Meeting Summary, March 3, 2016
Tactical Operations Committee (TOC)

The twelfth meeting of the Tactical Operations Committee (TOC), held on March 3, 2016, 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 12, 2015 TOC Meeting
Attachment 4 – Tasking letter for PBN Route Structure Concept of Operations task
Attachment 6 – AOPA White Paper on the Need to Standardize the Format of Temporary Flight Restrictions
Attachment 7 – Tasking letter for Western Regional Task Group on Operator Questions in the NorCal Noise Initiative Plan
Attachment 8 – FAA Initiative to Address Noise Concerns of Santa Cruz/Santa Clara/San Mateo/San Francisco Counties
Attachment 9 – Recommendation on Improving Awareness, Planning and Execution of Airport Construction

Welcome and Introductions

Committee Co-Chair, Mr. Bryan Quigley, Managing Director of Flight Operations at United Airlines, called the meeting to order and welcomed the TOC members and others in attendance. Co-Chair, Mr. Dale Wright, National Air Traffic Controllers Association (NATCA), was unable to attend. 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. Quigley then reviewed the agenda and began the proceedings of the meeting. (The briefing charts from the meeting are included as Attachment 2.)
**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 12, 2015 Meeting Summary**

The Chair asked for and received approval of the written summary for the November 12, 2015 meeting (Attachment 3).

**FAA Report**

Ms. Ray next provided a report from the FAA on various topics relevant to industry. She began by reviewing the budget situation for the FAA. The FAA has appropriations for Fiscal Year (FY) 2016 and FY2017, which is 0.4% higher than the FY2016 enacted budget. The increase in the FY2017 budget enables the FAA to continue maintaining active levels of its workforce as well as hire for the future. The budget is currently authorized through March 31, 2016, and the FAA anticipates an extension beyond the current authorization. The key concern for the FAA is, without a new budget deal, the FY2018 budget is planned to return to sequestration levels of funding, which correspond to FY2014.

Ms. Ray next spoke of the FAA’s continued approach to hiring new air traffic controllers to staff for the future. Over the last five years, the FAA has hired 4,700 new controllers and it plans to hire an additional 7,400 in the next five years. The FY2016 goal is to hire 1,619 controllers. The FAA has hired 719 controllers and has about 300 more in process year-to-date; that leaves an additional 600 new controllers to meet this year’s goal.

Ms. Ray informed the TOC about key vacancies in the executive staff at the FAA. She noted that the Deputy Vice President of Safety role had been filled by Steve McMahon. Within Mission Support, Ms. Ray noted that Bill Davis was moving aside from the Deputy VP role to focus on key strategic issues, including Unmanned Aircraft Systems (UAS), Commercial Space and the Performance Based Navigation (PBN) NAS Navigation Strategy. Jodi McCarthy will be filling in the Deputy VP role behind Mr. Davis.

Ms. Ray concluded by reviewing the key issues that are garnering the most attention within the FAA. She mentioned that UAS continues to be a critical area of attention. Additionally, noise and community outreach was receiving attention as the FAA sought to develop robust approaches to engaging with airports and communities on noise.

Finally, a TOC member inquired about how newly hired controllers are deployed into the NAS and how the FAA’s agreement with NATCA manages the facility release process and policy. The TOC expressed an interest to better understand how the movement of controllers is managed, to ensure appropriate staffing, to keep critical facilities “healthy” as well as allowing for career progression.
Ms. Ray noted that such information would be best provided by Management Services and/or Air Traffic Services.

**Discussion on PBN-Related Industry Taskings and Introduction to PBN Route Structure Task**

Mr. Robert Novia, PBN Program Office, next briefed the TOC about the different ongoing initiatives between the FAA and industry on PBN. (A chart depicting these activities is included on page 4 of Attachment 2.) He noted that the recently completed PBN NAS Navigational Strategy is an enterprise strategy, including required infrastructure, routes, instrument flight procedures and decision tools to augment spacing. It is a 15 year planning framework intended to identify what is required and not required for the NAS to transition to a PBN NAS. Mr. Novia commented that the National Procedure Assessment (NPA) Task Group’s work to develop process and criteria for cancellation of unnecessary or redundant procedures was a component of the Nav Strategy to remove elements of the “legacy” NAS that are no longer required.

Another aspect of the FAA’s larger PBN strategy is to develop what is required for the future PBN operation. This includes a route structure for PBN operations. (The tasking letter for the PBN Route Structure Concept of Operations task is included as Attachment 4.) In the high altitude domain, the FAA is planning to phase out Jet (J) routes and replace them with some level of Q routes. The FAA has developed a concept of operations for this route structure, and the TOC has been tasked to evaluate this Conops.

A TOC member noted that traveling east to west, the straight line is rarely the best route and there is a need in the NAS to enable flexibility in routing day to day. Mr. Novia stated that the Conops does not make specific suggestions on how to enable such flexibility in the NAS and that the FAA is open to the TOC’s ideas on this subject. There was additional discussion about ensuring the TOC’s Task Group consider existing grid systems; previous working groups have worked hard to develop these grid concepts and they should be given appropriate consideration.

A TOC member noted that the NAS includes a variety of route solution sets that do not integrate the needs of air traffic controllers in the controller handbook (7110.65), what the crew does, what the dispatcher does and what to do in non-normal conditions. A future PBN Route Conops needs to consider all of these factors.

Mr. Novia also noted that the scope of the Conops is both high and low altitude route structure. He mentioned that some Victor airways will be removed as the VOR Minimum Operating Network effort proceeds.

Finally, TOC members offered some important considerations for the PBN Route Structure Task Group. One member noted that there is a critical issue of database size on Flight Management System (FMS) computers. Simply adding more route options in the NAS is not an option as the FMS can only accommodate a fixed volume of data, and this should be considered in the work of the PBN Route Conops Task Group. Another TOC member commented that modern, sophisticated flight planning systems tend to have similar underlying algorithms and typically select the same optimal
route which can cause en route congestion. The task group should consider such system level impacts in its effort.

Recommendation for Criteria and Process for Cancellation of Instrument Flight Procedures

Mr. Michael Perrizo, Air Wisconsin, and Mr. Randy Burdette, Virginia Department of Aviation, Co-Chairs of the National Procedure Assessment Task Group, briefed the TOC on recommendations for the criteria and process for cancellation of Instrument Flight Procedures in the NAS. (The full recommendation report is included as Attachment 5.) Mr. Perrizo and Mr. Burdette informed the TOC that the FAA spent approximately $50 million on procedure maintenance and flight inspection in FY2015. With the NAS transitioning to NextGen, from a mostly ground-based NAS, there was need and opportunity to save capital by removing unnecessary procedures. That capital could then be redeployed to further improve access to airports, runway ends and communities throughout the NAS.

Mr. Perrizo and Mr. Burdette informed the TOC that the Task Group’s approach was to review procedures as they are categorized in the FAA’s Instrument Flight Procedures Inventory webpage, which is https://www.faa.gov/air_traffic/flight_info/aeronav/procedures/ifp_inventory_summary/.

The table below presents an assessment of which types of procedures the Task Group elected to evaluate in its report. For those not evaluated for cancellation at this time, rationale is provided on pages 13-14 of Attachment 5. For those that were evaluated for cancellation, criteria and additional detail are provided in the report. The report includes a detailed decision tree for identifying cancellation candidate Circling Procedures or Lines of Minima as well as candidate SIDs and STARs for cancellation.

Messrs. Perrizo and Burdette reviewed the group’s recommendations for PBN Instrument Approach Procedures, noting that PBN approaches are considered a key foundation of the NextGen NAS. As a result, they stressed that a NAS-level approach and criteria to cancellation of PBN was not
appropriate. Instead they recommended that local teams identify any redundant PBN procedures and lead requests for cancellation.

Ms. Perrizo and Mr. Burdette also presented a proposed process for cancellation of IFPs. The process recognizes the fact that cancellation of IAPs as well as SIDs/STARs requires development of criteria at a national level while identifying candidates for cancellation at a local level. The proposed process allows for participation of both flight operators and air traffic controllers while only requiring formal public comment where it is necessary. They also presented recommendations focusing on the outreach required to stakeholders in the cancellation process.

A TOC member noted that it was important that any procedure cancellation effort not hamper flight schools that are training future aviators. Mr. Perrizo noted that recommendation 3b, the decision tree for circling approaches, includes the concept of not cancelling procedures if a trainee needs to travel more than 20NM from a flight school for training. The 20NM distance was thought by the group to not be too onerous.

Another TOC member commented that flight operations outside of the NAS may include procedure types that are uncommon in the NAS. There is thus an important consideration in retaining procedures to ensure availability of procedures for US operators to train in preparation for international operations. The TOC member noted that in the future simulation capabilities may help address this issue.

A TOC member inquired whether the NAS is at the point to remove all conventional (non-PBN) SID and STAR procedures at the largest airports. The member noted that Nav Canada had done so at major airports in Canada over 10 years ago without any negative repercussions. Ms. Ray noted that this could be done in the NAS today but a question of resiliency remains, as there is currently no identified backup plan in the event of a GPS outage.

**Committee Action:** The Committee agreed by consensus to approve the Process and Criteria for Cancellation of Instrument Flight Procedures (Attachment 5) and sunset the NPA Task Group.

**Update on Mitigation of Obstacles in the Visual Surface Area**

Mr. Danny Hamilton and Mr. Steve Szukala, FAA, next provided an update to the FAA’s effort for addressing obstacles in the 20:1 visual surface area. Mr. Hamilton and Mr. Szukala noted that obstacle validation in the visual segment is highly manual work and that the data in the obstacle database was often not valid. The FAA had conducted a two year “get healthy” plan for obstacles in the visual segment in which it pursued a three step process:

1. Verify the database obstacles through validation and coordination with the airport sponsor
2. Once obstacles were validated, use Notice to Airmen (NOTAMs) to NOTAM out impacted procedures
3. Work with the airport to plan long term mitigation
Messrs. Hamilton and Szukala informed the TOC that over 3,000 airports in the National Airspace System (NAS) had been evaluated and about half had obstacles penetrating a visual surface. After two years of mitigation efforts, nearly all airports had mitigated obstacles through a combination of lighting, obstacle removal and procedure amendment. Recent evaluation of penetrations suggested only about 5-10% of airports had penetrations, suggesting a significant reduction from two years before. The FAA noted that there is intent to continue using a risk based approach for managing obstacles in the visual segment, though the specific approach for the future may not be identical to the approach used in the “get healthy” process of the past two years.

The briefing generated multiple questions from TOC members. One TOC member inquired about when airports are responsible for conducting a survey. The FAA responded that there are no formal requirements for surveys on a periodic basis. When there is a change at an airport, airports typically need new surveys. However, after an airport receives a survey, it typically takes 12 to 18 months for obstacles to get into the obstacle database. Finally, one participant noted that surveys are becoming more and more affordable to conduct with use of unmanned aerial systems (UAS).

A TOC member suggested the FAA and industry provide an educational campaign for airports on this obstacle validation effort. Growth of vegetation is a key challenge for airports, and the participant suggested educational information about how to monitor vegetation growth would be helpful. The intent of such a campaign would be to enable airports to effectively monitor potential obstacles and address them proactively.

Discuss Potential New Task – Graphical Temporary Flight Restrictions (TFRs)

Ms. Melissa Rudinger, Aircraft Owners and Pilots Association (AOPA), next discussed a white paper AOPA had provided requesting a new TOC task related to graphical TFRs (included as Attachment 6). Ms. Rudinger noted there was no definitive source for graphical TFRs, and different vendors had their own solutions. As a result of confusing and possibly incorrect graphical TFR data, pilots were violating TFRs. In a recent VIP movement in Los Angeles in February 2016, 43 pilots had violations.

Ms. Ray noted that the FAA was considering this task and whether to conduct it now or whether the FAA had to conduct any internal work prior to initiating a task. She commented that she expected the FAA to have a conclusion on next steps for this topic in approximately one month.

One Committee member commented that Special or Security TFRs were the greatest challenges and that the text of the TFR needed to follow a consistent format. Additionally, the member noted that there was a need for a definitive, reliable source to generate the graphic. There is desire for the graphic to be controlling data along with the text of the TFR.

Discuss New Task – Western Regional Task Group NorCal Initiative

Ms. Ray next introduced a new task to the TOC for the Western Regional Task Group to provide operator input into a noise initiative the FAA has underway in Northern California (NorCal).
Tasking Letter is included as Attachment 7 and the FAA’s Noise Initiative Plan for Northern California is included as Attachment 8.) Ms. Ray pointed out that the NorCal Metroplex effort was done and complete and this noise initiative was not a reopening of Metroplex. She said that the community had identified proposals to improve noise and the FAA committed to conducting a feasibility assessment of these proposals. The FAA is aware that not all of the proposals will be feasible and that safety would not be compromised. However, Ms. Ray noted, there would likely be some tradeoffs with respect to efficiency.

Update on the NextGen Advisory Committee (NAC)

Mr. Andy Cebula, RTCA, provided an update on the NAC. Mr. Cebula highlighted recent and current taskings of the NAC relating to metrics tracking operational performance impacts of NextGen as well as long term strategy relating to Traffic Flow Management. Briefing materials from this discussion may be found in Attachment 2.

FAA Response to Recommendations on Class B Airspace

Mr. Ken Ready, FAA Acting Manager Airspace and Rules Team, next provided the FAA’s response to recommendations from the TOC relating to Class B airspace. Mr. Ready’s response is included in briefing materials in Attachment 2.

He mentioned that these recommendations were timely as the FAA is working on changes to the 7400.2 guidance document (in which Chapter 15 relates to Class B airspace) as well as evaluating Class B excursions in the NAS. The FAA concurred with all but one of the recommendations of the TOC. The only one which was a non-concur was the concept of a buffer on the boundary of Class B airspace. Some TOC members commented that the non-concur from the FAA on this recommendation means that aircraft in and out of the Class B may be in very close proximity and still be considered “legal”. This issue, the members stated, was driving TCAS Resolution Advisories (RAs) on the boundaries of Class B airspace. These members noted that the issue would warrant discussion and attention in the future.

Another TOC member noted that air traffic controllers already have a Complexity Index (CI) that may be leveraged as the FAA considers new safety and complexity oriented metrics as suggested in the recommendations.

Finally, there was discussion that much human factors work would be required to evaluate what is feasible for executing a part time Class B concept.

Briefing on Proposed Approach to Consider One Engine Inoperative (OEI) Procedures

Mr. John Speckin, FAA, next provided a briefing on the FAA’s proposed policy to considering OEI procedures in hazard determinations. The concept, detailed in briefing materials in Attachment 2, is for airports to work with its operators to identify one OEI path that would be utilized in hazard
assessments. Mr. Speckin and Ms. Ray both noted that this approach is currently a proposed policy and may not be implemented. He said that pilot projects were conducted at multiple airports in the NAS with the focus of determining whether it was even feasible to identify a single surface for OEI procedures.

There was discussion about Miami Dade County as a unique case for OEI procedures. The county had enacted zoning laws to protect OEI paths around the airport.

FAA Response to Recommendations on Improving Operations in the Caribbean

Mr. Jim Linney, Director Air Traffic Systems in the Program Management Organization (PMO), next provided a response to the TOC on its July 2015 recommendations on improving operations in the Caribbean. (Mr. Linney’s briefing materials are included in Attachment 2.)

The FAA has parsed all of the TOC’s recommendations in the Caribbean into four categories:

1. FAA concurs with recommendation. No additional research is required. International agreement and interdependencies are required.
2. FAA concurs with recommendation. Additional research regarding operations and/or technical interdependencies are required.
3. FAA concurs with recommendation. Additional research regarding operations and/or technical interdependencies are required. Investment decision not yet made (requires JRC-level approval or disapproval).
4. FAA does not concur with moving forward with this recommendation, not pursuing at this time.

Mr. Linney then reviewed each of the TOC’s recommendations and explained the categorization. Currently, the FAA was putting together a schedule for those recommendations that would be implemented or researched further, along with milestones. He also expressed a willingness to come back to the TOC at future meetings and provide updates.

