Performance Based Navigation (PBN)

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

OCWG Membership
Mix of Expertise

- Aircraft Operators: Air Carriers, General Aviation, DoD
- Airports
- Automation Providers
- Controllers
- Dispatchers
- Engineering Services
- MITRE
- Pilots
- OEMs
- SMEs FAA
Criteria for Prioritizing Production of PBN Procedures

- Evaluate managing inventory of procedures
- Determine best use of our resources while ensuring effective, efficient, and useful routes and RNP procedures for both the FAA and operators

Recommend criteria for:
- Prioritizing requests for new PBN procedures
- Modifying existing PBN procedures
- Eliminating PBN procedures that do not provide measurable benefits

OCWG Approach

- The work group reviewed recent PBN implementations such as Greener Skies in Seattle and the expansion of PBN procedures in the Denver Terminal area to ensure that broad scale PBN activities such as these had appropriate prioritization.
- Additionally the work group included members that had participated in the Regional Airspace and Procedures Teams (RAPT) and benefitted from their experience.
- Working collaboratively the group discussed the information and experiences of team members in working with PBN procedures.
OCWG Discussion Items

- Should a PBN request be processed similar to a Capital project?
  - Forecasted benefit
  - Cost
  - Rationale
  - Benefit
  - Airport uniqueness
  - Should surface be integrated in process?

- How to leverage FAA National and Regional Process?
Recommendations

- Revise FAA guidance (FAA Order 8260.43B) for Regional Airspace Procedures Teams (RAPT) to include:
  - A standardized checklist to aid in quantifying projected benefits (i.e. objectives and goals for procedures)
  - Require any new procedure to have a demonstrated benefit (i.e. capacity, efficiency)

- Implement a collaborative process involving all concerned parties
  - Collaboration should be done locally to account for airport configuration variances, aircraft equipage and controller procedures

DISCUSSION
NAC Action

Consider:

Recommendation for Prioritization for Performance Based Navigation (PBN) Procedures

and Transmit to FAA

Recommendation for Future Metroplex Optimization

Operational Capabilities Work Group Co-Chairs:
Tom Bock, Port Authority of New York & New Jersey
Bill Murphy, International Air Transport Association
Optimization of Airspace and Procedures in the Metroplex (OAPM)

- Review and revalidate the criteria used to select and prioritize the current OAPM sites
  - Prioritize remaining locations from the list of first OAPM sites
  - Revisit sites where OAPM teams have already been deployed
  - Include new sites not considered in the first round of Metroplexes

Review of OAPM “OAPM 1”

- Task Force 5 Recommendations
- Initiated in 2010 in collaboration with the aviation community to optimize airspace and procedures & improve efficiency in large geographic areas
- NAC provided criteria for implementing at 16 of the 21 Metroplexes
- OAPM limited to improvements within a three-year cycle
- OAPM 1 planned completion 2017
- Can’t trigger Environmental Assessment
Criteria Used for First Installation of OAPM

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Delay</th>
<th>Operations</th>
<th>Efficiency/Capacity</th>
<th>Metro Connectivity</th>
<th>Site Readiness/Potential</th>
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<tr>
<td></td>
<td>Average Scheduled Gate Arrival Delay</td>
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<tr>
<td></td>
<td>Average Scheduled Airport Departure Delay</td>
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<tr>
<td></td>
<td>OPSNET Delays as Percent of Operations</td>
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<td>x</td>
<td>x</td>
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<td></td>
<td>Aircraft 3% Departures or Delay &gt; 14 hrs</td>
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<td></td>
<td>Median Taxi Out Time Change (AM push)</td>
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</tr>
<tr>
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<td>Total Departures between Metro Pairs</td>
<td>x</td>
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<td>x</td>
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<tr>
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<td>Metro Connectivity Index</td>
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<td>x</td>
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<td>x</td>
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<tr>
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<td>PBN Equipages (Lowest in Metro)</td>
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<tr>
<td></td>
<td>Possible SNM Coverage</td>
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<tr>
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<td>KN 0.8 with RT % of Ops (highest in Metro)</td>
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**Criteria Review Table**

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<tr>
<th>Metric</th>
<th>Proposed Action</th>
<th>OAPM 2 Impacts/Collections</th>
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<td>Average Scheduled Gate Arrival Delay</td>
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<td>OAPM 2 should target capacity/throughput improvements; this metric is indicative of where capacity/throughput benefit is needed</td>
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<tr>
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<td>Replace with Average Taxi Out Delay</td>
<td>OAPM 2 should target departure benefits, but overall departure delay is affected by too many other factors; group explored taxi out time and change in taxi out time, but infrastructure plays too much of a factor in these metrics</td>
</tr>
<tr>
<td>OPSNET Delays as Percent of Operations</td>
<td>Replace</td>
<td>OAPM 2 should target departure improvements; this metric is indicator of where capacity/throughput benefit is needed</td>
</tr>
<tr>
<td>Taxi In Time % Change</td>
<td>Replace</td>
<td>OAPM 2 should target departure improvements; this metric is indicator of where capacity/throughput benefit is needed</td>
</tr>
<tr>
<td>Block Time % Change</td>
<td>Replace</td>
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<td>Replace</td>
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<tr>
<td>Total Departures between Metro Pairs</td>
<td>Replace</td>
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</table>
Recommendations

- Maintain or reduce the three-year life cycle for OAPM Projects
- Leverage the new NextGen capabilities to build on OAPM 1 i.e. integration opportunities with surface and Time Based Flow Management (TBFM) improvements and new NextGen capabilities
- The FAA should not delay the start of second round of OAPM (OAPM 2), the last four sites should be incorporated into OAPM 2
- Utilize the seven identified criteria in prioritizing future sites using a weighting system that emphasizes the potential benefits of OAPM

Consistent with NextGen Prioritization Recommendation!

DISCUSSION
NAC Action

Consider:

Recommendation for Future Metroplex Optimization

and Transmit to FAA

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
February 2014
TBD

Adjourn
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.
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 widespread 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.
**TERMS OF REFERENCE**

**NextGen Advisory Committee**

**Committee Leadership:**

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<th>Position</th>
<th>Name</th>
<th>Organization</th>
<th>Telephone</th>
<th>Email</th>
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<tbody>
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<td>Whitaker, FAA Deputy</td>
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<td></td>
<td>Administrator</td>
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**Background:** NextGen offers the United States the unprecedented opportunity to increase the safety, predictability and environmental performance of aviation. The FAA seeks to establish an ongoing venue and process to enable stakeholders to advise the FAA on issues related to near- and mid-term implementation by providing a shared vision of NextGen for domestic and international arenas.

**Purpose and Scope:** The NextGen Advisory Committee will develop a common understanding of NextGen priorities in the context of overall NextGen capabilities and implementation constraints, with an emphasis on the near-term and mid-term (through 2018). The Committee provides 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. The Committee will provide a venue for the FAA as well as industry partners to report on progress on the implementation of NextGen operational capabilities and associated airspace performance improvements.
The Advisory Committee will include representation from affected user groups, including operators, manufacturers, air traffic management, aviation safety, airports and environmental, from civil and military perspectives, both domestically and internationally.

**Tasking:** Within the bounds of the committee’s purpose and scope, the FAA will issue specific tasking statements for consideration by the committee. Such tasks will generally reflect an FAA request for aviation community advice and recommendations on a particular operational, implementation, or investment topic. Current year tasks will be listed on the RTCA Committee website.

**Envisioned Use of Deliverables:** The deliverables of the Committee will document the consensus recommendations of the Committee informed by input from the FAA. These products will facilitate both the FAA and user community procedural planning and investments needed to achieve implementation of components of NextGen and criteria for successful implementation. The FAA will use the deliverables to inform its planning and execution of NextGen.

**Representation:** The Committee will include members who represent the following stakeholders in alphabetical order:

- Air Traffic Management Automation Providers
- Aircraft Manufacturers
- Airports
- Avionics Manufacturers
- DoD
- Environmental Interest
- Finance
- Labor
- Operators: General Aviation, Air Carriers, Business Aviation
- TSA

FAA (Air Traffic Operations, Aviation Safety, Airports, and Policy and Environment), MITRE and RTCA are non-voting members of the committee. They will take part in the committee’s deliberations and provide input to final products; however, they do not represent affected user groups in reaching consensus.

**Committee Characteristics:** In addition to representing the aviation community segments described above, the NAC will have the following characteristics:

- Executive level membership who can speak for and commit their organizations
- Flexibility to reach out to necessary segments of the aviation community to answer specific requests from the FAA
• Leanness and efficiency, with membership not to exceed a reasonable number, to enable the Committee to have substantive dialog and reach timely consensus

• Appropriate expertise to include operations, policy, technology, labor relations, training and finance

Structure of the Committee (Attachment 1): The NextGen Advisory Committee will conduct its’ deliberation on recommendations to be provided to the FAA in meetings that are open to the public. To meet the criteria described above, the Committee structure will be two-tiered with subordinate Work Groups established to develop recommendations and other documents for the Committee.

At the top level is the NextGen Advisory Committee comprised of top-level executives representing affected members of the community. Adjunct to the Advisory Committee is a Subcommittee (NAC Subcommittee) comprised of members with broad knowledge and expertise related to the implementation of NextGen. Some meetings of the NACSC will be open to the public to provide an early opportunity to identify potential concerns associated with draft recommendations.

In an effort to maintain an appropriate and manageable size, the number of NACSC members will be limited. The NACSC will utilize a rotating membership that will maximize the opportunity of participation among interested organizations. Interested parties should make their interest in serving on the Subcommittee known to the Designated Federal Official, the Chairman of NAC and the RTCA President.

The Advisory Committee may establish Work Groups (WG) and/or Task Groups (TG) to accomplish specific tasks as described above. WG products—including recommendations, where appropriate—are presented to the NACSC for review and deliberation, then forwarded to the Advisory Committee. Members of Work Groups and Task Groups will be appointed by the NACSC Co-Chairs in consultation with the RTCA President and NAC Chairman and DFO. Work Groups and Task Groups may not be open to the public. For each work group that is established, the Advisory Committee will approve Terms of Reference defining the objective, scope, membership, specific tasks and deliverables with a schedule. Unlike the Advisory Committee and NACSC, members of the Work Groups and Task Groups do not represent a particular affected entity and are selected for their expertise in the subject matter rather than their affiliation. Work Groups develop draft recommendations for consideration by the Subcommittee. Work Groups and Task Groups will disband upon delivery of their recommendations as appropriate.

• NextGen Advisory Committee
  o Overall direction of Committee
  o Review and approve recommendations to FAA
  o Field requests from FAA
  o Review and approve creation of Work Groups, as appropriate
  o Meet three times per year in Plenary (open to public)
• **NAC Subcommittee**
  o Staff to Advisory Committee
  o Guide and review work of WGs and TGs, present findings to NAC
  o Meet bi-monthly or as needed (not all open to public)
  o Forward recommendations and other deliverables to NAC for consideration

• **NAC Work Groups and Task Groups**
  o Created to address specific tasking
  o May be short-term or standing activities

**Operating Norms:** Advisory Committee members are appointed for a two-year term. Committee members may serve multiple terms. After the initial appointments, these will be made by the RTCA Policy Board in coordination with FAA. The RTCA President, FAA Air Traffic Organization Chief Operating Officer, and the Associate Administrator for Aviation Safety will review NextGen Advisory Committee membership yearly to ensure balanced representation that equitably represents, to the extent feasible, the aviation community. Membership is based on the ability to authoritatively and effectively represent the interests of an organization or constituency. Members will be expected to work toward consensus to the greatest extent possible.

The Advisory Committee will hold at least three plenary meetings per year (open to the public), as well as preparatory one-hour telecons (not open to the public) to ensure continuity and good preparation for public, decision-making meetings.

The NACSC will, at a minimum, meet every other month, with some of the meetings open to the public. All recommendations of the NACSC must be vetted through the Advisory Committee and forwarded to the FAA as appropriate. Recommendations will not be transmitted directly from the NACSC to the FAA.

Work Groups and Task Groups will meet as dictated by their Terms of Reference. As appropriate, Work Groups or Task Groups can reach out to individual experts and other outside groups providing advice to the FAA on NextGen implementation issues to facilitate the development of draft recommendations. Work Group and Task Group meetings are not open to the public.

**Standard Advisory Committee Meeting Agenda:** Proposed agenda items with approximate duration are to be submitted to the chair at least 45 days prior to the scheduled date of a meeting. The Chair, in consultation with the DFO, shall refine the scheduled duration of the meeting and promulgate the meeting agenda to the Committee members.

**Conduct of the Meeting:** Advisory Committee members will receive all information needed to prepare for the meeting (e.g., Work Group progress reports; Work Group products and recommendations for Committee action) at least fifteen (15) calendar days prior to the meeting.
With the exception of routine administrative items, discussions of agenda items shall, in general, be supported by written reports or formal briefing material as appropriate.

Products and recommendations submitted for Advisory Committee action will be accompanied by a one-page Action Paper prepared by the NACSC.
As we enter into our last meeting of the year, I have a growing enthusiasm for the relevance and importance of the Committee.

NextGen is an initiative that we all care about, and we want to help it succeed. In the highly competitive aviation industry, I continue to be impressed with the way the members of this Committee and the associated NACSC and Work Groups come together with a commitment to reach consensus on NextGen related issues. My predecessor used to say, “to be successful, we all need to take the logos off our chest.” My experience is that the NAC has been doing just that. That is why we have been able to provide more than 20 recommendations and reports to the FAA in the last three years. And we will be considering four more in our meeting today.

At this point I want to say a special word of thanks to the NAC Subcommittee co-chairs Steve Dickson and Melissa Rudinger, along with all the members of the Subcommittee who did an outstanding job of adding critical, substantive details to the overall structure and framework provided by the NAC AdHoc on the NextGen Prioritization Tasking. Their work, condensed into a roughly a six week window of time in the late summer, was indicative of the commitment by the aviation community stakeholders to help make NextGen a reality.

I also want to thank FAA Administrator, Michael Huerta, and Deputy Administrator, Mike Whitaker, for their trust in the aviation community’s ability to develop constructive consensus recommendations on NextGen. The NAC strives to be a supportive, positive force in the implementation of NextGen and the FAA’s Tasking on Prioritization is illustrative of the partnership necessary to make NextGen a reality.
Tipping Point

Tipping Point slide

As I stated at our last meeting, we are at a tipping point. We must remain together and focused on overcoming challenges and building the momentum to tackle the next set of challenges we will undoubtedly face. The NAC members remain committed to the goal of implementing NextGen through the evolutionary, benefits-driven approach articulated by Task Force 5. The aviation community will continue to be called upon to resolve the barriers to achieving the much needed benefits of NextGen. Delivering operational capabilities using existing equipage will help accomplish two critical outcomes: (1) increase the confidence in our collective ability to implement a program as complex as NextGen; and (2) set the stage for the future investments in more sophisticated NextGen capabilities.

