

February 5, 2015

## **Meeting Summary, February 5, 2015**

### **Tactical Operations Committee (TOC)**

The eighth meeting of the Tactical Operations Committee (TOC), held on February 5, 2015, convened at 9:00 a.m. The meeting discussions are summarized below. The following attachments are referenced:

Attachment 1 – List of Attendees

Attachment 2 – Presentations for the Committee (containing detailed content of the meeting)

Attachment 3 – Summary of the November 20, 2014 TOC Meeting

Attachment 4 – NOTAM Search Phase 1 Implementation

Attachment 5 – FAA Response to VOR MON Recommendation on Outreach and Modifications

Attachment 6 – Recommendation on VOR MON Waterfall and PBN Route Concept of Operations

Attachment 7 – Tasking Letter for GPS Adjacent Band Compatibility Task

Attachment 8 – Terms of Reference for GPS Adjacent Band Compatibility Task

Attachment 9 – Tasking Letter for National Procedure Assessment Initiative Task

### **Welcome and Introductions**

Committee Co-Chairs, Mr. Jim Bowman, Vice President of Flight Operations at FedEx Express, and Mr. Dale Wright, Director of Safety and Technology at NATCA, called the meeting to order and welcomed the TOC members and others in attendance. All TOC members and attendees from the public were asked to introduce themselves (TOC members and General Public Attendees are identified in Attachment 1).

Mr. Bowman and Mr. Wright reviewed the agenda and began the proceedings of the meeting.

### **Designated Federal Official Statement**

Ms. Elizabeth “Lynn” Ray, Vice President of Mission Support for the Air Traffic Organization (ATO), and the Designated Federal Official of the TOC, read the Federal Advisory Committee Act notice governing the open meeting.

### **Approval of November 20, 2014 Meeting Summary**

The Chairs asked for and received approval of the written Summary for the November 20, 2014 meeting (Attachment 3).

## **FAA Report**

### Organizational Changes

Ms. Ray then provided the FAA Report. She first addressed a series of organizational changes that had recently taken place in the FAA's Air Traffic Organization (ATO). Ms. Ray noted that both the Vice President and Deputy in Management Services had recently retired and that TOC Member Nancy Kalinowski would be stepping in as the Acting Vice President of Management Services. Dan Smiley, previously Deputy Vice President of System Operations, would become Acting Vice President in Kalinowski's place and also take the position on the TOC. Ms. Ray also said that the Director of System Operations position was open.

Within Mission Support Services, Ms. Ray informed the TOC that previous Director of Airspace Services, Dennis Roberts, was moving to a new position within the FAA and that the Directorate was open. Finally, she mentioned that Aviation Information Management (AIM) and Aeronav were merging into a new Directorate, Aeronav Services (AJV-5).

### Metroplex

Ms. Ray then discussed the status of Metroplex activities in the NAS. She informed the TOC that there were eleven active projects in various stages of maturity. Most current efforts are being pursued in a staged manner and the recent implementations of Houston and North Texas Metroplexes were the only "big bang" projects, intended to shift to many new procedures at one time.

Ms. Ray noted that Houston was currently in post implementation and a report was due out approximately one month later. She said that FAA, MITRE and operators were working to reconcile and analyze a significant amount of operational data. All project were scheduled out into 2017 with post implementation efforts into 2018. One TOC member requested if there was a requirement to utilize metering as Metroplex implementations go into place. Ms. Ray answered that the work of Metroplex and Time Based Flow Metering (TBFM) were tied together.

Finally, she provided a series of specific updates on Northern California, Southern California, Phoenix, Denver, Cleveland, Detroit, Washington DC, Charlotte, Atlanta and South Florida.

### Performance Based Navigation (PBN)

Ms. Ray then spoke about PBN. She mentioned that the TOC may expect task requests in PBN in the future but that for now such efforts were within the auspices of the NextGen Advisory Committee (NAC). She said the FAA was at a "tipping point" in the numbers of procedures but dealing with challenges on utilization of the existing PBN procedures. The overarching question the FAA is considering is what it will take to evolve the NAS to where the primary procedure advertised, for example, on the Automatic Terminal Information Service (ATIS) System is the PBN procedure. She

noted that there is still significant work required for supporting Decision Support Tools (DSTs) as well as environmental challenges.

### **NOTAM Improvement Panel Recommendation on Phase 1 Implementation of NOTAM Search**

Mr. Mark Cardwell, FedEx Express and Co-Chair of the NOTAM Task Group of the TOC, briefed the TOC on the NOTAM Task Group's recommendation regarding the Phase 1 Implementation of NOTAM Search. The FAA implemented the first phase of the NOTAM Search website in November 2014 and requested the NOTAM Improvement Panel to provide feedback on the implementation. The Task Group met in December 2014 and drafted the recommendation titled "NOTAM Search Phase 1 Implementation." This is included as Attachment 4 to this summary.

Mr. Cardwell described that the group's feedback focused on three primary categories:

1. Broad considerations for new functionality
2. Input on user interface
3. Specific fixes for website

For the first category, Broad considerations for new functionality, the recommendation offered a set of specific recommendations. The group recommended that NOTAM Search include functionality for the following:

- Select VFR vs IFR flight option
- How to train users beyond user guide; videos?
- Downloading content to use/sort/filter while offline
- Any mobile version replicate functionality of [www.faa.gov/mobile](http://www.faa.gov/mobile)
- Question of whether printing should be standard sequence or based on user sorting

Next, Mr. Cardwell reviewed a series of requests regarding the User Interface for NOTAM Search. The full set of recommendations is included in Attachment 4. Some examples include:

- Space and not comma separated route string
- Placement of specific labels
- Providing description of categories
- Clear guidance of what is/is not accepted in the route string (such as SIDs/STARs not accepted)

Finally, Mr. Cardwell discussed the Task Group's recommendations for specific fixes to the NOTAM Search website. Again, the full set is included in Attachment 4. Some example fixes include:

- Change specific icon that is confusing
- Including specific headers in PDF export
- Changing label "Help" to state "User Guide"
- Fixing date format differences between browsers
- Clarifying UTC in the time filter

Mr. Cardwell concluded by informing the TOC that the next implementation phase of NOTAM Search was expected in March 2015 and the Task Group would meet again after that time.

**Committee Action:** The Committee agreed by consensus to approve the NOTAM Recommendations on NOTAM Search Phase 1 Implementation (Attachment 4).

### **FedEx Briefing on NOTAM Filtering and Sorting**

Mr. Cardwell of FedEx Express provided a second briefing, this one focusing on a NOTAM improvement experience FedEx had over the previous two years. Mr. Cardwell's briefing is included in Attachment 2. He relayed that FedEx had learned through its experience that sorting NOTAMs by runway was an effective method to manage the volume of NOTAMs and make the appropriate set of NOTAMs accessible to a pilot at the right time.

### **FAA Response to VOR MON Recommendation on Outreach and Modifications**

Mr. Dale Courtney, FAA's National Resource Engineer for Navigation, presented the FAA's response to the VOR MON Recommendation on Outreach and Modifications. This is included as Attachment 5. Mr. Courtney said that prior to the Program being formalized as policy, the FAA would look for opportunities to announce the policy. Generally, the FAA stated that it agreed with the recommendations of the VOR MON Task Group. One TOC member asked when the information on the proposed VORs scheduled for shutdown would be published. The member noted that without any list published from the FAA, lists of VORs are being generated by unknown sources and communities are beginning "calls to action" to fight potential shut down. This underscored the need for the FAA to provide the list as soon as practical.

### **VOR MON Recommendation on VOR MON Waterfall and PBN Route Concept of Operations**

The Co-Chairs of the VOR MON Task Group, Mr. Bob Lamond (NBAA) and Mr. Don Dillman (FedEx Express) next presented a recommendation on the VOR MON. The recommendation addressed the VOR MON Waterfall and PBN Route Concept of Operations (included as Attachment 6). Mr. Lamond and Mr. Dillman began by informing the TOC that the target for the VOR MON had been scaled back recently. While the original plans were to decommission 500 VORs by 2020, the plan now was to decommission about 100 VORs by 2020 and an additional 200 by 2025. The Final Investment Decision (FID) for the VOR MON Phase 1 for the first 100 VORs was expected in September 2015.

Next, Mr. Lamond and Mr. Dillman informed the TOC that the current recommendation addresses four areas:

- Waterfall for VOR MON
- Publishing List of Phase 1 VORs
- Feedback on PBN Route CONOPs

- Relationship between VOR MON and PBN Route CONOPs

#### Waterfall for VOR MON

The recommendation suggested that since the original goal of decommissioning 500 VORs by 2020 had been scaled back, the need for TOC input on the Waterfall had been greatly reduced. The VOR MON Task Group noted that the FAA's stated criteria for selecting Phase 1 VORs would be for those VORs with the least impact on route structure of the NAS. The Task Group supported this approach.

#### Recommendations on Publishing List of Phase 1 VORs

Next, the Co-Chairs noted that funding to decommission the first 100 VORs was expected to be approved in September and received in October. The VOR MON Task Group re-emphasized previous recommendations to allow public to see proposed list of VORs as early as possible. Mr. Lamond and Mr. Dillman quoted the September 2014 Task Group recommendation which stated:

*"The Task Group strongly recommends that the FAA publish a list of all VORs planned for decommissioning at the beginning of the notification process. It is paramount to publish the full list upfront so there are no surprises to the public later in the process about which VORs are being shut down."*

The recommendation suggested that not providing advance notification of full list of Phase 1 VORs risked a negative public response.

#### Recommendations on PBN Route Concept of Operations

The VOR MON Task Group gave high commendation for PBN Route Concept of Operations and suggested that, if implemented, it would deliver many of the anticipated operational benefits suggested in the study. The group recommended the FAA to aggressively implement the CONOPs but also recognized it was currently unfunded. The report recommended the FAA address this to ensure a robust national PBN route network is developed.

The Task Group offered no specific input on routes in the future network, instead noting that development of such a network would require multiple regional/national Work Groups.

#### Recommendation on Relationship Between VOR MON and PBN CONOPs

Mr. Lamond and Mr. Dillman concluded with the recommendation that the PBN Route Structure should be developed based on operational needs of NAS and not constrained by the VOR network of the past. The FAA should not link VOR MON and future PBN Route Structure. They did note that there would some required integration between the VOR MON and the PBN Route structure; this would be synchronizing decommissioning of VORs and implementing PBN routes to backfill routes impacted by VORs. Finally, they informed the TOC that failing to fund the PBN Route effort suggested the ultimate route structure would be incremental effort to plug gaps created by the implementation of the VOR MON program.

Finally, Mr. Lamond and Mr. Dillman informed the TOC that this task completed the final task of the group and suggested the TOC sunset the VOR MON Task Group.

During the ensuing discussion, Mr. Ray informed the TOC that the FAA was aware of the emphasis on publishing the list of proposed VORs to be shut down as soon as possible. TOC members noted that in lieu of an official list, unofficial lists or rumors would arise. Ms. Ray stated that the FAA was working on an approach to explain the MON, the process around developing the MON as well as an approach to inform the public of the collaborative work involving the TOC. One TOC member suggested that membership associations were interested to utilize their Communications organizations to share this message to their members.

Another TOC member inquired about the status of funding for the PBN Route Concept of Operations. Ms. Ray answered that funding through standard processes would not be available for this until 2017.

**Committee Action:** The Committee agreed by consensus to approve the VOR MON Recommendations on Waterfall and PBN Search Phase 1 Implementation (Attachment 6) and Sunset the VOR MON Task Group.

### **Discussion of TOC Areas of Interest**

The TOC next reviewed a series of topics of interest:

#### National Special Activity Airspace Program (NSAAP)

Mr. Bob Lamond, NBAA, next lead a TOC discussion on NSAAP. He noted that NSAAP was a “win-win” for both FAA and industry, and he questioned why funding for the program was so difficult. Ms. Ray noted, similar to many other topics of interest, that NSAAP was in competition with numerous other ideas and Programs and ideas for future funding. Mr. Lamond reemphasized the extend of the benefit the Program would have for the National Airspace System (NAS). He stated that the next steps of NSAAP would be to identify the operational and policy details of how NSAAP would operate on a day-to-day basis. This type of work would likely be under Collaborative Decision Making (CDM).

#### Time Based Flow Management (TBFM)

Mr. Mark Hopkins, Delta Airlines, spoke next regarding TBFM. He inquired about the plans for sharing data with TBFM. Mr. Hopkins noted that there was an impact of TBFM on airline customers that operators could not predict and were only visible to the operator after pushback and call for taxi. He noted that TBFM data was now available via System Wide Information Management (SWIM) but there was further work to be done on visibility of the operational data.

Mr. Hopkins also spoke about the need for further work on post-operational analytical data to review performance and impact of TBFM. He mentioned that operational use of TBFM by different facilities had variation with some metering all the time, some metering to a freeze horizon and others to the runway. Mr. Hopkins noted that operators are experience good results in the airspace with less holding and vectoring but there was still concern and questions as to whether the benefits were achieved from gate to gate.

#### Remote Towers

Mr. Dale Wright, National Air Traffic Controllers Association (NATCA), next discussed Remote Towers. He informed the TOC that remote towers were in process of being implemented at Leesburg Airport which had multiple safety incidents in recent years. He informed the TOC that airports like Leesburg would benefit financially; a recent tower in Frederick, MD, cost approximately \$6 million while the Remote Tower effort in Leesburg was approximately \$1.5 million. Mr. Wright raised the concern that there were no efforts in the US to examine remote towers and how they would work operationally. He mentioned that remote towers in operation in Europe had only about 10 operations a day and airports like Leesburg may have up to 10 operations in the terminal area at any one time.

#### Unmanned Aerial Systems (UAS)

Finally, Ms. Ray spoke about UAS. She informed the TOC that the UAS Program Office under the direction of Jim Williams served as the official voice of the FAA on UAS. She had also stood up an ATO/UAS Integration Team under Dan Williams so act as the facilitator of all UAS activities within the ATO. Within this organization was a Permanent "Article 48" employee, Steve Widener. She told the TOC that the Notice of Proposed Rulemaking (NPRM) on small UAS was expected "any day" in the Federal Register. She also spoke about the emphasis on event reporting, "Section 333" exemptions and other exception agreements with news organizations that were ongoing.

#### **New Task: GPS Adjacent Band Compatibility Study**

Mr. Paul McDuffee, Insitue Inc., next introduced a new task, the GPS Adjacent Band Compatibility (ABC) Study (Tasking Letter included as Attachment 7). Mr. McDuffee informed the TOC that in January 2012, the Departments of Transportation (DOT) and Defense (DOD) planned to evaluate new GPS spectrum interference standards to inform future proposals for non-space, commercial uses in the bands adjacent to the GPS signals. In October 2014, the FAA published the GPS Adjacent-Band Compatibility Study and asked RTCA to review the study and answer 6 specific questions. Three of these questions were given to RTCA Special Committee 159 and three were being request of the TOC.

The critical question of the TOC task on the GPS ABC study was about the possible impact of deploying networks of ground based transmitters radiating near GPS frequencies and the effect on aviation interests. Mr. McDuffee informed the TOC that the GPS ABC study proposed "Exclusion Zones" where GPS would be consider unreliable based on transmissions on the GPS adjacent band. The TOC was being asked to evaluate the operational and safety impacts of these exclusion zones. Specifically, the TOC was being requested to evaluate the impact to helicopter operators, UAS operators as well as other fixed wing operators.

Mr. McDuffee informed the TOC that a TOC GPS ABC Task Group had begun to inform and he presented proposed Terms of Reference for the effort (included as Attachment 8).

**Committee Action:** The Committee agreed by consensus to approve the Terms of Reference for the GPS Adjacent Band Compatibility Task Group.

## **Update on Existing Tasks**

### Eastern Regional Task Group: Caribbean Operations

Mr. Joe Bertapelle, JetBlue, gave an update to the TOC on the existing task under the Eastern Regional Task Group on Caribbean operations. He informed the TOC that the task had kicked off in January with 25 in person and 5 remote attendees for the first meeting. The group had scheduled future monthly meetings and anticipated delivering its final report at the July 2015 TOC meeting. Mr. Bertapelle informed the TOC that next steps were for the FAA's operating facilities in the region to identify "wish lists" for operational improvements and status of existing infrastructure projects.

One TOC member noted that this region will continue to grow and this effort was very important for the future of Caribbean operations and growth.

### Class B Designation and Design

Ms. Melissa McCaffrey, Aircraft Owners and Pilots Association (AOPA), provided an update on the Class B Task Group. Ms. McCaffrey informed the TOC that the previous week, the Class B group had its initial kickoff meeting in which it discussed the history of Class B airspace and current processes for airspace change. She noted some initial observations that there were new data sources available that may better inform Class B designation and that no process existed for revoking Class B. Ms. McCaffrey informed the TOC that the group had scheduled a series of monthly meeting and intended to deliver its final recommendation at the July TOC meeting.

### Airport Construction

Mr. Mark Hopkins, Delta, and Mr. Chris Oswald, ACI-NA, Co Chairs of the Airport Construction Task Group next gave an update on this effort. They noted that the group was in its very early stages of activity. Some initial thinking was to evaluate construction in context of equipment and nav aids as well as runways/taxiways. Additionally, the group was considering evaluating the task in distinct phases of construction – Planning and Design (3 year to 18 months), Start of Construction Planning (18 months out), During Construction and Post Event Assessment. Mr. Hopkins and Mr. Oswald were considering dividing the efforting into sub tasks and were evaluating whether to do sub tasks in parallel or linearly.

## **New Task: National Procedure Assessment**

Next, Ms. Ray introduced a new task for the TOC regarding the National Procedure Assessment Initiative (Tasking Letter included as Attachment 9). She informed the TOC that the FAA was interested in the best approach to cancelling VOR/NDB procedures (regulatory) and Standard Instrument Departure (SID) and Standard Terminal Arrival Routes (STARs) (non-regulatory) that were not required in the NAS. Already the FAA has a proposed removal of 732 VOR and NDB Instrument Approach Procedures that was part of a process that had begun 5 years ago. The FAA was interested in gathering additional TOC feedback on the processes in place for both the regulatory and non-regulatory procedures.



Mr. Mitra informed the TOC that RTCA would be seeking interested participants for this task in the near future.

### **RTCA-IATA Partnership**

Ms. Jennifer Iverson, RTCA, provided an overview of a new IATA-RTCA partnership to the TOC. She informed the TOC that the partnership was intended to promote a seamless air transportation system for operators around the world. The initial region of focus was South America.

### **Anticipated issues for TOC consideration and action at the next meeting**

Mr. Mitra informed the TOC that the Committee may anticipated an additional virtual meeting in May 2015 to consider a report from the GPS ABC task as well as to review Terms of Reference for the Airport Construction and National Procedure Assessment tasks.