Recommendations on Improving Awareness, Planning and Execution of Airport Construction

Mr. Mark Hopkins, Delta Airlines, briefed the TOC about recommendations from the Airport Construction Task Group related to improving awareness, planning and execution of airport construction.

Mr. Hopkins began by providing some overarching thoughts regarding airport construction. First, he noted that airport construction involves stakeholders from across the aviation spectrum, including airport operators, flight operators, many groups with the FAA’s Air Traffic Organization as well as the FAA’s Airports division. In this context, collaboration is paramount to success. While recommendations are offered specifically to the FAA in this report, success will result from identifying reliable ways to institutionalize collaboration between these various stakeholders.
Mr. Hopkins also pointed out that there is much guidance, process, checklists, etc. for stakeholders on various aspects of airport construction planning and execution. What is often missing is the connectivity between different existing tools. Hence, the recommendations offered in this report are aimed at “connecting the dots” between what already exists.

Mr. Hopkins next went through the recommendations from the Task Group. The recommendations were grouped into four primary categories: improving awareness of construction, planning of complex construction projects, improving execution of construction and safety-related aspects of construction.

During the discussion on safety in construction, one TOC member inquired about the Task Group’s intent about Safety Risk Management (SRM) Panels. Mr. Hopkins commented that the industry continues to evolve SRMs. Historically, there may have been an SRM panel conducted by the airport and another conducted by air traffic. Ultimately, the recommendations in the report seek to identify more effective methods of determining when panels are required and conducting them in a manner that has appropriate participation and engagement.

- **Committee Action**: The Committee agreed by consensus to approve Improving Awareness, Planning and Execution of Airport Construction (Attachment 9) and sunset the Airport Construction Task Group.

**Adjourn**

Chairman Quigley ended the meeting of the Committee at 3:30 p.m.

**Next Meeting**

The next meeting of the TOC is April 4, 2016 in Washington, DC.
## Attendees: March 3, 2016 Meeting of the Tactical Operations Committee
### Washington, DC

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RTCA Tactical Operations Committee

Twelfth Meeting
March 3, 2016
RTCA Headquarters

Welcome and Introductions

Co-Chairs:
Bryan Quigley, United Airlines
Dale Wright, NATCA
Topical Agenda

- FAA Report

- Two Proposed Recommendations for Approval
  - National Procedure Assessment Task Group
  - Airport Construction Task Group

- Responses from FAA on Previous Recommendations
  - Caribbean Operations
  - Class B Airspace

- Update Briefings
  - 20:1 Background, Policies and Action
  - One Engine Inoperative (OEI) Procedures
  - Update on the NextGen Advisory Committee (NAC)

- Discussion on New Tasks
  - PBN Route Structure Concept of Operations
  - Western Regional Task Group task on NorCal
  - Graphical TFRs

PUBLIC MEETING ANNOUNCEMENT

Read by: Designated Federal Official Elizabeth Ray
Tactical Operations Committee (TOC)
March 3, 2016

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

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

February 9, 2016

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

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

The public may present written material to the Advisory Committee at any time.
Review and Approval of:

November 12, 2015
Meeting Summary

FAA Report

Elizabeth “Lynn” Ray
Vice President, Mission Support Services
Air Traffic Organization
PBN NAS NAV Strategy
• Sets vision of PBN as the basis for daily operations and identifies key navigation capabilities that will be available in the NAS over the next 15 years

PBN Route Structure Conops
• PBN NAS NAV Strategy element
• Conceptual strategy and methodology for the transition of the national high- and low-altitude ATS route structures to a predominantly PBN environment

Flow Management
• Align Tools Strategy over 15 years
• Tools include: Procedure-specified speeds, TSAS, GIM-S, Path stretching, and more

National Procedures Assessment (NPA)
• PBN NAS NAV Strategy element
• Establishes a repeatable process and plan to cancel redundant or excess procedures and reduce maintenance costs
Introduction to PBN Route Structure
Concept of Operations Task

Robert Novia, FAA

Process and Criteria for Cancellation of Instrument Flight Procedures

Michael Perrizo, Air Wisconsin
Randall Burdette, Virginia Dept. of Aviation
Co-Chairs, National Procedure Assessment TG
Background

- NAS transitioning to NexGen, from a mostly ground-based NAS to a Performance-Based NAS

- FAA spent approximately $50 million on procedure maintenance and flight inspection in FY2015

- Removal of unnecessary procedures saves capital that may be redeployed to further improve access to airports, runway ends and communities throughout the NAS
  - Build upon previous FAA cancellation efforts
  - Involves a regulatory track for cancellation of IAPs and non-regulatory for cancellation of SIDs/STARs

Objectives of Task

- Criteria for Procedure Cancelation
  - For both regulatory (IAPs) and non-regulatory (SIDs/STARs) tracks
  - Validate or recommend changes to current approach
  - Explore opportunity to define one track

- Implementation
  - Validate or recommend ways to streamline current plans

- Outreach to Operators and ATC
  - Validate or recommend changes to current plans
  - Particular attention to non-regulatory track

- Recommend where to go next beyond current plan
NPA Task Group Participants

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<td>Air Wisconsin</td>
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Key Guiding Principles

- Frequency of use should not be a sole criterion
- Focus on public procedures
- Cancellation process is dependent upon other efforts such as VOR MON, PBN NAS Nav Strategy, rewrite of the RAPT order, etc.
- Create no new process steps unless necessary, particularly when considering alignment of regulatory (IAP) and non-regulatory (SID/STAR) processes
- Air traffic and operational personnel should all have a voice in procedure evaluation
Approach

- Evaluated different types of Instrument Flight Procedures
  - Focus on all Instrument Approach Procedures with special emphasis on Circling
  - Focus on SIDs and STARs collectively
  - Did not consider Airways which may be addressed in the PBN Route ConOps task

<table>
<thead>
<tr>
<th>Type of IFP</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Circling</td>
<td>ILS</td>
</tr>
<tr>
<td></td>
<td>LOC</td>
</tr>
<tr>
<td></td>
<td>LOC (B/C)</td>
</tr>
<tr>
<td></td>
<td>LDA</td>
</tr>
<tr>
<td></td>
<td>LDA PRM</td>
</tr>
<tr>
<td></td>
<td>Side Step</td>
</tr>
<tr>
<td></td>
<td>VOR / DME RNAV</td>
</tr>
<tr>
<td>2. Instrument Approach Procedures (IAPs)</td>
<td>Ground-Based IAPs</td>
</tr>
<tr>
<td></td>
<td>IAPs</td>
</tr>
<tr>
<td></td>
<td>TACAN</td>
</tr>
<tr>
<td></td>
<td>VOR</td>
</tr>
<tr>
<td></td>
<td>VOR / DME</td>
</tr>
<tr>
<td></td>
<td>MLS</td>
</tr>
<tr>
<td></td>
<td>TLS</td>
</tr>
<tr>
<td></td>
<td>SDF</td>
</tr>
<tr>
<td></td>
<td>PAR</td>
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<tr>
<td></td>
<td>ASR</td>
</tr>
<tr>
<td></td>
<td>RNAV</td>
</tr>
<tr>
<td></td>
<td>GLS</td>
</tr>
<tr>
<td>3. SIDs and STARs</td>
<td>Conventional</td>
</tr>
<tr>
<td></td>
<td>SID</td>
</tr>
<tr>
<td></td>
<td>STAR</td>
</tr>
<tr>
<td></td>
<td>SID</td>
</tr>
<tr>
<td></td>
<td>STAR</td>
</tr>
</tbody>
</table>

Note: there is significant variability in the maintenance costs associated with any individual procedure
Assessment of Each Type of IFP

Recommended Decision Tree for Circling Procedures

Start: Consider an individual Circling Procedure

1. Is this Circling procedure one of the designated MON airport procedures? Y N

2. If multiple IAPs serve a single runway end, is this the lowest circling minima for that runway? (If the RNAV circling minima MDA is not the lowest but within 50' of others, give it preference) Y N

3. Does this circling only procedure exist because of high terrain or an obstacle that makes a straight in procedure unfeasible or which would result in the straight in minimums being higher than the circling minimums? Y N

4. Is this circling only procedure (1) at an airport where not all runway ends have a straight-in IAP and (2) does it have a PAC not aligned within 45 degrees of a runway which has a straight-in IAP? Y N

5. Will cancellation result in removal of circling minima from all Conventional NAVAID procedures at an airport? (If circling minima exist for multiple Conventional NAVAID procedures, preference to retain ILS circling minima) Y N

6. Will removal result in all circling minima being removed from all airports within 20 NMs? Y N

7. Will removal eliminate lowest landing minima to an individual runway? Y N

Legend:
- Green circle: Evaluated for cancellation
- Red circle: Not evaluated at this time
The FAA should coordinate with simulator operators prior to removal of any IFPs, particularly Circling Procedures.

**Additional Recommendation for Circling Procedures**

- For ground-based IAP policy, expand the current criteria “Extensive use by the military for training and/or proficiency” to “Extensive use by civil or military operators for training, flight test and/or proficiency”.
- Include “No other airport within 20 NMIs with a similar type of IAP” as an additional factor for consideration in cancellation of ground-based IAPs.
- The FAA should modify the title of those Notice of Proposed Rulemaking (NPRM)/Final Rules to better inform the public of what the notice is about. Proposed language would be: "Cancellation of Standard Instrument Approach Procedures as Part of National Procedure Assessment Initiative".

**Recommendations for Ground-Based IAPs (1 of 3)**

**NDB, TACAN, VOR and VOR/DME Procedures**

- For ground-based IAP policy, expand the current criteria “Extensive use by the military for training and/or proficiency” to “Extensive use by civil or military operators for training, flight test and/or proficiency”.
- Include “No other airport within 20 NMIs with a similar type of IAP” as an additional factor for consideration in cancellation of ground-based IAPs.
- The FAA should modify the title of those Notice of Proposed Rulemaking (NPRM)/Final Rules to better inform the public of what the notice is about. Proposed language would be: "Cancellation of Standard Instrument Approach Procedures as Part of National Procedure Assessment Initiative".

**Attachment 2 - Presentations for the Committee**
MLS and TLS Procedures

- Remove Microwave Landing System (MLS) and Transponder Landing System (TLS) procedure categories.

SDF Procedures

- Consider remaining SDF procedures for cancellation.

PAR and ASR Procedures

- Review PAR and ASR procedures at civilian only facilities for cancellation.

- FAA should engage rest of government (Department of Defense (DoD), Customs and Border Patrol (CBP), etc.) to evaluate necessity of PAR and ASR procedures at joint use facilities.

- If any procedures are maintained, including but not limited to PAR or ASR, FAA must maintain training and currency of controllers to offer the procedure. If the Facility cannot provide the procedure due to training, the FAA should NOTAM those procedures out of service until such time that staff is trained.
Flight Procedures Teams (FPTs), in collaboration with other appropriate organizations in the FAA, should examine whether there are any redundant PBN instrument approach procedures and lead any requests for cancellation.

Continue to replace GPS stand-alone procedures with RNAV (GPS) procedures that offer better minima and are not predicated on design criteria for ground-based procedures.

**Recommended Decision Tree for SIDs / STARs**

- **Start**: Collect SID/STAR data
- **Is this an Obstacle Departure Procedure?**
  - **Yes**: Forward to DoD for review
  - **No**: Continue
- **Is this a procedure designed for the military?**
  - **Yes**: Forward to DoD for review
  - **No**: Continue
- **Is SID/STAR used regularly, even if it has not been filed (e.g., vector SID)?**
  - **Yes**: Has the SID/STAR been in use for less than 6 months?
    - **Yes**: Is this the only SID/STAR for the airport?
      - **Yes**: Is the SID/STAR a special event procedure?
        - **Yes**: Is the SID/STAR a SWAP/weather procedure?
          - **Yes**: Is the SID/STAR a noise abatement procedure?
            - **Yes**: Are all criteria met for all airports sharing SID/STAR?
              - **Yes**: Candidate for cancellation
              - **No**: No action
            - **No**: Forward to DoD for review
          - **No**: Are this SID/STAR shared between airports?
            - **Yes**: Candidate for cancellation
            - **No**: No action
        - **No**: Is the SID/STAR a special event procedure?
          - **Yes**: Candidate for cancellation
          - **No**: No action
      - **No**: Is this the only SID/STAR for the airport?
        - **Yes**: Candidate for cancellation
        - **No**: Continue
    - **No**: Is this the only SID/STAR for the airport?
      - **Yes**: Candidate for cancellation
      - **No**: Continue
  - **No**: No action
Recommendation for Cancellation Process

Regular Cancellation Process Cycle

1. Re-examine criteria for identification of candidates for cancellation
   - Done by IFP types: Circling, Ground-Based NAVAID, PBN, SIDs & STARs

2. Informal Feedback from key stakeholders
   - Utilize existing forums; may include RAPT, NCF, TOC RTGs, etc.

3. Generate candidate cancellation list and provide to local facilities and operators
   - Done by IFP types: Circling, Ground-Based NAVAID, PBN, SIDs & STARs
   - In person engagement between Service Center and ATC operational facilities; utilize forums for Operator input; may be integrated into new "RAPT" order

4. Solicit feedback from Operators and Local Air Traffic Facilities
   - Non Reg

5. NPRM Process for Proposed Criteria for Circling and IAPs
   - Regulatory
   - (Publish NPRM, Adjudicate comments, Publish policy)

6. NPRM Process for Candidate Circling and IAPs for Cancellation
   - Regulatory
   - (Publish NPRM, Adjudicate comments, Publish policy)

7. Adjudicate comments and Execute cancellations (FPTs and AJV-5)
   - Non Reg

8. Regular Cancellation Process Cycle

Additional Recommendation for Cancellation Process

- Removal criteria should be periodically re-examined by Mission Support or appropriate national office.
**Recommendations on Outreach for Procedure Cancellation**

- Both local ATC Facilities and Operators should be engaged into the regulatory and the non-regulatory cancellation processes.

- Recommend the new RAPT order include a process step for flight operators to offer comment/feedback on cancellation of SIDs and STARs.

- Engaging local ATC facilities for feedback is most effectively accomplished in person in order to guide facilities through the process and discussion.

- The key air traffic facility involved in creation of a procedure should participate in its cancellation.

**Additional Recommendations**

- Develop a process to ensure any procedures associated with closed airports or decommissioned/restricted NAVAIDs (VORs, NDBs) are removed or amended as appropriate.

- Establish a national policy to motivate procedure cancellation.

- Further augment FAA’s capacity for procedure maintenance and development through contract support (as needed and subject to availability of budget).

- Continue to invest in automation and technology improvements that have the potential to improve the FAA’s productivity in procedure maintenance and development.

DISCUSSION

TOC Action

Consider Recommendation on:

Process and Criteria for Cancellation of Instrument Flight Procedures

and Transmit to FAA and Sunset NPA Task Group
Obstacles in the Visual Segment

20:1 Background, Policies, and Action Plan

Presented to: RTCA Tactical Operations Committee

By: FAA

Date: March 3, 2016

Overview

• Background
• 2-Year Plan
• Assessment Phase
The purpose of the surface is to protect aircraft during the last stages of approach procedures when pilots transition from instruments to visual guidance.

Area Defined – historic

*Varies based on DAVOP distance
Background: 20:1 Penalties

1. Object lighted - Approach visibility restricted to at least 1 SM
2. Object not lighted – Restrict night operations – Procedure NA or Circling NA
Background – Problem Identified

• Due to improvements in how we identify and track obstacles, the FAA began enforcing a clear 20:1 surface in April, 2013
  • Subsequently, penetrations of airport approach surfaces were discovered at several high visibility airports (e.g., LGA, SAN)
  • Enforcement of requirements caught airport and operator community by surprise, affecting access on some procedures where operations have occurred for years

Interim Policy

• Effective January 6, 2014
• Long term goal
  Achieve and sustain compliance to required obstacle surfaces by January 2016
When 20:1 surface obstacle/terrain penetrations are discovered within the Visual Area Surface of an Instrument Approach Procedure (IAP), action will be taken to evaluate the entire airport to ensure that all 20:1 penetrations for every IAP have been identified.