It is important to emphasize that success fosters success. Today we will receive a briefing from Captain Brian Townsend, US Airways Tech Pilot, and Dennis Roberts, FAA, about procedures in Phoenix and the Washington DC area and the benefits these are enabling. I think you will be impressed by the commitment by the pilots, air traffic controllers and the FAA to develop creative approaches for successful implementation in these two Metroplex areas.

Their presentation will re-emphasize that 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 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.

Tipping Point: Increase Confidence slide

NextGen Capabilities Prioritization

Part of getting over the tipping point is setting priorities for NextGen investments. I believe that the Prioritization recommendation we will discuss today represent a “landmark moment” in the life of the Committee. Based on the willingness of the aviation community to participate in this effort over the last two months, and the strong interest in the outcome of our work, we have addressed a topic that is at the forefront of those with a stake in the success of NextGen.

Our recommendations are based on some key principles, including:

- Setting priorities is always good business practice, but is imperative in times of declining and uncertain budgets
- Success breeds success, dates matter
  - if we can jointly set and deliver on commitments, business case will close for next set of capabilities
- Apply laser-like focus on a manageable set of capabilities that will deliver tangible benefits and are well down the implementation path (Tier 1A)
- Accelerate a manageable set of capabilities that will deliver tangible benefits but are not ready to implement soon enough (Tier 1B)
- FAA needs to be given the flexibility to move funds and resources among projects as necessary to implement Tier 1 capabilities

This work demonstrates the value of the NAC and its ability to bring the aviation community together to develop consensus based recommendations for the FAA. It illustrates the dedication by the aviation community to apply the real world reality of how to overcome the barriers.
Beyond Prioritization of NextGen Capabilities

Today is not just about the prioritization effort. We will also consider important recommendations on:

- Obtaining fuel burn data to measure NextGen performance – this is the culmination of an issue that the NAC has been engaged with during the last year. The Committee has provided important guidance to the Subcommittee and the Business Case and Performance Metrics Work Group as they have undertaken the process of developing recommendations for an effective method for obtaining fuel use data to measure NextGen implementation in specific areas.

- Determining prioritization of new, or the revision or elimination of existing, Performance Based Navigation (PBN) procedures. This recommendation will assist the FAA by providing industry perspective on how the Agency manages its resources to efficiently provide PBN procedures.

- Future Metroplex Optimization of Airspace and Procedures in the Metroplex (OAPM). This recommendation builds on those provided previously by the NAC for Metroplex optimization. As you will hear during the discussion, these are very consistent with some of the top priorities identified by the Prioritization recommendation.

FAA Response to the June Recommendations

During our last meeting we approved recommendations in four areas:

1. PBN barriers and solutions
2. The streamlined environmental review process referred to as CatEx 2
3. A interim report on sources for measuring fuel burn
4. Suggested future Taskings for the NAC
We will hear the FAA’s response to these, along with a response to the DataComm Roadmap recommendation forwarded to the FAA in February of 2012. While we have been receiving status reports on the DataComm issue, today’s briefing will provide more specific details.

**Conclusion**

In closing, I am excited about where the work of this Committee in identifying the top priorities for NextGen and highlighting some important principles that, if followed, will greatly enhance our collective ability to turn the corner on NextGen.

We know this isn’t easy, but I am continually impressed by the commitment of the aviation community to collectively “roll up our sleeves” to do what is necessary to make NextGen implementation a reality.
Introduction

• This is my first “solo” NAC meeting as the federal official, and I’m delighted to be here.

• I’m very pleased to introduce Major General Edward Bolton, who is our new FAA Assistant Administrator for NextGen.

• Ed’s exemplary career with the Air Force and his background in engineering and program management, as well as financial management and acquisitions, makes him a great fit for this position.

• I would also like to thank and acknowledge Pam Whitley for the superb job she has done as Acting Assistant Administrator since the retirement of Vicki Cox. Thank you Pam.

• As you may know, David Grizzle will be retiring from the FAA in December, returning to greener pastures.
And, I do quite literally mean greener pastures. David has a working farm in southern Virginia, and he’ll be doing that and I’m sure other productive and interesting things. He has done a great job running the ATO, especially in these difficult financial times. We are currently searching for a replacement. I think I speak for everyone here when I thank you, David, for your service and wish you the very best.

I want to cover a few topics today – the budget, some of the NAC recommendations and an update on Data Comm.

**BUDGET**

First of all, the budget. There is not a lot to say on this right now. Congress has not yet approved a budget for FY 2014 – two weeks before the start of the fiscal year -- so we do not have an update for you regarding future funding allocations. The Administration continues to urge Congress to act to replace the damaging cuts
imposed by the sequester with a balanced approach that reduces the deficit while protecting critical priorities.

- A second year of sequestration cuts would force the FAA to operate at funding levels well below the President’s FY 2014 budget. Further, these cuts would require us to defer important investments in our future.

- Therefore, I really want to thank everyone who worked on the recent prioritization task – I know it was very challenging, and a lot of work and thought went into that project in a very short time frame. Going through the entire NextGen Implementation Plan, and giving recommendations for what work we should prioritize in this budget environment – it’s not easy. But we want industry feedback, and so I would especially like to thank Bill for his leadership on this and Margaret for spearheading the work. I am looking forward to hearing the results of this work today.

**NAC Recommendations**
CATEX

• We received a recommendation from you on the CATEX – categorical exclusion -- and we’re still working through it and how we would implement it. This categorical exclusion issue involves a different approach to evaluating aircraft noise -- the aviation impact most likely to generate community concerns and potential opposition to PBN procedures.
• We expect to provide our formal response in February.

DATA COMM

• As you know, the FAA is preparing an update and response on the NAC Data Communications recommendations that were provided last year.
• In 2011, we asked for recommendations around several key aspects of our Data Comm program. The questions we asked were around the roadmap for delivery of services, the integration of Data Comm with the aircraft navigation systems, and the importance of international harmonization.
• We have a NAC report from the aircraft operators in February of 2012 addressing these topics, and have had a number of internal groups working to consider the input and integration of these into our program and acquisitions, as appropriate. Bruce will provide an overview of how we have addressed the recommendations from the operators.

**Other Data Comm updates**

**International:**

- I am also pleased to announce a significant step forward in Data Comm harmonization internationally. We recently reached a common understanding for a commitment to convergence in ATN Baseline 2 for Data Comm.

- The agreed upon standard will ensure that both the United States and Europe will build our systems so that we can handle the same sets of tasks. Bruce will cover the specifics of this agreement.

**Trials:**
We are also currently conducting Departure Clearance Trials at Memphis and Newark towers using a prototype platform.

- The trials are being conducted to validate procedures. We need to conduct demonstrations using the existing prototype so that we can refine the technical specifications that we’ll need for full implementation of Data Comm at airports across the country.
- The trials have been underway in a limited capacity since spring 2013. We plan to significantly increase the number of operations over the next couple of months.
- Initial feedback from controllers and pilots on the capabilities has been very positive. Participants in the trials include FedEx, UPS, United, Delta, Lufthansa, and British Airways.

**Presentations:**

- David Grizzle is now going to discuss a public FAA website now available to report on Congressionally-mandated reauthorization metrics. He will also give an
update on the new PBN dashboard and provide other PBN and Metroplex updates.

- And, Bruce DeCleene is going to share our long-awaited FAA responses to the NAC’s Data Comm Recommendations.

After David and Bruce finish their remarks, conclude the FAA Report.

- Thank you, Bruce and David.

- And, thank you, again, to those who worked on the prioritization task. I know it was some of the most challenging work you’ve done to date.

- That concludes my presentation of the FAA Report. Brian Townsend from USAirways and Dennis Roberts from the FAA will share their PBN experiences from Dulles and National Airports with you after lunch as our FAA Featured PBN Implementation Location.
Approved by the NextGen Advisory Committee September 2013
Fuel Data Sharing for Measuring NextGen Performance

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

September 2013
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Background

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, 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 (see Appendix A). 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 (NAC) has also recommended that the FAA report on fuel efficiency, using a metric that normalizes fuel usage to weight and distance between city pairs.

While the BCPMWG has historically explored a wide range of metrics (both high-level and diagnostic), the Work Group has focused this year on addressing the need for measured fuel use data, which is considered sensitive information by operators and is not currently available to the FAA. This report captures the findings and recommendations of BCPMWG on a feasible, initial step to addressing this data gap. It also incorporates the comments received from the NAC from previous Interim Reports presented to the Committee and subsequently forwarded to the FAA.

This included examining whether the Aviation Safety Information Analysis and Sharing (ASIAS) infrastructure could be leveraged for the purposes of collecting fuel use data. It was subsequently determined by the BCPMWG and approved by the NAC, that the ASIAS infrastructure is not appropriate for understanding and isolating specific NextGen impacts on fuel usage.1

Methodology

The BCPMWG membership has included active participation of a representative cross section of the aviation community, including airlines, freight haulers, GA, DoD, GAMA, NBAA, AOPA and ALPA. This has ensured an inclusive approach to our overall effort.

The BCPMWG focused its initial efforts on looking at collecting aircraft weight data and fuel use reports generated that are automatically transmitted from the aircraft to a flight operations center (FOC) during the progress of the flight. These fuel measurements are typically measured at the four major points of a flight: Out, Off, On, and In (OOOI).

To evaluate the feasibility of using this data, members of the BCPMWG participated in a prototype effort to collect and analyze data. The effort was designed to understand the suitability of the proposed data elements to support metrics as well as clarifying the difficulty of sharing information from an operator perspective. Participating operators included Air Wisconsin, Alaska Airlines, Delta Airlines, Federal Express, JetBlue, NetJets, United Airlines, and UPS. Data for the prototype effort was managed and analyzed by MITRE, ensuring that an operator’s sensitive data was not disclosed to any other

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1 Interim Report: Fuel Data Sharing for Measuring NextGen Performance approved by the NextGen Advisory Committee June 4, 2013.
participants. Over 75,000 flight records were shared for eight city pairs, spanning January 2010 through December 2012.

The BCPMWG also explored state-of-the-art fuel usage modeling to understand present capabilities and limitations.

Findings and Recommendations

Finding 1: Shared fuel data will improve fuel consumption insights and metrics

Operator provided data on actual fuel consumption, aircraft departure weight, and flight dates and times offer the ability to calculate high-level metrics from measured data. They also offer the potential for significant improvement over fuel consumption data or modeling available to FAA and the aviation community today. Fuel models generally use standardized inputs and averages – such as aircraft weight – to generate outputs. Operator data provided by flight including aircraft departure weight, fuel consumption, and Out, Off, On, In times (OOOI) will enable better correlation of fuel consumption to weather, winds, airspace congestion, and Metroplex optimization initiatives, among other facets.

Finding 2: Modeling and operational data collection will be complementary methods for generating fuel and other metrics indefinitely

Operational data collection can never completely replace fuel models, as modeling will always be required to predict the future and to fill in gaps in historical operational data. 100% availability of airspace users’ operational data is unlikely for the foreseeable future due to the diversity of aircraft data recording capabilities, user data collection and retention policies, user resources, and data sharing sensitivities.

Finding 3: Many airlines are ready to share fuel consumption and weight information by flight to improve visibility of NextGen impacts. The time, cost, and resources required to compile, transmit, and then aggregate and store the shared data is relatively small.

The airlines that participated in the fuel data sharing prototype agreed that time and resources required to compile and share aircraft weight, fuel usage, and flight times was manageable – and that their organizations would be willing to commit to ongoing data sharing to contribute to NextGen metrics and impact analyses. Overall, the community endorses a fuel data sharing model that includes a third party
to aggregate sensitive fuel data before metrics are shared with the FAA or with the public. In addition, airlines represented at the NACSC that were not directly involved in the prototype effort expressed the desire to contribute to an ongoing data sharing process going forward if adequate data protections and governance are established. Further, BCPMWG believes that as the need for data and publicly shared metrics evolve, continued government-industry dialog will be needed to agree on any 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.

**Finding 4: Department of Defense and General Aviation operators are interested in seeking meaningful ways to contribute to increased fuel insights.**

Due to the diversity of DOD and GA operations, different metrics may be valuable in capturing fuel impacts for these operators. For example, the key city pairs identified to inform the Modernization Act and the NAC recommended fuel consumption metric were developed based on aggregate delay data, which is driven by air carrier operations. DoD and GA have expressed a strong desire to contribute meaningfully to NextGen fuel metrics and impact analysis if their data is valued. However, data collection and potential sharing mechanisms are less developed for their users compared to airlines.

**Recommendation 1:** FAA should capitalize on operator willingness to share aircraft weight and fuel consumption information on a per flight basis to generate metrics, improve fuel modeling performance, and gain additional operational insights supporting improved business case visibility for NextGen initiatives. To enhance the usefulness of this data, the NAC encourages the FAA to report back regularly on the progress being made in the area of fuel metrics and data collection.

**Recommendation 2:** Where specific NextGen implementations require more detailed operational data to discern impacts, FAA should collaborate with the aviation community to identify the finite data elements that create a solid baseline from which to project ongoing benefits (eg, “calibrate and count”). As part of this effort, FAA should explore the use of this shared data to improve modeling capabilities and robustness.

In summary, aircraft departure weight, type, fuel consumption, and OOOI times are valuable to informing NextGen metrics and impact analyses – and provides insights that can improve fuel model robustness. Fuel modeling will always be complementary to operational data collection, both for forecasting the future as well as filling in historical data gaps. Airlines are willing to invest the time and resources to compile and share this fuel data, subject to adequate data protections and governance. DoD and GA users would like to contribute meaningfully to fuel data sharing if their data has value.
Next Steps

The aviation community has expressed support for increased insights in fuel data sharing and is ready to move forward with initial sharing of flight-based fuel and weight reports. Additional work is needed on the following topic areas:

- Refining the methodology for generating and publishing high-level metrics, including the development of baselines and a method to compare year-to-year performance
- Exploration of new uses of the data being shared and expansions of data sharing as appropriate. For example, new metrics such as a fuel use index may provide insights to the aviation community.
- Additional exploration and research is needed to identify the most useful data elements that can support insights on the impacts of specific NextGen initiatives.