Additionally, Mr. Mitra advised TOC members to anticipate multiple recommendations at the July TOC meeting. All of the following reports are anticipated at that meeting:

- NOTAM Feedback Phase 2 Implementation
- Interim report from Airport Construction
- Class B Airspace Criteria
- Eastern Regional Task Group – Caribbean Operations

### **Other business**

No other business was raised.

### **Adjourn**

Ms. Ray offered closing comments. She offered her gratitude to the work of the VOR MON Task Group noting that work provided critical recommendations to the FAA. She also thanked the NOTAM Task Group for its recommendation and observed that the level of collaboration and engagement between industry and the AIM organization had been very strong. Finally, she noted that the TOC had many tasks on its plate and she was willing to adjust timing for the new NPA task given the number of other tasks going on.

Chairmans Bowman and Wright ended the meeting of the Committee at 3:30 p.m.

### **Next Meeting**

The next meeting of the TOC is May 20, 2015 in Washington, DC.

**Attendees:**  
**February 5, 2015 Meeting of the Tactical Operations Committee**  
**Washington, DC**

| <b>Name<sup>1</sup></b>  | <b>Company</b>                                       |
|--------------------------|--|
| Allen, Dan               | FedEx Express  |
| <i>Baum, Chris</i>       | <i>Air Line Pilots Association</i>                   |
| <i>Bechdolt, Stacey</i>  | <i>Regional Airline Association</i>                  |
| Bertapelle, Joe          | JetBlue Airways                                      |
| <i>Bowman, Jim</i>       | <i>FedEx Express</i>                                 |
| Cardwell, Mark           | FedEx Express  |
| <i>Cirilo, Carlos</i>    | <i>International Air Transport Association</i>       |
| Courtney, Dale           | Federal Aviation Administration                      |
| <i>Hopkins, Mark</i>     | <i>Delta Air Lines, Inc.</i>                         |
| <i>Jenny, Margaret</i>   | <i>RTCA, Inc.</i>                                    |
| <i>Kast, Christian</i>   | <i>United Parcel Service</i>                         |
| <i>Lamond Jr, Bob</i>    | <i>National Business Aviation Association</i>        |
| Mitra, Trin              | RTCA, Inc.   |
| <i>Molin, Doug</i>       | <i>The MITRE Corporation</i>                         |
| Murphy, Bill             | International Air Transport Association              |
| <i>Oswald, Chris</i>     | <i>Airports Council International (ACI North ...</i> |
| Pennington, Darrell      | Air Line Pilots Association                          |
| <i>Ray, Lynn</i>         | <i>Federal Aviation Administration</i>               |
| <i>Roberts, Bart</i>     | <i>JetBlue Airways</i>                               |
| <i>Rudinger, Melissa</i> | <i>Aircraft Owners and Pilots Association</i>        |
| Solley, Edwin            | Southwest Airlines                                   |
| Teel, Brandi             | RTCA, Inc.   |
| Weatherly, Jim           | Federal Aviation Administration                      |
| <i>Will, Brian</i>       | <i>American Airlines, Inc.</i>                       |
| <i>Wright, Dale</i>      | <i>National Air Traffic Controllers Association</i>  |

<sup>1</sup>Committee member names appear in italics.



## **RTCA Tactical Operations Committee**

Eighth Meeting  
February 5, 2015  
RTCA Headquarters



## **Welcome and Introduction**

Co-Chairs:  
Jim Bowman, FedEx Express  
Dale Wright, NATCA



## Topical Agenda

- FAA Report
- NOTAM Task Group report on NOTAM Search
- Fedex Briefing on NOTAMs
- VOR Minimum Operating Network report on Waterfall and PBN Route CONOPs
- Discuss Areas of TOC Interest and Possible Future Effort
- Introduce New Tasks
- Status of Ongoing Tasks
- Overview of RTCA-IATA Partnership

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## PUBLIC MEETING ANNOUNCEMENT

**Read by: Designated Federal Official Elizabeth Ray  
Tactical Operations Committee (TOC)  
February 5, 2015**

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

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

**January 23, 2015 (Posted for review on January 20)**

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

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

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

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## **Review and Approval of:**

### **November 20, 2014 Meeting Summary**

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## **FAA Report**

Elizabeth "Lynn" Ray  
Vice President, Mission Support Services  
Air Traffic Organization

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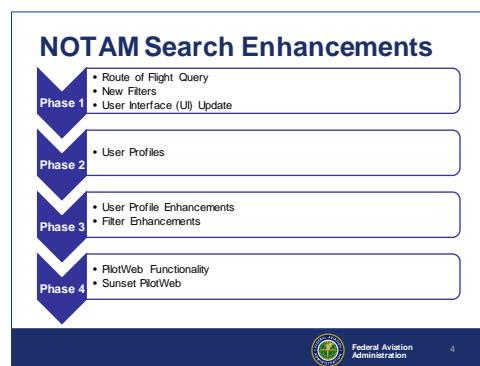
## NOTAM Task Group: Feedback on Phase 1 Implementation of NOTAM Search

Mark Cardwell  
Captain, MD-11 Flight Training  
FedEx Express

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## Recent History

- In August 2014, FAA published a four phase implementation plan for NOTAM Search
- Heavily influenced by previous feedback of NOTAM Improvement Panel
- NOTAM Task Group requested to provide feedback after each phase of implementation



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## Phase 1 Enhancement

- In November 2014, FAA released Phase 1 of the NOTAM Search enhancements

The screenshot shows the FAA NOTAM Search interface. At the top, there's a search bar with the text "Flight path search on NOTAM: 40000: 240 NOTAMS found". Below the search bar, there are tabs for "View All, Dep, Arr, ER, Alternates only" and "Construction". The main table lists NOTAMs with columns for Location, Number, Class, Start Date UTC, End Date UTC, and Condition. The table is filtered to show only NOTAMs for DCA.


| Location | Number | Class     | Start Date UTC  | End Date UTC       | Condition   |
|----------|--------|-----------|-----------------|--------------------|---|
| DCA      | N/A    | Aerodrome | 01/08/2014 1549 | PERM               | ON AIRPORT - SEE CONSTRUCTION GRAPHIC   |
| DCA      | 09543  | Aerodrome | 09/28/2014 0225 | PERM               | TWY F EDGE LOT 8TH APCH END RWY 33 AND RWY 422 OUT OF SERVICE 1403200225-PERM   |
| DCA      | 09551  | Aerodrome | 09/28/2014 0957 | PERM               | TWY F HOLDING POSITION SIGN FOR APCH END RWY 33 LOT OUT OF SERVICE 1403200957-P |
| DCA      | 09544  | Aerodrome | 09/28/2014 0225 | PERM               | APRON HOLDING APRON 33 EDGE LOT OUT OF SERVICE 1403200225-PERM                  |
| DCA      | 01087  | Airspace  | 01/08/2015 1618 | 01/31/2016 2359EST | AIRSPACE SEE FDC 1/11/15 D50K ZDC 36.7 TFR 1501081618-1601312359EST             |
| DCA      | 41176  | Procedure | 12/19/2014 1504 | 06/17/2015 1504EST | JAP RONALD REAGAN WASHINGTON NATIONAL, WASHINGTON, DC: VOR/DME RWY 1, ABOT 14.  |
| DCA      | 41173  | Procedure | 12/19/2014 1439 | 06/17/2015 1439EST | JAP RONALD REAGAN WASHINGTON NATIONAL, WASHINGTON, DC: VOR/DME OR GPS RWY 13.   |
| DCA      | 41165  | Procedure | 12/19/2014 1437 | 06/17/2015 1437EST | JAP RONALD REAGAN WASHINGTON NATIONAL, WASHINGTON, DC: ILS OR LOC/DME RWY 1, A. |
| DCA      | 50251  | Procedure | 01/05/2015 1435 | 07/04/2015 1435EST | JAP RONALD REAGAN WASHINGTON NATIONAL, WASHINGTON, DC: VOR/DME OR GPS RWY 19.   |
| DCA      | 50829  | Procedure | 01/05/2015 1503 | 07/29/2015 1503EST | SID RONALD REAGAN WASHINGTON NATIONAL, WASHINGTON, DC: LAZR FIVE DEPARTURE L.   |
| DCA      | 50257  | Procedure | 01/05/2015 1525 | 07/04/2015 1515EST | JAP RONALD REAGAN WASHINGTON NATIONAL, WASHINGTON, DC: LOC/DME RWY 19, ABOT 2.  |

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## Compiling Task Group Feedback

- NOTAM Task Group met in December 2014 and compiled feedback
- Three categories of input:
  - Broad considerations for new functionality
  - Input on user interface
  - Specific fixes for website


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## Phase 1 Recommendations

- **Broad considerations for new functionality**
  - Select VFR vs IFR flight option
  - How to train users beyond user guide; videos?
  - Downloading content to use/sort/filter while offline
  - Any mobile version replicate functionality of [www.faa.gov/mobile](http://www.faa.gov/mobile)
  - Question of whether printing should be standard sequence or based on user sorting

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## Phase 1 Recommendations

- **Input on User Interface, for example:**
  - Space and not comma separated route string
  - Placement of specific labels
  - Providing description of categories
  - Clear guidance of what is/is not accepted in the route string (such as SIDs/STARs not accepted)
  - Etc...

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## Phase 1 Recommendations

- **Input on Specific Fixes for Website**, for example:
  - Change specific icon that is confusing
  - Including specific headers in PDF export
  - Changing label “Help” to state “User Guide”
  - Fixing date format differences between browsers
  - Clarifying UTC in the time filter
  - Etc...

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## Feedback to Task Group

- Based on NOTAM Task Group's **draft** feedback, FAA already began assessment of how to follow through

[illegible]

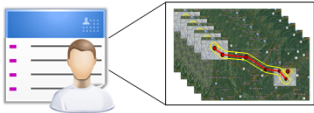
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## Next Steps

- FAA target date in early March to release Phase 2 of the NOTAM Search enhancements
- Task Group will convene after March and present Phase 2 report during July TOC meeting

**User Profiles**



- ✓ Create user login to save search preferences
- ✓ Optional feature
- ✓ Designed for avid users
- ✓ Ability to save up to 10 pre-defined flight path queries
- ✓ Additional features in Phase 3

Federal Aviation Administration

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## TOC Action

Consider Recommendation on:

***NOTAM Task Group Feedback on  
Phase 1 Implementation of NOTAM  
Search***

and Transmit to FAA

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THE GOLD STANDARD FOR AVIATION SINCE 1935

## Briefing from FedEx on Safety Learnings in NOTAMs

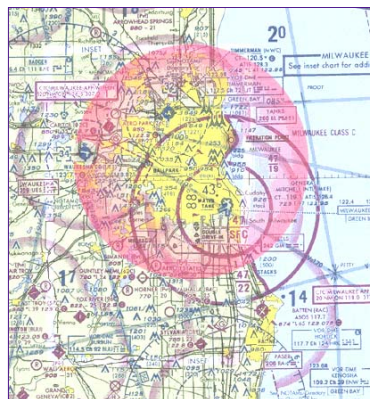
Mark Cardwell  
Captain, MD-11 Flight Training  
FedEx Express

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## NOTAM Filtering and Sorting

A Combined Approach



## Today's Presentation

- Why?

The desire to share the results of our efforts in the hope that they will prove helpful to others.

- Why Now?

After two years of development, experimentation, and cooperation, we believe that our concept is viable.

## Filtering...NOTAM's Silver Bullet?

- FedEx acquired a large and powerful filtering and alerting program.
- Filtering (in this context) is the removal of irrelevant NOTAMs
- What did we want to filter and how effective were we?

## NOTAMs Must Possess Two Characteristics to be Filtered

- It must contain information that won't be missed.
- There must be elements of the NOTAM that the automation can “hook”.

What is the natural enemy of filtering?

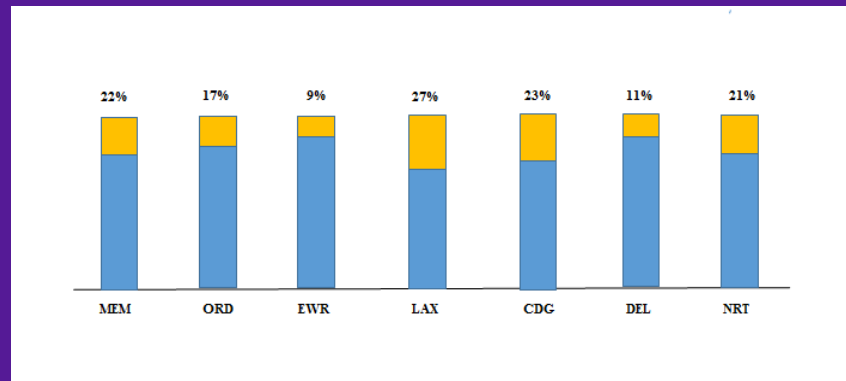
*Liability*

## What Types of NOTAMs Might be Filtered Out?

- Temporal\*
- OBST
- Phase of Flight\*
- RNAV (RNP)
- Keyword

\*Future enhancements to the product

## Manual Filter Modeling



FDC 4/7371 JFK IAP JOHN F KENNEDY INTL, NEW YORK, NY.

**RNAV (GPS) Y RWY 4L, AMDT 1C...**

RNAV (RNP) Z RWY 4L, ORIG-B...

MISSED APPROACH: DIRECT TO AND CROSS  
WORDI AT 2000 THEN CLIMB  
TO 3000 ON TRACK 091 TO DUFFY AND  
HOLD.

**1408222050-1502222050EST**

## Filtering...NOTAM's Silver Bullet?

- FedEx acquired a large and powerful filtering and alerting program.
- Filtering (in this context) is the removal of irrelevant NOTAMs
- What did we want to filter and how effective would it be?
- Modeling indicated that filtering alone would be insufficient to meet our goals.
- What else could be done?

Domestic NOTAMs  
-----

JFK 09/199 JFK RMY 22L ALS OUT OF SERVICE 1409190158-1409211900EST  
JFK 09/181 JFK RMY 31R HOLDING POSITION MARKINGS AT RMY 4L/22R SE  
SIDE OBSC 1409171306-1412312359EST  
JFK 09/166 JFK RMY 31R DECLARED DISTANCES: TORA 10000FT TODA 10000FT  
ASDA 9513FT LDA 8483FT. 1409180400-PERM  
JFK 09/162 JFK RMY 4L/22R NE 1171FT CLSD. DECLARED DISTANCES: RMY 4L  
TORA 9780FT TODA 9780FT ASDA 9780FT LDA 9780FT. RMY 22R TORA  
10130FT TODA 10130FT ASDA 10130FT LDA 8655FT.  
1409160031-1409240359EST  
JFK 09/159 JFK RMY 22L LEAD ON LGTS FOR TWY E OUT OF SERVICE  
1409151630-1410311000  
JFK 09/158 JFK RMY 4R LEAD OFF LGTS FOR TWY E OUT OF SERVICE  
1409151630-1410311000  
JFK 09/067 JFK RMY 4L HOLDING POSITION SIGN AT RMY 13R/31L LEFT SIDE  
MISSING 1409062219-1410311800  
JFK 08/125 JFK RMY 4L/22R WIP CONST NE END 1408092038-1504092359EST  
JFK 08/085 JFK RMY 4R/22L CL MARKINGS OBSC 1408071128-1410312359EST  
JFK 06/151 JFK RMY 13L HOLDING POSITION MARKINGS FOR RMY 4L/22R  
INTERSECTION NW SIDE OBSC 1406091020-1410312359EST  
JFK 06/058 JFK RMY 13L/31R CL MARKINGS OBSC 1406041741-1410312359EST  
JFK 06/019 JFK RMY 4R ENGINEERED MATERIALS ARRESTING SYSTEM NOT STD  
1406021423-PERM  
JFK 04/015 JFK RMY 13L/31R BTN TWY E AND TWY D 600FT X 150FT  
UNGROOVED 1404011535-1504011300  
JFK 09/121 JFK RMY 13R PAPI CMEN. A STRAIGHT-IN AND OFFSET PAPI IS  
USED FOR THIS VISUAL APPROACH. THE STRAIGHT-IN SYSTEM CONSISTS OF  
ONE BAR OF LIGHTS LOCATED ON THE LEFT SIDE OF THE RUNWAY  
CENTERLINE AS VIEWED FROM THE APPROACH DIRECTION. THE SECOND  
SINGLE BAR OF LIGHTS IS AIMED 22 DEGREES WEST OF THE EXTENDED  
RUNWAY CENTERLINE IS LOCATED ON THE RIGHT SIDE OF THE RUNWAY AS  
VIEWED FROM THE APPROACH DIRECTION. THE VISUAL GLIDE PATH IS 3.00  
DEGREES. THE THRESHOLD CROSSING HEIGHT (TCH) IS 73 FEET FOR THE  
STRAIGHT IN APPROACH. THE SYSTEM IS CONTROLLED BY THE ATCT. THE  
PAPI IS MONITORED JFK 09/204 JFK TWY CB CL LGT BTN TWY C AND HANGAR 3 AND HANGAR 4 AND  
HANGAR 5 NORTH RAMP OUT OF SERVICE 1409190849-1410032300  
JFK 09/203 JFK TWY Y HOLDING POSITION SIGN FOR ILS NORTHEAST SIDE  
NOT LGTD 1409190842-1410032300  
JFK 09/201 JFK TWY Y CL LGT BTN TWY E AND TWY FB OUT OF SERVICE  
1409190743-1410312300  
JFK 09/200 JFK TWY E CL LGT BTN APCH END RMY 22L AND TWY Y OUT OF  
SERVICE 1409190738-1410312300  
JFK 09/196 JFK TWY A BTN TWY NA AND TWY NB AIRCRAFT SPEED  
RESTRICTION OF 17KTS/20MPH MAXIMUM FOR A380, B747-400,  
B777-300ER, B777-200, A340, A330, AND B787 1409181700-PERM  
JFK 09/154 JFK TWY KG BTN TWY A AND TERMINAL 4 RAMP CLSD  
1409151237-1411302359EST