**HIGH RISK** (more than 11 feet)
- Immediately restrict IAP visibility to at least 2 NM and implement restricted visibility operations (e.g., a Notice to Airmen (NOTAM) or a Procedural Amendment)
- Submit compliance plan as soon as possible but no later than 30 days
- IAP restrictions will remain until penetrations are mitigated

**MEDIUM RISK** (more than 3 feet and up to 11 feet)
- No immediate IAP actions
- Submit compliance plan as soon as possible but no later than 30 days
- Mitigate penetrations as soon as possible but not exceed 180 days

**LOW RISK** (3 feet or less)
- No immediate IAP actions
- Submit compliance plan as soon as possible but no later than 30 days
- Mitigate penetrations as soon as possible but not exceed 180 days
Timelines and IAP Restrictions

Attachment 3: Timelines and IAP Restrictions

<table>
<thead>
<tr>
<th>RISK CATEGORIES</th>
<th>Obstacle Penetrates 20:1 by:</th>
<th>Verification Timelines</th>
<th>IAP Restrictions if 20:1 are valid</th>
<th>Compliance Plan Timelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH</td>
<td>More than 11 feet</td>
<td>Not to exceed 30 days</td>
<td>Immediately restrict IAP visibility and 20:1 if a notification and Airman (NOTAM) or a Procedure Amendment</td>
<td>IAP Restrictions will remain until penetration(s) are mitigated</td>
</tr>
<tr>
<td>MEDIUM</td>
<td>More than 3 feet and up 11 feet</td>
<td>Not to exceed 30 days</td>
<td>No immediate action</td>
<td>30 days for Compliance Plan &amp; 180 days to light, lower, or remove</td>
</tr>
<tr>
<td>LOW</td>
<td>3 feet or less</td>
<td>Not to exceed 30 days</td>
<td>No immediate action</td>
<td>30 days for Compliance Plan &amp; 1 year to light, lower, or remove</td>
</tr>
</tbody>
</table>

NOTE: Verification and compliance timelines should be completed as soon as possible but not to exceed the appropriate number of calendar days. If any of the timelines are not met or the obstruction cannot be removed, the IAP will be restricted immediately.

IAP = Instrument Approach Procedure
VIS = Visibility

2-Year Plan – Scope of Issue

- Aeronautical Information Services reviewed more than 16,000 Instrument Flight Procedures at 3002 airports
- More than 1500 airports had possible 20:1 penetrations
2-Year Plan Report Card (Ending Jan 2016)

- FAA restricted IFPs at 933 airports
- More than 2000 procedures amended
- More than 565 airports have either removed or mitigated obstacles to address safety risks
- 82 airports remain in the notification, validation and/or mitigation phase

Assessment Phase

- Objective: Determine if the 2-year plan was successful in obtaining compliance throughout the NAS
  - If successful, there should be very few noncompliances
  - If not successful, a new strategy to achieve compliance will be needed
- Began with initial procedure reviews of procedures which had been addressed under the 2-year plan
Assessment Phase - Criteria

- Each case: Continue to apply principles of the 2-year plan, with some additional considerations
  - Was the airport able to mitigate a prior low or medium risk penetration?
  - How was the new obstacle discovered, and what caused it?
  - Grant time-limited waivers when warranted
- Detailed tracking of reviews
  - What recurring factors contribute to new obstacles (e.g., tree growth, new survey/old obstacle, ..?)
  - How can we address root causes and achieve 100% compliance?

Assessment Phase – To-Date

- Reviewed 165 airports
- Reviewed 392 procedures
- Found 10 airports with possible 20:1 penetrations impacting 28 procedures requiring verification and possible action
  - 9 airports in the validation phase
  - 1 airports at AFS for PRB review
Next Steps

- Share Insights from Assessment
  - Potential for new root-cause actions
- Goal is 100% Compliance
  - Anticipate penetrations before FAA review and take corrective action
  - Conclude formulaic acceptance of low and medium risk penetrations

Update on the NextGen Advisory Committee (NAC)

Andy Cebula, RTCA
NAC Agenda Topics
Feb 25th

- PBN Time, Speed, Spacing Task Group
- NextGen Integration Working Group Reports
  - NextGen Priorities Beyond the Four
  - Reports & Discussion
- PBN JFK Implementation
- European Air Traffic Management Masterplan
- Joint Analysis Team
- PBN Blueprint Community Outreach Task Group
- ADS-B Equipage
- NextGen Vision

NAC Work Projects

<table>
<thead>
<tr>
<th>Tasking</th>
<th>Description</th>
<th>Leaders</th>
<th>Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBN Time, Speed, Spacing Task Group</td>
<td>Review plans for time, speed, spacing and related capabilities &amp; develop a 15 year plan for deployment: 5 - year increments: near - 2020, mid - 2025, far term - 2030 Identify and prioritize tools and technologies ground vs. aircraft Appropriate in various operating conditions</td>
<td>Dan Allen, FedEx Express Steve Fulton, Sandel Avionics FAA SME – Rob Hunt</td>
<td>October 2016</td>
</tr>
<tr>
<td>Joint Analysis Team (JAT)</td>
<td>Evaluate the performance improvements attributable to the implementation of selected capabilities at specific locations.</td>
<td>Ilhan Ince, American Airlines Dave Knorr, FAA Chris Maccaron, Passur FAA and Industry SMEs</td>
<td>October 2016</td>
</tr>
<tr>
<td>PBN Blueprint Community Outreach Task Group</td>
<td>Recommendations addressing community outreach in the implementation of PBN</td>
<td>Jim Crites, DFW Brian Townsend, American Airlines FAA SME – Jodi McCarthy</td>
<td>June 2016</td>
</tr>
</tbody>
</table>
DISCUSSION

Lunch
Response to Recommendations on Caribbean Operations

Jim Linney, FAA

Strategy for Enhancing Air Traffic in the Caribbean

ATO Response to the RTCA’s Eastern Regional Task Group (ERTG) Recommendations

Presented to: Tactical Operations Committee
By: Jim Linney, ATS Director
Date: March 3, 2016
**Background**

- In July 2015, in response to the FAA’s request, the Eastern Regional Task Group (ERTG) of the Radio Technical Commission for Aeronautics (RTCA), Tactical Operations Committee (TOC) responded with a report outlining 20 “Operational Needs To Address Caribbean Operations”
- On November 11th 2016, the FAA briefed the TOC, providing initial feedback regarding the 20 recommendations.
- On January 26th 2016, the FAA Administrator was briefed on the evaluation approach to the 20 recommendations. A commitment was made to draft a timeline for all recommendations.

**Approach**

- A cross-organizational FAA team including: FAA International plus Air Traffic Organization (ATO), ATO International, Safety and Training (AJI), representation from the Program Management Office (PMO), Tech Ops, Air Traffic Services, Airspace and Requirements evaluated each of the TOC’s recommendations
  - Team Represents: two lines of business, six service units and over 20 people
- Evaluation criteria were developed and applied to each recommendation for implementation consideration, to include: Rough Schedule, Rough Cost, Technical/Operational Risks, and Interdependencies with other recommendations and other FAA Investment Decisions
- All Costs/Schedules contained in this briefing not yet validated
- Final validation is required on the list of projects.
Evaluation Criteria

Each recommendation was evaluated against the four categories outlined below:

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FAA concurs with recommendation. No additional research is required. International agreement and interdependencies are required</td>
</tr>
<tr>
<td>2</td>
<td>FAA concurs with recommendation. Additional research regarding operations and/or technical interdependencies are required</td>
</tr>
<tr>
<td>3</td>
<td>FAA concurs with recommendation. Additional research regarding operations and/or technical interdependencies are required. Investment decision not yet made (requires JRC-level approval or disapproval)</td>
</tr>
<tr>
<td>4</td>
<td>FAA does not concur with moving forward with this recommendation, not pursuing at this time</td>
</tr>
</tbody>
</table>

Evaluation Results: Category 1

FAA concurs with recommendation. No additional research is required. International agreement and interdependencies are required.

<table>
<thead>
<tr>
<th>Recommendation Description</th>
<th>Category</th>
<th>Issue/Risk/Condition Description</th>
<th>ROM Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continue implementation of ADE with Santo Domingo</td>
<td>Technical Dependency</td>
<td>- In Progress. Establishing automated ADE interface with Santo Domingo. Also included is software ADE translator for data communication with ERAM</td>
<td>Labor, within normal business</td>
</tr>
<tr>
<td>Ensure ERAM software upgrades associated with ADE stay on schedule</td>
<td>- International Agreement; - Technical Dependency</td>
<td>- FAA to further research technical complexity vs. benefit of executing this recommendation</td>
<td>Believed to be within normal operating costs</td>
</tr>
<tr>
<td>Install Shout Lines between facilities for a Controller to &quot;communicate/coordinate&quot; with another facility without dialing</td>
<td>- International Agreement - Airspace Dependency</td>
<td>- In Progress. Agreement with foreign facility that an additional shout line is required and that the costs will be shared by the FAA facility that added the shout line. - Changes to Airspace could impact this activity</td>
<td>TBD, ROM in process, estimate $400k</td>
</tr>
</tbody>
</table>

Estimate 18-24 months to implementation
Evaluation Results: Category 1 (cont.)

FAA concurs with recommendation. No additional research is required. International agreement and interdependencies are required.

<table>
<thead>
<tr>
<th>Recommendation Description</th>
<th>Category</th>
<th>Issue/Risk/Condition Description</th>
<th>ROM Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuse / Input St. Maarten/Marten Radar into ZSU’s surveillance Data</td>
<td>International Agreement</td>
<td>- Agreement with St. Maarten/Marten Princess Juliana International Airport Authority required.</td>
<td>TBD, ROM in process, estimate $650K</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Requires updated agreement with St. Maarten/Marten after new requirements and funding. This</td>
<td></td>
</tr>
<tr>
<td>Implement a New Communication Frequency at St. Maarten/Marten</td>
<td>International Agreement</td>
<td>recommendation will be assessed and validated based upon the results of the airspace study</td>
<td>TBD, ROM in process, estimate $750K</td>
</tr>
<tr>
<td>Develop software translation for neighboring facilities with AIDC protocol</td>
<td>- International Agreement</td>
<td>- In Progress. A modification is required in ERAM. The scope and timeline to implement this is</td>
<td>Believed to be within normal operating costs</td>
</tr>
<tr>
<td></td>
<td>- Technical Dependency</td>
<td>In Progress. A modification is required in ERAM. The scope and timeline to implement this is</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>implemented this is being assessed. At this point, the change is believed to be in scope</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>- Plans to pursue AIDC/ADE interfaces with other States/Territories in the Caribbean</td>
<td></td>
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</tbody>
</table>

Total Cost * $1.800M

Evaluation Results: Category 2

FAA concurs with recommendation. Additional research regarding operations and/or technical interdependencies are required.

<table>
<thead>
<tr>
<th>Recommendation Description</th>
<th>Category</th>
<th>Issue/Risk/Condition Description</th>
<th>ROM Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigate Option to Access Weather Information from Long Range DoD/DHA</td>
<td>None Identified</td>
<td>Separate business case and requirements analysis required in order to make investment decision</td>
<td>TBD, ROM in process, estimate $200k</td>
</tr>
<tr>
<td>If the Offshore Precipitation Capability shows promise, expedite Caribbean access</td>
<td>None Identified</td>
<td></td>
<td>TBD, ROM yet unknown</td>
</tr>
</tbody>
</table>

* - incomplete costs

Estimate 12-36 months to implementation (or longer if larger scope)
### Evaluation Results: Category 2 (cont.)

FAA concurs with recommendation. Additional research regarding operations and/or technical interdependencies are required.

<table>
<thead>
<tr>
<th>Recommendation Description</th>
<th>Category</th>
<th>Issue/Risk/Condition Description</th>
<th>ROM Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implement a Shortcut Route</td>
<td>Technical Dependency</td>
<td>- The first step for each of these recommendations requires them to be included as part of an umbrella analysis for all affected airspace and facilities - AJV will lead a group including MITRE CAASD, Eastern Service Center (ESC), ZMA and ZSU in an airspace study (nominally six months) to examine historical operational data spanning several years in order to establish trends that identify potential airspace issues</td>
<td>Believed to be within normal operating costs</td>
</tr>
<tr>
<td>between CARPX and RENAH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conduct an integrated Redesign of ZMA and ZSU Airspace</td>
<td>Technical Dependency</td>
<td></td>
<td>$1M Rough Estimate</td>
</tr>
<tr>
<td>Explore Options to Reduce Separation between ZNY and ZSU/ZMA</td>
<td>Technical Dependency</td>
<td></td>
<td>Cost of Doing Business</td>
</tr>
<tr>
<td>Improve Short Term Cuba Access in Giron Corridor</td>
<td>International Agreement</td>
<td>Interagency (FAA, DOT, DOS, DOD, NSC) discussions are currently taking place. The Office of International Affairs is the lead for the FAA. U.S. government approval of any proposals is required before approval is requested from Cuba</td>
<td>Believed to be within normal operating costs</td>
</tr>
</tbody>
</table>

Total Cost * $1.200M

* - incomplete costs

Estimate 12-36 months to implementation (or longer if larger scope)

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### Evaluation Results: Category 3

FAA concurs with recommendation. Additional research regarding operations and/or technical interdependencies are required. Investment decision not yet made (requires JRC-level approval or disapproval)

<table>
<thead>
<tr>
<th>Recommendation Description</th>
<th>Category</th>
<th>Issue/Risk/Condition Description</th>
<th>ROM Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implement a New Communication Frequency at Abaco Island</td>
<td>International Agreement</td>
<td>There are no existing agreements in place for the installation of new FAA-owned equipment in the Bahamas. Previous agreement negotiations with the Bahamas have been protracted</td>
<td>TBD, ROM in process, estimate $750K</td>
</tr>
<tr>
<td>Implement a New Communication Frequency at St. Maartin/Marten</td>
<td>International Agreement</td>
<td>Agreement with St. Maarten/Marten Princess Juliana International Airport Authority required</td>
<td>TBD, ROM in process, estimate $750K</td>
</tr>
<tr>
<td>Implement ADS-B in the Caribbean</td>
<td>- International Agreement - Technical Dependency</td>
<td>- Potential issues with existing infrastructure Bahamian and Abaco sites - Although international agreements are usually required, in the past we have received approval from both the GOB and the TCIAA for installations of FAA-owned equipment without a formal agreement. This has been on a case-by-case basis and poses more risk for the FAA</td>
<td>$3.5M</td>
</tr>
<tr>
<td>Implement independent Flight Data Processing in ZSU</td>
<td>Technical Dependency</td>
<td>Existing use of ZMA Flight Data will be addressed after FAA Offshore Automation investment and upgrades of MEARTS at ZSU</td>
<td>$3M - $4M</td>
</tr>
</tbody>
</table>

CONTINUED NEXT PAGE
Evaluation Results: Category 3 (cont.)

FAA concurs with recommendation. Additional research regarding operations and/or technical interdependencies are required. Investment decision not yet made (requires JRC-level approval or disapproval).