Finally, contingent on FAA needs, BCPMWG will continue its outreach to the GA and military communities to improve understanding of NextGen fuel impacts for these communities.
Appendix A: June 4, 2012 Letter from Acting Administrator Michael Huerta

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, metropolex 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.
Appendix B: Business Case & Performance Metrics Work Group
Contributors

The findings in this report were made possible through a number of contributions by BCPMWG members and participants, as listed below:

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MESSAGE FROM THE NAC CHAIRMAN

Tough Times Call for Tough Choices
By Bill Ayer, Chairman, Alaska Group and Chair of the NextGen Advisory Committee
September 2013

Just two months after receiving the request from the FAA, the NAC is pleased to deliver recommendations on the top priorities for NextGen that document a very meaningful and significant accord among many diverse and competing aviation system stakeholders. While the latest round of potential budget cuts further threatens the NextGen program, it is the consensus of the NAC that, regardless of fiscal realities, it is always good business practice to drive investment decisions based on a set of priorities. As Deputy Administrator Mike Whitaker stated at the September 19th NAC meeting in Washington, this prioritization was not a budget exercise – the FAA simply needs to know industry’s priorities. We all recognize that unlike previous air traffic management modernization programs, NextGen requires significant investment not only on the part of the government, but also of those who operate in the system.

First, I want to thank the FAA Administrator, Michael Huerta, and Deputy Administrator, Mike Whitaker, for entrusting the NAC with the task of coalescing the industry’s point of view on NextGen priorities. The NAC appreciates the FAA’s acknowledgement that NextGen is a partnership, as is manifested in their continued collaboration with industry on NextGen decisions. I also want to thank the committee members, especially the NAC Subcommittee members who deliberated tirelessly to achieve this consensus. Prioritization is simply the most important task we have undertaken and the most important set of recommendations we have delivered to the FAA since our inception. Actions taken on these recommendations could shape the future of NextGen and ensure its long term viability.

While the report stands on its own, several key points merit emphasis:

1. The priorities were forged based on the shared assumptions documented in the report.
2. All eleven capabilities included in Tier 1 are equally important and implementing the full set is essential to maintaining the consensus of the NAC.
3. Included as part of the recommendations are an important set the principles the NAC believes should guide the implementation of NextGen. Most notably among them is the NAC’s strong contention that to succeed in implementing Tier 1, the FAA must be given the flexibility to ensure all necessary resources are applied to implement the eleven capabilities, throughout their lifecycle and regardless of budget levels or certainty.

To forge consensus on these recommendations, the members of the NAC and the NAC Subcommittee displayed a level of collaboration and unanimity of purpose that transcended their individual agenda. The resulting recommendations are intended to lead to improvements in overall air traffic system performance. We stand ready to assist the FAA in the next steps, and look forward to sitting down with key FAA officials to answer any questions you have about this report.
NextGen Prioritization

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NextGen Priorities in a Budget Constrained Environment

Background/Introduction

In July 2013, the FAA requested the NextGen Advisory Committee (NAC) to develop recommendations related to the Agency’s NextGen investments.¹ According to the FAA request, “the Taskings, NextGen Activity and Prioritization and Revised Prioritized List of NextGen Integrated Capabilities and Locations, are in response to the uncertainty around funding for NextGen projects.”

In light of budget pressures and possible sequestration impacts, the NAC was requested to review current FAA plans and activities that have an effect on the implementation of NextGen² and develop a prioritized list of Tier 1 (consensus on activities that should continue no matter what) and Tier 2 (consensus on activities that should continue, resources permitting) recommendations. The NAC was requested to complete this work and present the report at the September 19, 2013 NAC meeting.

This task included the following activities:

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 activities that should continue, resources permitting) recommendations. This task would include the following activities:

   a. Identify relevant activities within FAA that have an impact on 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

¹ Letter from Michael P. Huerta (FAA Administrator) to Margaret Jenny (RTCA President) dated July 12, 2013.
² The scope of the NAC prioritization efforts is limited to areas associated with NextGen implementation. The budget expenses could encompass Facilities and Equipment, Operations and Maintenance or Research and Development.
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.

**Executive Summary**

The NAC followed a process that incorporated an analytic, transparent, repeatable, defensible approach to prioritizing NextGen capabilities and related activities. This approach entailed applying a ranked list of weighted criteria against a candidate list of capabilities and activities. Based on the FAA request, the work of the NAC was conducted in as agile, and comprehensive a manner as the accelerated timelines allowed. The Committee also specified a set of underlying assumptions to guide its work and a set of guiding principles to inform the FAA as it considers these recommendations and sets its priorities for NextGen investments.

The NAC used the following criteria and weightings to carry out its prioritization task. (Numbers following each criterion represent the relative weights assigned to that criterion.):

- Benefits (Monetizable) – 46%
- Benefits (non-Monetizable) – 13%
- Implementation Readiness – 28%
- Other Considerations – 13%
  - Global Harmonization
  - Confidence Building
  - Foundational Critical Infrastructure

The overall results of applying these rankings against a list of 36 NextGen capabilities derived from FAA planning documents yielded an outcome very consistent with previous recommendations from the NAC, as well as those made by Task Force 5 (TF5) (see Appendix D for this comparison).

The Committee was presented a sensitivity analyses to determine the effects of changing the relative rankings and determined that the top five or six were consistent. To ensure that the recommendations were not too heavily weighted toward those things that are low risk and high benefit (the so called “low hanging fruit”) at the expense of some potentially high benefit capabilities that ranked low in implementation readiness, the group looked at those capabilities that were high in benefits and medium or low in implementation readiness. To accomplish this and provide additional fidelity to the recommendation, the capabilities were broken down by tiers, recommending items that are deemed:

---

3 If necessary, the FAA should seek reprogramming authority to carry out the prioritization recommendations.

4 The scope of the prioritization recommendation did not include the FAA costs of the programs.
• High in benefit and readiness (Tier 1A)
• High in benefit and low or medium readiness (Tier 1B)
• Medium benefit and high readiness (Tier 2)
• All other capabilities

Methodology
To begin this initiative, the NAC established a set of assumptions to guide its prioritization work and guiding principles as input for the FAA in its prioritization efforts. Next, to ensure a transparent and defensible outcome, the NAC first reached consensus on the criteria it would use to prioritize among the list of candidate initiatives and then weighted the criteria. Following this, the Committee reached consensus on the list of candidate capabilities that were considered within scope of this task, namely those things that are related to the implementation of NextGen. To facilitate the work of the NAC, NACSC and meet the tight time frame for completing the work, RTCA employed a decision support model. An important element of this process was the ability to vote on the criteria as well as the candidate capabilities.

The capabilities originated from the FAA’s 2013 NextGen Implementation Plan (NGIP) and the NextGen Segment Implementation Plan (NSIP) documents but were aggregated to a level that made the size of the list more manageable while maintaining enough fidelity to produce meaningful recommendations. The items on the candidate list are traceable back to those documents. The NACSC played an important role in the process by applying its expertise in the details associated with the specific capabilities to evaluate these against the list of ranked and weighted criteria.

Throughout the project, the FAA provided relevant subject matter experts to inform the Committee on its constraints and to help identify those activities considered to be in scope for consideration, but they did not participate in the deliberations and final decisions regarding the recommendations.

Assumptions
The NAC made the following assumptions as a basis for its work:

• Sequestration will affect budgets for the foreseeable future.
• Providing a prioritized list of capabilities can inform the FAA no matter which financial option occurs.
• Community consensus on NextGen investments necessary for NextGen is critical.
• The implementation of NextGen capabilities should have a business case with a positive ROI regardless of budget circumstances.
• Aircraft operators continue to invest in updated aircraft/equipage based on a positive ROI and anticipate the removal of barriers to gain their return on investment in these new capabilities.

5 Additional information is available at http://www.decisionlens.com/products/software/
• NextGen should leverage forward fit (purchase of new generation aircraft) and equipage modernization underway by aircraft operators and expedite delivery of relevant capabilities accordingly.
• Mixed equipage will remain for many capabilities – it is an on-going process and a reality that must continually be addressed.
• Expanding the use of PBN is foundational and will become the norm for aircraft operations.
• Scope of this prioritization task is limited to NextGen capabilities. It is assumed that the FAA will decommission unused or obsolete infrastructure or consolidate existing facilities as required to achieve maximum fiscal benefit without degrading system safety or access.
• Subject matter experts will transfer the lessons learned from one NextGen implementation experience to subsequent ones, most notably from one Metroplex implementation to the next.

Guiding Principles
The NAC established the following principles to provide the FAA with consensus on key drivers in their prioritization of the NextGen investments:

• NextGen investments enhance safety.
• Delivering tangible, measurable benefits is crucial to encouraging NextGen investments.
• It is better to fund capabilities at a level required to deliver benefits and drive to 100% completion of a single capability than to cut x% from everything and/or delay everything. Funding must include all necessary resources including personnel, training, etc.
• It is imperative that all high priority initiatives are not only fully funded, but also have all the necessary resources allocated, including participation of the key stakeholders, especially air traffic controllers.
• Those initiatives with a validated operational concept and a positive business case that are in a critical stage of implementation should be considered for continued investment.
• Timing matters – Operator’s business case for investment in NextGen capabilities are predicated on commitment on the part of the FAA to deliver capabilities by defined dates.
• Right size the investments – deploy NextGen capabilities at locations where measurable benefits can be achieved.
• It is important to have “scalability” of capabilities across the NAS (capabilities deployed in one location could then be deployed across the National Airspace System).
• Metrics is an overarching issue and it is critical to define goals associated with the key NextGen metrics, establish baseline measures, and continue to track and report progress on these metrics in a public forum.

Criteria
To ensure a transparent and defensible outcome, the NAC reached consensus on the following criteria, associated definitions, weightings and rating scales. These were developed based on work conducted by TF5 and previous NAC recommendations.

1. Monetizable Benefits
2. Non-Monetizable Benefits
3. Implementation Readiness (including risk mitigation)
4. Other: (Enhance Global Harmonization, Increase Confidence, Is a Critical Infrastructure Element of NextGen)

Benefits (Monetizable)
Weighting: 46.2%

<table>
<thead>
<tr>
<th>Sub Criteria</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>This criterion will be used to assess how much the capability will increase capacity.</td>
</tr>
</tbody>
</table>
| Capacity                   | **SAMPLE MEASURES**  
Airport and Metroplex throughput  
Airspace capacity in weather events  
Deconflict airports |
| Efficiency                 | This criterion will be used to assess whether the investment increases efficiency. |
|                            | **SAMPLE MEASURES**  
Fuel use, blocked time lengths, terminal and flight time, airport and airspace.  
Reduction in passenger delays  
Reduction in delay minutes  
Increased predictability  
Deviation from scheduled block time  
Scheduled block time  
Deviation from flight plans and flight time |
| Societal                   | This criterion will be used to assess improvements in the ATC System Productivity. |
|                            | **SAMPLE MEASURE**  
ATC cost per hour |
Environmental

This criterion will be used to assess the impact on the environment by the ATC.

SAMPLE MEASURES
Reduction of emissions
Reduction in noise

Rating Monetizable Benefits | Scale Definition
--- | ---
High | The capability delivers significant benefit to stakeholder groups in all categories (Capacity, ATC System Productivity, Environmental).
Medium | The capability delivers significant benefit to stakeholder groups in 3 or more categories AND has no perceived negative impact on any of the other categories.
Low | The capability delivers significant benefit to stakeholder groups in 3 or fewer categories and may have a perceived negative impact on one of the other categories.
N/A | The operational capability has a minor negative impact on stakeholders and delivers little or no significant benefit.
Showstopper | The negative effects of the operational capability are a show stopper.

Benefits (Non-Monetizable)

Weighting: 12.8%

<table>
<thead>
<tr>
<th>Sub Criteria</th>
<th>Definition</th>
</tr>
</thead>
</table>
| Access | This criterion will be used to assess the operator’s access to resources that are essential to meeting the objectives of an operation, including airspace, airports and services.  
SAMPLE MEASURES  
Civilian use of Special Activity Airspace  
Airports with all-weather approaches or options  
Ability to operate UAS in airspace for civilian and public aircraft  
DoD access to airspace  
Access to Metroplex environment  
Ability to operate commercial space flights |
| Flexibility | This criterion will be used to assess the operator’s ability to plan, carry out and adjust their operations and/or schedules, especially during irregular operations due to things such as adverse weather.  
SAMPLE MEASURES  
Flight plans approved  
Number of TFM restrictions |
| Safety | This criterion will be used to assess whether the capability delivers improvements in situational awareness for pilots and controllers and/or improves operational decision making. |
### Rating non-Monetizable Benefits

<table>
<thead>
<tr>
<th>Scale Definition</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>The capability delivers significant benefit to stakeholder groups in all categories (Access, Flexibility, Safety, Security).</td>
</tr>
<tr>
<td>Medium</td>
<td>The capability delivers significant benefit to stakeholder groups in 2 or more categories AND has no perceived negative impact on any of the other categories.</td>
</tr>
<tr>
<td>Low</td>
<td>The capability delivers significant benefit to stakeholder groups in 3 or fewer categories and may have a perceived negative impact on one of the other categories.</td>
</tr>
<tr>
<td>N/A</td>
<td>The operational capability has a minor negative impact on stakeholders and delivers little or no significant benefit.</td>
</tr>
<tr>
<td>Showstopper</td>
<td>The negative results of the operational capability are a show stopper.</td>
</tr>
</tbody>
</table>

### Implementation Readiness

Weighting: 28.3%

<table>
<thead>
<tr>
<th>Sub Criteria</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standards and Approvals</td>
<td>This criterion will assess the extent to which Standards, Approvals, Certifications and Regulatory Guidance as well as Equipage are in place.</td>
</tr>
<tr>
<td></td>
<td>SAMPLE MEASURE</td>
</tr>
<tr>
<td></td>
<td>Need for rule making</td>
</tr>
<tr>
<td>Policy/Ops</td>
<td>This criterion will be used to assess the extent to which Training, valid Concept of Operations (ConOps) and Procedures are in place. It also takes into account Site Readiness including the degree of acceptance by local stakeholders.</td>
</tr>
<tr>
<td>Systems</td>
<td>This criterion will be used to assess whether aircraft and ground infrastructure, automation and decision support tools are ready (ex. ERAM). This criterion also addresses the level of integration among systems that is required to achieve operational benefits. It also takes into account the extent to which there are a lot of elements already in place.</td>
</tr>
</tbody>
</table>
Institutional

This criterion will be used to assess the extent to which the required institutional, cultural changes, or new policies or political considerations have been mitigated.

**SAMPLE MEASURES**

- Scope of the change
- Extent of stakeholder alignment around the change
- The extent of institutional/organizational change required to implement

Roles & Operational Complexity

This criterion will be used to assess the extent to which the changes in the role of the pilots, controllers or dispatchers have been made to enable the capability. The complexity of implementing the capability includes changes to airspace, equipage, traffic flow management, requirements and the need for integrated decision support tools.