JFK 09/110 JFK TWY E BTN TWY Y AND TWY C CLSD 1409111100-1412312300  
JFK 09/056 JFK TWY Z RUNUP PAD OPEN 1409051707-PEEM  
JFK 09/015 JFK TWY JB CL MARKINGS OBSC 1409021606-1410312359EST  
JFK 08/365 JFK TWY NB NO ACFT TURNS SOUTHBOUND TO TWY A PERMITTED  
1408281709-1410302359EST  
JFK 08/113 JFK TWY C BTN RMY 4L/22R AND TWY E, TWY FB BTN TWY Y AND  
TWY E, TWY 2A BTN RMY 13L/31R AND TWY FB CLSD  
1408090200-1512312359EST  
JFK 07/039 JFK TWY E SURFACE PAINTED HOLDING POSITION SIGNS SOUTH  
SIDE FOR RMY 13L/31R NOT STD 1407022236-1411072359EST  
JFK 04/359 JFK TWY B TWY DIRECTION SIGN FOR TWY R NOT STD  
1404300813-1411282359EST  
JFK 04/103 JFK TWY D BTN TWY C AND HANGAR 7 RAMP CLSD  
1404070918-1505252359EST  
JFK 02/040 JFK TWY H CL LGT BTN TWY A AND TWY B OUT OF SERVICE  
1402030319-1412312359EST  
JFK 02/041 JFK TWY H CL LGT BTN TWY B AND RMY 4L/22R OUT OF SERVICE  
1402030321-1412312359EST  
JFK 02/039 JFK TWY H CL LGT BTN TERMINAL 4 RAMP AND TWY A OUT OF  
SERVICE 1402030319-1412312359EST  
JFK 09/172 JFK AD WINDCONE FOR RMY 31R NOT LGTD 1409170134-1411301000  
JFK 08/272 JFK AD HELIPAD 3 LGT OUT OF SERVICE  
1408202158-1410152359EST  
JFK 08/122 JFK OBST CRANE 403909N0734620W (0.1NM N APCH END RMY 31R)  
UNKNOWN (100FT AGL) FLAGGED AND NOT LGTD 1408091520-1410061300  
JFK 12/356 JFK OBST STACK 403639N734540W (1.3 SSE) 265FT (257 AGL)  
LGT OUT OF SERVICE 1312211645-1401212359EST  
JFK 12/355 JFK OBST STACK 403657N0733840W (7.5 ESE) 262FT (250 AGL)  
7.5 LGT OUT OF SERVICE 1312211652-1401212359EST  
JFK 08/143 JFK NAV ILS RMY 4L OUT OF SERVICE 1408111231-1412092300EST  
JFK 09/173 JFK AIRSPACE SEE FDC 4/5781 ZNY 4/5782 ZBW 91.141 VIP TFR  
1409231530-1409251900  
JFK 10/069 JFK (O) RMY 22L PAPI RELOCATED LEFT SIDE  
  
FDC NOTAMS  
-----  
FDC 4/7371 JFK IAP JOHN F KENNEDY INTL, NEW YORK, NY.  
ENAV (GPS) Y RMY 4L, AMDT 1C...  
ENAV (RNP) Z RMY 4L, ORIG-B...  
MISSED APPROACH: DIRECT TO AND CROSS WORDI AT 2000 THEN CLIMB  
TO 3000 ON TRACK 091 TO DUFFY AND HOLD.  
1408222050-1502222050EST

FDC 4/4220 JFK IAP JOHN F KENNEDY INTL, NEW YORK, NY.  
ILS OR LOC RMY 13L, AMDT 16B...  
ILS OR LOC RMY 31L, AMDT 10C...  
VOR RMY 4L, ORIG-A...  
VOR RMY 4R, ORIG...  
VOR RMY 31L, ORIG...  
ILS RMY 22R, AMDT 2A...  
ILS RMY 4R (CAT II), AMDT 29C...  
ILS RMY 13L (CAT II), AMDT 16B...  
ILS RMY 4R (CAT III), AMDT 29C...  
ILS OR LOC RMY 4R, AMDT 29C...  
ILS OR LOC RMY 22L, AMDT 24B...  
ILS RMY 22L (CAT II), AMDT 24B...  
ILS RMY 22L (CAT III), AMDT 24B...  
MSA FROM JFK VOR/DME 270 TO 360 MINIMUM ALTITUDE 2900.  
1408151740-1502151740EST  
FDC 4/4557 JFK STAR KENNEDY INTERNATIONAL, NEW YORK, NY.  
LENDY SIX ARRIVAL...LENDY INT TO LGA VOR/DME NOT AUTHORIZED BELOW  
3,000 FEET.  
1406272000-1409242300  
FDC 4/2758 JFK IAP JOHN F KENNEDY INTL, NEW YORK, NY.  
COPTER RNAV (GPS) 028, ORIG-A...  
MSA MINIMUM ALTITUDE 2900.  
1404022057-1410022057EST  
FDC 4/2757 JFK IAP JOHN F KENNEDY INTL, NEW YORK, NY.  
ILS OR LOC RMY 4L, AMDT 10B...  
S-LOC 4: MDA 420/HAT 408 ALL CATS. VIS CAT C RVR 6000.  
MSA FROM JFK VOR/DME 270 TO 360 MINIMUM ALTITUDE 2900.  
1404022055-1410022055EST  
FDC 4/2756 JFK IAP JOHN F KENNEDY INTL, NEW YORK, NY.  
VOR/DME RMY 22L, AMDT 4D...  
S-22L: VIS CATS A AND B RVR 4000.  
FOR INOPERATIVE ALSF-2, INCREASE S-22L CAT A/B VISIBILITY TO  
RVR 5000.  
NOTE: HELICOPTER VISIBILITY REDUCTION BELOW RVR 4000 NOT  
AUTHORIZED.  
MSA FROM JFK VOR/DME 270 TO 360 MINIMUM ALTITUDE 2900.  
1404022055-1410022055EST

FDC 2/9237 JFK PARCHI RNAV STAR TRACKS VIA CHAIL AND CAPIT  
WPS N/A  
UFN. EXPECT RADAR VECTORS TO FINAL APPROACH COURSE PRIOR  
TO ROBER.  
  
Military NOTAMS  
-----  
NONE  
  
Local NOTAMS  
-----  
NONE  
  
Company NOTAMS  
-----  
NONE  
-----



## Sort by Runway (SbR)

- Any NOTAM containing runway specific information will be grouped together under that runway title
- NOTAMs affecting multiple runways will be duplicated for “one stop shopping”
- NOTAMs with no runway affiliation will be grouped at the bottom of the report by category

### Runway 4R

KJFK APT 201406014C6V01 06/019 02JUN14 1423Z - PERM  
JFK RWY 4R ENGINEERED MATERIALS ARRESTING SYSTEM NOT  
STD 1406021423-PERM.

KJFK APT 20140911125V01 09/158 15SEP14 1630Z - 31OCT14  
1000Z  
JFK RWY 4R LEAD OFF LIGHTS FOR TWY E OUT OF SERVICE  
1409151630-1410311000

KJFK APT 20140806C08V01 08/085 07AUG14 1128Z - 31OCT14  
2359Z EST  
JFK RWY 4R/22L CL MARKINGS OBSCURED 1408071128-1410312359EST

KJFK APT 20140810A31V01 4/4220 15AUG14 1740Z -15FEB15  
1740Z EST  
JFK IAP JOHN F KENNEDY INTL, NEW YORK, NY.  
ILS OR LOC RWY 13L, AMDT 16B...  
ILS OR LOC RWY 31L, AMDT 10C...  
VOR RWY 4L, ORIG-A...  
VOR RWY 4R, ORIG...  
VOR RWY 31L, ORIG...  
ILS RWY 22R, AMDT 2A...  
ILS RWY 4R (CAT II), AMDT 29C...  
ILS RWY 13L (CAT II), AMDT 16B...  
ILS RWY 4R (CAT III), AMDT 29C...  
ILS OR LOC RWY 4R, AMDT 29C...  
ILS OR LOC RWY 22L, AMDT 24B...  
ILS RWY 22L (CAT II), AMDT 24B...  
ILS RWY 22L (CAT III), AMDT 24B...  
MSA FROM JFK VOR/DME 270 TO 360 MINIMUM ALTITUDE 2900.  
1408151740-1502151740EST

### Runway 13L

KJFK APT 201406095CAV01 06/151 09JUN14 1020Z - 31OCT14 2359Z  
EST  
JFK RWY 13L HOLDING POSITION MARKINGS FOR RWY 4L/22R  
INTERSECTION NW SIDE OBSCURED 1406091020-1410312359EST.

KJFK APT 201406046D9V01 06/058 14 04JUN1741/14 31OCT2359 EST  
JFK RWY 13L/31R CL MARKINGS OBSCURED  
1406041741-1410312359EST

KJFK APT 20140400D60V01 04/015 14 01APR1535/15 01APR1300  
JFK RWY 13L/31R BTN TWY E AND TWY D 600FT X 150FT  
UNGROOVED 1404011535-1504011300.

KJFK APT 20140808ADC01 08/113 14 09AUG0200/15 31DEC2359 EST  
JFK TWY C BTN RWY 4L/22R AND TWY E, TWY FB BTN TWY Y  
AND TWY E, TWY ZA BTN RWY 13L/31R AND TWY FB CLOSED  
1408090200-1512312359EST

KJFK APT 20140702A05V01 07/039 14 02JUL2236/14 07NOV2359 EST  
JFK TWY E SURFACE PAINTED HOLDING POSITION SIGNS SOUTH  
SIDE FOR RWY 13L/31R NOT STD 1407022236-1411072359EST

KJFK APT 20140810A31V01 4/4220 14 15AUG1740/15 15FEB1740 EST  
JFK IAP JOHN F KENNEDY INTL, NEW YORK, NY.  
ILS OR LOC RWY 13L, AMDT 16B...  
ILS OR LOC RWY 31L, AMDT 10C...  
VOR RWY 4L, ORIG-A...  
VOR RWY 4R, ORIG...  
VOR RWY 31L, ORIG...  
ILS RWY 22R, AMDT 2A...  
ILS RWY 4R (CAT II), AMDT 29C...  
ILS RWY 13L (CAT II), AMDT 16B...  
ILS RWY 4R (CAT III), AMDT 29C...  
ILS OR LOC RWY 4R, AMDT 29C...  
ILS OR LOC RWY 22L, AMDT 24B...  
ILS RWY 22L (CAT II), AMDT 24B...  
ILS RWY 22L (CAT III), AMDT 24B...  
MSA FROM JFK VOR/DME 270 TO 360 MINIMUM ALTITUDE 2900.  
1408151740-1502151740EST

## Pros and Cons

### Positive

- Quickly locate information of greatest interest
- Exclude irrelevant information
- SbR does not inherently increase liability

### Negative

- Increase in report length
- Must still review non-runway associated NOTAMs

## The Future

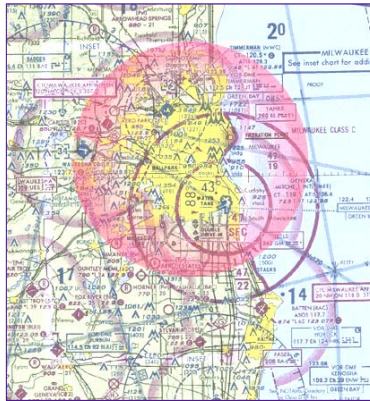
- Introduce Sort by Runway and plain text.
- Filtering of enroute NOTAMs in 3 dimensions (vertical, lateral and temporal) for Dispatch.
- Enhancements to Sort by Runway.
  - Ordering of NOTAMs below the runway title
  - Color coding

...and sometime in the coming years

- Graphical NOTAMs displayed directly on EFB and tablets.



## QUESTIONS?



# RTCA

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## Lunch



## FAA Response to VOR MON Recommendations on Outreach and Modifications

Dale Courtney  
National Resource Engineer for Navigation  
FAA


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## Recommendations on Process for Decomm. VORs to Achieve MON

- 1. At the beginning of the process, the FAA should notify the public concerning the full list of VORs to be planned for decommissioning; this should be done via non-rulemaking action such as an Advisory Circular (AC). If the FAA chooses to use A Cs, publication of ACs could include one for the entire MON Program or one for each Service Center. In either case, the list(s) should be broken down by State.

The FAA agrees with the recommendation on notifying the public of the full list of VORs to be planned for discontinuance. However, the FAA intends to use a Federal Register notice to announce the VOR MON final policy, address the targeted NAS end state, provide the candidate list of VORs under consideration, and announce the manner in which the FAA will be soliciting public comments through existing processes under multiple non-rulemaking circular notices and, as appropriate, subsequent rulemaking NPRM as the project progresses.

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## Recommendations on Process for Decomm. VORs to Achieve MON


- **2. Process for decommissioning should separate the notification (non-rulemaking) component from the rulemaking components to not stall the process necessarily.**

The FAA agrees with the recommendation.

- **3. The process for collecting, evaluating and adjudicating public comment should be communicated clearly in the notification of the VOR MON.**

The FAA agrees with the recommendation.

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## Recommendations for Outreach and Education on the VOR MON

- **1. The overarching theme about the VOR MON should relate to the transition to Performance-Based Navigation (PBN) and NextGen.**

The FAA agrees with the recommendation and understands that VOR MON is happening as a result of the Planned PBN transition and supports NextGen plans.

- **2. To ensure transparency, the FAA should provide a published VOR MON plan, including plans for decommissioning VORs, as soon as possible.**

The FAA agrees with the recommendation and will provide information about the Plan as soon as is available.

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## Recommendations on Tools for Communication about the VOR MON

- **3. FAA should accept the support of industry organizations to help communicate the message about the VOR MON.**  
The FAA agrees with the recommendation and will continue to work with industry organizations to communicate the message about the program.
- **4. Utilize the internet and social media to communicate about the VOR MON.**  
The FAA agrees with the recommendations and will explore the idea of using the internet to communicate information about the VOR MON program.
- **5. The FAA should actively reach out to Legislative Staff to ensure they understand the Program and the approach and rationale for decision-making.**  
The FAA will coordinate this recommendation with our legislative affairs office that can assist with feasibility and strategy of reaching out to Legislative Staff.

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## Required modifications and mitigations to implement the MON

- **1. Required Modifications to Procedures**  
The FAA will catalogue all known uses, procedures and other non-navigation services of VORs proposed for decommissioning. The FAA will substitute/mitigate or remove these uses, as appropriate and practicable, prior to the VOR being decommissioned.
- **2. One Engine Inoperative**  
The FAA agrees with the recommendation that operators retain responsibilities for the update of these procedures. The FAA agrees to the recommendation to provide the plan early to allow operators time to address these types of impacts.
- **3. Required Modifications to Publications**  
The FAA will include publication impacts as part of the MON analysis

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## Required modifications and mitigations to implement the MON

- **4. Required Modifications to Notifications**
  - a. The VOR MON team has started collaboration with the Aeronautical Charting Forum on MON charting issues
  - b. GPS NOTAMs are outside the scope of the VOR MON program, but these issues are being considered by the Coordinating Organization on GNSS and the NAS Enterprise Operations Office
  - c. The VOR MON team is considering changes to restoration priorities as part of implementing the MON. Additionally, changes to policies of when to release VORs for maintenance may need to be revised
- **5. Required Modifications to Training and Operations**

Outcomes from the Aeronautical Charting Forum will help the FAA focus on what changes to pilot and air traffic controller training is required. Flight Standards Office will be engaged to address changes to pilot training.

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## VOR MON Task Group Recommendations on Waterfall and PBN Route Concept of Operations

Don Dillman, FedEx Express

Bob Lamond, National Business Aviation Association

42



## Developments in VOR MON Program

- Target for VOR MON scaled back
  - Original plans to decommission 500 VORs by 2020
  - Now plan to decommission ~100 VORs by 2020 and an additional 200 by 2025.
- Phase 1 Final Investment Decision (FID) expected September 2015.
- Today's response focused on PBN Route Concept of Operations and the Waterfall/Implementation Roadmap for the VOR MON.
- Response addresses four areas:
  1. Waterfall for VOR MON
  2. Publishing List of Phase 1 VORs
  3. Feedback on PBN Route CONOPs
  4. Relationship between VOR MON and PBN Route CONOPs

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## Recommendations on Waterfall

- Original goal of decommissioning 500 VORs by 2020 necessitated TG feedback on waterfall
  - With goal scaled back to 100 by 2020, not as critical to solicit TG input on Waterfall
- FAA's stated criteria for selecting Phase 1 VORs will be on those with the least impact on route structure
  - Approach supported by VOR MON TG

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## Recommendations on Publishing List of Phase 1 VORs

- Funding to decommission expected to be approved in September and received in October
- TG reemphasizes previous recommendations to allow public to see proposed list of VORs as early as possible. Sep 2014 report states:

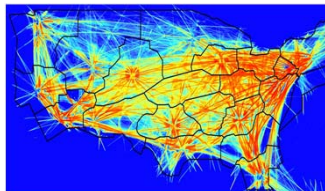
*"The Task Group strongly recommends that the FAA publish a list of all VORs planned for decommissioning at the beginning of the notification process. It is paramount to publish the full list upfront so there are no surprises to the public later in the process about which VORs are being shut down."*

- Not providing advance notification of full list of Phase 1 VORs risks a negative public response

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## Recommendations on PBN Route Concept of Operations

- High commendation for PBN Route Concept of Operations
  - If implemented, should deliver many of the operational benefits
- FAA should continue to aggressively implement the CONOPs
  - Currently unfunded and TG recommends FAA address this to ensure robust national PBN route network is developed
- TG agrees with CONOPs team that development will require multiple regional/national Work Groups
  - No TG input on routes in future network or which to retain in transition



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## Recommendation on Relationship Between VOR MON & PBN CONOPs

- PBN Route Structure should be developed based on operational needs of NAS and not constrained by the VOR network of the past
- FAA should not link VOR MON and future PBN Route Structure



- Point of integration will be synchronizing decommissioning of VORs and implementing PBN routes to backfill routes impacted by VORs
- Failing to fund PBN Route effort implies ultimate route structure would be incremental effort to plug gaps created by the implementation of the VOR MON program


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## Sun setting the VOR MON Task Group

- Task Group sees its work as complete and recommends sun setting the VOR MON Task Group

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## **TOC Action**

Consider Recommendation on:

***VOR MON Task Group  
Recommendations on Waterfall and  
PBN Route Concept of Operations***

and Transmit to FAA and Sunset VOR  
MON Task Group

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## **Areas of TOC Interest**

National Special Activity Airspace Program (NSAAP)  
Time Based Flow Management (TBFM)  
Remote Towers  
Unmanned Aerial Systems (UAS)

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## **Areas of TOC Interest: National Special Activity Airspace Program (NSAAP)**

Bob Lamond  
National Business Aviation Association

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## **Thoughts on NSAAP and the TOC**

- “Ongoing budget challenges in the FAA make maintaining the NSAAP program difficult” – Rob Hunt
- NSAAP a “win-win” for all parties involved
  - Why should funding be such a struggle?
- Operational use of NSAAP will begin to become more critical in the future
  - TOC? CDM?

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## Areas of TOC Interest: Time Based Flow Management (TBFM)

Mark Hopkins  
Delta Airlines

53



## Thoughts on TBFM and the TOC

- November briefing on TBFM raised number of issues and questions:
  - How do we ensure a common strategy for consistent metering and scheduling application across NAS?
    - Facility adaptation parameters may differ due to dissimilar needs and constraints but use philosophy and objective must be standardized
  - What are the 68 sites selected for Integrated Departure Arrival Capability (IDAC)?
    - What can be done to replace DSP? (NYC not getting IDAC because of DSP)
  - What is plan for sharing TBFM data?
    - Tactical Visibility (SWIM)
    - Post Op analytics data
  - What is status of sharing and integrating data from surface to TBFM?
- Request made that TOC Leadership consider tasking on TBFM related to increased collaboration between industry and FAA
  - Further consideration of this?
  - TOC appropriate venue?