<table>
<thead>
<tr>
<th>Recommendation Description</th>
<th>Category</th>
<th>Issue/Risk/Condition Description</th>
<th>ROM Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make FAA Caribbean Radars available to ZNY</td>
<td>- Technical Dependency</td>
<td>- Depends on ATOP Tech Refresh; Tech Ops to investigate scope of project</td>
<td>No ROM estimate</td>
</tr>
<tr>
<td></td>
<td>- International Agreement</td>
<td>- If radar data is from a foreign facility, an international agreement is required</td>
<td></td>
</tr>
<tr>
<td>Enable ZSU to Participate in Data Comm.</td>
<td>Technical Dependency</td>
<td>Data Comm. has been requested for input on adding ZSU to its waterfall. This will be addressed after FAA Offshore Automation investment and upgrades of MEARTS at ZSU</td>
<td>TBD</td>
</tr>
</tbody>
</table>

Total Cost $8M - $9M

Total Known ROM Cost (All Categories) $10.15M - $11.15M

***NOTE: ROM Costs do not include all estimates, reflects capital costs only, and do not reflect yearly recurring or operational costs

Estimate 36+ months to implementation

Evaluation Results: Category 4

FAA does not concur with recommendation and will not pursue at this time

<table>
<thead>
<tr>
<th>Recommendation Description</th>
<th>Category</th>
<th>Issue/Risk/Condition Description</th>
<th>ROM Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify and Access a Backup Option for Grand Turk Backup</td>
<td>Technical Dependency</td>
<td>FAA has determined implementation of ADS-B is a better option to provide Grand Turk Backup</td>
<td>$1M</td>
</tr>
<tr>
<td>Prepare for Significant Growth in Cuba Operations</td>
<td>State Department and DoD Dependency</td>
<td>FAA recommends closing this recommendation as the future of Cuba Operations is unknown</td>
<td>SCOPE YET UNKNOWN</td>
</tr>
</tbody>
</table>

Total Cost *$1M

* - incomplete costs
## Summary of Recommendations

<table>
<thead>
<tr>
<th>Recommendations In Progress</th>
<th>Recommendations Requiring Additional Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continue implementation of ADE with Santo Domingo</td>
<td>Implement a New Communication Frequency at St. Maartin/Marten</td>
</tr>
<tr>
<td>Install Shout Lines between facilities for a Controller to “communicate/coordinate” with another facility without dialing</td>
<td>Implement a New Communication Frequency at Abaco Island</td>
</tr>
<tr>
<td>Develop software translation for neighboring facilities with AIDC protocol</td>
<td>If the Offshore Precipitation Capability shows promise, expedite Caribbean access</td>
</tr>
<tr>
<td>Ensure ERAM software upgrades associated with ADE stay on schedule</td>
<td>Implement independent Flight Data Processing in ZSU</td>
</tr>
<tr>
<td>Ensure ERAM software upgrades associated with ADE stay on schedule</td>
<td>Improve Short Term Cuba Access in Giron Corridor</td>
</tr>
<tr>
<td>Implement a Shortcut Route between CARPX and RENAH</td>
<td>Identify and Access a Backup Option for Grand Turk Backup</td>
</tr>
<tr>
<td>Conduct an integrated Redesign of ZMA and ZSU Airspace</td>
<td>Enable ZSU to Participate in Data Comm.</td>
</tr>
<tr>
<td>Explore Options to Reduce Separation between ZNY and ZSU/ZMA</td>
<td>Implement ADS-B in the Caribbean</td>
</tr>
</tbody>
</table>

### Next Steps

- Develop detail cost and schedule estimates
- Initiate international coordination
- Initiate Airspace Study
- The FAA will continue to communicate with the TOC regarding progress in the assessments and implementation efforts
Response to Recommendations on Class B Airspace

Ken Ready, FAA
Background

- The report is comprehensive and a number of recommendations will require the FAA examine existing practices
- Based on the scope of the recommendations, the FAA recognizes that significant time and effort will be required for the agency to research and develop these changes to Order 7400.2 for implementation
  - These changes will not be made quickly and will require an adequate program management plan to handle a project of this magnitude
- The FAA concurs with all recommendations except one

Recommendation 1

- **The FAA should remove the enplanement and air carrier/air taxi quantitative criteria.**
  - The FAA concurs but has the following comments
  - The FAA does not see a correlation between enplanements and the stated purpose of reducing the potential for midair collisions in the airspace surrounding airports with high density air traffic ops
  - The FAA also recognizes the potential for a more complex operation when considering secondary airports (as Class C does) versus just the primary airport with at least 240K air carrier/taxi ops of a min 300K.
    - Would a smaller percent to the primary coupled with secondary mixed ops lead to a higher complexity index?
  - The FAA must further study options for what a complexity index looks like and analyze why enplanements have been used as a criteria for Class B. Was it simply harmonizing with ICAO? Until we develop what the new criteria is we cannot act on this.
    - We need to analyze the rationale to determine if it still applies today.
Recommendation 2

- **Total Airport Operations counts should also include traffic from secondary airports and overflights.**
  - The FAA concurs
  - Analyzing why Class C considers secondary airports and Class B doesn’t need to be discussed? If the stated outcome for a Class B is reducing the potential for midair collisions in the airspace surrounding airports with high density air traffic ops
  - And the stated outcome for a Class C is designed to improve aviation safety by reducing the risk of midair collisions in the terminal area and enhance the management of air traffic ops therein
  - Why does one consider secondary airports and the other doesn’t
  - We need to define why and when a secondary airport will be considered and type or volume of traffic in and out or by distance from the primary airport and other considerations

Recommendation 3

- **An airspace complexity index should be developed to address airspace considerations beyond that of Total Airport Operations.**
  - The FAA concurs
  - The development of a Complexity Index will require a study. Our research has found 4 “complexity” and “index” related products from Civil Aerospace Medical Institute
  - Leveraging a study which identifies all factors taken from controllers and pilots who operate within Class B airspace, would assist in developing policy for future design
  - RTCA provided considerations
    - SAA
    - Traffic Counts
    - Secondary Airport ops
    - Terrain
  - Factoring complexity could provide for a sliding scale of total ops due to the complexity considered
Recommendation 4

• **Criteria should be developed for airports with strong seasonal or time of day demand surges.**
  o The FAA concurs
  o RTCA supports full time Class B ops for airports that annualize the Class B threshold but only for part of the year
  o The FAA needs to further study whether part-time Class B airspace is feasible
  o We have part-time airspace for other classes of airspace, why not Class B
  o Other considerations would be charting, outreach, facility staffing

Recommendation 5

• **Use available safety data to more directly assess airspace complexity issues and mitigations.**
  o The FAA concurs
  o The FAA will continue development of the recommendation further to address the availability of relevant databases and determine how to use the data in Class B analysis
    - These reports will be a component of the complexity index
  o The limited ability of the OSG’s to access robust safety databases was identified by the TOC
  o When the Complexity Index is studied different safety databases need to be identified and included into the Index
Recommendation 6

- Provide more guidance on how operational issues can be addressed without the Class B designation.
  - The FAA concurs
  - Allowing more flexibility for Class C expansion provides the opportunity to capture the stated goal reducing midair collisions on a smaller scale
    - Class B airspace is considerably smaller than Class C airspace
  - There is a need for more substantial guidance form HQ to the OSGs
    - This guidance needs to be developed
    - Current language of safety seminars and improved radar services needs to be expanded upon
  - “Sticking to the design” is inflexible. i.e Memphis

Recommendation 7

- The FAA should periodically review Class B designation criteria to determine whether they should be adjusted.
  - The FAA concurs
  - The TOC suggestion is to mandate a HQ policy review of policy for Class B airspace criteria on a recurring basis
  - Whether we write it into the 7400.2 or internally mandate a review, the FAA agrees
    - Arguably, a review of all classes of airspace should be done at the policy level
  - Manning and competing priorities are always a consideration
Recommendation 8

• **Remove existing guidance indicating design should be centered on a NAVAID [Navigational Aid] and amend guidance to ensure designers leverage the flexibility to configure airspace that maintains Class B safety standards. (Being addressed in 7400.2 rewrite)**
  
  o The FAA concurs
    
    – We are amending the guidance to deemphasize both centering the Class B on a NAVAID and using the circular, upside down wedding cake configuration
  
  o Instead, other methods, such as latitude/longitude coordinates, waypoints, etc, may be considered for defining the airspace
  
  o There will be no “standard” design
    
    – Design will vary depending on location-specific ATC operational requirements, runway alignment and containment of instrument procedures
  
  o The option will be retained to center the airspace on a NAVAID where that makes sense for the local situation

Recommendation 9

• **Require a review of Class B airspace and instrument procedures whenever new runways are built, existing runway changes occur (e.g. decommissioned, lengthened, or shortened) or when procedures are developed or old ones canceled. (Being addressed in 7400.2 rewrite)**
  
  o The FAA concurs
    
    – These factors are being added to an expanded list to be considered during the Service Center’s required periodic evaluation of Class B airspace areas
  
  o The TOC relayed concerns with the development of PBN approaches.
    
    – Our policy is to contain new approaches in existing Class B airspace
    
    – If a new approach is developed that does not remain in Class B airspace the new approach will be delayed until the Class B has been modified
Recommendation 10

- Encourage designers to make maximum use of existing tools to accommodate VFR flights through or around Class B airspace. (Being addressed in 7400.2 rewrite)
  - The FAA concurs
  - We are developing guidance for enhancing the VFR Terminal Area Chart (TAC) and the VFR Flyway Planning Chart by adding VFR waypoints, VFR checkpoints, GPS waypoints, prominent landmarks and geographical features easily visible from the air
  - Additionally, there are 8 Class B areas that do not have a VFR Flying Planning chart on the reverse side of the TAC chart
    - All locations will be encouraged to create such a chart

Recommendation 11

- Evaluate lateral and vertical gaps between adjacent airspace where VFR flight has the potential to increase hazards for Class B or Class C operations.
  - The FAA concurs
  - Congested airspace areas with overlapping B/C/D airspace occasionally have gaps and lead VFR aircraft very little room to operate
    - At times only hundreds of feet are available to “shoot the gap”
  - When developing airspace these tunnels or gaps of airspace need to be considered and evaluated to determine if there is enough room to safely operate and if not then join the different types of airspace to avoid these gaps
Recommendation 12

- **Recommend introduction of an altitude buffer between protected IFR airplanes and VFR aircraft.**
  - The FAA Non-Concurs
  - Most TCAS incidents happen just outside of Class B or Class C airspace due to the presence of VFR aircraft and IFR aircraft in close legal proximity
  - Building a buffer would push VFR aircraft further away and compress their potential flying area even more

Recommendation 13

- **Ensure all Class B Terminal Area Charts include information on IFR arrival/departure routes to/from the primary airport and explore possibility of extending to include secondary airports.**
  - The FAA concurs
  - The FAA intends on adding this to the 7400.2 which suggests charting will be coordinated with AIS
  - In concert with recommendation 10 to enhance terminal charts for all Class B airspace and have a VFR Flying planning chart
Recommendation 14

- **Update FAA Order 7400.2 with additional guidance on data sources relevant for the biennial review. (Being addressed in 7400.2 rewrite)**
  - The FAA concurs
  - We have created a list of suggested data sources that will be added to the biennial review paragraph
    - Airspace modeling results (PDARS, Targets)
    - TCAS RAs
    - Safety reports (ATSAP, ASRS)

Recommendation 15

- **Develop criteria for identifying when Class B airspace should be revoked.**
  - The FAA concurs
  - Consideration of a baseline below the percentage for a period of time needs to be studied
    - Below 80% for 3 years
  - Development of a complexity index would need to be considered as well
  - What are the ramifications of downgrading of airspace and union participation
Recommendation 16

- Outline a process for revoking Class B airspace.
  - The FAA concurs
  - In addition to recommendation #15 upon developing criteria we will need to define the process to revoke

Recommendation 17

- Conduct further public engagement before implementation of any design, designation and evaluation changes to Class B guidance.
  - The FAA concurs
  - The workgroup deciding the changes for Class B design will decide the level of informal outreach capable, depending on resources
  - Community meetings and at what level?
    - NAS, regional, local to the Class B airspace
  - Additionally on-line options could be held as well
Recommendation 18

- Whether communicating draft language or a Final Rule of changes to the Class B guidance, the group recommends the FAA utilize one centralized and consistent package of information across all public engagements.
  - The FAA concurs
  - A Notice of Proposed Policy change will be posted to the Federal Register for comment

Briefing on One Engine Inoperative (OEI) Procedures

John Speckin, FAA
Consider the Impact of One Engine Inoperative (OEI) Procedures in Part 77 Hazard Determinations

To: ATO Technical Operations Committee (TOC)
From: John Speckin, Airport Obstructions Standards Committee
Date: March 3, 2016

Overview

• Explain Aircraft Departure Requirements, Current Policy, and One-Engine Inoperative (OEI) Issue
  – Outline Real World Impact
• Explain FAA Proposal for Protecting for OEI
• Public Comments Received
• Moving Forward
Aircraft Departure Requirements

- Normal Takeoff Operations
  - Considers all engines operative
  - Path of takeoff protected by FAA Obstruction Evaluation Process

- One Engine Inoperative
  - Air carrier operators must ensure there is a safe, alternate departure route in the event of engine loss on departure.
    - 14 CFR Part 121.177, 121.189, 135.367, 135.369, 135.398 and AC 120-91

- Multiple paths internal to air carrier (proprietary)
  - Since they are proprietary, paths are not available to external parties (developers, zoning officials, etc.)

OEI Issue

- Ever increasing construction around NAS airports is encroaching on the airspace, restricting acceptable takeoff paths for operator’s OEI procedures
- In some cases, operators can only ensure safe departure by compromising capacity
  - Airlines must off-load fuel, passengers, and/or cargo to achieve a higher climb gradient (fly over, not around).
- Conflict between the airport, airline, and community development undermining federal investment and airport capacity
  - Airspace studies under 14 CFR Part 77 (Part 77) evaluates airport capacity as aircraft operations without consideration of an aircraft’s capacity in terms of fuel, passengers, or cargo
Real World Example

Ronald Reagan
Washington National
Airport (DCA)

Activity (FY2011)
Aircraft Operations – 281,770
  Air Carrier – 125,834
  Regional – 150,084
  GA – 5,236
  Military – 616

Passengers – 18.8 (MAP)

Airlines – 15
Operational Impacts
(Current Policy Provides No Resistance to Further Negative Impacts)

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>Payload Reduction (lbs.)*</th>
<th>Equivalent Passenger Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>A320</td>
<td>3,800 – 5,700</td>
<td>16 – 25</td>
</tr>
<tr>
<td>A321</td>
<td>8,600 – 9,300</td>
<td>38 – 41</td>
</tr>
<tr>
<td>A319</td>
<td>3,000 – 5,700</td>
<td>13 – 25</td>
</tr>
<tr>
<td>737-400</td>
<td>2,700 – 5,000</td>
<td>12 – 22</td>
</tr>
<tr>
<td>MD-80</td>
<td>2,200 – 2,900</td>
<td>10 – 13</td>
</tr>
<tr>
<td>MD-83</td>
<td>2,100 – 2,500</td>
<td>9 – 11</td>
</tr>
<tr>
<td>ERJ-170, 175, 190</td>
<td>650 – 3,300</td>
<td>3 – 15</td>
</tr>
</tbody>
</table>

6400 Annual Flights Affected to West Coast destinations such as Phoenix, Salt Lake City, Los Angeles, and San Francisco

*Reduction based upon maximum operating weight; lower number is during colder winter temperature, higher number is for higher summer temperatures.
Proposal to Consider Impact on OEI Procedures

- **PROPOSAL:** Utilizing its existing authority under Part 77, the FAA is proposing to consider the impact on OEI procedures during the Obstruction Evaluation process
  - No change to the regulatory requirement specifying when a notice is required to be filed with the FAA nor to the obstruction standards considered during the aeronautical study.

- **PROCESS:**
  1. Airport owner, in consultation with its users, VOLUNTARILY decides that based on their local circumstances OEI protections are needed
  2. Airport owner will work with its users/operators and local community to determine a single OEI departure path for each critical runway end
  3. This single path will be depicted on the Airport Layout Plan (ALP)
  4. The single path would then be considered as part of the Obstruction Evaluation Process under Part 77 for evaluation of future construction proposals
  5. Communities would ideally adopt local zoning that protects for these single OEI paths.
  - If implemented, the FAA will revise pertinent Advisory Circular(s) that outlines the process for the airport owners to follow
No Change to Part 77

- No change to the standards for when a notice must be filed with the FAA or the obstruction standards that are considered
- Change agency policy to consider the impact of OEI procedures when conducting aeronautical studies at select airports who have developed a consolidated path

Why is this the Right Process

- VOLUNTARY: The FAA realizes that each airport and community is unique and one size does not fit all, so this decision should be made locally – maximizes flexibility at the local level
- BALANCE: Proposal allows the airport owner to balance the aviation needs with the community needs and define a single path
- DOCUMENTED: The single path is clearly documented where communities can plan accordingly
Public Comments

OEI Pilot Project

- From 2008 – 2010, the FAA conducted a successful pilot project that followed a similar process at:
  - Boston Logan International
  - Las Vegas McCarran International
  - Miami International
  - Phoenix Sky Harbor International
  - Ronald Reagan Washington National
One Engine Inoperative – Public Comments

• Through the Federal Register Notice and the Public Meeting, we received 339 comments. Some of the commenters from the public meeting are duplicates to what they submitted to the Federal Register.