Community Perceived Noise and Emission Impact

This criterion will be used to assess whether the mitigations are in place to counter noise or emissions impacts.

**SAMPLE MEASURE**

The potential for a community to perceive a negative impact on noise.

Time to Completion

This criterion will be used to assess the amount of time required to derive the intended benefit from the capability.

**SAMPLE MEASURES**

- Incremental Transition Decisions/Plans (ground systems, interim aircraft capabilities etc)

<table>
<thead>
<tr>
<th>Rating Implementation Readiness</th>
<th>Scale Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly Ready</td>
<td>Needed elements are already in place to achieve the operational capability.</td>
</tr>
<tr>
<td>Moderate Readiness</td>
<td>Elements are achievable with nominal lead times for the needed timeframe (2018). Low risk to complete.</td>
</tr>
<tr>
<td>Low Readiness</td>
<td>Significant intervention is required to ensure the elements are in place in the needed timeframe (2018).</td>
</tr>
<tr>
<td>Showstopper</td>
<td>Required elements cannot be available in the needed timeframe (2018).</td>
</tr>
<tr>
<td>Not Applicable</td>
<td>Elements are not required to achieve the operational capability.</td>
</tr>
<tr>
<td>Don't Know</td>
<td>No information is known</td>
</tr>
</tbody>
</table>

**Other Considerations**

Weighting: 12.7%

<table>
<thead>
<tr>
<th>Sub Criteria</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Harmonization</td>
<td>This criterion will be used to assess whether the capability will enhance global harmonization. It will also take into account the</td>
</tr>
<tr>
<td>Rating Global Harmonization</td>
<td>Scale Definition</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>High Impact</td>
<td>It is a capability called out in an ICAO Aviation System Block Upgrade (ASBU) and helps maintain US leadership in aviation.</td>
</tr>
<tr>
<td>No Impact</td>
<td>The capability does not require harmonization.</td>
</tr>
<tr>
<td>Negative Impact</td>
<td>Implementation of this capability would be contradictory to the direction of the rest of the global aviation community.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Confidence Building</th>
<th>Scale Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>This criterion will be used to assess whether the capability increases the aviation stakeholders’ confidence in industry and FAA's ability to deliver on commitments (early delivery of benefits) leading to higher probability of positive business case for equipage.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rating Confidence Building</th>
<th>Scale Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong Positive Impact</td>
<td>Will greatly increase likelihood of a positive return on investment related to this or subsequent related capabilities.</td>
</tr>
<tr>
<td>Moderate Positive Impact</td>
<td>Will modestly increase likelihood of a positive return on investment related to this or subsequent related capabilities.</td>
</tr>
<tr>
<td>Minimal Positive Impact</td>
<td>Will only minimally increase likelihood of a positive return on investment related to this or subsequent related capabilities.</td>
</tr>
<tr>
<td>Neutral / No Impact</td>
<td>Will not increase likelihood of a positive return on investment related to this or subsequent related capabilities.</td>
</tr>
<tr>
<td>Negative Impact</td>
<td>Will be perceived as having a negative return on investment related to this or subsequent related capabilities.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Foundational Critical Infrastructure</th>
<th>Scale Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>This criterion will be used to assess the degree to which this capability provides a foundational critical infrastructure component of NextGen or is required to be compliant with mandates.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rating Foundational Critical Infrastructure</th>
<th>Scale Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essential</td>
<td>To future benefits-yielding NextGen capabilities or to cost-cutting measures.</td>
</tr>
<tr>
<td>Very Important</td>
<td>To future benefits-yielding capabilities or to cost-cutting measures.</td>
</tr>
<tr>
<td>Moderately Important</td>
<td>To future benefits-yielding capabilities or to cost-cutting measures.</td>
</tr>
<tr>
<td>Marginally Important</td>
<td>To future benefits-yielding capabilities or to cost-cutting measures.</td>
</tr>
<tr>
<td>No Impact on NextGen</td>
<td>Or considered not essential to ability to deliver NextGen benefits at reasonable cost or to cost cutting measures.</td>
</tr>
</tbody>
</table>

**NextGen-Related Activities**

Working with the FAA, the NAC identified the following NextGen-related initiatives as the candidate list to prioritize. The list was derived from the NGIP and the NSIP that were also evaluated against...
The list (contained in Appendix C) is aggregated from the much longer list of Operational Improvements (OIs) in the FAA documents, and all are traceable back to those OIs. The aggregation was carried out to enable the following outcomes: (1) produce a more manageable number of capabilities to prioritize while (2) ensuring an appropriate level of fidelity to ensure meaningful recommendations, and (3) produce a prioritized list that the FAA can more easily digest back into its planning processes.

<table>
<thead>
<tr>
<th>NGIP/NSIP PORTFOLIO</th>
<th>Consolidated CAPABILITY / ACTIVITY</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Surface Ops</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Data Sharing</td>
<td>Share data on movement of traffic on surface</td>
</tr>
<tr>
<td>2.</td>
<td>Situational Awareness – ADS-B</td>
<td>Display target for ground equipment on ATC display and aircraft displays TIS-B for ground equip and aircraft on surface</td>
</tr>
<tr>
<td>3.</td>
<td>Revised PDC via DataComm</td>
<td>Deliver revised PDC to pilot pre-flight via DataComm</td>
</tr>
<tr>
<td><strong>Surface/Terminal</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Surface/Terminal Alerting (ADS-B In)</td>
<td>Automated Terminal Proximity Alert (ATPA) provides situational awareness and alerts to controllers ADS-B In Traffic Situational Awareness on the Airport Surface</td>
</tr>
<tr>
<td><strong>Low Vis Approaches</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>GLS I</td>
<td>GLS I – precision approaches</td>
</tr>
<tr>
<td>6.</td>
<td>GLS II/III</td>
<td>GLS II-III – precision approaches</td>
</tr>
<tr>
<td>7.</td>
<td>EFVS</td>
<td>Enable use of enhanced flight vision systems to conduct approach and landing in low visibility conditions</td>
</tr>
<tr>
<td><strong>Multiple Runway Ops</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Sep standards reduced (CSPO)</td>
<td>Reduced lateral separation for runways closer than 4300’ and 2500’ SATNAV or ILS for parallel runway ops</td>
</tr>
<tr>
<td><strong>PBN</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>OAPM</td>
<td>Expedite OAPM, leverage categorical exclusions (based on RTCA priorities), increase emphasis on OAPM</td>
</tr>
<tr>
<td>11.</td>
<td>PBN</td>
<td>PBN/RNAV, RNP AR Large scale airspace redesign</td>
</tr>
<tr>
<td>12.</td>
<td>Advance PBN</td>
<td>New function – upload dynamic PBN procedures (Advanced RNP)</td>
</tr>
<tr>
<td>NGIP/NSIP PORTFOLIO</td>
<td>Consolidated CAPABILITY / ACTIVITY</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>----------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>TBFM</td>
<td>13. Metering/Merging/Spacing (Enroute and Terminal) (Ground-based)</td>
<td>Ground automation-based time-based metering, merging and spacing</td>
</tr>
<tr>
<td></td>
<td>14. Interval Management (IM) (ADS-B)</td>
<td>IM in cruise phase of flight Terminal IM, single stream of aircraft</td>
</tr>
<tr>
<td></td>
<td>15. Advanced Flight deck Interval Management (FIM)</td>
<td>Terminal IM for multiple streams of aircraft</td>
</tr>
<tr>
<td></td>
<td>16. Flight Planning Feedback</td>
<td>Ability for operators to get feedback on NAS constrains during flight planning process Collaborative Trajectory/Flight Planning</td>
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<tr>
<td></td>
<td>17. Airborne Rerouting -TFM</td>
<td>Traffic Manager ability to propose reroutes and amend for weather or other constraints</td>
</tr>
<tr>
<td></td>
<td>18. Modeling, improved predictions</td>
<td>Enhanced modeling for better demand/capacity balance predictions</td>
</tr>
<tr>
<td></td>
<td>19. CDM</td>
<td>Collaborative Arrival, Departure, Enroute Planning</td>
</tr>
<tr>
<td></td>
<td>20. Separation Services (reduced separation) (ADS-B Out)</td>
<td>Expanded use of 3-nm separation standards Reduce aircraft separation standards Increased access to low altitude, non-radar airspace</td>
</tr>
<tr>
<td></td>
<td>21. Terminal Controller Proximity Alerting</td>
<td>Alerts controllers when compression between subsequent aircraft is likely to result in unsafe separation</td>
</tr>
<tr>
<td></td>
<td>22. In Trail Procedures (ITP) (ADS-B)</td>
<td>Enable aircraft equipped with ADS-B and appropriate on-board automation to climb and descend through altitudes where current non-ADS-B separation standards would prevent desired altitude changes</td>
</tr>
<tr>
<td></td>
<td>23. Oceanic DataComm (ATN Services)</td>
<td>Extend Data Communications services beyond satellite and FANS 1/A to aircraft having the ATN baseline 1 application package</td>
</tr>
<tr>
<td></td>
<td>24. Advanced ATOP Applications</td>
<td>Numerous enhancement to the ATOP system</td>
</tr>
<tr>
<td></td>
<td>25. Enhanced Conflict Detection</td>
<td>Enhanced conflict probe for</td>
</tr>
<tr>
<td>NGIP/NSIP PORTFOLIO</td>
<td>Consolidated CAPABILITY / ACTIVITY</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>26.</td>
<td>CPDLC, Weather Reroute (DataComm, FANS 1/A)</td>
<td>Basic CPDLC and reroutes around weather for DataComm-equipped aircraft (FAN 1/A, VDL 2)</td>
</tr>
<tr>
<td>27.</td>
<td>DataComm ATN B2 Services</td>
<td>DataComm ATN B2 services (CPDLC, 4D TRAD, FIS)</td>
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<tr>
<td>29.</td>
<td>Enroute PBN</td>
<td>Automation will then reduce conformance bounds used in conflict detection algorithms for aircraft with RNAV/RNP based on performance criteria adapted for the route and aircraft capabilities, allowing the system to take advantage of the reduced separation of the routes while maintaining safe operations</td>
</tr>
<tr>
<td>30.</td>
<td>Wake Re-Categorization &amp; Wake Separation</td>
<td>Improve throughput at capacity constrained airports maintaining or improving wake safety Revised separation based on wake information</td>
</tr>
<tr>
<td>31.</td>
<td>Oceanic User Requests</td>
<td>Enable aircraft to stay closer to preferred route</td>
</tr>
<tr>
<td>32.</td>
<td>NAS information to stakeholders (Near-Term)</td>
<td>Provide information to stakeholders on status of NAS resources.</td>
</tr>
<tr>
<td>33.</td>
<td>NAS information to stakeholders (Far-Term)</td>
<td>Provide more sophisticated and more real-time NAS status information</td>
</tr>
<tr>
<td>34.</td>
<td>Common Weather Info DB</td>
<td>Access to common aviation weather picture, using global and open standards</td>
</tr>
<tr>
<td>35.</td>
<td>SWIM Ground</td>
<td>Provides policies and standards to support NAS data management, secure its integrity and control its access and use.</td>
</tr>
<tr>
<td>36.</td>
<td>SWIM Air</td>
<td>Airborne Access to SWIM (AAtS) enables in-flight aircraft access to information available through SWIM. AAtS extends</td>
</tr>
</tbody>
</table>
these capabilities to the cockpit through third party communication vendors, providing Internet access on the flight deck, for example on an EFB. Although AAtS aircraft guidance is complete, AAtS implementation is still in development.

Recommendations
The following overall ranking was derived by a previously described decision support tool process which involved voting on the application of the four criteria to the list of 36 candidate consolidated capabilities. The outcome reflects the results of the voting.

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<thead>
<tr>
<th>Alternative Name</th>
<th>Candidate #</th>
<th>Score</th>
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<td>Multiple Runway Ops - Sep standards reduced (CSPO)</td>
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<td>1</td>
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<td>Separation Management - Wake Re-Categorization &amp; Wake Separation</td>
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<td>0.673</td>
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<tr>
<td>PBN - OAPM</td>
<td>10</td>
<td>0.648</td>
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<tr>
<td>Separation Management (reduced separation) (ADS-B Out)</td>
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<tr>
<td>CATM - Flight Planning Feedback</td>
<td>16</td>
<td>0.633</td>
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<td>On Demand NAS Info - Near Term</td>
<td>32</td>
<td>0.628</td>
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<tr>
<td>Separation Management - CPDLC, Weather Reroute (DataComm, FANS 1/A)</td>
<td>26</td>
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<td>CATM-CDM</td>
<td>19</td>
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<td>Surface/Ops - Revised PDC via DataComm</td>
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<td>Core Infrastructure - SWIM Ground Based</td>
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<td>Separation Management - Enroute PBN</td>
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<td>0.608</td>
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<tr>
<td>Separation Management - Terminal Controller Proximity Alerting</td>
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<td>CATM - Airborne Rerouting -TFM</td>
<td>17</td>
<td>0.600</td>
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<tr>
<td>Separation Management - In Trail Procedures (ITP) (ADS-B)</td>
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<td>0.597</td>
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<tr>
<td>Low Vis Approaches - GLS I</td>
<td>5</td>
<td>0.571</td>
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<tr>
<td>Separation Management - Oceanic User Requests</td>
<td>31</td>
<td>0.562</td>
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<tr>
<td>Separation Management - Enhanced Conflict Detection</td>
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<td>0.561</td>
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<td>Weather - Common Weather Info DB</td>
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<td>0.551</td>
</tr>
<tr>
<td>On Demand NAS Info - Far Term</td>
<td>33</td>
<td>0.543</td>
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<tr>
<td>Separation Management - DataComm ATN B2 Services</td>
<td>27</td>
<td>0.534</td>
</tr>
<tr>
<td>TBFM - Interval Management (IM) (ADS-B)</td>
<td>14</td>
<td>0.530</td>
</tr>
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</table>
The Committee was presented a sensitivity analyses to determine the effects of changing the relative rankings and determined that the top five or six were consistent. To ensure that the recommendations were not too heavily weighted toward those things that are low risk and high benefit (the so called “low hanging fruit”) at the expense of some potentially high benefit capabilities that ranked low in implementation readiness, the group looked at those capabilities that were high in benefits and medium or low in implementation readiness. Based on that analysis, the group determined that there are a set of capabilities that are potentially high benefit but not scored as high in implementation readiness, i.e., more work needs to be done to implement and deploy but it would be worth accelerating that work. As the result of examination of the prioritization done by the Committee, the Committee recommends that the candidate capabilities be categorized into four tiers:

### Tier One Prioritized Capabilities

To be considered for the Tier 1 list (consensus on activities that should continue regardless of budget constraints) an initiative must have scored high when compared to other potential investments (based on the criteria).