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## **Areas of TOC Interest: Remote Towers**

Dale Wright


National Air Traffic Controllers Association (NATCA)

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## **Area of Interest: Remote Towers**

### **Observations or Reflections from Today's Remote Tower Demo?**


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## **Remote Towers - where we are now**

- Contract between FAA and VSATS
- Equipment delivery
- SRM work
- Operational Work Plan

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## **Other Areas of Attention**

- Safety benefits
- Who in United States benefits
- Technological benefits of test
- European Working Groups

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## Areas of TOC Interest: Unmanned Aerial Systems (UAS)

Lynn Ray  
FAA

59

## Area of Interest: UAS

- List of Industry or other partners in the UAS world:
  - UAS ExCom Senior Steering Group
  - RTCA SC-228 Steering Group
    - Two working groups 1) detect and avoid and 2) command and control
  - UAS Aviation Rulemaking Committee
  - “Know Before You Fly”
    - Partnership with AUVSI, AMA and sUAV coalition to outreach and message safe model UAS operations
- International:
  - ICAO UAS RPAS Panel
    - Co-chair (R. Willis)
    - Coordinate the membership and work program
  - Joint Authorities for Rulemaking on Unmanned Systems (JARUS)
    - Vice-chairman (C. Swider)
    - Coordinate the membership and work program
  - Support Civil Air Navigation Services Organization UAS Working Group

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## Other Industry/Academic Relationships

- **Manage UAS Test Site Program**
  - Six Test Sites, R&D location for industry to conduct R&D
  - FAA may use Test Sites (if needed) for flight Testing
  - No specific appropriation, but FAA may direct funds to Test Site(s) as appropriate
- **UAS Center of Excellence**
  - In selection process
  - Expected to be selected in FY 2015
  - The FAA has identified initial COE research areas of current interest which may evolve over time to adapt to the needs of the NAS.
    - 1. Air Traffic Control Interoperability
    - 2. Airport Ground Operations
    - 3. Control and Communication (COULD INCLUDE CYBERSECURITY RESEARCH IF DESIRED BY FAA)
    - 4. Detect and Avoid (DAA)
    - 5. Human Factors
    - 6. Low Altitude Operations Safety
    - 7. Noise Reduction
    - 8. Spectrum Management
    - 9. Unmanned Aircraft (UA) Crew Training and Certification, Including Pilots
    - 10. Unmanned Aircraft Systems Traffic Management
    - 11. UAS Wake Separation Standards for UAS Integration into the NAS

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## Introduce New Task: Exclusion Zones and GPS Adjacent Band Compatibility Study

Paul McDuffee  
Insitu, Inc.

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## Background of the Task

- Jan 2012
  - DOT and DoD evaluating new GPS spectrum interference standards to inform future proposals for non-space, commercial uses in the bands adjacent to the GPS signals
- Oct 2014
  - FAA publishes GPS Adjacent-Band Compatibility Study
  - RTCA asked by FAA to review study and answer 6 specific questions – three given to SC 159, three to the TOC
- Feb 2015
  - TOC launching GPS ABC Task with goal to complete work by April or May 2015

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## Key Question

- What is possible impact of deploying networks of ground based transmitters radiating near GPS frequencies and the effect on aviation interests?

64

## Exclusion Zones

- Study assumes aircraft operating relative to ground transmitter would have an aircraft exclusion zone
  - Assumptions drawn from DOT/FAA 2012 study of planned LightSquared transmitters



Figure C-2. Example Exclusion Area around LightSquared Tower

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## Three Questions for the TOC

- Impact of Exclusion Zones on Flight Safety
  - Question #4 to RTCA: (c) Are the size and aggregated density of aircraft and helicopter exclusion zones where GPS-based TAWS/HTAWS alerts cannot be assured (Appendix C, section above, and reference [4]) sufficiently small so as to not impact flight safety? (d) Alternatively, what TAWS/HTAWS exclusion zones parameters should be considered?
- Operational Acceptability and Safety Implications
  - Question #5 to RTCA: Comments are requested regarding the operational acceptability and safety implications for the proposed exclusions, operational limitations and safety considerations identified in Appendix C of this report and Annex A of the reference [4] report including any alternative suggestions and supporting rationale.
- Unique Considerations for Small UAV Operations
  - Question #6 to RTCA: (a) Considering the proposed fixed and rotary wing aircraft assumptions, exclusions, and limitations, are there safety impacts and operational limitations that are unique to small Unmanned Aircraft Vehicles (UAVs) operations? (b) If yes, please identify the unique operational use case scenarios and any associated safety and operational issues. (c) Propose additional assumptions and "exclusion zones" for consideration that would preclude the identified safety and operational issues (if any).

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## Work Done to Date

- Initial recruiting of the Task Group
- Outreach to UAS operator community for initial response to questions
  - Three responses received so far
- Establishment of Workspace site for Task Group
  - Added interested participants
  - Uploaded reference documents and white paper responses received to date


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## Schedule

- Late February or Early March: face-to-face meeting of Task Group
  - Learn history of exclusion zones
  - Understand size, scale, logic for exclusion zones
  - Ensure group is “on the same page” about the task
  - Begin dialogue on operational and safety implications of exclusion zones
- Anticipate one additional face-to-face or few telecons after face-to-face meeting
- Expect completion of report in April or May


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## Task Group

- Paul McDuffee, Institu Inc.
- Additional UAS operators
- Aircraft Owners and Pilots Association (AOPA)
- National Business Aviation Association (NBAA)
- Helicopter Association International (HAI)
- International Air Transport Association (IATA)
- LightSquared
- *Others interested?*

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## TOC Action

Consider for approval:

***GPS Adjacent Band Capability Task  
Group Terms of Reference***

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## **Status of Ongoing Tasks**

Eastern Regional Task Group – Caribbean Operations  
Class B Airspace Task Group  
Airport Construction Task Group

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## **Eastern Regional Task Group – Caribbean Operations**

Joe Bertapelle, JetBlue

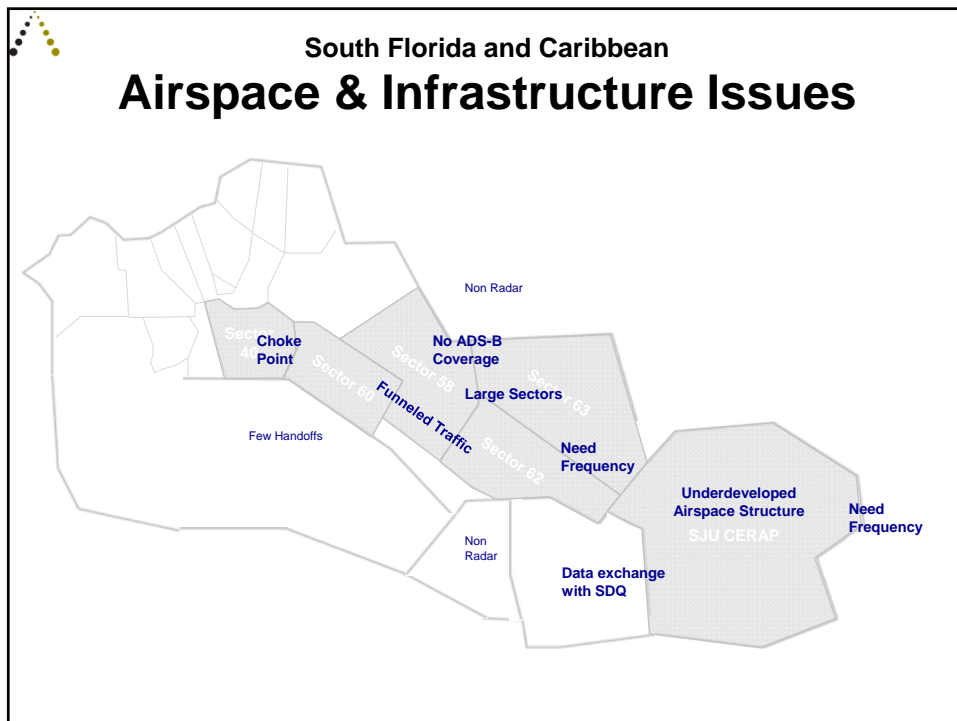
72

**South Florida and Caribbean**  
**Demand / Capacity Imbalance**

**MAP Numbers for Some ZMA Sectors**  
March 15, 2014 – typical peak Saturday in March, busiest month for ZMA Oceanic/Caribbean

| ZMA Sectors | MAP | 05:00 | 06:00 | 07:00 | 08:00 | 09:00 | 10:00 | 11:00 | 12:00 | 13:00 | 14:00 | 15:00 | 16:00 | 17:00 | 18:00 | 19:00 | 20:00 | 21:00 | 22:00 | 23:00 | 00:00 | 01:00 | 02:00 | 03:00 | 04:00 |
|-------------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 40          | 18  | 3     | 4     | 3     | 5     | 3     | 8     | 6     | 8     | 13    | 16    | 22    | 17    | 20    | 18    | 19    | 18    | 21    | 19    | 15    | 7     | 8     | 7     | 5     | 2     |
| 58          | 21  | 4     | 1     | 2     | 3     | 1     | 4     | 3     | 6     | 12    | 19    | 19    | 24    | 27    | 25    | 21    | 25    | 20    | 19    | 12    | 8     | 9     | 5     | 4     | 3     |
| 59          | 18  | 1     | 1     | 3     | 3     | 3     | 1     | 1     | 5     | 10    | 11    | 16    | 17    | 15    | 17    | 14    | 10    | 7     | 12    | 9     | 6     | 6     | 3     | 3     | 3     |
| 60          | 20  | 3     | 3     | 5     | 6     | 6     | 9     | 9     | 10    | 14    | 20    | 20    | 21    | 20    | 27    | 26    | 19    | 21    | 23    | 19    | 6     | 7     | 9     | 4     | 3     |
| 61          | 15  | 0     | 0     | 0     | 0     | 1     | 4     | 4     | 6     | 12    | 14    | 13    | 16    | 13    | 16    | 13    | 11    | 12    | 6     | 6     | 4     | 2     | 1     | 1     | 1     |
| 62          | 21  | 10    | 2     | 6     | 5     | 3     | 5     | 9     | 10    | 14    | 20    | 24    | 24    | 29    | 32    | 29    | 26    | 26    | 19    | 9     | 11    | 8     | 5     | 6     | 6     |
| 63          | 21  | 8     | 6     | 3     | 6     | 2     | 3     | 2     | 8     | 10    | 15    | 17    | 19    | 18    | 25    | 24    | 21    | 21    | 20    | 12    | 6     | 4     | 2     | 3     | 6     |

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## Current Task for the ERTG

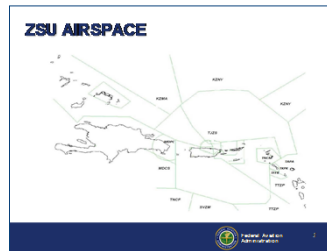
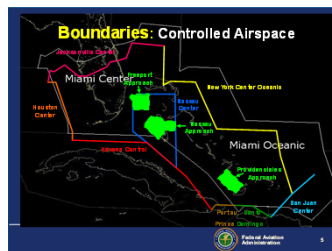
Components of tasking request include:

- Clearly **define the problem**: safety, efficiency and capacity
- Recommended **prioritized infrastructure solutions**
- Recommended **prioritized airspace improvements**
- **Ensure harmonization** with other efforts in the region

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## Status

- Kicked off task at ZMA in January
  - 30 attendees, 25 in person
  - Scheduled future monthly meetings through June (planned around delivery of report at July 2015 TOC meeting)
  - Discuss operational baseline for Miami Oceanic and San Juan CERAP
  - Currently in information gathering mode – on traffic, flows, airspace, etc.



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## Next Steps

- ZMA and ZSU refining wish lists for infrastructure/airspace in the region
- Gather data on flows in the region
- FAA providing data on infrastructure projects (current and potential) and costs
- Airline analysis on time/fuel savings from improved routing options in region due to better radar coverage
- Regional coordination with relevant ICAO WGs

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**Class B Airspace Task Group  
Tactical Operations Committee  
Update**

Melissa McCaffrey  
Aircraft Owners and Pilots Association

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## Tasking

- FAA requests comment and recommendations on the following:
  - Class B airspace designation requirements.
  - Appropriate considerations for Class B airspace design criteria.
  - The evaluation process for airspace biennial reviews including criteria to expeditiously reduce or eliminate Class B airspace that no longer meets designation requirements.
  - Obtaining input from affected users as early in the process as possible.
  - Identifying the best mechanism(s) to communicate updated processes to key stakeholders.

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## Task Group Members

### Task Group Co Chairs

|                   |  |
|-------------------|--|
| Melissa McCaffrey | Aircraft Owners and Pilots Association |
| Phil Santos       | FedEx Express                          |

### FAA Subject Matter Experts

|                 |                                 |
|-----------------|---------------------------------|
| Gary Norek      | Federal Aviation Administration |
| Gemechu Gelgelu | Federal Aviation Administration |
| Hazen Briggs    | Federal Aviation Administration |

### Task Group Members

|                    |  |
|--------------------|--|
| Thor Abrahamsen    | The MITRE Corporation                            |
| Joe Bertapelle     | JetBlue Airways                                  |
| CDR Joel Doane     | US Department of Defense                         |
| Keith Gordon       | National Business Aviation Association           |
| Nat Iyengar        | National Business Aviation Association           |
| Debra Moch-Mooney  | The MITRE Corporation                            |
| Glenn Morse        | United Airlines, Inc.                            |
| Darrell Pennington | Air Line Pilots Association                      |
| Bill Reabe         | US Department of Defense                         |
| Chris Stephenson   | National Air Traffic Controllers Association     |
| Kim Stevens        | National Association of State Aviation Officials |
| Robert "Rip" Torn  | Air Line Pilots Association                      |
| Brian Townsend     | American Airlines, Inc.                          |

### Secretary

|            |            |
|------------|------------|
| Trin Mitra | RTCA, Inc. |
|------------|------------|

# Class B Tasking Kickoff

- First Meeting, January 29th 2015
  - Discussed
    - History of Class B
    - Motivations for task
  - Process
  - Establishment, Review, Motivation, Resignation
- Briefings from:
  - FAA Airspace and Rules Group
  - FAA Eastern Service Center

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## Class B CY2012

**14 of 36 Do Not Meet Criteria for Establishing Class B**

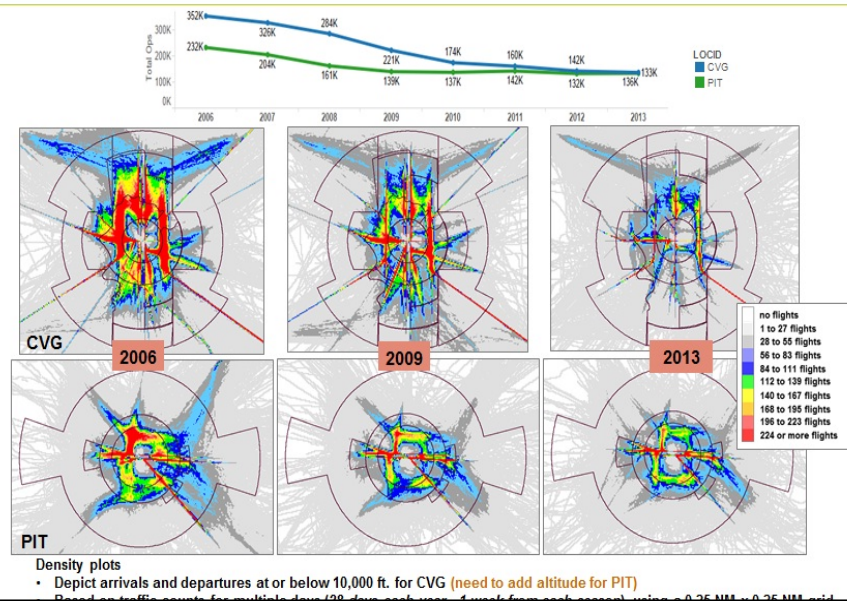


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## Decrease in Class B Airspace Usage CVG and PIT Examples



## Additional Observations

- “There is a process for establishing Class B airspace but the process to revoke it is not as well-defined” –MITRE Class B Study, 2014
- “Class B airspace-related criteria, processes, and design could be updated with more current data sources and research” – MITRE Class B Study, 2014

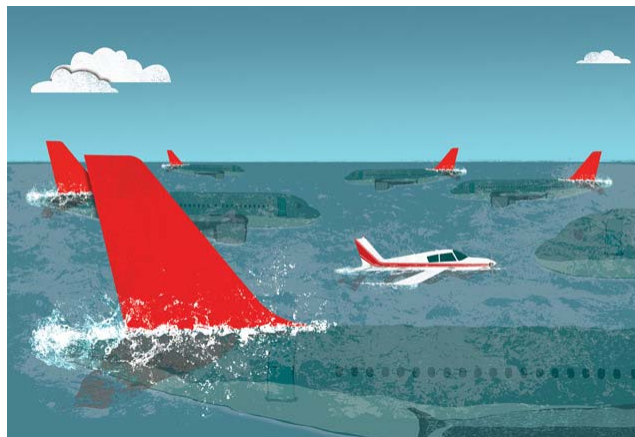
## Moving Forward

### Future Meeting Dates:


- Thu Feb 19<sup>th</sup>
- Thu Mar 29<sup>th</sup>
- Week of Apr 6<sup>th</sup>
- Week of May 4<sup>th</sup>
- Additional meetings as required
- Submit final report for consideration at July TOC meeting

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## Questions?