• Comments were categorized into:
  a) Airlines and Airlines Organizations
  b) Airports and Airports Organizations
  c) Real Estate Companies and Real Estate Organizations
  d) State and Local Governments
  e) Member of Congress
  f) Individuals

One Engine Inoperative – Public Comments

• Airlines and Airline Association
  – Summary of Comments
    - All airlines and airlines organizations are supportive of the proposed policy with American Airlines noting the proposed policy does not go far enough and protect for 62.5:1
    - A4A, Jetblue, American Airlines want FAA Aeronautical Charting Forum to work the logistics and aspects of implementing the policy
    - ALPA wanted it incorporated into Part 77 and not leave to local jurisdictions because it might erode safety
    - Only 10 airlines or airline organizations submitted comments
  • Concerned that we didn’t receive more comments of support from additional airlines and their associations
One Engine Inoperative – Public Comments

• Airport and Airport Associations
  – Summary of Comments
    - Only 17 Airports or Airport Associations commented and only 10 of those came out and stated support for the proposed policy
    - Airports are wanting more definitive guidance with questions of ALP updates, AIP Eligibility, NEPA requirements, when can it be done, etc., which would come with a finalized policy
    - Some are concerned that the voluntary program is not really voluntary and that airports will be somehow penalized by not implementing the policy
    - Some are concerned that additional burden is being placed on the Airport

• Real Estate Developers and Development Organizations
  – Summary of Comments
    - Almost all developers or development organizations believe it should go to rulemaking.
    - Some stated that we have not provided any empirical evidence that development is actually encroaching on airports
    - Some stated that this is an economic benefit to the airlines at the expense of the land owner without any supporting economic analysis performed to indicate that it is appropriate
    - OEI Path would restrict building heights and create Eminent Domain, or ED effect (5th amendment taking clause) and land owners should be compensated
    - Weitzman Study indicates that thousands of buildings will be impacted by the proposed policy and asked us to respond
One Engine Inoperative – Public Comments

- **State and Local Government Entities**
  - Summary of Comments:
    - 12 government entities, including 3 letters from US House with joint signatures, all but one do not support the proposed policy
    - Vast majority are requesting that we go to rulemaking
    - Many are requesting an economic analysis / cost benefit analysis
  - College Park, GA Provided Excellent Representative Comments:
    - Wanting to understand role of local government
    - What was our standard to determine encroachment
    - Cross jurisdictional issue will result in lack of consensus

Status

- AOSC Steering Group has concurred with moving forward with the proposed policy
- Currently communicating with AOA-1’s office to ensure the timing is right to move forward
  - Further coordination OST and OMB OIRA also needed
Questions and Answers

Improving Awareness, Planning and Execution of Airport Construction

Mark Hopkins, Delta
Chris Oswald, ACI-NA
Co-Chairs, Airport Construction Task Group
### Airport Construction Tasking

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Lessons Learned (Case Studies)</td>
<td>Review select past airport construction projects and associated data and identify <strong>lessons learned and recommend best practices</strong> for future projects. This would include the review of available safety and efficiency data where construction issues were noted as a factor. Please recommend a mechanism to ensure we capture and share lessons learned from future projects.</td>
</tr>
<tr>
<td>2. Evaluate FAA Planning Tools</td>
<td>Identify and <strong>evaluate current strategic planning initiatives/tools used by FAA stakeholders</strong> at the Headquarter, Service Area/Region, and Service Delivery Point levels and provide recommendations on a best approach.</td>
</tr>
<tr>
<td>3. Evaluate FAA Processes</td>
<td><strong>Assess the use of agency orders, advisory circulars, and internal processes</strong> currently being used to guide airport sponsors in their management of airport operations during construction and provide recommendations on a best approach.</td>
</tr>
<tr>
<td>4. Understand Stakeholders</td>
<td><strong>Identity all stakeholders internal and external</strong> to the FAA needed and define their roles in the coordination and implementation processes.</td>
</tr>
<tr>
<td>5. Outreach Strategies</td>
<td>Describe <strong>needed outreach strategies</strong> associated with each stakeholder and include a recommended timeline for outreach for major, long term projects.</td>
</tr>
<tr>
<td>6. Managing Safety Risk</td>
<td>Identify a set of <strong>recommendations on how safety risk should be better managed</strong> for aircraft operations impacted by airport construction projects.</td>
</tr>
</tbody>
</table>

The FAA requests this task be completed by the 2nd Quarter, FY2016 TOC meeting – March 2016

### The Need for Collaboration

[Image of hands forming a circle, representing collaboration]
Task Group Participants

Steve Jangelis, Air Line Pilots Association
John White, Air Line Pilots Association
Melissa Rudinger, Aircraft Owners and Pilots Association
Frank Oley, Airlines for America
Chris Oswald, Airports Council International-NA (Co-Chair)
Eric Silverman, American Airlines, Inc.
Justin Towles, American Association of Airport Executives
Rico Short, Beacon Management Group
Paul Martinez, Dallas/Fort Worth International Airport
Mark Hopkins, Delta Air Lines, Inc. (Co-Chair)
Jim Marcoux, Delta Air Lines, Inc.
John Dermody, Federal Aviation Administration
Kent Duffy, Federal Aviation Administration
Freddie James, Federal Aviation Administration
Jeffrey Jones, Federal Aviation Administration
Khalil Kordi, Federal Aviation Administration
Andrew Lamb, Federal Aviation Administration
Vered Lovett, Federal Aviation Administration
Jennifer Morris, Federal Aviation Administration
Pat Mulqueen, Federal Aviation Administration
Susan Pfingstler, Federal Aviation Administration
Dave Stiebeer, Federal Aviation Administration
Tony Tisdall, Federal Aviation Administration
Beverly Tulip, Federal Aviation Administration
Richard VanAllman, Federal Aviation Administration
Lynn Williams, Federal Aviation Administration
Greg Yamamoto, Federal Aviation Administration
Bill Murphy, International Air Transport Association
Lee Brown, Landrum-Brown
Celia Fremberg, Landrum-Brown
Paul Shank, Maryland Aviation Administration
Vincent Cardillo, Massachusetts Port Authority
Ric Loewen, National Air Traffic Controllers Association
Ralph Tamburro, Port Authority of New York & New Jersey
Trin Mitra, RTCA, Inc.
Bob Flynn, The MITRE Corporation
Glenn Morse, United Airlines, Inc.

Connecting the Dots
Organization of Report

- Overview of Key Stakeholders in Construction
- Three Major Gaps in Construction
  - Awareness of Planned Construction
  - Consistent Planning of Complex Construction
  - Repeatable Construction Execution
- Safety-Focused Recommendations
- Recommendations for FAA Tools, Process and Guidance in Airport Construction

Key Gap: Awareness of Planned Construction

- Information about planned construction at smaller airports can “slip through the cracks”
- Applicable to airports other than the Core 30 large hub commercial
- No centralized information source for planned construction
Awareness Case Study
“National GA” Airport Runway Reconstruction

2010 2011 2012 2013 2014 2015

- Project first appears in ACIP (2010)
- EIS Record of Decision (Sep 2011)
- Eastern PRG learn of project; start discovery process (Fall 2012)
- Preliminary design RA developed (Nov 2013)
- Road constr. begins to move road in prep for RSA work (Sep 2014)
- CSPP submitted through iOE/AAA process (Apr 23)
- NBAA hears of constr. (Jul 16)
- Construction Begins (Jul 27)
- Expected completion (Nov 2015)

Many individual stakeholders may be aware of construction well in advance

Construction Clearinghouse Concept

Multiple stakeholders submit construction information via simple, standard web-based form with minimal required data

Centralized Construction Clearinghouse data is quality controlled and made available to stakeholder community

Required Construction Information
- Airport
- Runway(s), Taxiways, Aprons impacted
- Date/Hours of closures
- Expected impact
- Degree of Certainty
- Point of contact for more info
**Awareness Recommendations:**

**Construction Clearinghouse**

- Define one organization within the FAA to establish and manage a construction clearinghouse.

- Develop a notification process and clearinghouse for intended construction.

- Multiple sources may submit into a construction information clearinghouse; FAA would validate.

- Make construction portal information accessible to any user authorized through password protection.

---

**Additional Awareness Recommendations**

- Develop a one page “desk reference” or check list for airport operators to understand their full suite of reporting requirements.

- Engage key airport trade organizations such as ACI-NA, AAAE and NASAO to collectively develop educational materials and help roll out any new process improvements to the airport operator and consulting community.
Key Gap: Consistent Planning of Complex Construction

- Addresses Non-Standard Conditions
- Required for AIP Grant Eligibility

Key Issues in Complex Construction

- Still reinvent process and timeline for each project
- Broad set of stakeholders involved
- Wide ranges of construction phasing options
- Modeling work across multiple stakeholders
- Time for development of temporary procedures or other mitigations
- Sustaining stakeholder engagement
Complex Construction Recommendations (1 of 2)

- Develop a process for classifying expected construction as “complex”.

- Plans for complex projects should be briefed to industry at least two years in advance of the NTP and on a well-defined schedule linked to project design.

- Identify and document key roles and RAAs for engagement of key stakeholders during planning and design.

- Identify a leadership team for the effort to drive schedule, manage process, keep participants on task, etc.

Complex Construction Recommendations (2 of 2)

- Develop an Airport Construction Action Plan (ACAP) template with checklists, timelines and associated requirements that facilitates coordination of any construction projects deemed “complex”.

- Ensure complex project sponsors schedule monthly or bi-monthly stakeholder meetings.

- There should be a mechanism for complex projects to report to FAA HQ Leadership (on an exception basis) if high level attention is required.

- Ensure awareness of modeling efforts and sharing of assumptions among FAA, airports and flight operators.

- Proactively seek opportunities to integrate NextGen capabilities during construction.
Key Gap: Repeatable Construction Execution

- Instrument Flight Procedures
- Obstacles
- Project Status & Information

Survey Data Case Study

- Small GA airport extended runway and raised elevation
- Initial survey from 2014 provided to FAA Flight Procedures Team
- Due to concern about errors in survey data, NOTAM issued indicating RNAV (GPS) procedure to runway was N/A:

  ![FDC X/XXXX XXX IAP RNAV (GPS) RWY X, AMDT 1... PROCEDURE NA]

- New survey to reconcile issue not planned until summer of 2016
- IFP Team regularly “NOTAM” procedures “N/A” until the IFP, airport and construction processes are all aligned
Construction Execution – IFP
Recommendations

- Synchronize collection and dissemination of Survey Data with the Instrument Procedures Production Cycle.

- Prepare the Magnetic Variation Letter and send it to Aeronautical Information Services far in advance of planning any required marking or signage changes and coordinate airfield changes with instrument flight procedure revision cycle.

Temporary Obstacle Case Study

- With temporary cranes in place, FDC NOTAMs required restricting IAPs to two runways:
  
  FDC X/XXXX – XXX ILS RWY XXX (CAT II/III) Procedure
  N/A: Temporary Cranes up to 267 MSL beginning
  936 feet northeast of RWY XX

- On one day, weather degraded requiring CAT II/III minimums but procedure was NA due to this NOTAM, so aircraft began diverting

- At 0400 local, contractor left voice message to airport operator and local ADO that crane was down

- At 0545 airport operator conducted visual search for crane; at 0715 ATC requested cancellation of the NOTAM

- By 0715, there were 32 diversions, 611 minutes of holding, average delays of 121 min due to GS and 74 min due to GDPs
Construction Execution – Obstacles Recommendations (1 of 2)

- Ensure there is a 24/7 NOTAM response to notification of changes in status for on-airport obstacles.
- Require project proponent (owner of 7460 submission) to work with crane operators to notify the Tower, TRACON and/or Airport Operator when raising or lowering a crane.
- The Instrument Flight Procedures Group should continue to maintain a tracking system that details all Temporary Restrictions to Navigation and their effects on Flight Procedures (Crane Tracker).
- The Contingency plan for all On-Airport temporary obstacles that impact instrument flight procedures should be developed and implemented for all major airport construction.

Construction Execution – Obstacles Recommendations (2 of 2)

- Establish a Working Group with key stakeholders (Airport Operators, FAA, airlines, jurisdictions, construction industry, etc.) to develop a robust process for managing the impacts of off-airport construction in a manner that does not overly restrict local growth while also maintaining flight safety and efficiency.
Construction Execution – Info & Status Recommendations

- Include the OE/AAA number and Latitude and Longitude of Obstacles impacting flight procedures.

- Provide flight operators with draft information on temporary and permanent obstruction impacts to IFR flight procedures earlier than the current 72 hour prior timeframe whenever possible.

- Develop repeatable approach to share construction status information throughout execution, especially for complex projects.

- Update airport construction diagrams using Federal NOTAM System (FNS) to ensure depictions are real-time, current and accurate.

- Explore software, OE/AAA system automation enhancements or GPS technology to report the height, latitude, and longitude of cranes in real time.

Safety-Focused Recommendations

[Image of Reason's Swiss Cheese Model]

"a trajectory of accident opportunity"
Safety-Focused Recommendations

Visual Notification to Pilots and Controllers

- Utilize ATC simulation capabilities to evaluate procedures and to prepare and train controllers for construction playbook.
- Prioritize and promote visualization of construction impacts and mitigations to the pilot community.
- Continue to communicate risk management culture to air traffic controllers, dispatchers and pilots, even during construction projects with seemingly minimal impact.

Safety-Focused Recommendations

Alignment of Data with Publications and Procedures

- Allow the update of the Airport/Facility Directory (A/FD)14 and Instrument Flight Procedures during the 28 day Change Notice (CN) process.
- When there is a gap between completion of construction of a facility and its availability to the operation, provide clear information about what resources are unavailable, and ensure areas are properly demarcated.
- Make fast track slots available in the charting cycle to respond to safety needs.
Execution of Safety Risk Management Panels

- Identify and solicit participation of a mix of subject matter experts for construction Safety Risk Management Panels that represent all key stakeholders in airport operations, air traffic operations and safety.
- Consider improvements to SRM process to make it more effective.

Key Takeaways for the FAA (1 of 4)

Single Entity for NAS-Level Coordination of Construction

- Duties include
  - Own construction clearinghouse
  - Determine which are complex projects
  - Establishing structured teaming arrangements and guide local teams leading complex construction
  - Managing and improving templates and checklists
- Should examine option to expand Airport Construction Advisory Council (ACAC) role and resources to meet this need
Key Takeaways for the FAA (2 of 4)

Local Leadership Teams for Complex Construction

- Mechanisms to build local teams that collaborate through life cycle of project
- Cross-functional leadership including Project sponsor, Air Traffic Manager, Tech Ops, Flight Operator

Key Takeaways for the FAA (3 of 4)

Managing Obstacles

- Merging two current processes for tracking and managing obstacle status
- Significant stakeholder interest in on/off airport obstacles
Key Takeaways for the FAA (4 of 4)

Synchronization of Aeronautical Information

- Data is foundation of operations and data changes during construction
- Challenge to align evolving construction schedules, surveys and databases, publications and procedures, etc.
- Impacts safety risk and operational efficiency

Review of “Improving Awareness, Planning and Execution of Airport Construction”

DISCUSSION
TOC Action

Consider Recommendation on:

*Improving Awareness, Planning and Execution of Airport Construction*

and Transmit to FAA and Sunset Airport Construction Task Group

Other Business

New Task: WRTG NorCal
Potential New Task: Graphical TFRs
New Task: WRTG NorCal

- Solicit operator perspective and input into defined issues in NorCal
  - **Use of speed brakes**: Operators can focus on reducing the use of speed brakes. Pilots have the sole responsibility to determine when speed brakes should be used.
  - **Runway choices**: Operators may request more “fly friendly” Runways, especially at night, to reduce noise concerns in certain locations.
  - **IFP choices**: Operators can file “fly friendly” procedures, especially at night, to reduce noise concerns in certain locations.
  - **Nighttime Offloads/Routes**: Communities want focus on reducing noise concerns at night.
  - **Early Turns**: Operators can assist ATC in ensuring as much as possible of a flight is over water versus over land by not requesting early turns on course.
  - **International air carrier execution of Optimized Profile Descents (OPDs)**: AJV will reach out to IATA to discuss and get input and perspective on this issue.