The Committee outlined the following principles important to Tier 1 consensus:

- No scope creep
- No schedule creep – given full resources
- Only capabilities with a validated concept of operation, with the assumption that it is based on solid business case analysis
- Many of these capabilities have enablers (ie. revision of controller handbook, policies, etc.) that need to be addressed in order to achieve the intended benefit

Tier 1A: Capabilities that are deemed to be high benefit and high readiness. These should be considered highest priority, and be given full resources to achieve or IOC dates or accelerate those dates. Budget cuts should not affect these capabilities. It is important to note that several of these are interdependent and lead to service improvements. For example, PBN will not achieve the projected benefit in congested terminal airspace without the merging and spacing tools or CSPo work being completed.
• PBN - PBN
• Multiple Runway Ops – Sep standards reduced (CSPO)
• Surface Ops - Data Sharing
• TBFM - Metering/Merging/Spacing (Enroute and Terminal) (Ground-based)
• Separation Management - Wake Re-Categorization & Wake Separation
• PBN – OAPM

Tier 1B: Capabilities that are deemed to be high benefit and low or medium readiness. These capabilities should also be given full resources to achieve or IOC dates or accelerate those date. In the case of Tier 1B, attention should be given to address and resolve all technical and non-technical issues, and the capabilities should be accelerated if possible. Budget cuts should not affect these capabilities.

• CATM - Flight Planning Feedback
• CATM - CDM
• Separation Management (reduced separation) (ADS-B Out)
• Separation Management - CPDLC, Weather Reroute (DataComm, FANS 1/A)
• Separation Management - Enroute PBN

Tier Two Capabilities
Tier 2: Capabilities that are deemed to be of medium benefit and high readiness. These capabilities should remain on track budget permitting, but if budget cuts dictate, they could be delayed. To be considered for the Tier 2 list (consensus on things that should continue, resources permitting), an initiative must have scored relatively high, but below the cutoff point defined by the Committee.

• Surface/Ops - Revised PDC via DataComm
• CATM - Airborne Rerouting - TFM
• Separation Management - Terminal Controller Proximity Alerting
• Separation Management - In Trail Procedures (ITP) (ADS-B)
• Separation Management - Enhanced Conflict Detection
• Separation Management - Oceanic User Requests
• On Demand NAS Info - Near Term
• Core Infrastructure - SWIM Ground Based

Other Capabilities
All other candidate capabilities.

• Surface Ops - Situational Awareness ADS-B
• Surface/Terminal - Surface/Terminal Alerting (ADS-B In)
• Low Vis Approaches - GLS I
• Low Vis Approaches - GLS II and III
• Low Vis Approaches - EFVS

---

6 The aviation community has been actively involved and supportive of OAPM as indicated by the overall rating. In consideration of the importance of this initiative, it was placed in the Tier 1A list even though it was determined to be a Tier 2 capability.
• Low Vis Approaches Advanced EFVS
• PBN - Advanced PBN
• TBFM - Interval Management (IM) (ADS-B)
• TBFM - Advanced Flight deck Interval Management (FIM)
• CATM - Modeling, improved predictions
• Separation Management - Oceanic DataComm (ATN Services)
• Separation Management - Advanced ATOP
• Separation Management - DataComm ATN B2 Services
• Separation Management - New DataComm Applications
• On Demand NAS Info - Far Term
• Weather - Common Weather Info DB
• Core Infrastructure - SWIM Airborne Based
The scatter diagram below shows the results of that analysis and resulting suggestion for capabilities in Tiers 1A, 1B, 2, and Other.

**Figure 1: Monetizable Benefits vs. Implementation Readiness - Tier Groupings**

It should be noted that the only capability that falls outside the natural line demarcations is Capability 10: PBN-OAPM. The Committee included OAPM in Tier 1A because of its high readiness score. Though others were deemed to have higher benefit, the Committee believes that the FAA is well on the way to completing these initiatives, and the community will benefit from their completion.
Appendix A: NextGen Capabilities Task Group - Members of the NAC & Associated Organizations

Members of the NextGen Advisory Committee

Bill Ayer, Alaska Airlines, NAC Chair
Ed Bolen, NBAA
Frank Brenner, EUROCONTROL
Sherry Carbary, The Boeing Company
Mario Diaz, Houston Airport System
Carl Esposito, Honeywell International, Inc.
Christa Fornarotto, FAA
Craig Fuller, AOPA
Bob Gray, ABX Air
David Grizzle, FAA
John Harris, Raytheon Systems Company
John Hickey, FAA
Stephanie Hill, Lockheed Martin Corporation
Margaret Jenny, RTCA, Inc.
James Jones, USAF
Patrick Ky, SESAR
Rob Maruster, JetBlue Airways
Allan McArtor, Airbus Americas, Inc.
Lee Moak, ALPA
Arlene Mulder, O’Hare Noise Compatibility Commission
Julie Oetinger, FAA
Mike Perrone, Professional Aviation Safety Specialists
Jim Rankin, Air Wisconsin
Paul Rinaldi, NATCA
Lillian Ryals, The MITRE Corporation
Mike Whitaker, FAA, DFO
Pamela Whitley, FAA
Andy Cebula, RTCA, Inc., NAC Secretary

NAC organization representatives and leaders of NACSC, Business Case Performance Metrics Workgroup and Operational Capabilities Work Group

Steve Alterman, CAA
Merrill Armstrong, USAF
Chris Baum, ALPA
Monte Belger, Metron Aviation, Inc.
Joseph Bertapelle, JetBlue Airways
Tom Bock, Port Authority of NY & NJ
Steve Brown, NBAA
Bruce DeCleene, FAA
Jana Denning, Lockheed Martin Corporation
Steve Dickson, Delta Air Lines, Inc.
Dan Elwell, A4A
Keith Hagy, ALPA
Fran Hill, Lockheed Martin Corporation
Craig Hoskins, Airbus Americas
Charles Keegan, Raytheon Systems Company
Debbie Kirkman, The MITRE Corporation
Ed Lohr, Delta Air Lines, Inc.
Paul McGraw, ATA
Gisele Mohler, FAA
Juan Narvid, USAF
Melissa Rudinger, AOPA
Sandy Samuel, Lockheed Martin Corporation
Heidi Williams, AOPA
Dale Wright, NATCA
Appendix B: Members of the NACSC

Frank Bartonek, Cessna Aircraft Company
David Batchelor, SESAR JU
Gary Beck, Alaska Airlines
Ali Bahrami, Aerospace Industries Association
Monte Belger, Metron Aviation, Inc.
Christopher Benich, Honeywell International
Joe Bertapelle, JetBlue Airways
Tom Bock, Port Authority of NY & NJ
Steve Brown, NBAA
Ed Bular, US Airways
Randy Burdette, NASAO
Sean Cassidy, ALPA
Peter Cerda, IATA
Peter Challan, Harris Corporation
Jim Crites, Dallas/Fort Worth International Airport
Ben DeLeon, FAA
Bruce DeCleene, FAA
Steve Dickson, Delta Air Lines, Inc., NACSC Co-Chair (A4A)
Todd Donovan, Thales
William Dunlay, LeighFisher
Ken Elliott, Jetcraft Avionics LLC
Steve Fulton, GE Aviation
Michael Gonzales, Professional Aviation Safety Specialists
Ron Hawkins, ARINC, Inc.
Cole Hedden, ACSS
Jens Hennig, GAMA
Urmila Hiremath, The MITRE Corporation
Craig Hoskins, Airbus Americas, Inc.
Jennifer Iversen, RTCA, Inc., NACSC Secretary
Nancy Kalinowski, FAA
Ken Kaminski, Saab-Sensis Corporation
Charles Keegan, Raytheon Systems Company
John Kefaliotis, ITT Corporation
George Ligler, Project Management Enterprises, Inc.
Ed Lohr, Delta Air Lines, Inc.
Paul McGraw, A4A
Joe Miceli, Airline Dispatchers Federation
Gisele Mohler, FAA
Juan Narvid, USAF
Chris Oswald, ACI-NA
Neil Planzer, The Boeing Company
John Plowman, Flight Dispatchers, Meteorologists & Operation Specialists Union
Bo Redeborn, EUROCONTROL
David Rhodes, CSC
Martin Rolfe, NATS, Ltd.
Melissa Rudinger, AOPA, NACSC Co-Chair
Van Ruggles, Garmin
Sandy Samuel, Lockheed Martin Corporation
Nan Shellabarger, FAA
Steve Vail, Mosaic ATM, Inc.
Bryan Vester, Rockwell Collins, Inc.
Brian Will, American Airlines
Chris Williams, UPS
Heidi Williams, AOPA
Dale Wright, NATCA
Appendix C: Capabilities Ranked by NextGen Advisory Committee Subcommittee
Capabilities Ranked by Relative Priority

**Ranked 1-6**

**Ranked 7-20**

**Ranked 21-36**
Tier Groupings

- **Tier 1a**
- **Tier 1b**
- **Tier 2**
- **Other**

**Implementation Readiness**

**Benefits (Monetizable)**

- Tier 1a
- Tier 1b
- Tier 2
- Other

**Tier Groupings**

- Tier 1a: Surface Ops - Data Sharing
- Tier 1b: Surface Ops - Situational Awareness ADS-B
- Tier 2: Surface/Ops - Revised PDC via DataComm
- Other: Surface/Terminal - Surface/Terminal Alerting (ADS-B In)

**Attachment 8** NextGen Prioritization
Appendix D: High-level Comparison of RTCA Recommendations

The following chart compares the top level recommendations developed by the aviation community (NextGen Advisory Committee and RTCA Task Force 5) highlighting the consistency of many of the recommendations.

<table>
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<th>RTCA Recommendations at-a-Glance</th>
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<tr>
<td><strong>NAC 09-2013</strong></td>
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<td>Surface Data Sharing</td>
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<td>CSPO</td>
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<td>PBN</td>
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<td>TBFM</td>
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<td>Wake Re-Cat</td>
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<td>Separation Services (reduced separation) (ADS-B Out)</td>
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<td>DataComm CPDLC Weather reroute FANS 1/A</td>
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### Appendix E: Consolidated Candidate Capabilities List Mapping to NGIP/NSIP

<table>
<thead>
<tr>
<th>Portfolio</th>
<th>NAC Consolidated Capability #</th>
<th>NAC Consolidated Capability Name</th>
<th>Name</th>
<th>OI ID</th>
<th>IOC</th>
<th>Alpha/Bravo Phase</th>
<th>Status</th>
<th>Enablers</th>
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<tbody>
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<td>Improved Surface Operations</td>
<td>1</td>
<td>Data Sharing</td>
<td>Data Exchange with operators</td>
<td>104209-17</td>
<td>TBD</td>
<td>Bravo</td>
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<td>Expansion of Surface Surveillance</td>
<td>103207-13</td>
<td>2013-2015</td>
<td>Alpha</td>
<td>In Progress</td>
<td>ASSC(P), ADS-B(S), DDU(S), TIS-B(S), ADS-B Out Services, ADS-B for Surface Vehicles</td>
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<td>External Surface Data Release</td>
<td>104209-16</td>
<td>2010-2011</td>
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<td>DEX (P), TDDS (P), ASDE-X(S), ASSC(S), DDU(S)</td>
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<td>Data Sharing</td>
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<td>Provide Initial Surface Management System</td>
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Appendix F: Task Force 5 Recommendations

Task Force Operational Capability Recommendations Are:

1. Surface

*Improve surface traffic management to reduce tarmac delays and enhance safety, efficiency and situational awareness by defining, standardizing requirements, and implementing the capture and dissemination of surface operations data to pilots, controllers, ramp towers and user operations centers. These actions should be undertaken under the auspices of one consolidated point of responsibility, authority and accountability within the FAA, in accordance with a coordinated execution plan jointly established by industry and government.*

To resolve Surface problems, the Task Force recommends that the following operational capabilities be implemented:

- **Surface Situational Awareness Phase 1:** Deploy ground infrastructure to capture and integrate surface activities (40)
- **TFM Common Operational Picture:** Define consistent views of operational data for collaborative decision-making (43)
- **Surface Connectivity & Surface Situational Awareness Phase 2 among FOCs, FAA, Airports (38, 41)**

2. Runway Access

*Increase runway access, especially in low visibility, to converging, intersecting and closely-spaced parallel runways. Accomplish this by leveraging potential capacity gains achievable through accurate and predictable flight paths, as well as enhanced surveillance methods. Foundational activities are based on existing ground and aircraft capabilities leading to a determination of needed additional investment.*

To resolve Runway Access problems, the Task Force recommends that the following operational capabilities be implemented:

- **Increase capacity and throughput to converging and intersecting runways (9)**
- **Improve parallel runway operations in a phased manner, where near-term commitment and implementation successes dictate the need for mid-term investments (37a, 12, 13, 14)**

3. Metroplex
Relieve congestion and tarmac delays at major metropolitan area airports, inefficiencies at satellite airports, and surrounding airspace by instituting tiger teams that focus on quality of implementation at each location and deconflicting of adjacent airports. Core capabilities to leverage are RNAV, with RNP where needed (e.g., when RF turns are called for); optimized vertical profiles using vertical navigation; use of 3 NM and terminal separation rules in more airspace; integrated approach to airspace design and classification; and ATC, flow and surface traffic management tools.

To resolve Metroplex problems, the Task Force recommends that the following operational capabilities be implemented:

- Optimize RNAV and RNP operations, institute tiger teams that focus on quality at each location (29, 32a, 32b)
- Integrate procedure design to deconflict airports and expand use of terminal separation rules (4, 21a)

4. Cruise

Improve efficiency of cruise operations by increasing the ability to disseminate real-time airspace status and schedules (particularly with respect to Special Activity Airspace); improving flow management to better utilize time-based metering and flight operator capabilities; and implementing data communications between ATC systems and aircraft to more effectively manage traffic and exchange routing and clearance information.