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## **TOC Action**

Consider for approval:

***Class B Airspace  
Terms of Reference***

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## **Airport Construction Task Group**

Mark Hopkins, Delta  
Chris Oswald, ACI-NA

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## Task Objectives


- Lessons Learned (Case Studies)
- Evaluate FAA Planning Tools
- Evaluate FAA Processes
- Understand Stakeholders
- Outreach Strategies
- Managing Safety Risk

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## Task Group Participation

- Who is currently on the Task Group:
  - Mark Hopkins (Delta)
  - Chris Oswald (ACI-NA)
  - John Dermody (FAA)
  - Susan Pflingster (FAA)
  - Vincent Cardillo (Massport)
  - Paul Martinez (DFW)
  - Paul Shank (BWI)
  - Ralph Tamburro (PANYNJ)
  - Ric Loewen (NATCA)
  - Capt. Steve Jangelis (ALPA)
  - Rick Kessel (ALPA)
  - Glenn Morse (United)
  - Celia Fremburg (Landrum/Brown)
- Seeking Additional FAA participants:
  - Tech Ops
  - Flight Procedures
  - Performance Analysis
  - Khalil Kodosi
  - Kent Duffy
  - Command Center
  - ACAC
- Seeking Additional Industry Participants:
  - Management pilot
  - Performance engineering
  - Network scheduling
  - AOPA
  - NBAA
  - AAAE
  - Others interested from the TOC

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## Timing

- Forming Task Group by 3<sup>rd</sup> week of February
- Initial meeting in early March
- Intend interim deliverable in July TOC meeting
- Final deadline in Q2 FY 2016 (about 1 year from now)

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## Other Business

New Task: National Procedure Assessment Initiative  
RTCA-IATA Partnership  
RTCA Symposium Awards

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## **New Task: National Procedure Assessment Initiative**

Lynn Ray, FAA

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## **New Task: National Procedure Assessment Initiative**

- National Procedures Assessment (NPA) Initiative
  - Establish a repeatable process and plan to cancel redundant or excess procedures and reduce the maintenance costs associated with them
- Two processes used for publication or cancelation of procedures:
  - (1) Regulatory, which includes airways, routes, and instrument flight procedures that require rulemaking
  - (2) Nonregulatory which includes SIDs and STARs and don't require rulemaking

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## NPA Task Request

FAA Requests TOC to address following by 4<sup>th</sup> Quarter FY 2015:

1. **Review and validate current NPA Initiative** assumptions and criteria developed to date for regulatory and non-regulatory tracks
2. **Review proposed FAA implementation plans** for both tracks and provide feedback and recommendations as needed.
3. **Assess effectiveness of the outreach planned and accomplished** by FAA and recommendations for improvement.
4. Provide recommendations on what assumptions and criteria should be considered to **advance the NPA Initiative** beyond its current scope to encompass the remaining conventional and PBN routes and procedures.

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## National Procedure Assessment Initiative

- Interested parties?

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## **RTCA-IATA Partnership**

Jennifer Iverson, RTCA

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## **International Initiative**

- **IATA & RTCA Partnership**
  - Promote a seamless air transportation system for operators
  - Expand marketplace for suppliers of products
- **First Project - Task Force in Latin America**
- **Facilitated by ICAO South America Regional Office, Lima, Peru**
  - ANSPs – November 2014 – ICAO, Lima, Peru
  - Industry Day – February 6, 2015 – RTCA, Washington DC



## South America Task Force

- Industry Day – Baseline Understanding of Initiative, Steps and Goals
- Overview
  - Based on ICAO Developed Aviation System Block Upgrades (ASBUs)
  - Starting with South American Performance Based Implementation Plan
  - Modeled after RTCA Task Force 5 Approach
  - Mapped ASBUs to TF5 Elements and NAC Tier 1 A&B, Tier 2 Priorities



## RTCA Symposium Awards



- At Annual Symposium, RTCA gives awards for
  - Outstanding Leadership
  - Significant Contributors
- Plan to integrate TOC into Awards ceremony this year
- Call for nominations will be made to TOC members
  - Nominations will be provided to Trin Mitra
  - Committee of Margaret Jenny, Jim Bowman, Dale Wright and Lynn Ray will evaluate



## Anticipated Issues for Next Meeting

May have a 1-2 hour phone call ~ May:

- Approval of GPS ABC report
- Approve TORs for Airport Construction and NPA

Multiple recommendations expected at July TOC meeting

- NOTAM Feedback Phase 2 Implementation
- Interim report from Airport Construction
- Class B Airspace Criteria
- Eastern Regional Task Group – Caribbean Operations

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## Closing Comments

### Co-Chairs:

Jim Bowman, FedEx Express

Dale Wright, NATCA

### Designated Federal Official:

Lynn Ray, Federal Aviation Administration

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Next Meetings:  
*May 2015 Phone Call TBD*  
July 21, 2015  
*November 2015*

Washington, DC

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**Adjournment**

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RTCA Paper No. 249-14/TOC-16

November 20, 2014

**Meeting Summary, November 20, 2014**  
**Tactical Operations Committee (TOC)**

The seventh meeting of the Tactical Operations Committee (TOC), held virtually on November 20, 2014, convened at 9:00 a.m. The meeting discussions are summarized below. The following attachments are referenced:

- Attachment 1 – List of Attendees
- Attachment 2 – Presentations for the Committee (containing detailed content of the meeting)
- Attachment 3 – Summary of the September 3, 2014 TOC Meeting
- Attachment 4 – Eastern Regional Task Group Caribbean Tasking Letter
- Attachment 5 – Eastern Regional Task Group Appendix to Terms of Reference
- Attachment 6 – Class B Tasking Letter
- Attachment 7 – Airport Construction Tasking Letter
- Attachment 8 – NPA Initiative Draft Tasking Letter
- Attachment 9 – FAA Article on NOTAM Search

**Welcome and Introductions**

Committee Co-Chairs, Mr. Jim Bowman, Vice President of Flight Operations at FedEx Express, and Mr. Dale Wright, Director of Safety and Technology at NATCA, called the meeting to order and welcomed the TOC members and others in attendance. All TOC members and attendees from the public were asked to introduce themselves (TOC members and General Public Attendees are identified in Attachment 1).

Mr. Bowman and Mr. Wright reviewed the agenda and began the proceedings of the meeting.

**Designated Federal Official Statement**

Ms. Elizabeth “Lynn” Ray, Vice President of Mission Support for the Air Traffic Organization (ATO), and the Designated Federal Official of the TOC, read the Federal Advisory Committee Act notice governing the open meeting.

**Approval of September 3, 2014 Meeting Summary**

The Chairs asked for and received approval of the written Summary for the September 3, 2014 meeting (Attachment 3).

### **Introduction of New TOC Tasks**

Mr. Trin Mitra, RTCA, introduced four new tasks that the FAA is in process of requesting of the TOC. For each task, Ms. Ray provided an overview and the TOC provided input on leadership and participation, where appropriate. The summary of each task discussion is below:

#### *Operations in the Caribbean*

Mr. Joe Bertapelle, JetBlue, began the discussion on this task by providing a review of the operational issues in the region. Mr. Bertapelle noted the airspace challenges in South Florida, in San Juan, as well as in the region between Florida and San Juan. He also discussed various infrastructure needs in the region, such as frequencies, data exchange with foreign Air Navigation Service Providers (ANSPs) and ADS-B coverage.

Ms. Ray then provided an overview of the task from the FAA perspective. This task (included as Attachment 4) requests the Eastern Regional Task Group (ERTG) to provide recommendations to the FAA on how to prioritize resolutions to the efficiency, delay and safety concerns resulting from growth of operations in the Caribbean. The task asks the Eastern RTG to submit a report to the TOC with recommendations in June 2015. This task has an existing Task Group (ERTG) with Terms of Reference and Leadership in place.

Ms. Ray emphasized the FAA's interest and excitement for this task but also communicated the reality that the people who do the airspace and infrastructure work to resolve such issues are in high demand. She stated that any prioritization from the Eastern RTG would be valuable in guiding the FAA on how to sequence the solutions in Caribbean region. She also noted that the FAA would provide a list of Subject Matter Experts to the Eastern RTG.

Mr. Bertapelle then discussed the ERTG's plan to conduct the work on this task. The Task Group would be meeting in early January and anticipated a monthly meeting in either Miami or San Juan through April. The group planned to submit its recommendations at the June TOC meeting.

Finally, an Amendment to the RTG Terms of Reference, focusing on the Caribbean Operations tasking (included as Attachment 5), was presented to the TOC for consideration. The TOR Amendment establishing the ERTG Caribbean task was approved by consensus by the TOC.

#### *Class B Airspace*

Ms. Ray next gave an overview of a tasking related to Class B airspace. She stated that the FAA was interested in strengthening the process and procedures for both adding Class B and removing Class B airspace that no longer fit the criteria. The task (included as Attachment 6) requests recommendations regarding the evaluation requirements and process for Class B airspace design or elimination. The task asks for recommendations by June 2015. This group has Leadership identified;



however, terms of reference are still to be developed along with establishing the members of the group.

A TOC member inquired if the task request was specific to a part of the country or focused on a particular airspace. Ms. Ray answered that the task was not designed to focus on a specific airspace. However, she also noted that examining specific case studies may be appropriate in informing how Class B evaluation could or should evolve in the future.

Mr. Mitra then introduced the leadership of this Task Group: Ms. Melissa McCaffrey of the Aircraft Owners and Pilots Association and Mr. Phil Santos of FedEx Express.

Finally, TOC members voiced input on participation on the Task Group itself. Multiple members communicated the sentiment that having General Aviation involved and in a leadership role was a strong fit for this activity. Additionally, representation from the military, a pilot organization, business aviation, airports and MITRE all expressed an interest in having representation from their organization on the Task Group.

#### Airport Construction

Ms. Ray next introduced a new task (included as Attachment 7) related to airport construction. She described the task as both complicated and “action-packed.” Ms. Ray noted that this task crossed multiple lines of business within the FAA, notably the Air Traffic and Airports Organizations. The task requests TOC recommendations on a series of issues related to airport construction, with emphasis on both the operational efficiency and safety impacts from construction. The task requests understanding best practices from historical construction projects, review of tools and agency processes, recommendations on stakeholder outreach and management of safety risk introduced by construction. TOC Leadership is in process of identifying leadership for this task as well as required participants, and recommendations are requested by March 2016.

Ms. Ray noted that there may not be one single answer from this effort as there may not be a “one-size-fits-all” resolution to the issues around airport construction.

A TOC member from an airports perspective mentioned that airports today already have substantial guidance and requirements during airport construction. The airports community saw this task as an opportunity to integrate a “patchwork” of existing processes and guidance to make it work more effectively. Hence, identification of gaps and inconsistencies in current processes would be important to this task. The TOC member also noted that communication between different stakeholders has traditionally been a stage in which collaborative processes break down.

A TOC member from an airports perspective advocated that an individual with airport operational experience would be required for a lead role. The individual also stressed that involvement of a large airline in the other lead role would be required. Another TOC member stressed that this task required a multi-faceted approach and any leadership, particularly from an airline, would require a breadth of knowledge across airport operations, surface operations, flow management, etc.

TOC members from both airport and airline organizations expressed an interest to begin identifying candidates for Task Group leadership during the rest of the calendar year 2014.

### National Procedure Assessment (NPA) Initiative

Finally, Ms. Ray introduced a draft tasking on the National Procedure Assessment (NPA) Initiative. The tasking letter (included as Attachment 8) requests TOC recommendations on the FAA's assumptions and criteria developed to date in the NPA Initiative. This initiative seeks to establish a repeatable process and plan to cancel redundant or excess procedures in the National Airspace System (NAS). The TOC expects a final tasking letter early in calendar year 2015 and to review a Terms of Reference on the NPA initiative at its next meeting in February 2015.

One TOC member noted that knowledge of approach operations would be important to this activity. Another TOC member stated that ultimately the count of the number of times an approach is used would not be the only criteria; instead the criticality of the approach to access an airport in or out would be most important to consider.

### **Status of Existing Tasks**

Mr. Mitra provided a brief update to the TOC members about existing tasks:

#### NOTAM Task Group

Mr. Mitra informed the TOC that the FAA launched the NOTAM Search website on November 13, 2014. The site, available to the public at <http://notams.aim.faa.gov/notamSearch/>, is designed to address the requirements of the Pilot's Bill of Rights legislation which calls for making NOTAMs easier to access, search and filter. During 2014, the Tactical Operations Committee (TOC), in its role as the NOTAM Improvement Panel, delivered a series of recommendations to the FAA. The recommendation "NOTAM Search and Filter Options" provided prioritization of new functionality in NOTAM Search. From these recommendations, the FAA developed a four phase implementation plan to deploy NOTAM Search with Phase 1 launching on November 13th. The FAA provided an article it was using to communicate the launch of the NOTAM Search website for any interested parties to share within their organizations (included as Attachment 9).

Mr. Mitra noted that the NOTAM Task Group is currently in process of evaluating NOTAM Search and compiling its feedback. The group will convene in December to prioritize feedback on the Phase 1 implementation and provide recommendations on the matter to the TOC in February 2015. Some TOC members expressed an interest to provide feedback in this process and Mr. Mitra committed to send the template for feedback to the TOC.

#### VOR Minimum Operating Network (MON)

Mr. Mitra briefed the TOC on proposed changes to the Terms of Reference for the VOR MON Task Group (included in the presentation materials of Attachment 2). The task group has one additional task remaining (Task 3) which centers on the Performance Based Navigation (PBN) Route Strategy. The wording changes in the VOR MON Terms of Reference focus on understanding the Task Group's input on criteria surrounding developing and evaluation of the route strategy. The proposed TOR change was presented to the TOC and approved by consensus.

### **Briefing on Time Based Flow Management (TBFM)**

Ms. Sherrie Callon, FAA, briefed the TOC on TBFM. The briefing materials are included in the presentation materials in Attachment 2. Ms. Callon explained to the TOC that the Air Traffic Procedures Directorate had been established to execute the vision of TBFM. Ms. Callon reviewed a number of topics including the history of TBFM, a recent study group and its findings, policies and procedures for TBFM, training, new capabilities, etc.

The briefing generated a number of questions from TOC members. One inquired whether the FAA had a standard definition of metering that would guide when the FAA would utilize metering. Ms. Callon responded that only “time on the glass” for an air traffic controller was considered metering. She stressed the need for common language and understanding across all stakeholders and facilities and that this was a priority item for TBFM.

Another TOC member inquired if the FAA’s software support team is robust enough to do all of the adaptation work required to implement TBFM across the NAS. Ms. Callon discussed how the TBFM team is working to deploy “adapters” across the country and that they understand that adaptation is key to getting the best result.

A TOC member inquired what the status was of sharing and integrating data from the non-movement area at departure to the non-movement area at arrival. Ms. Callon responded that there is a well understood need to connect surface-level data to TBFM such that planning can be done with both surface and TBFM in mind. However, this is not yet implemented.

During the briefing, Ms. Callon mentioned that the FAA planned to deploy Integrated Departure Arrival Capability (IDAC) to 68 terminals over the next 4 years. A TOC member inquired whether there would be transparency on what those additional 68 sites would be. Ms. Callon responded that she would inquire with the Program Management Office to determine if the list of locations could be shared.

Finally, a TOC member re-emphasized the need for robust information sharing. The member noted that TBFM was an application that had far reaching impacts outside of the FAA and currently operators have a lack of visibility on those impacts. The individual applauded the FAA’s expected deployment of an aircraft’s release time in Flight Schedule Monitor but that this was only a start. Also, data related to benefits – reduced delay and holding – was currently anecdotal and for the industry to make business cases to its internal financial leadership, it needs data and metrics. The TOC member made a request that the TOC Leadership consider a tasking on TBFM related to increased collaboration between industry and the FAA.

### **Briefing on National Special Activity Airspace Program (NSAAP)**

Mr. Rob Hunt, FAA, briefed the TOC on NSAAP. The briefing materials are included in the presentation materials in Attachment 2. Mr. Hunt spoke about the NSAAP program, its history, plans and its current status. He stressed the ongoing budget challenges in the FAA and noted that funding for the NSAAP program was difficult to maintain. A TOC member responded by expressing his

appreciation to Mr. Hunt and the team at the FAA for moving forward on NSAAP after the program had stalled a few years back. The member noted that NSAAP was a “win-win” for all parties involved and it was confusing why the FAA struggled to fund the program.

The TOC member continued, noting that operational use of NSAAP would begin to become more critical in the future. As an example, he mentioned that when airspace is recalled, NSAAP would need to determine certain cutoff times such that operators planning to use the airspace would have ample notice of any changes. Such specific details on how to manage engagement with Special Activity Airspace (SAA) will need clarity, and the member recommended beginning to do some of this coordination now. Mr. Hunt echoed that there may be a rationale for the TOC and the NSAAP program to engage in the future.

Finally, a TOC member inquired if there were any required interfaces to access the data from NSAAP. Mr. Jim Perkins, FAA, responded by informing the members that the data was available via SWIM Services.

#### **Discussion on UAS and Commercial Space IPTs**

Ms. Ray briefly discussed IPTs that were forming in the ATO for Commercial Space and UAS. For Commercial Space, she noted that the Mission Support organization was in process of evaluating strategic questions around how launches are handled today and what issues needed consideration. There were potential policy implications, particularly around airspace access, inherent in establishing space ports. The IPT would continue to understand these significant strategic issues.

Ms. Ray also spoke about an IPT forming for UAS. She noted that the Air Traffic Organization (ATO) was organizing itself to best support the Flight Standards Organization (AFS), which was the FAA’s single voice on unmanned aircraft. The intent of the IPT was to support AFS and provide additional support to activities such as RTCA Special Committee 228. The IPT is expected to be in place by January 2015.

#### **RTCA / IATA Partnership**

Ms. Jennifer Iverson, RTCA, provided a briefing (included in briefing materials in Attachment 2) to the TOC regarding RTCA’s partnership with IATA to build consensus outside of the United States on implementation of the ICAO Aviation System Block Upgrades.

#### **Anticipated issues for TOC consideration and action at the next meeting**

At the next meeting, the Committee will further discuss the potential of a new TOC tasking focused on Time Based Flow Management (TBFM).

#### **Other business**

No other business was raised.

**Adjourn**

Chairmen Bowman and Wright ended the meeting of the Committee at 12:00 p.m.

**Next Meeting**

The next meeting of the TOC is February 5, 2015 in Washington, DC.



**Approved by the Tactical Operations  
Committee February 2015**

## **NOTAM Search Phase 1 Implementation**

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*Report of the NOTAM Task Group in Response to Tasking from  
The Federal Aviation Administration*

*February 2015*

## NOTAM Search Phase 1 Implementation

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## Background/Introduction

The Federal Aviation Administration (FAA) is required under Section 3(c) of Public Law 112-153, also known as the 2012 Pilot’s Bill of Rights (“PBoR”), to “establish a NOTAM Improvement Panel, which shall be comprised of representatives of relevant nonprofit and not-for-profit general aviation pilot groups, to advise the Administrator in carrying out the goals of the NOTAM Improvement Program.” The FAA would like to build on the progress already derived from previously established efforts to digitize NOTAMs to comply with the provisions of this law.<sup>1</sup>

The Tactical Operations Committee (TOC) serves as the NOTAM Improvement Panel to further assist the Administration in crafting specific goals and priorities to meet the law’s intent and make needed enhancements to the NOTAM program. In this capacity, the TOC is relying on the NOTAM Task Group (TG) to provide specific recommendations on issues related to the NOTAM program.