- WRTG will respond with operator feedback on impact of these ideas on operations. Feedback may be in the form of neutral impact, negative impact or positive impact. WRTG will describe the impacts and provide rationale.

- Response requested by March 29, 2016

Potential New Task: Graphical TFRs
Anticipated Issues for Next Meeting

Closing Comments

Designated Federal Official:
Lynn Ray, Federal Aviation Administration

Co-Chairs:
Bryan Quigley, United Airlines
Dale Wright, NATCA
Next Meetings:

June 23, 2016
October 27, 2016

Washington, DC

Adjournment
Welcome and Introductions

Committee Co-Chair, Mr. Bryan Quigley, Managing Director of Flight Operations at United Airlines called the meeting to order and welcomed the TOC members and others in attendance. Co-Chair, Mr. Dale Wright, National Air Traffic Controllers Association (NATCA), was unable to attend due to a personal matter. All TOC members and attendees from the public were asked to introduce themselves (TOC members and General Public Attendees are identified in Attachment 1). Prior to beginning the meeting, Mr. Quigley and Ms. Ray both offered their acknowledgement and appreciation to Mr. Quigley’s predecessor as Co-Chair, Mr. Jim Bowman of FedEx Express, for his prior leadership of the Committee.

Mr. Quigley then 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 July 21, 2015 Meeting Summary

The Chair asked for and received approval of the written Summary for the July 21, 2015 meeting (Attachment 3).

FAA Report

Ms. Ray next provided a report from the FAA on various topics relevant to industry. She first addressed issues relating to staffing and vacancies in the FAA. Ms. Ray mentioned that 12% of executive or senior manager positions in the Air Traffic Organization (ATO) were expected to become vacant within the next 12 months. Four percent of incumbents have already announced retirements.

Ms. Ray also discussed priorities around Controller and Technician hiring. The FAA is planning to hire approximately 6,000 controllers over the next five years. A TOC member inquired about whether the FAA was having difficulty finding candidates for controllers. Ms. Ray responded that the FAA has not had difficulty with the pool of applicants. The challenges in hiring have been external issues such as budget uncertainties and information security breaches. Another member inquired where the pool of applicants come from for hiring new technicians. Ms. Ray stated that while hiring new technicians is a challenge, the FAA is able to identify new applicants with the Department of Defense (DoD) serving as one key source.

Next, Ms. Ray discussed the FAA’s Budget status. The FAA’s budget is currently authorized through March 31, 2016, and appropriations are currently extended through December 10, 2015. The FAA is anticipating a Continuing Resolution beyond December. For the longer term, she noted that the FAA is awaiting the budget “passback” from the Office of Management and Budget (OMB) for Fiscal Year 2017 around Thanksgiving. A TOC member inquired what impact the Bi-Partisan Budget Act of 2015 would have on the FAA’s funding. Ms. Ray noted that Act does not have any aviation related offsets in the bill, so the discretionary spending caps are not changed through FY2017.

Ms. Ray briefly touched on the subject of Privatization of the FAA or parts of it. While she did not have any additional information on the subject beyond what is publicly known, Ms. Ray again reiterated the Agency’s position that it needs management flexibility as well as stabilized funding.

A TOC Member inquired about the status of the FAA’s Surface Office which the member noted is rumored to be moved to System Operations. Ms. Ray said that no announcement has been made yet on the office. She said that System Operations is examining a number of reorganization scenarios and the role of the Surface Office is included in such discussions. A TOC Member requested that information be given on this subject in the future, noting that when information is not, stakeholders may draw conclusions in a vacuum. Ms. Ray noted that the TOC may benefit from a briefing on the Surface Office, Collaborative Decision Making (CDM) and the organization of System Operations in a future meeting.
Ms. Ray next discussed Performance Based Navigation (PBN). She informed the TOC that the NextGen Advisory Committee (NAC) would be undertaking a task on the long term strategy associated with Traffic Flow Management. She also noted that ongoing PBN activities would see an increased focus on community and airport engagement and outreach, and the FAA is closely examining the best ways to undertake such engagement. One TOC member noted that Las Vegas was an excellent test case to pursue new approaches to community engagement. Ms. Ray noted that South Florida, with its many procedures and many airports, would be a good test case as well. Another TOC member inquired how the FAA would approach engagement for projects that were near completion. Ms. Ray said that such projects would place more emphasis on a recap of the project efforts.

Finally, Ms. Ray commented on Unmanned Aircraft Systems (UAS). She reiterated that a Task Force was working on recommendations regarding a UAS registration process and the conclusions were expected by November 20th. A TOC member inquired whether the FAA had the ‘bandwidth’ to deal with the increasing activities related to UAS. Ms. Ray commented that much of the current focus was on the registration process. However, she agreed that resources would continue to be difficult to manage. UAS would continue to draw resources with increased rulemaking activities, Continuing Resolutions continue to cap staff and other activities such as Commercial Space require additional attention. A TOC member also commented that from an operator’s perspective, there needs to be a heightened level of concern about UAS. The member noted that for an airliner to hit a 10-15 lb. UAS is not the same hitting a bird of the same size, and the expect impact would be significant. The member inquired what had to happen for the issue to be raised in priority given that UAS will only proliferate in the future. Ms. Ray communicated her shared concern and urgency on the matter and suggested that the new executive leadership in the FAA working on UAS should come to a future TOC meeting and discuss with the Committee.

**NOTAM Search Overview and Demonstration**

Ms. Trish Gay, FAA, provided a history and overview of the NOTAM Search effort, and Mr. Steve Habicht, CNA, provided a demonstration of the NOTAM Search website. Ms. Gay’s presentation materials are included in Attachment 2. TOC members representing both general aviation and business aviation interests commented that their organizations had received positive feedback on NOTAM Search from members and that the powerful collaboration between industry and FAA was appreciated. Another TOC member inquired how third party flight planners may get NOTAMs from the Future NOTAM System. Ms. Gay mentioned the NOTAM Distribution Service will provide NOTAM data via System Wide Information Management (SWIM) and enables users to ingest all NOTAM information. Currently, NOTAM Distribution Services operates as a request/response service. In the first half of 2016, this will convert to a publish/subscribe service.

Another TOC member inquired about increasing NOTAM Search’s capabilities to populate UAS NOTAMs. The TOC members discussed that operators are interested in having this information but at the moment, there were safety risk concerns about enabling external parties such as UAS
operators to submit NOTAMs. The Members discussed that if external parties were permitted to enter NOTAMs, these would have to be highly structured inputs.

Finally, another TOC member noted that graphical NOTAMs remain a challenge and there is a need for industry and FAA collaboration to address the issue.

**Recommendation for Phases 3 and 4 of NOTAM Search**

Mr. Mark Cardwell, FedEx Express, and Chair of the NOTAM Task Group next briefed the TOC on the next set of recommendations on NOTAM Search. He informed the TOC that the NOTAM Task Group had reviewed Phases 3 and 4 of deployment of FAA’s NOTAM Search.

The report included recommendations across a number of categories:

- **Passwords**: recommendations included less restrictive and complex password policy, shortened lockout policy and use of ‘cookies’ to store username/password
- **Mapping Functionality**: recommendations included clarifying current restriction of mapping to US FIRs, option to adjust or resize view of map side-by-side with text, overlay geo-tagged NOTAMs on aeronautical charts and presenting ARTCC boundaries and geo-tagging ARTCC NOTAMs to the center of the ARTCC
- **Presentation of Information**: recommendations included consistent use of three or four letter airport identifier across pages, providing information and/or links to sources of defined terms, removing Military special icon and improving graphics used to convey NAVAIDs
- **Improving Accuracy and Completeness of Information**: recommendations included ensuring laser notices are classified correctly at the input stage, ensuring shared identifiers are working properly and the future incorporation of Airport and Facility notices from NTAP
- **Improving Usability of User Guide**: recommendations included the ability to make guide full screen, searchable within the guide and hyperlinks to sections from the Table of Contents

During discussion, Ms. Ray expressed appreciation to the Leadership and Members of the Task Group for all of the excellent work.

**Committee Action**: The Committee agreed by consensus to approve the NOTAM Recommendations on Phases 3 and 4 of NOTAM Search (Attachment 4) and sunset the NOTAM Task Group.

**VOR MON Program Update**

Ms. Rowena Mendez, FAA, provided an update on the VOR Minimum Operating Network (MON) program to the Committee members. She reviewed the target number of VORs planned for decommissioning (308), the geographical spread, the number at MON airports and the process for public comment on the intended list to decommission. Ms. Mendez’s briefing materials can be found in Attachment 2.
One Committee member inquired why International arrival routes were being retained in the MON given that most international aircraft often have state-of-the-art navigation equipment. The VOR MON Program team responded that impacting international arrival routes added a layer of international coordination complexity that the Program elected not to handle its initial phases.

Another TOC member inquired what the impact of the decommissioning VORs would be on existing conventional route structure. The member wished to further understand how the impact on routes would be managed. Ms. Ray responded that this topic would be addressed further later in the day when the TOC discussed the new tasking on the PBN Route Concept of Operations.

Finally, a TOC member inquired about accessing the full list of VORs that would be decommissioned in the next ten years. Ms. Mendez said that the full list would be made available through a Federal Register notice but that approximately 30 VORs on the list were already available as they had begun the public comment process. Ms. Mendez provided this list to the TOC (Attachment 5).

**Update and Draft Recommendations from Airport Construction Task Group**

Mr. Mark Hopkins, Delta Airlines, and Mr. Chris Oswald, Airports Council International-North America, provided an update and review of draft recommendations from the Airport Construction Task Group. Briefing materials reviewed during the meeting are included in Attachment 2.

During a discussion on recommendations related to developing a repeatable process for planning complex construction, a TOC member requested the Task Group to consider when the construction occurs as a factor for which operators might provide input. Mr. Oswald commented that for airports in the “Snowbelt”, timing is pre-defined as such facilities must conduct construction during the summer. He also noted that night time construction is often identified as an ideal solution to avoid impact to operations, but this approach does not work for all operators, particularly cargo carriers. He pointed out that the issue highlights the need for operators to have a voice during the early planning stage so that all possible solutions are examined. Mr. Oswald also noted that during the Construction Task Group’s visit to Baltimore-Washington Airport (BWI) in July 2015, the team at BWI mentioned that they brought their construction contractors into meetings with operators to build connections between these very different stakeholder groups.

During dialogue around recommendations related to execution and completion of construction, a TOC member highlighted the operational challenges associated with cranes at on and off airport locations. The member provided an example at an East coast hub when the operator did not know if an off-airport crane was up or down, and the TOC member drove in the local area to visually determine if it was down. Once the individual noted that the crane was not visible, he contacted the construction contractor and reminded them to inform the FAA that the crane was down so that associated NOTAMs impacting arrival procedures could be cancelled. The TOC member noted that the airline operator was unable to carry extra cargo on its aircraft given the impact of from this off-site crane.
The TOC members also discussed the value of having precise understanding of the lat/long of obstacles to minimize the impact of the obstacle on arrival and departure procedures. Finally, the group discussed the importance of improving lighting of cranes. Mr. Oswald informed the TOC members that the Task Group recognized the need to provide detailed information on obstacles, including lat/long information, out to the pilots, Dispatchers and Operational Engineers who are involved in planning and operating. He noted that the Task Group had not yet determined the best method for disseminating such information.

The members also discussed the immense challenges with managing off-airport obstacles, as these obstacles are managed by parties who are completely independent of the aviation system. One member commented that the Task Group may consider a phased approach to the crane and obstacle recommendations, emphasizing that control of obstacles on airport should be accomplished sooner and that off airport obstacle would pose a greater and more long term challenge.

Finally, a TOC member inquired about the status of the FAA’s consideration of recognition of one engine inoperative procedures in the future. Ms. Ray noted that this could be a future briefing topic for the TOC.

**Update on the NextGen Advisory Committee (NAC)**

Mr. Andy Cebula, RTCA, provided an update on the NAC. Mr. Cebula highlighted recent and current taskings of the NAC relating to metrics tracking operational performance impacts of NextGen as well as long term strategy relating to Traffic Flow Management. His briefing materials may be found in Attachment 2.

**FAA Response to Recommendations on Improving Operations in the Caribbean**

Mr. Jim Linney, Director Air Traffic Systems in the Program Management Organization (PMO), next provided an initial response to the TOC on its July 2015 recommendations on improving operations in the Caribbean. (Mr. Linney’s briefing materials are included in Attachment 6.) Mr. Linney noted that the FAA is considering the 20 recommendations provided in the TOC’s July recommendations and were working to assess each. He stated that the FAA was identifying which recommendations were “within authority” of current Programs, meaning it could be addressed with increased funding and scope of existing efforts. The FAA is also identifying which “required new authority” which would be a longer process to go through approval processes to develop new implementation efforts. As an example, Mr. Linney noted that when costing out the recommendation to include ADS-B ground stations in the Caribbean, a 20 year life cycle cost for such ground stations becomes costly enough to trigger more involved evaluation processes. He commented that the FAA would have its assessment of the recommendations completed by January 2016 and would return to brief the TOC after that time.

A TOC member noted that the TOC as well as the Eastern Regional Task Group members that developed the recommendations would be willing and interested to support the FAA in any
evaluation or assessment of the recommendations. Another TOC member, focused on increasing the urgency of addressing the Caribbean, suggested the FAA consider the potential growth in Cuba and the need to accommodate a likely growth from the normalizing of relations between the US and Cuba. Ms. Ray noted that the ERTG recommendations were being considered in context of a larger Caribbean strategy for the Administrator that would be rolled out early in 2016. Finally, a TOC member commented that if the TOC felt the issue was not receiving great enough attention and focus, it could warrant attention of the NextGen Advisory Committee.

**Update on Regional Task Groups**

Mr. Bob Lamond, NBAA and Co-Chair of the Western Regional Task Group (WRTG), provided a summary of a recent WRTG meeting that included a briefing from the Marine Corps on the proposal for expansion of the 29 Palms Special Activity Airspace (SAA). Mr. Lamond mentioned that the WRTG members were particularly interested in the assessment of the operational impact of the expansion to the civilian operator community. The Marine Corps briefing on 29 Palms is included as Attachment 7.

Mr. Edwin Solley, Southwest Airlines and Co-Chair of the Central Regional Task Group (CRTG), mentioned that there is no activity currently in the CRTG.

Finally, Mr. Glenn Morse, Co-Chair of the ERTG, inquired about the status of the next steps for the New York/New Jersey/Philadelphia airspace redesign efforts. Ms. Ray noted that there is a commitment for a Metroplex-like project for New York in the 2018 timeframe, pending budget availability. Currently environmental work was still in process and would need to be completed prior to moving forward on the effort.

**FAA Response to Recommendations on Class B Airspace**

Mr. Ken Ready, FAA Acting Manager Airspace and Rules Team, provided an initial response to recommendations from the TOC relating to Class B airspace. He mentioned that these recommendations were timely as the FAA is working on changes to the 7400.2 guidance document (in which Chapter 15 relates to Class B airspace) as well as evaluating Class B excursions in the NAS. He noted that this feedback was a preliminary report and more detailed feedback would be forthcoming. Mr. Ready’s response document may be found as Attachment 8.