To resolve Cruise problems, the Task Force recommends that the following operational capabilities be implemented:

- Special Activity Airspace: Efficient management and use of SAA through real-time data exchange of status and schedules (35)
- Improve time-based metering and leverage operator capabilities (24, 25)
- Develop Area Navigation-Based En Route System (30)

5. Access to the NAS:

Improve access to and services provided at non-OEP airports and to low altitude, non-radar airspace by implementing more precision-based approaches and departures, along with the expansion of surveillance services to areas not currently under radar surveillance.
To resolve Access problems, the Task Force recommends that the following operational capabilities be implemented:

- **Low Altitude Non-Radar**: Extend radar-like services to low altitude airspace without radar surveillance (28)
- **Implement LPV procedures for airports without precision approaches** (22)

**Cross Cutting Recommendations**

In addition, the Task Force submits recommendations in two capability areas that cut across the five domains outlined above:

1. **Data Communications**

   Improve cruise and transition operations by using data communications to enable more efficient use of available or forecast capacity in the NAS. Increase the ability to better adapt to changing conditions through improved dissemination of tactical reroutes around weather forecast and congestion.

   To resolve problems due to lack of digital data communications and associated applications, the Task Force recommends that the following operational capabilities be implemented:

   - **Digital ATC-Aircraft Communications for Revised Departure Clearances, Weather Reroutes, and Routine Communications** (16, 17, 39, 42a, 44)

2. **Integrated Air Traffic Management (I-ATM)**

   Create an Integrated Air Traffic Management System that leverages new technologies and collaboration with the users, and implements solutions to traffic flow problems that are effectively integrated across time and air traffic control domains, to achieve the efficiency goals of the service provider and the users.

   To resolve problems due to lack of an Integrated ATM approach, the Task Force recommends that the following operational capabilities be implemented:

   - **Integrated CDM/TFM/ATC Solution to traffic flow problems** (47)
• Improved Collaborative ATM (C-ATM) Automation: C-ATM automation to negotiate user-preferred routes and alternative trajectories

Overarching Recommendations

In addition to the five operational capability recommendations and the two cross-cutting recommendations, the Task Force recommends that the FAA consider the following Overarching Recommendations deemed critical to the success of implementing the recommended operational capabilities:

1. Achieving Existing 3 and 5 Mile Separation Standards

Implement a more collaborative approach to change management and build on relationships by increasing transparency, including robust use of the controller Air Traffic Safety Action Program (ATSAP), creating a program using incentives for operations that perform at most efficient levels and, finally, building metrics that best evaluate the highest performing locations by measuring efficiency and safety in each location’s operation.

2. Incentivizing Equipage

Incentivize investments in NextGen capabilities by: 1) providing financial incentives either in the form of low-interest loans, direct subsidies of equipage, or other innovative mechanisms such as other user fees, fuel/excise taxes or income tax credits; 2) providing a timely, unambiguous set of processes (regulations, avionics certifications, operational procedures and approvals, engineering support, etc.) to assure the realization and timelines by NAS users of a sufficient level of operational benefits that justify investments in new avionics or new Flight Operations Centers technologies, i.e., to enable them to make the business case for those investments; and 3) establishing a National Airspace System (NAS) where system users who have aircraft with higher aircraft performance/capability levels get higher levels of service. This is referred to in the FAA’s Next Generation Implementation Plan as the Best-Equipped, Best-Served (BEBS) concept.
Recomendation for Prioritization of PBN Procedures

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

September 2013
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Appendix 3: Prioritization for New/Revised RAPT Category 2 (High) PBN Procedures .................. 13
Background/Introduction
The number of flight (arrival, departure, and approach) procedures that the FAA has implemented and then has to track and maintain numbers in the tens of thousands. The process of implementing, tracking and maintaining is exacerbated due to the mix of “classic” and “advanced” navigation equipage on aircraft that operate at any of the 5,000 plus public airports in the National Airspace System (NAS). Mixed equipage will exist for the foreseeable future and must be effectively considered in any planning. Also with the expanded utilization of Performance Based Navigation (PBN), it is not uncommon for a single airport to have a number of procedures to each runway end. For example, The FAA Digital Terminal Procedures web site lists over 115 pages of procedures (24 pages for arrivals, 63 for approaches and 29 for departures) for Hartsfield-Jackson Atlanta International Airport.

With this daunting number of existing procedures, and with the growing number of new ones requested to take advantage of aircraft equipage and new types of procedures, FAA Order 8260.43B Flight Procedures Management Program established the Regional Airspace and Procedures Team (RAPT) process. This order:

a. Describes how to request the development, amendment or cancellation of an Instrument Flight Procedure.
b. Defines the Federal Aviation Administration (FAA) process for coordinating, approving and prioritizing each request.
d. Addresses how the FAA ensures standard application of this guidance.

The RAPT process brought some organization to the process and incorporated a high-level three (3) tier priority scheme into the approval process. These tiers are:

a. CRITICAL - Procedures requiring amendment to correct a known flight safety deficiency, procedures based on newly installed or relocated navigational aids or airport runway addition/change and Mag Var at those locations affecting Cat II and III Instrument Landing System (ILS).
b. HIGH - Procedures at airports without existing instrument flight rules (IFR) approach, procedures providing flow improvement, more efficient routing, reduced communication, or reduced coordination or complexity, procedures that test or implement an FAA national initiative, procedural amendments or cancellations that provide substantial benefit but require minimal IFP development resources for completion.
c. Routine - All other procedures that do not provide any of the aforementioned benefits. RAPT may, on a case-by-case basis, elevate the priority of any procedure, as well as procedures developed by FAA for the Department of Defense (DOD).

NOTE: All PBN procedures are assigned prioritization level HIGH

PBN encompasses a set of enablers with a common underlying capability of constructing a flight path that is not constrained by the location of ground-based navigation aids.
Even though FAA Order 8260.43B brought some organization to the process, the current IFP request process lacks specific submission standardization and request traceability between the various RAPT teams and the requestors. This is accentuated by the fact that almost all new or revised procedure requests are classified as PBN and thus fall in the same HIGH prioritization category. Further refinement to this RAPT process, especially in the HIGH prioritization category, would enforce a single process among the various RAPT teams, including thorough evaluations, consistent approval rationalization and prioritization, traceability and documentation retention.

Just as important as priority for new and revised procedures, is the priority for the elimination of unneeded or minimally used procedures. Continued publication of unneeded procedures causes unnecessary expense for both the FAA and the user. The FAA has to maintain the procedure, including flight checks, obstacle evaluations, etc., and the user has to pay for inclusion in their aircraft navigation databases.

It is noted that automated initial screening and revised prioritization may not eliminate the need for human judgment to be applied to the screening process. Also detailed proponent input, including input from all interested parties, will be needed to provide perspective and agreement before final priority can be assigned.

**Executive Summary**

The Operational Capabilities Work Group (OCWG) found that FAA Order 8260.43B and the RAPT process, whose development was comprehensive and lengthy, has added structure and organization to the procedure request and revision prioritization process. There are however, insufficient standardized decision tools used by all the RAPT’s to ensure uniformity of the process nationwide. This process is only as good as the information provided by the proponent or FAA ATC facility and the collaborative process used in developing the new procedure or revision.

Although prioritization and development processes may seem to be two different and separate elements, the work group found they have a direct link. For example, how can the RAPT prioritize the implementation or revision if the proponent or FAA facility does not use a collaborative all-inclusive process to develop the procedure that will accomplish a specific operational goal or objective? Although the RAPT is not responsible for development of the procedure or inclusiveness of said development, these items must be known to the RAPT so that different procedures from different proponents can be prioritized.

FAA Order 8260.43B Flight Procedures Management Program and the high-level three (3) tier prioritization work of CRITICAL, HIGH, and ROUTINE works well to identify safety and critical issues, which of course warrant the highest priority. Since almost all PBN requests or revisions, which are a vast majority of the RAPT’s workload, fall into the HIGH category, further granularity is required to properly prioritize procedures within this category.

To provide this information for HIGH category granularity to the RAPT, the work group developed a two-phase checklist.
a. The first phase is termed as PRE-REQUISITE:
   1) What is the goal or aim of the procedure being proposed or amended?
   2) What metrics will be used to measure success?
   3) What are the implementation hurdles?
   4) Will PBN training, recommended in the NAC at their June 2013 meeting, be accomplished?
   5) Does the procedure require an EIS?
   6) Was the procedure developed in a collaborative process with appropriate representation of navigation equipment in simulator trials?
   7) Does the procedure have controller aids, such as similar fix names to other procedures, to promote application and usage?

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

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

Again if many of these benefits are not present, they are not disqualifiers. For example, at a general or business aviation airport, a new PBN procedure may simply provide access to an airport/runway that did not previously exist. This may be the only benefit but it is certainly a worthy benefit that the subjective RAPT process would consider.

Almost as important as prioritizing new and revised procedures, is the elimination of unneeded PBN procedures primarily at major airports. The FAA has a program that is reviewing legacy procedure elimination but has yet to eliminate unused PBN procedures, which incur cost for both the FAA and the user. Due to variances of airport configuration, need for redundancy, changing aircraft equipage, changing controller procedures, etc., the workgroup recommends the use of a collaborative process of all parties concerned. This can be done through user groups at the FAA ATC facility level, through OAPM projects or during major airspace changes. This will ensure all aspects of the PBN procedure are reviewed and that certain procedures, though unused, are retained so as to provide redundancy in the event of an ILS or NAVAID failure.

It should be noted, that one constant theme kept appearing in the workgroup’s research: implementation of a PBN procedure is a complicated process. Notwithstanding the skill and intent of the proponent, procedures must be developed and implemented in a collaborative manner to achieve success. The recent implementation in the Denver area involved more than two (2) dozen groups and organizations. Since it is integral to success, collaboration must be a key factor in the prioritization
Methodology and Structure of Analysis
The work group was comprised of a cross section of aviation expertise, from service provider, to operator, to research, to decision support tool developers.

The work group reviewed pertinent materials including:

a. FAA Order 8260.43B Flight Procedures Management Program
b. FAA NextGen Implementation plan
c. ICAO PBN Manual

The work group received FAA briefings from the following

c. Flight Standards Service, Mark Steinbicker, Manager Performance Based Flight Systems Branch, AFS-470

The work group reviewed recent PBN implementations such as Greener Skies in Seattle and the expansion of PBN procedures in the Denver Terminal area to ensure that broad scale PBN activities such as these had appropriate prioritization. Additionally the work group included members that had participated in the RAPT teams and benefitted from their experience.

Using this robust set of background materials, the OCWG collected individual member inputs and began to characterize these inputs into major benefit and implementation categories. These bins represent the primary attributes concerning implementation and utilization of PBN procedures. These categories are described in the next section, “Findings”. Following the categorization of the identified attributes, the OCWG analyzed the attributes in each category, and developed a checklist for prioritization of PBN procedures and revisions. This assessment was largely qualitative and formed by the operational expertise available from the OCWG membership.

The full roster of OCWG membership is included in Appendix 2. While the FAA did not participate in the deliberations, they provided subject matter expertise to the OCWG.

Findings
The work group found that FAA Order 8260.43B and the RAPT process, whose development was comprehensive and lengthy, has added significant structure and organization to the procedure request and revision prioritization process. Since the RAPT process is always going to be a subjective one and since allocation of resources through prioritization is a key component, the RAPT members must be...
knowledgeable and receive comprehensive training. The RAPT process, however, is only as good as the information provided by the proponent and/or the local FAA ATC facility and also the collaborative process used by the FAA facility and the proponent in developing the new procedure or revision. This proponent and/or FAA ATC facility information is a key step in determining priority for implementation of new procedures and needed revisions. In addition, there are no standardized decision tools used by all the RAPT’s to ensure uniformity of the process nationwide.

Although prioritization and development processes may seem to be two different and separate elements, the work group found they had a direct link. For example, how can the RAPT prioritize the implementation or revision if the proponent does not use an all-inclusive collaborative process to accomplish a specific operational goal or objective? Although the RAPT is not responsible for development of the procedure or inclusiveness of said development, these items must be known to the RAPT so that different procedures from different proponents can be prioritized.

FAA Order 8260.43B Flight Procedures Management Program and the high-level three (3) tier prioritization work of CRITICAL, HIGH, and ROUTINE works well to identify safety and critical issues, which of course warrant the highest priority. But the fact that almost all PBN requests or revisions, which are a vast majority of the RAPT’s workload, fall into the HIGH category, further granularity is needed to properly prioritize procedures within this category.

To provide this information for HIGH category granularity to the RAPT in order to determine prioritization, the work group developed a two-phase checklist (see Appendix 3). The checklist is not meant to be a disqualifier, but a means to determine priority.

The first part of the checklist contains the list of prerequisite actions. It defines the goal or aim of the procedure being proposed and sets forth a list of best practices that will enhance the development of the procedure including the parameters on how the procedure should be developed. The second part of the checklist identifies potential benefits of capacity, efficiency or access. This checklist asks for measurements that can determine the potential benefits once the procedure has been implemented.

The checklist information, will enable the RAPT to make a more informed decision on priority. Additionally, use of a checklist by all the RAPT’s should result in more uniform decision-making. It is understood that the RAPT is not the organization determining the information. That is the proponent’s and/or FAA’s task. But the information will not only enable the RAPT to prioritize, but also evaluate and critique the proposal, which should in turn provide information for future implementations.

Almost as important as prioritizing new and revised procedures, is the elimination of PBN procedures that lack value. The FAA has a program that is reviewing legacy procedures for possible elimination, but no process is in place as of yet to eliminate unused PBN procedures. These massive inventories of procedures, many of which are unnecessary, incur costs for both the FAA and the user. Due to variances of airport configuration, need for redundancy, changing aircraft equipage, changing controller procedures, etc. there needs to be a collaborative process of all parties concerned to make these critical decisions. This can be done at the local ATC facility level, through OAPM projects or other major
airspace changes. PBN procedures can provide redundancy in the event of an ILS or NAVAID failure but multiple PBN overlays of legacy approaches to the same runway may not be needed.

**Recommendations**

Based on the analysis of the OCWG, the work group recommends that the following actions be considered:

- The FAA continue to use FAA Order 8260.43B and the RAPT as a process to evaluate and prioritize proposed procedures. However, the process needs to have a better foundation with similar data to base its decisions. Utilization of a standardized checklist that identifies best practices and requires the proponent to identify objectives and goals for the procedures is a good place to start.

- Use the 2-part checklist found in Appendix 3 as a starting point for any proposed procedure. It will aid the proponent in developing the procedure to quantify the projected benefits. This checklist should become part of the RAPT process.

- The procedures development process should be “time bound.”

Any new procedure must have a demonstrated benefit. In order to reduce costs to all stakeholders, those procedures that only provide marginal benefits should be eliminated.