The work of the panel will yield an increasing amount of standardized digital NOTAMs that can be more easily filtered, sorted, and prioritized. This should result in a significant reduction in the volume of NOTAMs pilots must currently review and allow pilots to focus only on those NOTAMs relevant to their flight plan/path. As a result, pilots will be more confident in the quality and accuracy of this focused NOTAM information, and the safety of the National Airspace System (NAS) will be improved.

The panel is currently in process of providing feedback to the FAA on the implementation of the NOTAM Search website.

## Task and Approach

In previous FAA responses to NOTAM Improvement Panel recommendations, the FAA requested “working meeting[s] between the members of the Task Group and the Federal NOTAM System (FNS) engineering and development teams to define stakeholder requirements for some of the specific requests.” The Task Group Leadership engaged directly with the FNS team previously and provided clarification of search and filter terms, prioritization of search and filter options and other specific inputs. Much of the input of the NOTAM Task Group formed the NOTAM Search implementation plan for the FAA.

Building upon these interactions, the FAA requested the NOTAM Improvement Panel continue to provide feedback to the FAA after NOTAM Search implementation. The FAA crafted a four phase plan and the NOTAM Task Group agreed to provide feedback after each phase of implementation.

The NOTAM Task Group evaluated the NOTAM Search Phase 1 implementation during November-December 2014 and compiled feedback. Raw feedback is available on the RTCA Workspace sharing site for the NOTAM Task Group. The Task Group met with the FAA in December 2014 to review and discuss the feedback. The summary of that meeting forms the body of this recommendation document.

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<sup>1</sup> Letter from Elizabeth L. Ray (Vice President, Mission Support Services) to Margaret Jenny (RTCA President) dated July 10, 2013.



## Feedback on NOTAM Search Phase 1 Implementation

The following sections represent the summarized feedback from the NOTAM Task Group regarding the first phase of implementation of NOTAM Search:

### Broad Considerations for NOTAM Search

1. The Task Group discussed the disclaimer upon entry to the NOTAM Search website. The disclaimer states: *“This site is informational in nature and is designed to assist pilots and aircrews for flight planning and familiarization. It may be used in conjunction with other pre-flight information sources needed to satisfy all the requirements of 14 CFR 91.103 and is not to be considered as a sole source of information to meet all pre-flight action.”* The Task Group learned that the disclaimer language was developed in August 2013 to communicate that NOTAM Search serves as a valid source for pilots to use in meeting the requirements of 14 C.F.R. 91.103. However, the requirements in 14 C.F.R. 91.103 go beyond the information provided by NOTAM Search and include additional requirements, such as weather information. Hence, NOTAM Search should be considered a valid, but not a sole source, for meeting the requirement.
2. Consider adding the option to select a VFR vs IFR flight.
3. Consider ways to communicate how one would utilize the functionality beyond a printed user guide. The idea of utilizing videos for training was suggested.
4. The Task Group noted that a user may want to download the content from NOTAM Search on a tablet and access it while flying the airplane. After being on the airplane, the user may wish to filter or sort the content while offline using the NOTAM Search interface in an offline mode.
5. The group suggested for mobile applications that the FAA replicate the functionality of [www.faa.gov/mobile](http://www.faa.gov/mobile).
6. The Task Group observed that if one changes the sequence in NOTAM Search through sorting, it does not change the sequence of the printed NOTAMs. This raised questions on what the approach should be for printing. Should it print how the user sorts the information? Or is it preferred to have a standard sequence of how NOTAMs are printed?

### General Suggestions for Website

7. The group requested improvements in how counts are depicted to the user. There are counts for the total number of NOTAMs, the number filtered out and the number remaining. Currently the information is in multiple places and the presentation of the information can be improved.
8. The group suggested the FAA consider viewing the route string space separated (and not comma separated) as that is industry standard.
9. When using data/time filters, there should be an option to click to open a calendar to select the date.
10. The site should provide guidance and clarity to the user that the system does not accept SIDs/STARs in the flight path tool.
11. There should be a way for the user to see full NOTAM text without having to go to another screen. This may include seeing the full text by hovering, using wrapped text, a “see more/see less” button, etc.



12. If the user goes to a new window to see full text (or anything else) and returns to the list of NOTAMs, the user wants to return to the spot where he or she was before (not the top of the list as it is now).
13. The Flight Path screen should include “Show ARTCC” and “Show TFR” on the same side with clarity that ARTCC is superset and TFR is subset.
14. There needs to be a distinction between 4 letter and 3 letter codes in Location Search (i.e., when searching ZZV the search could be with respect to an airport or the VOR).
15. For pointer NOTAMs, there should be a tab or a link with the content of the NOTAMs that are pointed to.
16. The group recommends to categorize NOTAMs by their keywords (and a few other items) and not by Class. The Class column should be replaced with one called “Category”.
17. For search categories (Location, Flight Path, etc.), the group requests the site provide a description if you hover over it. This is particularly relevant for lesser known categories like “Accountability.”
18. Letters to Airmen (LTA): the group suggests to provide the full text in the NOTAM Search individual line item; but users do not want the full text if you download the content to PDF.

### Specific Fixes for Website

19. The group found the “Counts” icon to be confusing and requested it be replaced.
20. Currently, the archive search export to a PDF does not show you what you searched in the header.
21. The group requested that the label “Help” be changed to “User Guide”.
22. There are date format differences when using the Safari web browser.
23. There was question of whether the time filter is based on UTC or local time and the group suggested including the label of “Zulu time”.
24. The group requested an “End of Report” label.
25. The PDF export has extra header labels that increase the page count.
26. For the User Guide, start the text on the first page at the top of the page.
27. The group noted bugs during scrolling and requested these be fixed immediately.
28. The group requested that the search history recall the last 10 and not the last 5 searches. This was deemed to be a lower priority.

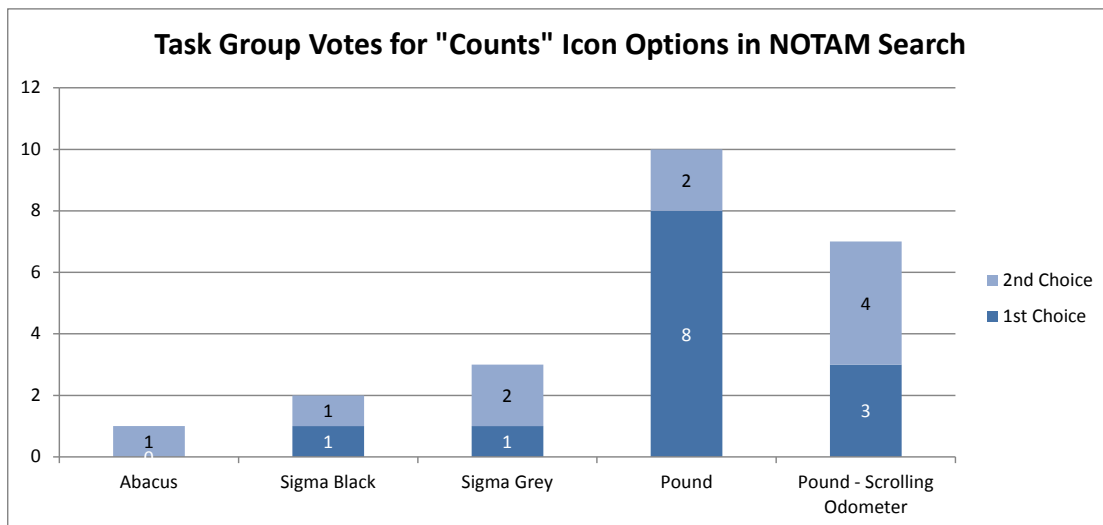
### Feedback on the “Counts” Icon

The Task Group was asked by the FAA to provide specific feedback on the “Counts” icon which is referenced in Comment #19 above. The FAA Human Factors organization provided the following set of alternatives and asked for Task Group input on a preferred option:

|                           |   |
|---------------------------|---|
| 1. Abacus                 |  Counts 33 ▾ |
| 2. Sigma Black            |  Counts 33 ▾ |
| 3. Sigma Grey with Border |  Counts 33 ▾ |

|                               |               |
|-------------------------------|---------------|
| 4. Pound Black                | # Counts 33 ▾ |
| 5. Pound – Scrolling Odometer | # Counts 33 ▾ |

Task Group members were requested to provide their first and second choice for the Counts icon. Thirteen members of the Task Group responded and the results are depicted in the chart below. The results suggest a majority of the Task Group prefers the Pound or Pound-Scrolling Odometer icon to represent “Counts” in NOTAM Search.



The Task Group noted that it may be more appropriate to label this icon as the singular term “Count” versus “Counts”. If the intent of the icon is to represent the single total count of NOTAMs from a search, then the singular term may be more appropriate.

## Next Steps

The next scheduled release for NOTAM Search is March 5, 2015 and will focus on User Profiles. The NOTAM Task Group plans to schedule a meeting with the AIM office in March to review the site and compile feedback.

## Appendix A: Members of the NOTAM Task Group

|                      |  |                   |  |
|----------------------|--|-------------------|--|
| Chris Baum           | Air Line Pilots Association                              | Bob Lamond        | National Business Aviation Association       |
| Rich Boll            | National Business Aviation Association                   | Jeffrey Miller    | International Air Transport Association      |
| Dave Bradshaw        | Federal Aviation Administration                          | Jim Mills         | U.S. Air Force                               |
| <b>Mark Cardwell</b> | <b>FedEx Express (Co-Chair)</b>                          | Trin Mitra        | RTCA, Inc.                                   |
| Andy Cebula          | RTCA, Inc.   | David Newton      | Southwest Airlines                           |
| Jocelyn Cox          | CNA  | Glenn Sigley      | Federal Aviation Administration              |
| Trish Gay            | Federal Aviation Administration                          | Ashish Solanki    | Maryland Aviation Administration             |
| Adam Gerhardt        | TASC, Inc.   | Edwin Solley      | Southwest Airlines                           |
| Steve Habicht        | CNA  | Harold Summers    | Helicopter International Association         |
| Shaelynn Hales       | CNA  | Brandi Teel       | RTCA, Inc.                                   |
| Jack Hurley          | Delta Air Lines, Inc.                                    | Robert Utley      | National Air Traffic Controllers Association |
| Ezra Jalleta         | The MITRE Corporation                                    | David von Rinteln | Hewlett Packard                              |
| Scott Jerdan         | Federal Aviation Administration                          | Michael Williams  | Hewlett Packard                              |
| Christian Kast       | United Parcel Service                                    | Diana Young       | Federal Aviation Administration              |
| Des Keany            | American Airlines, Inc.                                  |                   |  |
| <b>Tom Kramer</b>    | <b>Aircraft Owners and Pilots Association (Co-Chair)</b> |                   |  |



U.S. Department  
of Transportation

**Federal Aviation  
Administration**

DEC 10 2014

Ms. Margaret Jenny  
President  
RTCA, Inc.  
1150 15<sup>th</sup> Street NW  
Washington, DC 20036

Mission Support Services  
800 Independence Avenue, SW.  
Washington, DC 20591

Dear Ms. Jenny:

In September 2014, the Tactical Operations Committee (TOC) provided the FAA the report "VOR MON Outreach, Education and Required Modifications" in response to Task 4 of the Very High Frequency Omni-Directional Range (VOR) Minimum Operational Network (MON) tasking. The FAA appreciates the work of the TOC in providing this report and will use the recommendations by the TOC in the outreach and education activities for the VOR MON program. These recommendations were in three broad areas: 1) the process for decommissioning VORs to achieve the MON, 2) community outreach and education before and during implementation of the MON and 3) required modifications and mitigations to successfully implement the MON. The FAA reviewed the TOC's recommendations and provides the following response.

**Recommendations on Process for Decommissioning VORs to Achieve the MON:**

1. **At the beginning of the process, the FAA should notify the public concerning the full list of VORs to be planned for decommissioning; this should be done via non-rulemaking action such as an Advisory Circular (AC). If the FAA chooses to use ACs, publication of ACs could include one for the entire MON Program or one for each Service Center. In either case, the list(s) should be broken down by State. The FAA agrees with the recommendation on notifying the public of the full list of VORs to be planned for discontinuance. However, the FAA intends to use a Federal Register notice to announce the VOR MON final policy, address the targeted NAS end state, provide the candidate list of VORs under consideration, and announce the manner in which the FAA will be soliciting public comments through existing processes under multiple non-rulemaking circular notices and, as appropriate, subsequent rulemaking NPRMs as the project progresses.**
2. **Process for decommissioning should separate the notification (non-rulemaking) component from the rulemaking components to not stall the process necessarily. The FAA agrees with the recommendation.**
3. **The process for collecting, evaluating and adjudicating public comment should be communicated clearly in the notification of the VOR MON. The FAA agrees with the recommendation.**

**Recommendations for Outreach and Education on the VOR MON**

1. **The overarching theme about the VOR MON should relate to the transition to Performance-Based Navigation (PBN) and NextGen. The FAA agrees with the recommendation and understands that VOR MON is happening as a result of the Planned PBN transition and supports NextGen plans.**
2. **To ensure transparency, the FAA should provide a published VOR MON plan, including plans for decommissioning VORs, as soon as possible. The FAA agrees with the recommendation and will provide information about the Plan as soon as is available.**

3. **Recommendations on Tools for Communication about the VOR MON - FAA should accept the support of industry organizations to help communicate the message about the VOR MON.** The FAA agrees with the recommendation and will continue to work with industry organizations to communicate the message about the program.
4. **Utilize the internet and social media to communicate about the VOR MON.** The FAA agrees with the recommendations and will explore the idea of using the internet to communicate information about the VOR MON program.
5. **The FAA should actively reach out to Legislative Staff to ensure they understand the Program and the approach and rationale for decision-making.** The FAA will coordinate this recommendation with our legislative affairs office that can assist with feasibility and strategy of reaching out to Legislative Staff.

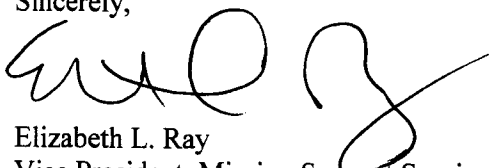
#### **Required modifications and mitigations to successfully implement the MON**

The FAA appreciates the additional insight into these additional areas of consideration including:

1. **Required Modifications to Procedures:** The FAA will catalogue all known uses, procedures and other non-navigation services of VORs proposed for decommissioning. The FAA will substitute/mitigate or remove these uses, as appropriate and practicable, prior to the VOR being decommissioned.
2. **One Engine Inoperative:** The FAA agrees with the recommendation that operators retain responsibilities for the update of these procedures. The FAA agrees to the recommendation to provide the plan early to allow operators time to address these types of impacts.
3. **Required Modifications to Publications:** The FAA will include publication impacts as part of the MON analysis
4. **Required Modifications to Notifications**
  - a. The VOR MON team has started collaboration with the Aeronautical Charting Forum on MON charting issues
  - b. GPS NOTAMs are outside the scope of the VOR MON program, but these issues are being considered by the Coordinating Organization on GNSS and the NAS Enterprise Operations Office
  - c. The VOR MON team is considering changes to restoration priorities as part of implementing the MON. Additionally, changes to policies of when to release VORs for maintenance may need to be revised
5. **Required Modifications to Training and Operations:** Outcomes from the Aeronautical Charting Forum will help the FAA focus on what changes to pilot and air traffic controller training is required. Flight Standards Office will be engaged to address changes to pilot training.

If you have any questions, please contact Rowena Mendez-Ruano at 202-267-4540 or Dale Courtney at 202-267-4537.

Sincerely,



Elizabeth L. Ray  
Vice President, Mission Support Services  
Air Traffic Organization



**Approved by the Tactical Operations  
Committee February 2015**

## **VOR MON Response to Task 3 Request**

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*Report of the VOR MON Task Group in Response to Tasking from  
The Federal Aviation Administration*

*February 2015*

## VOR MON Response to Task 3 Request

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## Background/Introduction

In order to transition from the use of a very high frequency (VHF) Omni-directional Range (VOR) based route structure to one based on Performance-Based Navigation (PBN), the VOR Minimum Operational Network (VOR MON) Implementation Program was established by the Federal Aviation Administration (FAA). It is one of many activities required to shift resources and operations from the legacy National Airspace System (NAS) to NextGen. The VOR MON Task Group (TG) was tasked by the RTCA Tactical Operations Committee (TOC) in July 2013 to provide recommendations to the FAA on the MON Implementation Program.

The VOR MON Program went before the FAA Joint Resources Council (JRC) and was approved for Investment Analysis Readiness Decision (IARD) in March 2014. A Final Investment Decision (FID) is expected in September 2015. Originally, plans for the VOR MON expected completion of the MON program in 2020 with approximately 500 VORs slated for decommissioning. However, recent assessment of the procedural modifications required to implement the MON along with negotiations with the Department of Defense have scaled the VOR MON Program back to a total of approximately 300 VORs. The Program intends to decommission 100 VORs by 2020 and an additional 200 by 2025.

The VOR MON Task Group has completed three previous tasks for the FAA to review VOR MON selection criteria and assumptions, offer additional criteria, prioritize criteria and provide input on outreach for the VOR MON.

This response focuses on Task #3, which requests Task Group input on the PBN Route Concept of Operations and the Waterfall/Implementation Roadmap for the VOR MON. The Task Group response addresses four areas:

1. Waterfall for VOR MON
2. Publishing List of Phase 1 VORs
3. Feedback on PBN Route CONOPs
4. Relationship between VOR MON and PBN Route CONOPs

## Waterfall for VOR MON

The original intent of Task 3 was to focus on the Waterfall for the VOR MON program. However, from the inception of the VOR MON Task Group to today, there have been a number changes in the VOR MON Program. Namely, the Program, which was originally intended to decommission 500 VORs by the year 2020, now plans to decommission 100 by 2020 (Phase 1) and an additional 200 by 2025 (Phase 2). The need for Task Group input on the Waterfall was clear when the goal was decommissioning 500 VORs in five years. However, the number of VORs to decommission has been reduced and spread out over time. Hence, it is not as critical to solicit Task Group input on the Waterfall today, especially considering 30 of the initial 100 VORs are already offline.

The FAA stated that its initial focus on selecting VORs for Phase 1 decommissioning will be on those with the least impact on route structure. The Task Group believes this is a logical approach to begin implementation of the MON.

## **Publishing the List of Phase 1 VORs**

The FAA advised the VOR MON Task Group that the Program is funded for planning purposes. However, funding to actually shut down VORs may not be used until the program gets further approval in September 2015. These funds would be received after the new fiscal year for the FAA begins on October 1, 2015.