Mr. Ready commented that the FAA requested further information or discussion on a number of the recommendations, and the TOC discussed that a valuable next step would be for the Leadership of the Class B Task Group to dialogue with Mr. Ready and his colleagues in the FAA that were evaluating the recommendations. Such dialogue would be intended to ensure that the intent of the recommendations were clearly communicated to the FAA. This interaction will be planned before the next TOC meeting.
Update and Draft Recommendations the National Procedure Assessment (NPA) Task Group

Mr. Randy Burdette, Virginia Department of Aviation, and Mr. Michael Perrizo, Air Wisconsin, presented an update and draft recommendations from the NPA Task Group. Briefing materials from this discussion are included in Attachment 2.

There was extensive discussion on the NPA TG’s draft recommendations around identifying circling lines of minima candidates for cancellation. Mr. Rune Duke, Aircraft Owners and Pilots Association and member of the NPA Task Group, assisted Mr. Burdette and Mr. Perrizo in explaining the Task Group’s draft criteria for identifying circling candidates. Mr. Duke explained the criteria and acknowledged that the intent of the criteria was to identify candidates and all candidates would require subject matter expert review from both the air traffic and operator communities prior to cancellation.

Potential Tasking on PBN Route Concept of Operations

Mr. Robert Novia, FAA, next provided an overview of a new tasking to the TOC relating to review of the FAA’s PBN Concept of Operations. Mr. Novia noted that development of the ConOps had been done with an FAA-centric team and that the FAA was interested to engage operators into the review of the concept. Ms. Ray also noted that this effort was a direct follow-on to the VOR MON activity which would be impacting conventional route structure.

Mr. Novia explained that the concept intends to address questions such as what the upper level route structure needs to look like in the future. He said that the FAA has believed it needs to put structure only where it is needed but that such (and other) assumptions in the concept thinking needed feedback from the operators. He also explained that most recent airspace efforts, including Metroplex, were localized in nature with development of approach and departure procedures and limited, local airway work. However, no local effort was examining routes in an integrated and holistic way across the NAS.

Ms. Ray stated that the TOC will be requested to examine the Concept, validate the problem statement, provide recommendations around a NAS-wide point-to-point strategy and identify alternative to the intended design and implementation. For specific regions, she also noted that the FAA may request any of the Regional Task Groups to provide support.

Ms. Ray informed the TOC that the tasking letter would be made available within a matter of weeks.

Adjourn

Chairman Quigley ended the meeting of the Committee at 3:30 p.m.

Next Meeting

The next meeting of the TOC is March 3, 2016 in Washington, DC.
MAR 8 2016

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

Dear Ms. Jenny:

Today’s conventional Air Traffic Service (ATS) route system is defined by very high frequency omnidirectional range (VOR) radials and low/medium frequency non-directional beacons. The low-altitude airway system consists primarily of a VOR-based network of approximately 700 routes known as Victor airways. The high-altitude jet route system consists of approximately 300 VOR-based routes that are predicated solely on VOR and navigation facilities with co-located VOR and tactical air navigation (TACAN) beacons (VORTAC).

As the Federal Aviation Administration (FAA) transitions to a foundational performance based navigation (PBN) service environment, there is a need to migrate away from the increasingly obsolete VOR-based navigational infrastructure and the mounting costs associated with maintaining that aging system. This is especially true because the majority of operators no longer use the signals from the VORs.

Retaining all VOR-based conventional ATS routes in addition to a more flexible PBN structure would be counterproductive and costly. The recapitalization and rising maintenance costs associated with the VOR-based system are a drain on the FAA budget. In addition, the divestment of VORs from the route structure is a requirement for the achievement of the VOR minimum operational network (MON).

The FAA has initiated several programs to support the transition to a foundational PBN service environment and leverage increasing PBN capabilities. Programs such as Metroplex have been designed around the localized development of PBN routes and procedures. Due to the localized nature of these programs there has been minimal integration of efforts, which has resulted in ineffective or underutilized elements of the national airspace system (NAS) and little clear connectivity between areas determined to benefit from the PBN ATS structure. This lack of strategic alignment has led to various concerns, including:

- disjointed route structure;  
- costly growth and maintenance of route structure with little systemic value that has resulted in a need to “right-size” the NAS;  
- inability to procedurally de-conflict aircraft on parallel routes in congested airspace;
• unclear guidance on whether ATS structure or point-to-point navigation is preferred;
• restrictive traffic management initiatives due to inefficient use of airspace; and,
• reduced ability to circumvent or utilize special activity airspace avoidance points.

To address the present lack of a holistic national strategy regarding ATS route structure, an FAA workgroup, with the assistance of various external stakeholders, has drafted a PBN Route Structure (PBN-RS) Concept of Operations (CONOPs). This draft document describes a conceptual strategy and methodology for the transition of the national high- and low-altitude ATS route structures to a predominantly PBN environment.

The FAA remains committed to collaboratively identifying and addressing these issues that directly impact the efficiency of the NAS. The current draft CONOPs is based largely on an air traffic control perspective. In order to help the FAA address the issues discussed, we would like to task the TOC to provide recommendations from a broader system perspective in several key areas.

The FAA requests that the TOC perform the following tasks:

**Task 1 - Use broader expertise and data to refine or validate CONOPs problem statement.**

**Task 2 - Recommend refinement to the criteria-based methodology for establishing low and high altitude PBN route structure.**

**Task 3 - Recommend a NAS-wide point to point navigation strategy.**

**Task 4 - Recommend alternatives to the proposed approach for design and implementation.**

Completion of these tasks will provide the FAA with clearer insight into what industry values and help to inform better decision making moving forward. The FAA will provide subject matter experts as needed to support these tasks.

Sincerely,

[Signature]

Elizabeth L. Ray
Vice President, Mission Support Services
Air Traffic Organization
Approved by the Tactical Operations Committee March 2016

Process and Criteria for Cancellation of Instrument Flight Procedures

Report of the Tactical Operations Committee in Response to Tasking from the Federal Aviation Administration

March 2016
Process and Criteria for Cancellation of Instrument Flight Procedures

Contents

Introduction ............................................................................................................................................ 3
Terminology ........................................................................................................................................ 3
Background .......................................................................................................................................... 4
Executive Summary ............................................................................................................................. 5
Methodology ........................................................................................................................................ 7
Guiding Principles ............................................................................................................................... 9
Procedure Counts and Costs .................................................................................................................. 10
FAA Flight Procedures ........................................................................................................................ 10
Cost of Procedure Maintenance ......................................................................................................... 12
Recommendations for Each Type of IFP .............................................................................................. 13
Procedures Not Evaluated for Cancellation at this Time .................................................................... 13
Circling Procedures ............................................................................................................................ 15
Ground-based Instrument Approach Procedures .................................................................................. 17
   NDB, TACAN, VOR and VOR/DME Procedures ......................................................................... 17
   MLS and TLS Procedures .............................................................................................................. 18
   SDF Procedures ............................................................................................................................ 18
PAR and ASR Procedures .................................................................................................................... 18
PBN Instrument Approach Procedures ............................................................................................. 19
   Standard Instrument Departures (SiDs) and Standard Terminal Arrivals (STARs) ...................... 20
Recommendations on the Process for Procedure Cancellation .......................................................... 23
   Recommendations on the Outreach for Procedure Cancellation ................................................ 25
Additional Recommendations ............................................................................................................. 26
Appendix A: Tasking Letter .................................................................................................................. 27
Appendix B: Members of the National Procedure Assessment Task Group ....................................... 30
Appendix C: Case Studies on Application of Circling Criteria ........................................................... 31
Appendix D: FAA’s Final Policy on Criteria for Ground Based IAP Cancellation ............................... 34
Introduction

In February 2015, the Federal Aviation Administration (FAA) requested the Tactical Operations Committee (TOC) provide feedback and recommendations on criteria and processes for cancellation of instrument flight procedures in the National Airspace System (NAS). The full tasking letter is in Appendix A of this report. The TOC established the National Procedure Assessment (NPA) Task Group to develop draft recommendations for the TOC by March 2016. The Task Group Members are shown in Appendix B. This report covers the discovery process, findings and recommendations of the NPA Task Group.

Terminology

Common terms used throughout this report are presented below to ensure clarity to the reader:

- The effort documented in this report is focused on cancellation of Instrument Flight Procedures (IFPs) in the National Airspace System (NAS). There are four broad types of IFPs – Instrument Approach Procedures (IAPs), Standard Instrument Departures (SIDs), Standard Terminal Arrivals (STARs) and Routes. Recommendations are organized around IAPs, with specific emphasis on Circling IAPs, as well as a combination of SIDs and STARs. Routes are not addressed in this report.
- IAPs are “a series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing or to a point from which a landing may be made visually.”\(^1\)
- Circling procedures, which are addressed independently from other IAPs in this report, are comprised of circling only procedures as well as circling minima charted on a straight-in IAP. A circling maneuver is “initiated by a pilot to align the aircraft with a runway for landing when a straight-in landing from an instrument approach is not possible or is not desirable.”\(^2\)
- Other IAPs are broken down by Ground-based IAPs and Performance Based Navigation (PBN) IAPs. PBN IAPs are comprised of all Area Navigation (RNAV)-related procedures as well as Global Navigation Satellite System (GNSS) Landing System (GLS) procedures. The remaining IAPs are grouped under Ground-based IAPs.\(^3\)
- SIDs and STARs can be further broken down into Conventional and RNAV procedures. SIDs are preplanned instrument flight rule (IFR) air traffic control (ATC) departure procedures printed for pilot/controller use in graphic form to provide obstacle clearance and a transition from the terminal area to the appropriate en route structure. Conversely, a STAR provides transition from the en route structure to an outer fix or an instrument approach fix/arrival waypoint in the terminal area. SIDs and STARs are primarily designed for system enhancement to expedite traffic flow and to reduce pilot/controller workload.\(^4\)

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\(^1\) FAA Pilot / Controller Glossary, page PCG I–3  
\(^2\) FAA Pilot / Controller Glossary, page PCG C–2  
\(^3\) The report acknowledges that there are some PBN procedures that may rely on ground-based infrastructure.  
\(^4\) FAA Pilot / Controller Glossary, page PCG S–6
Background

The National Airspace System is currently in transition to a Next Generation Air Transportation System, also known as “NextGen”. The NextGen NAS will rely on modern technology for communication, navigation and surveillance of air traffic operations. During this transition, the Federal Aviation Administration is managing the technology and procedures to support both the current mostly ground-based NAS as well as the satellite/flight deck-based NextGen NAS. Managing a NAS with redundant legacy elements requires excess manpower, infrastructure and information management, which is costly and unsupportable in the long run. To mitigate these costs, the FAA has a number of efforts underway to reduce elements of the legacy NAS.

One area of focus for transition is Instrument Flight Procedures. For IFPs, 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 NAS safety.”

In recent years, the FAA has undertaken focused efforts to remove unnecessary or redundant IFPs from the NAS. Since 2013, the National Procedure Assessment effort has identified criteria and candidate ground-based IAPs for cancellation. Cancellation of IAPs are governed by Federal Aviation Regulation (FAR) Part 97 and follows a process with regulatory requirements that include public comment. The Procedure Review Refine Remove Team (PRRRT) has worked in a similar timeframe to remove select SIDs and STARs from the NAS. SIDs and STARs are not covered in Part 97, making their cancellation a non-regulatory process with no requirement for public comment.

Looking forward, the “FAA seeks to establish a repeatable process and plan to cancel redundant or excess [instrument flight] procedures and reduce the maintenance costs associated with them.”

Previous efforts have been led by FAA-focused teams. The FAA is interested to engage the broader operational stakeholder community to solicit recommendations on how to develop a process and criteria to effectively remove unneeded procedures from the NAS.

The Tactical Operations Committee was requested by the FAA to provide industry input and recommendations around the process and criteria for instrument flight procedure cancellation in both the regulatory and non-regulatory frameworks. Specifically, the TOC was requested to:

1. Review current FAA efforts in procedure cancellation and recommend any changes.
2. Review proposed implementation plans and provide recommendations.
3. Assess the effectiveness of outreach planned and accomplished by FAA.
4. Provide recommendations on what procedures FAA should look at next.

This report serves as the TOC’s recommendation on this tasking.

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5 Letter from Elizabeth L. Ray (Vice President, Mission Support Services) to Margaret Jenny (RTCA President) dated February 4, 2015. See Appendix A for full letter.
6 Ibid
Executive Summary

As the National Airspace System transitions to a Next Generation Air Transportation System, the FAA is challenged to manage the technology and procedures to support both the current, mostly ground-based NAS as well as the Performance Based Navigation NextGen NAS. At the core of the challenge is to modernize with the newer technology satellite/flight deck-based procedures while maintaining only the necessary legacy systems to maintain access while managing risk and costs. Managing a NAS with the new technologies and all of the current redundant legacy elements is costly and unsupportable in the long run.

The focus of this report is to identify unnecessary procedures to reduce the overall cost to the FAA which will allow the FAA to better maintain current procedures and create additional NextGen procedures where needed to improve access to airports, runway ends, and communities throughout the nation.

In Fiscal Year 2015, the FAA spent approximately $50 million on maintenance and flight inspection of its current IFP inventory. As of the February 4, 2016 Charting Cycle, there were 33,004 IAP Lines of Minima and SIDs/STARs. Each individual Line of Minima or Procedure drives some element of the cost of maintenance, though the cost is not equivalent across all types of procedures.

To help mitigate these costs to allow for better funding utilization, the FAA is seeking to remove unnecessary or redundant Instrument Flight Procedures from the NAS. The RTCA Tactical Operations Committee was tasked by the FAA to offer recommendations on cancelling IFPs. This report serves as the TOC’s response and offers recommendations on both criteria development and process development to reduce procedures and Lines of Minima not required in the NAS. The TOC stresses that reduction of unnecessary procedures is a worthy effort for the FAA as it contributes to the reallocation of capital resources toward both maintenance of the NAS as well as meeting current and future needs at additional airports and runway ends.

Recommendations in this report are organized around cancellation criteria for Instrument Approach Procedures, with special emphasis on Circling Approaches, as well as for the combination of SIDs and STARs. The table to the right depicts which types of procedures were evaluated by the TOC for cancellation and which were not (as part of these recommendations).

For Circling procedures, which are comprised of Circling Only procedures as well as the circling minima charted on a straight-in IAP, a decision tree
with seven criteria is presented to identify candidates for cancellation. Applying these criteria to a set of nine case study airports, approximately 60% of circling procedures/lines of minima were identified as candidates for cancellation.

For those ground-based IAPs evaluated for cancellation, specific recommendations are offered for each type of ground-based IAP. For NDB, TACAN, VOR and VOR/DME procedures, specific recommendations are offered to improve upon the cancellation effort the FAA has had underway since August 2013. Recommendations are included to remove MLS, TLS and SDF procedure types from the inventory. Finally, the report offers recommendations to remove PAR and ASR procedures at civilian only facilities.

PBN IAPs are identified as an important component of the future of the NAS, so national-level criteria to identify candidates for cancellation were not developed. Instead, the report recommends that the FAA identify redundant PBN IAPs at a local level.

For SIDs and STARs, a decision tree with multiple objective criteria is presented to identify candidates for cancellation.

The report includes a recommended process for procedure assessment and cancellation. The process suggested is to develop cancellation criteria at a national level and rely on the Service Center and Local Air Traffic facilities to make final determinations about what procedures are cancelled. The recommendations stress the importance of involving both air traffic and flight operator expertise in cancellation of all types of procedures. The report recommends the process be conducted on a recurring basis and that criteria be periodically re-examined at a national level.

The cancellation of procedures in the NAS is critical to manage cost during the transition to NextGen. However, the FAA must exercise care during the process and ensure that all stakeholders have a voice in the process. Successful cancellation of unnecessary or redundant procedures will ensure that scarce resources are applied to maintenance of necessary existing procedures as well as development of new, required procedures throughout the NAS.