- The work group recommends that a collaborative process be developed involving all concerned parties. Due to the variances of airport configuration, need for redundancy, changing aircraft equipage, and changing controller procedures, these collaborative processes should be done on a local level. For example, leveraging the workgroups involved in the OAPM process or local FAA facility stakeholder meetings would be a good place to begin this process to collaborate on identifying procedures for removal.
Appendix 1: Tasking Letter

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 Metropoles (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
Chip Beall, Delta Air Lines, Inc.
Joe Bertapelle, JetBlue Airways

Tom Bock, Port Authority of New York & New Jersey – Co-Chair
Grady Boyce, Delta Air Lines
John Brandt, The MITRE Corporation
Chris Brinton, Mosaic ATM
Lee Brown, Landrum and Brown
Steve Brown, National Business Aviation Association
Lorne Cass, Delta Air Lines, Inc.
Mark Cato, Air Line Pilots Association
Perry Clausen, Southwest Airlines
Bill Cranor, JetBlue Airways
Brad Culbertson, Lockheed Martin Corporation
Mel Davis, Federal Aviation Administration
Steve Dickson, Delta Air Lines
Sylvan Drakes, U.S. Air Force
Brett Easler, U.S. Navy
Leo Eldredge, Federal Aviation Administration
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.
Attachment 9 Recommendation "Prioritization of PBN Procedures"

Angela Martin, Wood Consulting Services
David Medina, Federal Aviation Administration
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
Phil Santos, Fed Ex Express
Bill Sears, Beacon for Federal Aviation Administration (Observer)
Rico Short, Beacon for Federal Aviation Administration (Observer)
Molly Smith, Federal Aviation Administration (Observer)
Joseph Spelman, The MITRE Corporation
Mark Steinbicker, Federal Aviation Administration
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: Prioritization for New/Revised RAPT Category 2 (High) PBN Procedures

PRE-REQUISITE (to be completed by proponent and/or local FAA ATC facility):

List the goal or aim of the procedure being proposed and how attainment of the goal or aim achievement be measured (include current baseline for effective measurement)?

1. IMPLEMENTATION (check those that apply and complete info requested)

- ☐ What are the implementation hurdles?
- ☐ Procedure implementation has specific metrics of measurement identified to determine goals achievement
- ☐ Procedure design staff has completed PBN training (including TERPS expertise) prior to developing the proposed procedure
- ☐ Necessary controller decision support will be installed at time of procedure implementation
- ☐ Controllers will receive PBN training, including purpose/goals of the proposed procedure, prior to the time the procedure is to be implemented
- ☐ Nav data base will be made available for testing for at least 90% of the FMS box types presently serving target airport
- ☐ Implementation of procedure does not require an EIS

2. DESIGN (check those that apply and complete info requested)

- ☐ Procedure developed in a collaborative process with ATC, operators, airports and other interested parties
- ☐ Mitigates a relocated or decommissioned __________ NAVAID
- ☐ Mitigates the negative impact of airport construction _________________
- ☐ Number _________ of fix names of other current procedures at the same airport were utilized to the extent possible
- ☐ Procedure can be utilized in current operational environment without any additional automation or decision support
- ☐ Procedure resulted as part of the OAPM process
- ☐ Procedure provides vertical guidance where none existed to runway ________

NOTE: SAFETY is an understood priority and all applicable safety of flight procedures are in RAPT Category 1 and thus not included in this prioritization list
**BENEFIT** to be completed by proponent or local FAA ATC facility (check those that apply and complete info requested)

1. **CAPACITY**
   - □ Number ________ of operations impacted positively by the procedure
   - □ Increases arrival rate from ___________ to __________ per hour to the airport
   - □ Increases departure rate from ___________ to __________ per hour to the airport
   - □ Increase capacity of the metroplex by ___________ per hour
   - □ Conflicts between adjacent airports/airspace resolved ___________
     _______________________________________________________(list conflict resolved)
   - □ Allows approach capability to Runway __________ where none existed
   - □ Provides redundancy to Runway _________ at the airport
   - □ Reduces current lowest approach minima by ___________ feet

2. **EFFICIENCY**
   - □ Reduces approach flight time (after the IAF) by ___________ miles/minutes
   - □ Reduces terminal area flight time by __________ miles/minutes
   - □ Reduces delays from the current level of ______________ to ________________
   - □ Reduces operational environmental impact with more fuel efficient profiles or reduced vectoring/holding (please list)
     _______________________________________________________
     _______________________________________________________
   - □ The need for circling procedures eliminated
Approved by the NextGen Advisory Committee September 2013

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

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

September 2013
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Attachment 10 - Recommendation "Metroplex (OAPM) Criteria"
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; and

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; and

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

In its tasking letter to the NAC, the FAA asks for industry’s assistance in validating criteria for selection and prioritization of OAPM sites. Task 3 is further defined as follows:

- “Review and revalidate 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.”

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OAPM: Optimization of Airspace and Procedures in the Metroplex is the FAA’s effort initiated in 2010 to work with the aviation community to optimize airspace and procedures and provide efficiency across a metroplex. A metroplex is defined as a large geographic area that contains multiple airports and serves a diverse set of customers and large population base focusing on implementation of PBN procedures with fuel efficient profiles and shorter track distances, and minor airspace changes to enable these procedures. OAPM has a strict scope constraint that all improvements are anticipated to be implemented within a three-year life cycle. The key driver to this schedule is that improvements must be contained within the scope of a Categorical Exclusion (CATEX) or an Environmental Assessment (EA). The program was developed based on recommendations from RTCA Task Force 5 to address the needs of 21 metropolises across the NAS.
This report documents the findings and recommendations of the OCWG concerning this tasking. The report includes findings and recommendations concerning the scope of future renditions of OAPM, future OAPM sites, and criteria for prioritization of those sites.

Executive Summary
The OCWG began its deliberations on June 11, 2013 with a discussion with the FAA’s Director for Airspace Services, Dennis Roberts, to clarify the tasking and FAA’s request. After this discussion, the OCWG broke its efforts into three subtasks: defining the scope of future OAPM efforts, identifying how proposed prioritization criteria should be used, and proposing a set of prioritization criteria for future OAPM efforts.

Materials utilized by the OCWG for this task included:

- List of the original objective criteria and subjective considerations used by the FAA in the prioritization of the original 21 OAPM sites. (Presentation by the FAA’s Vice President of Mission Support, Elizabeth Ray to the ICWG in February 2011);
- List of metroplexes and criteria used to prioritize metroplexes for the ICWG. (ICWG Report to NAC in January 2012);
- The FAA’s NextGen Implementation Plan published in June 2013;
- A briefing on the Time Based Flow Management Program deliverables and schedules.

With respect to the “Scope of Future Applications of OAPM,” future applications of OAPM (referred to as OAPM 2) should also address capacity and throughput by leveraging separation and procedural improvements (e.g. Wake Recategorization, WTMD) and PBN-enabled procedures (e.g. ELSO). It is assumed that OAPM 2 will start subsequent to the completion of OAPM 1 (planned for 2017). Therefore, OAPM 2 should leverage integration opportunities with surface improvements (2017+) and TBFM improvements (2014+). OAPM 2 should also leverage the new NextGen capabilities to build on OAPM 1, fill performance gaps that could not be addressed during OAPM 1, and fix operational issues that may remain after OAPM 1. The OCWG felt strongly that the three-year project timeframe is still very important, and that the OAPM scope should still be constrained to recommendations that can be approved via CATEX or EA.

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2 OAPM 2: Refers to the proposed second iteration of OAPM that would start at the completion of OAPM 1 implementation. The OCWG recommends that OAPM 2 remains an airspace and procedures effort, but will build on OAPM 1 to affect capacity as well as efficiency by including more advanced PBN capabilities (e.g. ELSO) and by leveraging other mid-term NextGen capabilities (e.g. Wake Recat). The OAPM 2 timeline should remain consistent with a three-year life cycle and associated environmental constraints. The scope of OAPM 2 should include all 21 metroplexes, including those not addressed in OAPM 1. The prioritization of the implementation waterfall should be based on a new set of 7 criteria, and take into account sites with new NextGen capabilities.

3 OAPM 1: Refers to the original effort that initiated in 2010, the scope of OAPM 1 covers 16 of the 21 metroplexes, with the implementation waterfall determined by a set of 19 quantitative criteria and several qualitative factors. OAPM 1 is currently planned to be complete in the 2017 timeframe.
With respect to the “Future OAPM Sites and Use of Criteria,” the OCWG feels that application of criteria to the remaining OAPM 1 sites does not make sense. However, the group believes that it is important to start the “fixing” portion of OAPM 2. Specifically, if the completion of OAPM 1 slows the start of OAPM 2, then the remaining four sites should be skipped and considered for the next round. Similarly, if a site was not included in OAPM 1 for qualitative reasons, and had a higher priority than one of the remaining sites, the FAA should consider including that site in OAPM 1. Based on this assessment, the Las Vegas Metroplex should be reconsidered. The OCWG discussed adding new metroplexes to OAPM 2. The group reviewed the criteria used to identify the 21 OAPM metroplexes, as well as the 27 metroplexes proposed and assessed by the ICWG in 2011 and 2012. The group agreed with the criteria used to define the original 21 metroplexes and determined that adding new sites or metroplexes is not needed.
With respect to the “Proposed Criteria,” the OCWG completed a comprehensive review of each of the nineteen criteria used for OAPM 1. The following seven criteria are the result of the deliberations:

- Time at Level Flight (from Top of Descent to Runway),
- Track Mile Efficiency,
- Average Scheduled Gate Arrival Delay,
- Average Taxi-Out Delay (from unimpeded times),
- Total Metroplex Operations,
- Number of Level-Offs, and
- Percent Usage of PBN Procedures.

While objective, quantitative criteria should be used for the prioritization of OAPM 2 sites, subjective factors should also play a factor in site prioritization. Primarily, priority should be given to sites or metroplexes where key NextGen capabilities have been implemented; for example, leveraging surface improvements (e.g. Memphis) and TBFM improvements (e.g. Denver).

The group strongly believes that these seven criteria are not all equal and that a weighting system should be used to reflect the various levels of importance of each of these criteria. The OCWG believes that the criteria should be weighted by the following categories:

- Highest priority should be given to the proven benefits mechanisms of OAPM: Time at Level Flight and Track Mile Efficiency;
- Next priority should go to other benefits categories: Average Scheduled Gate Arrival Delay, Average Scheduled Airport Taxi-Out Delay, and Total Metroplex Operations; and
- Lowest priority should be given to the remaining criteria.

The OCWG recommends that the following actions be considered:

- The FAA should maintain or reduce the three-year life cycle for OAPM projects;
- The FAA should not delay the start of the second round of the OAPM program. If the resources associated with final four OAPM 1 sites jeopardizes the planned start of OAPM 2, work at the last four sites should be not be started and those sites should be included in the prioritization for OAPM 2;
- The FAA should utilize the seven identified quantitative criteria in prioritization of future OAPM sites. As with the original OAPM sites, qualitative considerations, such as ability to leverage NextGen capabilities, should also be used in prioritization of the OAPM 2 sites; and
The FAA should apply a weighting system to the seven criteria that emphasizes the potential benefits of OAPM.

**Methodology and Structure of Analysis**

In June 2013, the OCWG delivered its report “Recommendation for Increased Utilization of Performance Based Navigation (PBN) in the National Airspace System (NAS)” to the NAC, which documented the results of Task 1. Following the acceptance of the report by the NAC, the NACSC tasked the OCWG with completion of the two remaining tasks by the next NAC meeting in September 2013. In order to complete both tasks in the allotted time, the OCWG split into two sub-workgroups. The OAPM Criteria Sub-workgroup focused on Task 3 and began its deliberations on June 11, 2013, with a discussion with the FAA’s Director for Airspace Services, Dennis Roberts, to clarify the tasking and FAA’s request.

After this discussion, the OCWG broke its efforts into three subtasks:

- **Define the scope of future OAPM efforts:** Before criteria could be proposed, the group required an understanding of the scope of future OAPM efforts. The group was briefed on the current scope of OAPM projects that are planned for completion by 2017. With this background, the group deliberations included discussion of performance areas OAPM should target and the timelines associated with OAPM.

- **Identify how proposed prioritization criteria should be used:** On the June 11 teleconference with Mr. Roberts, it was explained that the program was looking for input on prioritizing remaining locations from the list of first OAPM sites, revisiting sites where OAPM teams have already been deployed or PBN has been recently deployed, and inclusion of new sites not considered under the first installation of OAPM. For simplicity, the current (and first) installation of OAPM will be referred to as “OAPM 1.” Future OAPM efforts are referred to as “OAPM 2.”

- **Propose a set of prioritization criteria for future OAPM efforts:** Using the results of the first two subtasks, the group reviewed the set of criteria previously used by the FAA in the fall of 2010. The group assessed the viability of each of the previously used criteria and proposed adjustments, additions, and deletions.

The other materials utilized by the OCWG were taken from the OCWG’s predecessor workgroups, the Integrated Capabilities Work Group (ICWG) and the Airspace and Procedures Work Group (APWG), and included:

- **List of the original objective criteria and subjective considerations used by the FAA in the prioritization of the original 21 OAPM sites.** (Presentation by the FAA’s Vice President of Mission Support, Elizabeth Ray to the ICWG in February 2011), and

- **List of metroplexes and criteria used to prioritize metroplexes for the ICWG.** (ICWG Report to NAC in January 2012).
The OCWG utilized information on NextGen initiatives available from the FAA’s NextGen Implementation Plan published in June 2013. The group requested information on program schedules and received a briefing on the Time Based Flow Management Program from the FAA’s Program Manager, Rebecca Guy, on July 9, 2013.

To successfully complete these subtasks, an appropriate representation of stakeholders interested in PBN procedure implementation and utilization was engaged in the work. The full roster of OCWG membership is included Appendix 2, with the OAPM Criteria Sub-workgroup members highlighted. While the FAA did not participate in the deliberations, they provided subject matter expertise to the OCWG.

Findings

Scope of Future Applications of OAPM

The primary focus of the procedural development from OAPM 1 focused on efficiency improvements, primarily fuel savings from Optimized Profile Descents (OPDs) and reduced flying distances. Projected benefits from OAPM designs are associated with efficiencies from better vertical profiles and from shorter lateral flight distances. With respect to departures, a number of sites adjusted departure procedures and saved lateral track miles.

OAPM 2 should also address capacity and throughput by leveraging separation and procedural improvements (e.g. Wake Recategorization, WTMD) and PBN-enabled procedures (e.g. ELSO). It is assumed that OAPM 2 will start subsequent to the completion of OAPM 1 (planned for 2017). Therefore, OAPM 2 should leverage integration opportunities with surface improvements (2017+) and TBFM improvements (2014+). OAPM 2 should also leverage the new NextGen capabilities to build on OAPM 1, fill performance gaps that could not be addressed during OAPM 1, and fix operational issues that may remain after OAPM 1.