The VOR MON Task Group strongly reemphasizes previous recommendations to the FAA to allow the public to see the proposed list of VORs for decommissioning as early as possible. Page six of the Task Group's September 2014 recommendation on VOR MON Outreach states:

*“The Task Group strongly recommends that the FAA publish a list of all VORs planned for decommissioning at the beginning of the notification process. It is paramount to publish the full list upfront so there are no surprises to the public later in the process about which VORs are being shut down.”*

If the FAA receives funding in September as expected, and should any decommissioning begin early in FY2016, the Task Group expects the public response to be negative if the public is not provided the list of Phase 1 VORs early in CY2015. The potentially short time window from funding to the first decommissioning would likely result in the public questioning the transparency of the FAA's actions. While the Task Group cannot speak to the legal constraints within which the FAA is operating, it recommends the FAA publish a draft list of candidate VORs for the first 100 to be decommissioned as soon as practical.

## **Feedback on PBN Route CONOPs**

The VOR MON Task Group offers high commendation for the effort to develop the PBN Route Concept of Operations (CONOPs). The Group's assessment is that the CONOPs is a reasonable plan that, if fully implemented, would likely deliver many of the operational benefits it predicts – reduction in chokepoints, enhanced throughput, reduced propagation of delay, reduced controller or pilot task complexity, more efficient flight paths and greater predictability. These are meaningful benefits for the operational community. The Task Group's feedback is that the CONOPs is an appropriate step towards a PBN route structure and the FAA should continue to aggressively implement. The Task Group is aware that the effort is currently unfunded and recommends the FAA rapidly address this to ensure a robust national PBN route network is developed.

While the Task Group could provide input on the routes in a future PBN Route Network, or which routes to retain in the transition, it agrees with the assessment of the CONOPs team that development of the network will involve detailed work by a number of regional and overarching national workgroups.

## **Relationship Between VOR MON and PBN Route CONOPs**

The Task Group recommends that the FAA only link the VOR MON Program and the future PBN Route Structure together where necessary. The VOR MON and PBN Route Structure are related but parallel efforts. The PBN Route Structure should be funded and developed based on the operational needs of the National Airspace System (NAS) and not be constrained by the VOR network of the past. The primary connection between the PBN Route Structure and the VOR MON Program will be in the relationship between synchronizing the decommissioning of VORs and the implementation of PBN routing. As VORs are decommissioned and come offline, the FAA needs to ensure that PBN routes are available to backfill any Jet or Victor routes that are removed from the decommissioning of VORs. However, sequencing the deployment of the PBN Route Structure should be the only point of integration between the PBN Route structure and VOR MON program.

If the FAA fails to provide funding to the PBN Route Structure effort, the Task Group recognizes the ultimate route structure would be an incremental effort to plug gaps created by the implementation of the VOR MON program. This would not be the preferred approach to develop the future PBN Route Structure as it would miss the aspect of national alignment of routes.

Finally, the Task Group sees its work as complete and recommends sun setting the VOR MON Task Group.

## **Appendix A: Members of the VOR MON Task Group**

Philip Basso, DoD Policy Board on Federal Aviation  
Rich Boll, National Business Aviation Association  
Dale Courtney, Federal Aviation Administration  
Don Dillman, FedEx Express  
Bob Ferguson, NetJets Association of Shared Aircraft Pilots  
Denise Fountain, DoD Policy Board on Federal Aviation  
Jens Hennig, General Aviation Manufacturers Association  
Trevor Henry, Federal Aviation Administration  
Mark Hopkins, Delta Air Lines, Inc.  
Jerry Johnson, Thales Group  
Tom Kramer, Aircraft Owners and Pilots Association  
Bob Lamond Jr, National Business Aviation Association  
Deborah Lawrence, Federal Aviation Administration  
David Manville, U.S. Army  
Vince Massissimini, The MITRE Corporation  
Don McClure, Air Line Pilots Association  
Rowena Mendez, Federal Aviation Administration  
Trin Mitra, RTCA, Inc.  
David Newton, Southwest Airlines  
Rick Niles, The MITRE Corporation  
Robert Novia, Federal Aviation Administration  
Matthew Ross, Real NewEnergy  
Leonixa Salcedo, Federal Aviation Administration  
Edwin Solley, Southwest Airlines  
Stephen Sorkness, SkyWest Airlines  
Greg Tennille, The MITRE Corporation  
Brian Townsend, American Airlines, Inc.  
Robert Utley, National Air Traffic Controllers Association  
David Vogt, Delta Air Lines, Inc.

## Appendix B: VOR MON Task #3

Task 3 – Review implementation planning to date and make recommendations to the preliminary waterfall schedule developed by FAA. Provide a report documenting the following actions:

1. Examine and analyze the PBN Route Strategy in light of the VOR MON Program. Provide recommendations on what criteria the FAA should consider in developing implementation/waterfall scenarios. Advise the FAA of the pros and cons of each.
  - a. For example, how should the FAA think about which geographies to implement earlier and which later? What are the operators' needs and concerns?
  - b. Should the FAA proceed in depth in one geographical area or start in multiple areas at the same time?
  - c. What is most important to take into account - routes? SIDs/STARs? Which conventional SIDs/STARs need to be retained? FAA will provide the TOC with a draft copy of the PBN Route Strategy.
2. Provide recommendations on the criteria for which victor and jet routes should be retained in the 2013-2020 timeframe and why. Please include the range of options and/or alternatives discussed in the documentation.
3. Provide high level industry perspective on the feasibility and actions needed to implement the National Route CONOPs.



U.S. Department  
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**Federal Aviation  
Administration**

OCT 07 2014

RTCA Paper No. 219-14/SC159-1021

Margaret Jenny  
President  
RTCA Inc  
1150 18th St. NW, Suite 910  
Washington, DC 20036

Dear Ms. Jenny,

As stated in my letter dated February 21, 2014, the Federal Aviation Administration (FAA) is participating in a Department of Transportation plan to determine and refine the processes, assumptions and analyses believed necessary as the basis of proposals for non-space, commercial applications in the frequency bands adjacent to the Global Positioning System (GPS) signals. The FAA proposed use of RTCA, Inc., as the forum for vetting assumptions for the Adjacent Band Compatibility assessment in order to increase transparency and maximize acceptance by the civil GPS aviation community.

The attached document addresses the planned approach for the first phase of the FAA's Adjacent Band Compatibility assessment. This first phase is intended to inform future proposals for the use of spectrum adjacent to GPS and ensure existing and evolving aviation uses of GPS are not affected. The document includes scenarios, assumptions and methodologies, and proposes questions for RTCA to address. Please coordinate with SC-159 and other committees (e.g., TOC and SC-228) that might provide perspective on the proposed "exclusion zones". Should the committees have any questions, please contact Ken Alexander, AIR-131 Navigation Team Lead, (202) 236-9794, [ken.alexander@faa.gov](mailto:ken.alexander@faa.gov). To facilitate our efforts, we would appreciate receiving your response by March 31, 2015.

Thank you for your consideration.

Sincerely,

A handwritten signature in cursive script, appearing to read "Richard Jennings".

Richard Jennings  
Acting Assistant Manager  
Design, Manufacturing and Airworthiness Division, AIR-101

Enclosure:

FAA Adjacent-Band Compatibility Study Methodology and Assumptions, October 3, 2014

## 5 Areas of Operation

Appendix C contains an excerpt from the January 20, 2012, DOT/FAA *Status Report: Assessment of Compatibility of Planned LightSquared Ancillary Terrestrial Component Transmissions in the 1526-1536 MHz Band with Certified Aviation GPS Receivers*. . One key part of that assessment was the determination of where aircraft would operate relative to the LightSquared transmitter locations. In particular, the study introduced assumptions regarding effective aircraft “exclusion zones” including:

“For fixed wing aircraft: “In order to accommodate LightSquared transmitters that are mounted on towers where the tower may be included in the TAWS obstacle database, an exclusion zone is permissible as follows:

- a. For transmitters within 7.5 NM of an airport, if they are mounted on an obstacle that is taller than 100’ AGL, then an exclusion zone that is the intersection of a cylinder centered on the obstacle (500’ in radius and extending 100’ above the top of the obstacle) and the region below the obstacle clearance surfaces (as defined by the FAA 8260 series orders) for all instrument procedures. The exclusion zone extends down to the minimum altitude where coverage would be required by paragraph 1c, d, or e above. The FAA must also retain the ability to publish new instrument procedures and establish new airports without undue constraints.
- b. For transmitters more than 7.5 NM away from any airport, if they are mounted on an obstacle that is taller than 200’ AGL, then an exclusion zone that is a cylinder centered on the transmitter (500’ in radius and 100’ above the top of the obstacle), but not above 1000’ AGL (including effects of falling terrain). The exclusion zone extends down to the minimum altitude where coverage would be required by paragraph 1c, d, or e above.”

“For helicopters: In order to accommodate LightSquared transmitters that are mounted on towers where the tower is included in the HTAWS obstacle database, an exclusion zone is permissible. If they are mounted on an obstacle that is taller than 100’ AGL, then an exclusion zone is defined that is the intersection of a cylinder centered on the obstacle (500’ in radius and extending 100’ above the obstacle) and the region below the obstacle clearance surfaces (as defined by the FAA 8260 series orders) for all instrument procedures. The exclusion zone extends down to 100’ AGL. The FAA must also retain the ability to publish new instrument procedures or establish new heliports without undue constraints.”

Appendix A of the January 20, 2012 report provides additional detail, including operations not addressed in this excerpt. This annex should be consulted and additional comments provided as appropriate.

**Question #4 to RTCA: (c) Are the size and aggregated density of aircraft and helicopter exclusion zones where GPS-based TAWS/HTAWS alerts cannot be assured (Appendix C, section above, and reference [4]) sufficiently small so as to not impact flight safety? (d) Alternatively, what TAWS/HTAWS exclusion zones parameters should be considered?**

**Question #5 to RTCA: Comments are requested regarding the operational acceptability and safety implications for the proposed exclusions, operational limitations and safety considerations identified in Appendix C of this report and Annex A of the reference [4] report including any alternative suggestions and supporting rationale.**

**Question #6 to RTCA: (a) Considering the proposed fixed and rotary wing aircraft assumptions, exclusions, and limitations, are there safety impacts and operational limitations that are unique to small Unmanned Aircraft Vehicles (UAVs) operations? (b) If yes, please identify the unique operational use case scenarios and any associated safety and operational issues. (c) Propose additional assumptions and “exclusion zones” for consideration that would preclude the identified safety and operational issues (if any).**

**Please note that non-TSO compliant GPS equipment interference susceptibility may be substantially greater, or less than TSO approved receivers and antenna. Non-TSO GPS/GNSS**

*equipment is used for UAV navigation, positioning, attitude control and payload systems; electronic flight bags, installed equipment for situational awareness, experimental and Light Sport Aircraft. Susceptibility needs to be characterized for each make, model and antenna pair. operators, manufacturers and GPS suppliers should participate in the parallel DOT Volpe center GPS Adjacent-Band Compatibility activities to ensure any unique operational use cases are considered and their GPS equipment susceptibility is characterized*  
*(<http://www.rita.dot.gov/pnt/>)Volpe POC: Steve Mackey [stephen.mackey@dot.gov](mailto:stephen.mackey@dot.gov).*



## Appendix C Details for Areas of Aviation Operations

The following material is an excerpt from DOT/FAA “Status Report: Assessment of Compatibility of Planned LightSquared Ancillary Terrestrial Component Transmissions in the 1526-1536 MHz Band with Certified Aviation GPS Receivers”, January 20, 2012. Section numbering from that report is retained for traceability.

### 1.4 Area of Aviation Operation

GPS is ubiquitous and aviation has embraced it for a wide variety of applications. The GPS Standard Positioning System Performance Standard (GPS PS) specifies the coverage provided by GPS as:

The terrestrial service volume for the baseline 24-slot constellation and expandable 24-slot constellation coverage comprises the entire near-Earth region which extends from the surface of the Earth up to an altitude of 3,000 km above the surface of the Earth which is not physically obscured by localized obstructions.<sup>7</sup>

In addition, the FAA has invested over \$1B in an augmentation to GPS, the Wide Area Augmentation System, to meet stringent aviation standards for performance integrity. The coverage requirement for WAAS is defined in the WAAS Performance Standard, and is defined for various regions within the footprint of the WAAS geostationary satellites. The relevant zone for this evaluation is the conterminous United States, which is defined as:

**Zone 1** - Zone 1 is defined as the region from the surface up to 100,000 feet above the surface of the 48 contiguous states, extended to 30 nautical miles (nm) outside of its borders.<sup>8</sup>

The proposed LightSquared EIRP (62 dBm) in the 1526-1536 MHz band exceeds the aviation certified GPS receiver tracking threshold (-28.1 dBm, see Section 1.3) for that band by 92.1 dB even without accounting for safety margin. It is not readily apparent that it is feasible to retain the current coverage of GPS for aviation with any LightSquared deployment. In an effort to resolve this issue and find a reasonable path forward, the FAA evaluated the uses of certified GPS avionics to identify those locations where impacts to GPS would be unacceptable. This Section summarizes those operations and identifies the locations where the interference thresholds should be applied for the purpose of this study.

Certified GPS receivers are used to support three main functions: navigation, surveillance (automatic dependent surveillance-broadcast or ADS-B) and terrain awareness and warning systems (TAWS).

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<sup>7</sup> Global Positioning System Standard Positioning Service Performance Standard, 4<sup>th</sup> Edition, September 2008, Section 3.3.2.

<sup>8</sup> Global Positioning System Wide Area Augmentation System Performance Standard, 1<sup>st</sup> Edition, 31 October 2008, Section 3.1.

The navigation function must be provided in all areas of normal aircraft<sup>9</sup> operation. 14 CFR 91.119 provides the general framework for operating areas, and additional insight is provided by 14 CFR 77.13 which defines surfaces around airports where obstructions *may* be considered hazards to navigation. The lowest altitudes are those associated with approach and landing operations to any airport or heliport.

The surveillance function must be provided wherever ATC separation services are applied. The ADS-B program requirement is to provide ADS-B surveillance in the areas where current secondary radars provide coverage, and the FAA is evaluating cost-effective expansions of surveillance to lower altitudes. The ability of ADS-B to provide surveillance at lower altitudes has been a primary benefit of the ADS-B program to the general aviation community. Due to the nature of these requirements, the altitudes vary significantly across the country. However, surveillance coverage is a subset of navigation coverage so this condition is not constraining.

The TAWS function provides a key safety enhancement designed to alert the flight crew of operation *outside* of the normal envelope of safe operations. The FAA mandated this system for many airplane operators (e. g., 14 CFR 121.354) following the Cali, Columbia accident. The standards for TAWS are defined in TSO-C151b. In commercial aircraft, TAWS includes a GPS-based function to look forward along the projected flight path and identify hazardous terrain, as well as an alerting capability based on radio altitude that is independent of the GPS function. The TAWS equipment in general aviation aircraft typically does not include alerting based on radio altitude and is completely dependent on GPS. The alerting that would occur depends on the aircraft trajectory, the terrain, the proximity to the airport, and details of the alerting algorithms implemented by each equipment supplier. This analysis uses the FAA standard and does not consider the radio altitude alerting.

The GPS-based alerting technology has been adapted for rotorcraft and the standards for that are defined in TSO-C194. Unlike commercial aircraft, helicopters routinely operate close to the ground and their alerting depends entirely on GPS-based positioning. The FAA has proposed that helicopter TAWS (HTAWS) be mandatory equipment for some rotorcraft operators as minimum safety equipment<sup>10</sup>.

One issue that has surfaced is how to treat LightSquared towers that are at or above the altitudes associated with TAWS and HTAWS as it is not possible to comply with the aviation threshold immediately adjacent to the transmitter. For

<sup>9</sup> The term ‘aircraft’ includes both airplanes and rotorcraft.

<sup>10</sup> Air Ambulance and Commercial Helicopter Operations, Part 91 Helicopter Operations, and Part 135 Aircraft Operations; Safety Initiatives and Miscellaneous Amendments, Federal Register: October 12, 2010 (Volume 75, Number 196).

HTAWS, the equipment is required to contain a database of obstacles which is used to provide collision avoidance alerting for the obstacle. The FAA does *not* specify the characteristics of obstacles which must be contained in the database, this is determined by the HTAWS manufacturer as part of their system design. After consulting with several vendors, the FAA determined that it is reasonable to assume that HTAWS vendors will include identified obstacles that are 100' above ground level (AGL) or higher. Since helicopters will avoid flying to those obstacles identified in the database, some exclusion zone around transmitters located on those obstacles is reasonable. The HTAWS alerting thresholds vary depending on manufacturer design, helicopter speed and altitude. After consulting with vendors and considering the nature of helicopter operations, the FAA suggested that disruptions to GPS may be acceptable for HTAWS within 500' laterally from the LightSquared transmitter and extending up to 100' above the top of obstacles in the database. This allowance remains to be coordinated with the users who would be impacted within the exclusion zone.

For TAWS, the equipment is not required to contain an obstacle database and the FAA does not have any requirements for this optional capability. For those models that do have such a database, they include identified obstacles that are 200' AGL or higher and lower obstacles close to airports if they pose a threat to normal operations. Considering the TAWS thresholds and fixed wing operations, the FAA proposed to extend the HTAWS exclusion zone to TAWS, with the exception that obstacles shorter than 200' are not expected to be in the aircraft database more than 7.5 NM to an airport. This allowance has not been coordinated with the users who would be impacted within the exclusion zone.

For obstacles that would be too low to be included in the respective TAWS/HTAWS databases, GPS function must be supported without exclusion to the coverage requirements detailed below. It is important to recognize that this exclusion zone applies only to the coverage requirements for TAWS and HTAWS and does not apply to navigation of aircraft approaching or departing airports or helipads.

Additional details for fixed and rotary-wing (helicopter) areas of aviation operations, aviation GPS required functions, TAWS/HTAWS standards and helicopter specific operations are provided in Appendix A. It should be noted that the FAA has not made operational and safety assessments for the additional areas of consideration identified in Appendix A Section 6 "Residual Operational Risks" and these risks have not been coordinated with the users who would be impacted.

The FAA identified current airports and heliports on the following website [http://www.faa.gov/airports/airport\\_safety/airportdata\\_5010/](http://www.faa.gov/airports/airport_safety/airportdata_5010/) (Select data downloads, Airport Facility Data).

The resulting coverage requirements where GPS tracking and acquisition thresholds must be met consistent with the three criteria identified in Section 1.3 are as follows, illustrated in Figure and Figure .

These coverage requirements do not protect all current aviation operations that use GPS but provide a reasonable approximation of the critical areas where GPS must be protected. Additional discussion of the operations that would be affected is provided in Appendix A. Again, the potential impacts outside of the region defined below have not been coordinated with the users who would be impacted.