OAPM 1 was not executed at all 21 metroplexes. OAPM 2 should address any issues associated with the lack of application of OAPM during the first phase at those excluded sites (i.e. New York/Philadelphia, Las Vegas, Seattle, Denver, or Minneapolis).

OAPM 1 has a strict scope constraint that all improvements must be implemented within a three-year life cycle. The key driver to this schedule is that improvements must be contained within the scope of a Categorical Exclusion (CATEX) or an Environmental Assessment (EA). The group felt strongly that the three-year project timeframe is still very important, and that the OAPM scope should still be constrained to recommendations that can be approved via CATEX or EA.

Related to the findings for Task 2 (from the FAA Tasking Letter) regarding elimination of procedures, OAPM teams will include local operational expertise, both operator and ATC. These teams should be considered an option to review and propose procedures for elimination. This local expertise
requirement has been identified in the companion OCWG deliverable “Recommendation for Prioritization of New, Revision and Elimination of PBN Procedures.”

**Future OAPM Sites and Use of Criteria**

At the June teleconference with Mr. Roberts, three applications for the criteria were identified: prioritizing remaining locations from the list of OAPM 1 sites, revisiting sites with recent PBN or OAPM implementations, and including new sites not considered under OAPM 1.

The group feels that application of criteria to the remaining OAPM 1 sites does not make sense because there are only four remaining sites and it appears that the OAPM program office is already developing a roll-out schedule for the remaining Study Teams. However, the group believes that it is important to start the “fixing” portion of OAPM 2 as soon as possible. Information from OAPM Program Schedules indicate that this could be as early as 2015 (after the completion of OAPM 1 at the first metroplexes) and as late as 2017 (after completion of the remaining OAPM 1 metroplexes). Specifically, if the resources needed to start, execute or complete OAPM 1 slows the start of OAPM 2, then the remaining four sites should be skipped and considered for the next round. Similarly, if a site was not included in OAPM 1 for qualitative reasons, and had a higher priority than one of the remaining sites, the FAA should consider including that site in OAPM 1. Based on this assessment, the Las Vegas Metroplex should be reconsidered⁴.

The OCWG discussed adding new metroplexes to OAPM 2. The group reviewed the criteria used to identify the 21 OAPM metroplexes, as well as the 27 metroplexes proposed and assessed by the ICWG in 2011 and 2012. The group agreed with the criteria used to define the original 21 metroplexes and determined that adding new sites or metroplexes is not needed, noting that non-OAPM PBN procedure development is still available and applicable to the other metroplexes and airports⁵. It should be noted that a minority opinion supported adding an additional metroplex that was in the ICWG list, the Kentucky-Ohio Metroplex that includes Louisville and Cincinnati airports.

**Proposed Criteria**

To develop the recommended set of criteria for the prioritization of the OAPM 2 metroplexes, the group started with the nineteen original OAPM criteria. The OCWG completed a comprehensive review of each criterion. While objective, quantitative criteria should be used for the prioritization of OAPM 2 sites, subjective factors should also play a factor in site prioritization. Primarily, priority should be given to sites or metroplexes where key NextGen capabilities have been implemented; for example, leveraging surface improvements (e.g. Memphis) and TBFM improvements (e.g. Denver). The table in Appendix 3 explains the group’s deliberations.

The following seven criteria are the result of the deliberations:

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⁴ On Page 12 of the February 9, 2011 briefing provided to ICWG by Ms. Ray, the Las Vegas Metroplex ranks higher than all but one of the remaining OAPM 1 metroplexes.

⁵ From the same briefing, the 21 metroplexes are identified as Atlanta, Boston, Charlotte, Chicago, Cleveland, Dallas-Ft. Worth, DC Metro, Denver, Detroit, Houston, Las Vegas Valley, South California, Memphis, Minneapolis-St. Paul, New York/Philadelphia, North California, Orlando, Phoenix, Seattle, South Florida, and Tampa.
• **Time at Level Flight (from Top of Descent to Runway):** One of the primary benefits from OAPM has been through more efficient flight arrival profiles. If a site has a higher amount of time at level flight (from top of descent to runway), then it has a higher potential to benefit from OAPM.

• **Track Mile Efficiency:** One of the primary benefits from OAPM has been through the planning and development of routes and procedures that reduced track mile flying distances. This is defined as the difference between an actual flight distance and an optimal (or shortest) path distance between the airport and a point in the transition airspace (e.g. 100nmi from the center of the metplex). This can apply to both arrivals and departures. Historical, aggregated flight track data could be evaluated against the notional optimal flight track. The more the historically aggregated data deviates from the optimal track the higher the weighting should be for optimizing that route. Figure 1 shows an example of this criterion for an arrival. The higher this value, the higher the potential to benefit from OAPM.

• **Average Scheduled Gate Arrival Delay:** Improved arrival throughput is a desired benefit of OAPM 2. Arrival delay was identified as an indicator of the need for improved arrival throughput. Sites that have higher arrival delays have a higher need for OAPM.

• **Average Taxi-Out Delay (from unimpeded times):** Improved departure throughput is a desired benefit of OAPM 2 through an expanded scope and use of associated tools beyond OAPM 1. Taxi-out delay was identified as an indicator of the need for improved departure throughput, as departure delay could be overly influenced by factors outside of OAPM’s scope. Sites that have higher taxi-out delays have a higher need for OAPM.

• **Total Metroplex Operations:** Higher operations counts indicate the potential for higher benefits pool.

• **Number of Level-Offs:** Level-offs in procedures are assumed to be there to better manage flows. The higher number of level offs was considered an indicator of higher complexity and therefore lower priority for the metplex.

• **Percent Usage of PBN Procedures**: OAPM 2 may include adjusting procedures in a metplex either previously published as part of OAPM 1 or other legacy PBN processes. If there is a high percentage of procedures that are published but not used, then that may indicate a higher need for OAPM 2.

Figure 1: Illustration of Track Mile Efficiency

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6 Issues concerning evaluating, revising and eliminating current procedures is addressed in a separate OCWG Recommendation: *Recommendation for Prioritization of PBN Procedures*. 

**Recommendations for Future Use of Optimization of Airspace and Procedures in the Metroplex (OAPM) Criteria**
Objective, quantitative criteria should be used for the prioritization of OAPM 2 sites. But as with the first application of OAPM, subjective factors should also play a factor in site prioritization. Primarily, priority should be given to sites or metroplexes where key NextGen capabilities have been implemented; for example, leveraging surface improvements (e.g. Memphis) and TBFM improvements (e.g. Denver).

The group strongly believes that these seven criteria are not all equal and that a weighting system should be used to reflect the various levels of importance of each of these criteria. Using notional data, the group evaluated various weighting schemes and while a specific set of weights is not recommended, the OCWG believes that the criteria should be weighted by the following categories:

- Highest priority should be given to the proven benefits mechanisms of OAPM: Time at Level Flight and Track Mile Efficiency;
- Next priority should go to other benefits categories: Average Scheduled Gate Arrival Delay, Average Scheduled Airport Taxi-Out Delay, and Total Metroplex Operations; and
- Lowest priority should be given to the remaining criteria.

**Recommendations**

Based on the analysis of the OAPM Criteria group, the OCWG recommends that the following actions be considered:

- The FAA should maintain or reduce the three-year life cycle for OAPM projects.
• The FAA should use OAPM 2 to leverage the new NextGen capabilities to build on OAPM 1, leverage integration opportunities with improved surface and TBFM capabilities, fill performance gaps that could not be addressed during OAPM 1 and fix operational issues that may remain after OAPM 1.

• The FAA should not delay the start of the second round of the OAPM program. If the resources associated with the final four OAPM 1 sites jeopardizes the planned start of OAPM 2, work at the last four sites should be not be started and those sites should be included in the prioritization for OAPM 2.

• The FAA should utilize the seven identified quantitative criteria in prioritization of future OAPM sites. As with the original OAPM sites, qualitative considerations, such as ability to leverage NextGen capabilities, should also be used in prioritization of the OAPM 2 sites.

• The FAA should apply a weighting system to the seven criteria that emphasizes the potential benefits of OAPM.

• With respect to the “Scope of Future Applications of OAPM,” future applications of OAPM (referred to as OAPM 2) will start subsequent to the completion of OAPM 1 (planned for 2017). OAPM 2 should leverage integration opportunities with surface improvements (2017+) and TBFM improvements (2014+). OAPM 2 should also leverage the new NextGen capabilities to build on OAPM 1, fill performance gaps that could not be addressed during OAPM 1, and fix operational issues that may remain after OAPM 1.

The OCWG also notes that there are a number of remaining issues around the scope of OAPM 2 and these issues should be addressed and reviewed further prior to the start of the OAPM 2 Study Teams. The OCWG believes that it is within the work span of the group to develop recommendations around the scope of OAPM 2.
Appendix 1: Tasking Letter

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
*John Brandt, MITRE Corporation
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
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
Recommendations for Future Use of Optimization of Airspace and Procedures in the Metroplex (OAPM) Criteria

*Bill Murphy, International Air Transport Association – Co-Chair
David Newton, Southwest Airlines
*Mark O'Neil, National Air Traffic Controllers Association
Chris Oswald, Airports Council International - North America
Wilson Riggan, Allied Pilots Association
*David Rinehart, Sensis Corporation
*Mike Sammartino, Metron Aviation
*Phil Santos, FedEx Express
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

* Designates members of the OCWG OAPM Criteria Sub-workgroup
## Appendix 3: Criteria Review Table

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Proposed Action</th>
<th>Rationale/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Scheduled Gate Arrival Delay</td>
<td>Keep</td>
<td>OAPM 2 should target capacity/throughput improvements; this metric is indicator of where capacity/throughput benefit is needed</td>
</tr>
<tr>
<td>Average Scheduled Airport Departure Delay</td>
<td>Replace with Average Taxi-Out Delay</td>
<td>OAPM 2 should target departure benefits, but overall departure delay is affected by too many other factors; group explored total taxi-out time and change in taxi-out time, but infrastructure plays too much of a factor in those metrics</td>
</tr>
<tr>
<td>OPSNET Delays as Percent of Operations</td>
<td>Delete</td>
<td>Duplicate measure</td>
</tr>
<tr>
<td>ASPM % Departures w Delay 1+ hrs</td>
<td>Delete</td>
<td>OAPM will not address excessive departure delays</td>
</tr>
<tr>
<td>Average Daily OPSNET Operations</td>
<td>Delete</td>
<td>Duplicate measure</td>
</tr>
<tr>
<td>Total Ops 2005-2009 ATADS</td>
<td>Keep</td>
<td>High operations counts increases overall benefits pool</td>
</tr>
<tr>
<td>% Capacity Used</td>
<td>Delete</td>
<td>OAPM will not address capacity utilization</td>
</tr>
<tr>
<td>OPD Complexity</td>
<td>Replace with Number of Level Offs</td>
<td>More transparent metric than the index; number of level offs was a component of that index</td>
</tr>
<tr>
<td>OPD Benefit</td>
<td>Replace with Time at Level Flight</td>
<td>More transparent metric than the index</td>
</tr>
<tr>
<td>Taxi In Time % Change</td>
<td>Delete</td>
<td>OAPM will not address taxi in times</td>
</tr>
<tr>
<td>Block Time % Change</td>
<td>Delete</td>
<td>OAPM will only address a small part of block time</td>
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<tr>
<td>Taxi Out Time % Change</td>
<td>Delete</td>
<td>See discussion of taxi-out delay above</td>
</tr>
<tr>
<td>Median Taxi Out Time Change (AM push)</td>
<td>Delete</td>
<td>Confusing metric</td>
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<td>Total Departures between Metro Pairs</td>
<td>Delete</td>
<td>Connectivity should not influence OAPM prioritization</td>
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<tr>
<td>Metro Connectivity Index</td>
<td>Delete</td>
<td>Connectivity should not influence OAPM prioritization</td>
</tr>
<tr>
<td>Flight Time % Increase between Metro Pairs</td>
<td>Delete</td>
<td>Connectivity should not influence OAPM prioritization</td>
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<tr>
<td>PBN Equipage (lowest in Metro)</td>
<td>Delete</td>
<td>Site readiness is less of a concern for OAPM 2 timeframe</td>
</tr>
<tr>
<td>Possible 3NM Coverage</td>
<td>Delete</td>
<td>Site readiness is less of a concern for OAPM 2 timeframe</td>
</tr>
<tr>
<td>RNP-0.3 with RF % of Ops (highest in Metro)</td>
<td>Delete</td>
<td>Site readiness is less of a concern for OAPM 2 timeframe</td>
</tr>
<tr>
<td>Track Mile Efficiency</td>
<td>Add</td>
<td>Largest benefit from OAPM is associated with reduction of lateral flight distances</td>
</tr>
<tr>
<td>% PBN Utilization</td>
<td>Add</td>
<td>OAPM 2 will include revisiting sites where PBN has been implemented; an indicator of use is needed</td>
</tr>
</tbody>
</table>
### Appendix 4: Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>APWG</td>
<td>Airspace and Procedures Work Group</td>
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<tr>
<td>ATC</td>
<td>Air Traffic Control</td>
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<tr>
<td>CATEX</td>
<td>Categorical Exclusion</td>
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<td>EA</td>
<td>Environmental Assessment</td>
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<td>ELSO</td>
<td>Equivalent Lateral Spacing Operations</td>
</tr>
<tr>
<td>FAA</td>
<td>Federal Aviation Administration</td>
</tr>
<tr>
<td>ICWG</td>
<td>Integrated Capability Work Group</td>
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<td>NAC</td>
<td>NextGen Advisory Committee</td>
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<td>NACSC</td>
<td>NextGen Advisory Committee Sub-Committee</td>
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<td>NAS</td>
<td>National Airspace System</td>
</tr>
<tr>
<td>NextGen</td>
<td>Next Generation Transportation System</td>
</tr>
<tr>
<td>OAPM</td>
<td>Optimization of Airspace and Procedures in the Metroplex</td>
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<tr>
<td>OCWG</td>
<td>Operational Capabilities Work Group</td>
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<td>OPD</td>
<td>Optimal Profile Descent</td>
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<td>PBN</td>
<td>Performance Based Navigation</td>
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<tr>
<td>RNAV</td>
<td>Area Navigation</td>
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<td>RNP AR</td>
<td>Required Navigation Performance Authorization Required</td>
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<tr>
<td>RNP</td>
<td>Required Navigation Performance</td>
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<tr>
<td>TBFM</td>
<td>Time Based Flow Management</td>
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<tr>
<td>TMA</td>
<td>Traffic Management Advisor</td>
</tr>
<tr>
<td>WTMD</td>
<td>Wake Turbulence Mitigation for Departure</td>
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