For fixed-wing airplane operations:<sup>11</sup>

- a. At airports with a runway 3,200' or longer: Above a 100 to 1 (run over rise) sloping surface extending from the nearest point of the nearest runway to 100' AGL at a horizontal distance of 10,000' away. Some regions of interference above this surface may be acceptable but would have to be evaluated on a case-by-case basis considering the traffic in the vicinity in order to make that determination.
- b. At airports with a runway less than 3,200': Above a 50 to 1 (run over rise) sloping surface extending from the nearest point of the nearest runway to 100' AGL at a horizontal distance of 5,000' away. Some regions of interference above this surface may be acceptable but would have to be evaluated on a case-by-case basis considering the traffic in the vicinity in order to make that determination.
- c. Between 5000'/10000' and 7.5 NM of any airport: At and above 100' AGL.
- d. Between 7.5 NM and 15 NM to any airport: At and above 300' AGL.
- e. Outside of 15 NM to any airport: At and above 500' (AGL).

Fixed-wing banking and pitch requirements, applicable to the tracking analysis with a 2 dB safety margin:

- a. At and above 300' AGL, aircraft bank in excess of 25 degrees (e. g. circling approach) and routinely change their pitch for approach and departure operations. The FAA uses a receiver antenna tilt of up to 25 degrees for interference analysis in this report.
- b. At and above 100', but below 300' AGL, aircraft can bank in excess of 15 degrees and routinely change their pitch for approach and departure operations. The FAA uses a receiver antenna tilt of up to 15 degrees for interference analysis in this report.
- c. Below 100' AGL, banking is aircraft and operator dependent. A typical aircraft pitch is up to 6 degrees nose-up leading into the flare for landing and up to 15 degrees bank for crosswind landings. The FAA uses a

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<sup>11</sup> The first two subparagraphs apply the surface for requiring notice to the FAA of potential hazards to navigation, allowing for penetrations that would be evaluated on a case-by-case basis. See 14 CFR 77.13, (a)(2)(i) and (ii). Subparagraphs c) through e) apply the requirements for TAWS, see TSO-C151b, Table A-2.

receiver antenna tilt of up to 6 degrees for interference analysis in this report.

In order to accommodate LightSquared transmitters that are mounted on towers where the tower may be included in the TAWS obstacle database, an exclusion zone is permissible as follows:

- a. For transmitters within 7.5 NM of an airport, if they are mounted on an obstacle that is taller than 100' AGL, then an exclusion zone that is the intersection of a cylinder centered on the obstacle (500' in radius and extending 100' above the top of the obstacle) and the region below the obstacle clearance surfaces (as defined by the FAA Orders in the 8260 series) for all instrument procedures. The exclusion zone extends down to the minimum altitude where coverage would be required by paragraph 1c, d, or e above. The FAA must also retain the ability to publish new instrument procedures and establish new airports without undue constraints.
- b. For transmitters more than 7.5 NM away from any airport, if they are mounted on an obstacle that is taller than 200' AGL, then an exclusion zone that is a cylinder centered on the transmitter (500' in radius and 100' above the top of the obstacle), but not above 1000' AGL (including effects of falling terrain). The exclusion zone extends down to the minimum altitude where coverage would be required by paragraph 1c, d, or e above.

#### For helicopter operations: <sup>12</sup>

- a. Above a 25 to 1 (run over rise) sloping surface extending from the nearest point of the nearest runway or landing surface to 100' AGL at a horizontal distance of 2,500' away. Some regions of interference above this surface may be acceptable, but would have to be evaluated on a case-by-case basis considering the traffic in the vicinity in order to make that determination.
- b. Beyond a horizontal distance of 2500' from any airport or heliport: at and above 100' above ground level (AGL).

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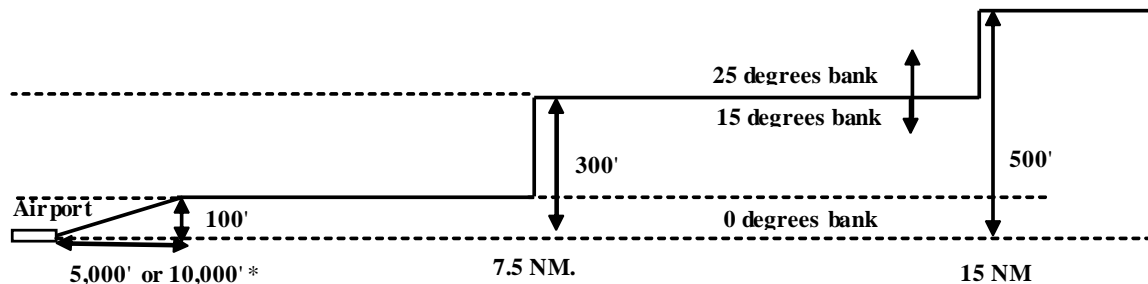
<sup>12</sup> The first subparagraph applies the surface for requiring notice to the FAA of potential hazards to navigation, allowing for penetrations that would be evaluated on a case-by-case basis. See 14 CFR 77.13, (a)(2)(iii). Subparagraph b) considers helicopter operations and the requirement for HTAWS for a slow rate of descent, see *Minimum Operational Performance Standards for Helicopter Terrain Awareness and Warning System Airborne Equipment*, RTCA/DO-309, March 13, 2008, Table 2-3

Helicopter banking and pitch requirements, applicable to the tracking analysis with a 2 dB safety margin:

- a. Helicopter banking requirements at and above 25' AGL: helicopter pilots bank and pitch in excess of 25 degrees. The FAA uses a receiver antenna tilt of 25 degrees for interference analysis in this report.
- b. Below 25' AGL, helicopter pitch and bank can be assumed to be 15 degrees.

In order to accommodate LightSquared transmitters that are mounted on towers where the tower is included in the HTAWS obstacle database, an exclusion zone is permissible. If they are mounted on an obstacle that is taller than 100' AGL, then an exclusion zone is defined that is the intersection of a cylinder centered on the obstacle (500' in radius and extending 100' above the obstacle) and the region below the obstacle clearance surfaces (as defined by the FAA 8260 series orders) for all instrument procedures. The exclusion zone extends down to 100' AGL. The FAA must also retain the ability to publish new instrument procedures or establish new heliports without undue constraints.

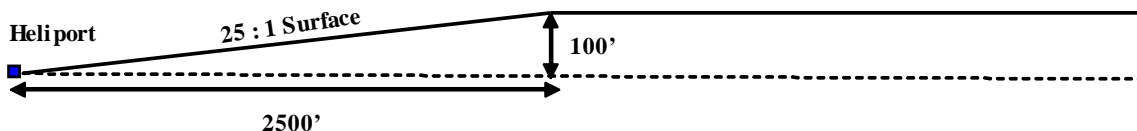
The following illustrations are not drawn to scale.



#### Fixed-wing GPS area of coverage maximum floor

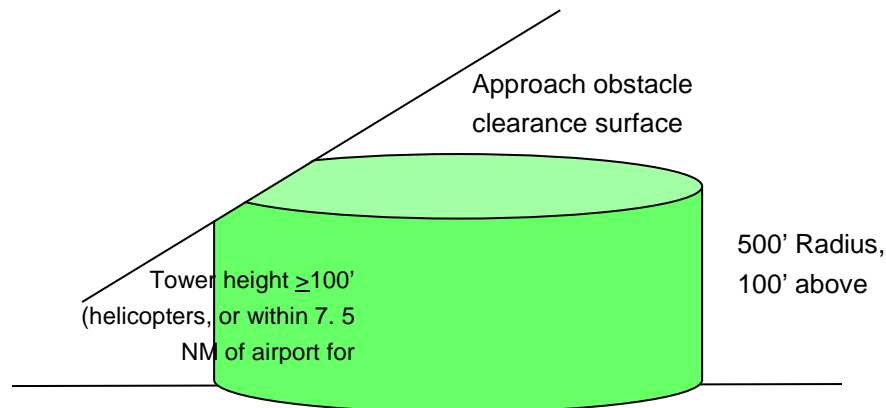
\* 5,000' if runway is less than 3200' and 10,000' if greater than 3200'

#### 25 degrees for helicopter interference analysis at any altitude



#### Helicopter GPS area of coverage maximum floor

**Figure C-1. Surfaces Above which GPS Coverage Must be Assured**



**Figure C-2. Example Exclusion Area around LightSquared Tower**

Helicopter operations, including HTAWS, provide the most stringent constraints in terms of the area of GPS reception. For fixed-wing airplanes, the low-altitude constraints are most significant in the vicinity of airports: within ~ 3 NM for navigation and 15 NM for TAWS.

These coverage requirements differ from the current United States Government and FAA specifications for GPS and WAAS, which do not include any exclusion zones where GPS coverage is not provided. The FAA has proposed these boundaries to protect the majority of operations and safety systems, but they do not provide complete protection. This proposal has not been coordinated with the users who would be impacted by interference inside and below the FAA proposed exclusion zones.





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February 5, 2015

## **TERMS OF REFERENCE**

### **GPS Adjacent Band Capability Task Group**

#### **Tactical Operations Committee**

#### **Committee Leadership:**

| <b>Position</b>  | <b>Name</b>   | <b>Organization</b> | <b>Telephone</b> | <b>Email</b>   |
|------------------|---------------|---------------------|------------------|--|
| <b>Co-Chairs</b> | Paul McDuffee | Insitu, Inc.        |                  | <a href="mailto:Paul.McDuffee@insitu.com">Paul.McDuffee@insitu.com</a> |
| <b>FAA SME</b>   | TBD           |                     |                  |  |
| <b>Secretary</b> | Trin Mitra    | RTCA                | 202-487-3650     | <a href="mailto:tmitra@rtca.org">tmitra@rtca.org</a>                   |

#### **Background:**

In the January 13, 2012 National Space-Based Positioning, Navigation, and Timing (PNT) Executive Committee (EXCOM) letter to the National Telecommunications and Information Administration (NTIA), Deputy Secretary of Transportation John D. Porcari and Deputy Secretary of Defense Ashton B. Carter proposed to develop new Global Positioning System (GPS) spectrum interference standards to help inform future proposals for non-space, commercial uses in the bands adjacent to the GPS signals. To accomplish this task, GPS adjacent-band transmitter power limit criteria will be developed; defining new adjacent-band applications that would be compatible with GPS, and perhaps forming the basis for GPS spectrum interference standards.

The Federal Aviation Administration (FAA) and the Research and Innovative Technology Administration (RITA), both operating Administrations of the Department of Transportation (DOT), developed a GPS Adjacent-Band Compatibility Study Plan to provide the framework for definition of the processes and assumptions that will form the basis for development of the GPS adjacent-band compatibility for GPS civil applications. That Plan identifies the processes to (a) derive adjacent-band transmitter power limit criteria for assumed new applications necessary to ensure continued operation of GPS services, and (b) determine similar levels for future GPS receivers utilizing modernized GPS and interoperable Global Navigation Satellite System (GNSS) signals.

The key question is what the possible impact is of deploying networks of ground based transmitters radiating near GPS frequencies and the effect on aviation interests. The Tactical Operations Committee has been asked to comment on three specific questions that relate to exclusion zones. The GPS Adjacent Band Capability study assumes aircraft operating relative to ground transmitter would have an aircraft exclusion zone.

Appendix C of the GPS Adjacent Band Capability study contains an excerpt from the January 20, 2012, DOT/FAA Status Report: Assessment of Compatibility of Planned LightSquared



Ancillary Terrestrial Component Transmissions in the 1526-1536 MHz Band with Certified Aviation GPS Receivers. One key part of that assessment was the determination of where aircraft would operate relative to the LightSquared transmitter locations. In particular, the study introduced assumptions regarding effective aircraft “exclusion zones” including:

For fixed wing aircraft: In order to accommodate LightSquared transmitters that are mounted on towers where the tower may be included in the TAWS obstacle database, an exclusion zone is permissible as follows:

a. For transmitters within 7.5 NM of an airport, if they are mounted on an obstacle that is taller than 100’ AGL, then an exclusion zone that is the intersection of a cylinder centered on the obstacle (500’ in radius and extending 100’ above the top of the obstacle) and the region below the obstacle clearance surfaces (as defined by the FAA 8260 series orders) for all instrument procedures. The exclusion zone extends down to the minimum altitude where coverage would be required by paragraph 1c, d, or e above. The FAA must also retain the ability to publish new instrument procedures and establish new airports without undue constraints.

b. For transmitters more than 7.5 NM away from any airport, if they are mounted on an obstacle that is taller than 200’ AGL, then an exclusion zone that is a cylinder centered on the transmitter (500’ in radius and 100’ above the top of the obstacle), but not above 1000’ AGL (including effects of falling terrain). The exclusion zone extends down to the minimum altitude where coverage would be required by paragraph 1c, d, or e above.”

For helicopters: In order to accommodate LightSquared transmitters that are mounted on towers where the tower is included in the HTAWS obstacle database, an exclusion zone is permissible. If they are mounted on an obstacle that is taller than 100’ AGL, then an exclusion zone is defined that is the intersection of a cylinder centered on the obstacle (500’ in radius and extending 100’ above the obstacle) and the region below the obstacle clearance surfaces (as defined by the FAA 8260 series orders) for all instrument procedures. The exclusion zone extends down to 100’ AGL. The FAA must also retain the ability to publish new instrument procedures or establish new heliports without undue constraints.”

Appendix A of the January 20, 2012 report provides additional detail, including operations not addressed in this excerpt. This annex should be consulted and additional comments provided as appropriate.

### **Deliverables:**

The TOC will deliver a report addressing three specific questions posed in the GPS Adjacent Band Capability Study. These questions are:

Question #4 to RTCA: (c) Are the size and aggregated density of aircraft and helicopter exclusion zones where GPS-based TAWS/HTAWS alerts cannot be assured (Appendix C, section above, and reference [4]) sufficiently small so as to not impact flight safety? (d) Alternatively, what TAWS/HTAWS exclusion zones parameters should be considered?

Question #5 to RTCA: Comments are requested regarding the operational acceptability and safety implications for the proposed exclusions, operational limitations and safety

considerations identified in Appendix C of this report and Annex A of the reference [4] report including any alternative suggestions and supporting rationale.

Question #6 to RTCA: (a) Considering the proposed fixed and rotary wing aircraft assumptions, exclusions, and limitations, are there safety impacts and operational limitations that are unique to small Unmanned Aircraft Vehicles (UAVs) operations? (b) If yes, please identify the unique operational use case scenarios and any associated safety and operational issues. (c) Propose additional assumptions and “exclusion zones” for consideration that would preclude the identified safety and operational issues (if any).

Please note that non-TSO compliant GPS equipment interference susceptibility may be substantially greater, or less than TSO approved receivers and antenna. Non-TSO GPS/GNSS equipment is used for UAV navigation, positioning, attitude control and payload systems; electronic flight bags, installed equipment for situational awareness, experimental and Light Sport Aircraft. Susceptibility needs to be characterized for each make, model and antenna pair. operators, manufacturers and GPS suppliers should participate in the parallel DOT Volpe center GPS Adjacent-Band Compatibility activities to ensure any unique operational use cases are considered and their GPS equipment susceptibility is characterized

The TOC will work with Special Committee 159 (SC 159) to compile answers its to the questions above with an additional set of questions on this study that SC 159 is addressing.

The TOC will complete this work by May 15, 2015.

#### **Scope:**

The TOC’s effort will only address the three specific questions posed to the group in the GPS Adjacent Band Capability Study.

#### **Envisioned Use of Deliverables:**

The TOC expects that the FAA will utilize the response to these questions to further mature the concept of exclusion zones around transmitters radiating near GPS frequencies.

#### **Specific Guidance:**

The TOC will work with Special Committee 159 to request Subject Matter Expertise from the FAA where necessary.

#### **Termination:**

Activities of the Task Group will terminate with approval by the TOC of the committee’s final report.



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

Mission Support Services  
800 Independence Ave, SW  
Washington, DC 20591

FEB 04 2015

Ms. Margaret Jenny  
President  
RTCA, Inc.  
1150 15<sup>th</sup> Street NW  
Suite 910  
Washington, DC 20036

Dear Ms. Jenny:

The FAA seeks to ensure an effective transition from ground-based airways, routes and instrument flight procedures to greater availability and use of satellite-based routes and procedures while still maintaining safety. Building from past, smaller-scale efforts, the National Procedures Assessment (NPA) Initiative seeks to establish a repeatable process and plan to cancel redundant or excess procedures and reduce the maintenance costs associated with them.

Currently, there are two processes or tracks used for the publication of the procedures and routes in our navigation structure: (1) Regulatory, which includes airways, routes, and instrument flight procedures (IFPs) that require rulemaking action before they are effective; and (2) Non-regulatory, which includes Standard Instrument Departures and Standard Terminal Arrivals (SIDs and STARs) and don't require rulemaking. Cancellation of procedures also follows these same two track methods.

The FAA based the process in the NPA Initiative which follows the regulatory track, on initial cancellation criteria received from the Flight Safety Foundation in 2011 and additional criteria solicited through public comment in the Federal Register in 2013/14. In June 2014, final criteria were published in the Federal Register. Using these final criteria, FAA focused on NDB and VOR procedures and has identified over 700 for cancellation. This list will be posted in the Federal Register before removal.

The non-regulatory track has also developed a process to review utilization data to identify both conventional and PBN candidate SIDs and STARs. Candidate procedures are further studied in the Service Center for facility input. The process does not include publication or comment via the Federal Register for public input. Existing collaborative processes like Metroplex projects are used to engage and coordinate with industry.

FAA requests feedback and recommendations from the TOC in key areas noted below. Specifically, FAA requests the TOC:

1. Review and validate the current NPA Initiative assumptions and criteria developed to date for both the regulatory and non-regulatory tracks. If changes are recommended, please include the range of options/alternatives considered.
2. Review the proposed FAA implementation plans for both tracks and provide feedback and recommendations as needed.
3. Assess the effectiveness of the outreach planned and accomplished by FAA and make any needed recommendations for improvement.
4. Provide recommendations on what assumptions and criteria should be considered to advance the NPA Initiative beyond its current scope to encompass the remaining conventional and PBN routes and procedures. Please provide industry perspective on whether existing implementation plans and outreach would suffice for an expanded NPA Initiative. If there are barriers to getting to such recommendations, please describe them. Please provide recommendations on the priority of further future actions. In other words, what procedures should FAA look at next?

FAA believes the timing of this work is critical. We currently have over 14,000 procedures in the inventory with hundreds of additional procedures planned this fiscal year. Removing underutilized or unneeded procedures reduces not only FAA maintenance costs but frees up personnel to work on higher priority procedures. It also reduced unnecessary controller and pilot proficiency training requirements. FAA will provide subject matter experts and needed documentation to the TOC on request and looks forward to the results of this important work.

FAA requests this work be completed by 4th Quarter FY2015 TOC meeting. Once the task group is established, FAA will work with TOC leadership to determine the schedule for interim deliverables and milestones.

Sincerely,

A handwritten signature in black ink, appearing to read 'ELR', with a long, sweeping horizontal line extending to the right.

Elizabeth L. Ray  
Vice President, Mission Support Services  
Air Traffic Organization