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7 Includes MLS, TLS, SDF, PAR, ASR, NDB, TACAN, VOR and VOR/DME procedures
Methodology

The TOC established the National Procedure Assessment Task Group to deliberate and deliver a set of recommendations to address the FAA’s task request. The NPA Task Group included stakeholders across all aspects of aviation operations:

- Aircraft Owners and Pilots Association (AOPA)
- Air Line Pilots Association (ALPA)
- Air Wisconsin
- American Airlines
- Department of Defense (DoD)
- National Air Traffic Controllers Association (NATCA)
- National Business Aviation Association (NBAA)
- National Association of State Aviation Officials (NASAO)
- The MITRE Corporation
- Multiple branches of the FAA in both Headquarters and the Service Centers, as well as FAA contractors supporting these organizations
- Southwest Airlines
- United Airlines

The intent of the Task Group was to compile a broad team covering all types of operators along with participants from the FAA that were directly involved in previous NPA and PRRRT efforts. Members of the Task Group are included in Appendix B.

Initially, the Task Group learned about the FAA’s costs for procedure maintenance, and it became apparent that maintenance cost varied across each individual IFP. The Task Group subsequently examined different types of procedures as the FAA categorizes them on their Instrument Flight Procedures Inventory Summary page. The breakdown from the IFP Inventory Summary page is presented in Figure 1. Note that additional detail on the counts of each type of procedure are found in the section “Procedure Counts and Costs”.

The Task Group elected to organize its work around the breakdown of IFPs presented in Figure 1. The group considered each procedure type and developed a high level finding for each – either to develop criteria for cancellation or to not address the category at this time. For those categories that warranted development of criteria, the Task Group conducted a deeper examination to develop criteria for cancellation.

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8 See: https://www.faa.gov/air_traffic/flight_info/aeronav/procedures/ifp_inventory_summary/
The Task Group also examined the processes utilized by the previous NPA and PRRRT efforts and offered a proposal for a future repeatable cancellation process.

Finally there were a few subject areas the Task Group discussed that were slightly beyond the scope of the original tasking. For these, the group documented its thinking and included these recommendations in the final section “Additional Recommendations,” with the acknowledgement that they may be considered on the edge of scope. These areas primarily focused on recommendations on ways to enhance the FAA’s capacity for procedure maintenance beyond cancellation.
Guiding Principles

A series of high level guiding principles were developed to provide context for the recommendations in this report:

- Frequency of use of a procedure was discussed and identified as a possible criteria for consideration in cancellation. Some procedures, while utilized minimally, are of high operational value when needed. Utilization was determined not to be a stand alone criterion for a variety of reasons, including the fact that usage data can be inaccurate or unavailable in some cases.

- The Task Group’s effort was focused on a NAS-level examination of public procedures maintained by the FAA. There are other important procedure types not included in this effort, including charted visuals and those Special IFPs authorized by Operation Specifications or Letters of Agreement (LOAs), including RNAV visuals. Additionally, this effort did not define specific criteria for special operating conditions, such as those in Alaska, where additional considerations may be required.

- The FAA procedure reduction program is highly dependent upon and interwoven with other efforts. These include the VOR Minimum Operating Network (MON), the Performance Based Navigation (PBN) NAS Navigation Strategy effort and the ongoing rewrite of the Regional Airspace Procedures Team (RAPT) Order. Clearly, the FAA will need to remain synchronized across all of these as it moves forward on this and future efforts. For example, the VOR MON Program will identify a set of procedures required for MON airports, and these should not be cancelled as part of the NPA effort.

- Airways were deemed to be beyond the focus of this group’s effort. Discussion around airways did not synchronize with the Task Group’s focus on IAPs and SIDs/STARS. Additionally, the group recommended that criteria for cancellation of routes be included as part of a new TOC task related to evaluation of the PBN Route Structure Concept of Operations. The TOC anticipates this task request from the FAA on the PBN Route Conops by March 2016 and that it will include a request for criteria for cancellation of routes.

- While the Task Group sought opportunities to align the regulatory and non-regulatory tracks related to procedure cancellation, alignment was not a primary goal in and of itself.
  - The Task Group did not introduce any additional process steps when they were not necessary. There was a concerted intent not to introduce requirements of the regulatory cancellation process into the non-regulatory process.

- When evaluating any procedure, air traffic personnel and operators should be involved.
Procedure Counts and Costs

FAA Flight Procedures
The FAA publishes its inventory of Instrument Flight Procedures on its IFP inventory webpage and updates this information every 56 days. The data below, drawn from this inventory webpage, depicts counts of procedures in the NAS, broadly organized in this report by Circling, Ground-based and PBN IAPs as well as Conventional and RNAV SIDs and STARs. The data presented is for the February 4, 2016, Publication Cycle and the “Change” noted in the table depicts the difference in procedure counts from October 15, 2015 to February 4, 2016.

Figure 2 Counts by Type of IFP (as of 2/4/16)

<table>
<thead>
<tr>
<th>Type of IFP</th>
<th>Additional Breakdown of IFPs</th>
<th>Count</th>
<th>Pct</th>
<th>Change Oct'15 - Feb'16</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Circling</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ILS</td>
<td></td>
<td>1,760</td>
<td>5%</td>
<td>8</td>
</tr>
<tr>
<td>LOC</td>
<td></td>
<td>1,437</td>
<td>4%</td>
<td>4</td>
</tr>
<tr>
<td>LOC (B/C)</td>
<td></td>
<td>67</td>
<td>0.2%</td>
<td>-1</td>
</tr>
<tr>
<td>LDA</td>
<td></td>
<td>33</td>
<td>0.1%</td>
<td>1</td>
</tr>
<tr>
<td>LDA PRM</td>
<td></td>
<td>1</td>
<td>0.003%</td>
<td>0</td>
</tr>
<tr>
<td>Side Step</td>
<td></td>
<td>80</td>
<td>0.2%</td>
<td>-3</td>
</tr>
<tr>
<td>VOR / DME RNAV</td>
<td></td>
<td>6</td>
<td>0.02%</td>
<td>-3</td>
</tr>
<tr>
<td>NDB</td>
<td></td>
<td>624</td>
<td>2%</td>
<td>-61</td>
</tr>
<tr>
<td>TACAN</td>
<td></td>
<td>15</td>
<td>0.05%</td>
<td>0</td>
</tr>
<tr>
<td>VOR</td>
<td></td>
<td>1,180</td>
<td>4%</td>
<td>-51</td>
</tr>
<tr>
<td>VOR / DME</td>
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<td>838</td>
<td>3%</td>
<td>-89</td>
</tr>
<tr>
<td>MLS</td>
<td></td>
<td>0</td>
<td>0%</td>
<td>0</td>
</tr>
<tr>
<td>TLS</td>
<td></td>
<td>0</td>
<td>0%</td>
<td>0</td>
</tr>
<tr>
<td>SDF</td>
<td></td>
<td>5</td>
<td>0.02%</td>
<td>-1</td>
</tr>
<tr>
<td>PAR</td>
<td></td>
<td>7</td>
<td>0.02%</td>
<td>0</td>
</tr>
<tr>
<td>ASR</td>
<td></td>
<td>220</td>
<td>1%</td>
<td>-2</td>
</tr>
<tr>
<td>RNAV</td>
<td></td>
<td>14,650</td>
<td>44%</td>
<td>168</td>
</tr>
<tr>
<td>GLS</td>
<td></td>
<td>11</td>
<td>0.03%</td>
<td>0</td>
</tr>
<tr>
<td>2. Instrument Approach Procedures (IAPs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBN IAPs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RNAV</td>
<td></td>
<td>14,650</td>
<td>44%</td>
<td>168</td>
</tr>
<tr>
<td>GLS</td>
<td></td>
<td>11</td>
<td>0.03%</td>
<td>0</td>
</tr>
<tr>
<td>3. SIDs and STARs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conventional RNAV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SID</td>
<td></td>
<td>540</td>
<td>2%</td>
<td>-1</td>
</tr>
<tr>
<td>STAR</td>
<td></td>
<td>313</td>
<td>1%</td>
<td>0</td>
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<tr>
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<td></td>
<td>567</td>
<td>2%</td>
<td>23</td>
</tr>
<tr>
<td>STAR</td>
<td></td>
<td>364</td>
<td>1%</td>
<td>2</td>
</tr>
<tr>
<td>Total --&gt;</td>
<td></td>
<td>33,004</td>
<td></td>
<td>-161</td>
</tr>
</tbody>
</table>

Presenting counts of IAPs can be confusing and some clarification is offered on how to interpret the numbers in the figure above. As noted earlier, IAPs are a predetermined set of maneuvers graphically depicted in an IAP chart that transfers an aircraft from the enroute flight environment to the terminal area for landing or a point from which a visual landing may be conducted. Some IAPs charts offer

9 [https://www.faa.gov/air_traffic/flight_info/aeronav/procedures/ifp_inventory_summary/](https://www.faa.gov/air_traffic/flight_info/aeronav/procedures/ifp_inventory_summary/)
different methods by which an aircraft may conduct the approach, based either on the status of the Navigational Aid (NAVAID) or on the aircraft equipage. For example, in the IAP chart below “ILS OR LOC 31L” to Seattle’s Boeing Field (BFI), the aircraft may execute the IAP using an ILS (Instrument Landing System) or LOC (Localizer) only. If the approach is flown via the LOC, the Minimum Descent Altitude (MDA) for the pilot to execute the approach is 700 feet for a Category A aircraft while the Decision Altitude (DA) for the ILS is 428 feet. Additionally, the approach may be used to execute a Circling maneuver to BFI with a circling MDA of 780 feet.

For the “RNAV (GPS) RWY 26R” to Miami International (MIA), the approach may be executed using various equipment options for lateral and/or vertical guidance. The minimum altitude for the pilot varies between a 273 foot DA and 480 foot MDA depending on what technology the aircraft is using.

*Figure 3 Sample Approach Charts*

These examples demonstrate that the same approach chart may have different DAs/MDAs based on variations in NAVAID status, different on-board equipment or whether the IAP chart leads to a Circling maneuver. These different DAs/MDAs for the same set of approach maneuvers are referred to as Lines of Minima (LoM). Each individual IAP chart can have between one and five Lines of Minima. The “ILS RWY 31L” IAP has three LoM and the RNAV (GPS) RWY 26R IAP has three LoM.
Figure 2 presents all Lines of Minima (LoM) for procedures in the NAS. Recent FAA efforts suggest there are approximately 16,500 unique IAP Charts in the NAS\(^{10}\) that correspond to the approximately 31,220 LoMs for IAPs noted in the Figure 2. (SIDs and STARs do not have LoMs.)

This group elected to count procedures according to the number of LoM as presented in the FAA’s IFP Inventory. The FAA’s Aeronautical Information Services Directorate, which develops and maintains IAPs, suggested that each individual LoM drives some, though not equal, workload during procedure development and maintenance. As this effort is focused on reducing FAA’s maintenance cost for procedures, the group decided to count all LoMs.

**Cost of Procedure Maintenance**

According to the FAA’s Aeronautical Information Services (AJV-5) and based on the most current available financial data, the FAA spent approximately $41.2 million on procedure maintenance for Fiscal Year 2015. This annual maintenance cost includes Notice to Airmen (NOTAMs) as needed for procedures, reviewing procedure impact based on proposed obstacles, non-procedural changes, scheduled procedure periodic review, and amendments resulting from user requests or changes to criteria. According to FAA Flight Inspection Services (FIS), flight inspection cost the FAA an additional $8.2 million in FY2015. The FAA bears a significant cost for maintenance of procedures, so any reduction of unnecessary procedures would contribute to reallocation of capital resources toward the maintenance of the NAS.

Additionally, there is significant variability in the maintenance costs associated with any individual procedure. The reader should take into account that the variables used to arrive at the approximate maintenance cost is a snapshot in time of available data on the specific date the totals were attained. Though an average cost measurement could be presented, the high variability of individual procedure maintenance suggests that any average number would not be representative of maintenance costs for most cases.

Finally, it is worth noting that maintenance costs for Circling LoMs are likely lower than other types of IAPs. The circling approach area is constant for the airport and each runway, so development and scheduled, periodic maintenance is a single cost, even if the approach is listed as a LoM on multiple other IAPs. However, maintenance cost to review obstacle impact does accrue for each individual instantiation of the Circling LoM.

\(^{10}\) This data is drawn from procedure evaluations conducted during assessment of 20:1 visual surface areas.
Recommendations for Each Type of IFP

Each type of Instrument Flight Procedure was assessed by the Task Group and the group determined whether or not to pursue criteria for cancellation for each. A summary of the Task Group assessment is included in the table below.

Figure 4 Task Group Assessment for each Type of Instrument Flight Procedure

The following sections provide a detailed examination for each type of Instrument Flight Procedure in the table above. Detail includes the rationale for not evaluating some type of procedures for cancellation at this time as well as criteria for cancellation for those types that were evaluated for cancellation.

Procedures Not Evaluated for Cancellation at this Time

Recommendation 1a. Do not evaluate all types of Instrument Landing System (ILS) Procedures for cancellation at this time.

There is another working group that is in the initial stages of evaluating the rationalization of ILS procedures. Additionally, the NPA Task group elected to avoid cancellation of procedures with vertical guidance when possible.

Recommendation 1b. Do not evaluate LOC and LOC (B/C) Procedures for cancellation at this time.

A significant majority of Localizer (LOC) and Localizer back-course (LOC B/C) procedures are associated
with existing ILS equipment. Given the conclusion not to evaluate all types of ILS procedures for cancellation, the group recommends LOC and LOC (B/C) also not be considered for cancellation at this time.

**Recommendation 1c. Do not evaluate LDA and LDA PRM Procedures for cancellation at this time.**

The Task Group recognizes that most Localizer type directional aid (LDA) procedures exist for critical operational reasons so the group elected not to focus on cancelling these types.

**Recommendation 1d. Do not evaluate Side Step Procedures for cancellation at this time.**

Given the small number of Side Step procedures and no immediate rationale for their cancellation, the Task Group elected not to focus on cancelling these types.

**Recommendation 1e. Do not evaluate VOR / DME RNAV Procedures for cancellation at this time.**

The FAA is already in process of cancelling VHF Omni-directional Range / Distance Measuring Equipment (VOR / DME) RNAV procedures so there was no need for the Task Group to consider this type.

**Recommendation 1f. Do not evaluate GLS Procedures for cancellation at this time.**

GLS is a new and emerging type of Instrument Approach Procedure and expansion of Ground-Based Augmentation System (GBAS) equipage and GLS procedures is anticipated in the future. Given this type of procedure is expected to grow, the group elected not to consider it for cancellation.
**Circling Procedures**

Circling procedures are comprised of circling-only procedures and the circling minima charted on a straight-in IAP. Together these make up 31% of all Lines of Minima in the NAS. As the FAA adds more straight-in PBN approaches to runway ends in the NAS, circling minima may not be beneficial for every IAP. However, in some cases, these procedures are still necessary under a defined set of criteria and provide benefits at airports of varying size and complexity. Examples include:

- **Airport Access and Operational Efficiency** – Circling-only procedures are utilized in areas where terrain or obstructions may preclude a straight-in IAP being the optimal IAP to that runway or airport. Noise abatement and airspace concerns can also result in a circling-only procedure offering the most favorable lateral navigation to a runway of all the IAPs available.\(^{11}\) Airport construction and other uncommon events can also be mitigated by the availability of a circling minima thanks to the flexibility they provide.

- **Airmen Training and Testing Requirements** – Pilots testing for the airplane Instrument Rating, Airline Transport Pilot, or Certified Flight Instructor Instrument certificate may be required by the Practical Test Standards, or the new Airmen Certification Standards, to demonstrate a circling approach. Pilots undergoing an airplane Instrument Proficiency Check are also required to demonstrate a circling approach. An IAP with a circling LoM must remain accessible due to its continued importance for pilot training, testing, and proficiency. Having such approaches available within 20 nm to facilitate training will help accommodate user access to required approaches for training.

- **Resiliency** – Given the ongoing removal of ground-based IAPs from the NAS, a GNSS outage could have a larger impact if the remaining ground-based IAPs did not have circling minima. Aircraft may need to utilize the available ground-based approach to descend through a cloud layer and then circle to another runway.

Below, criteria are presented that take into account those circling procedures considered to have value but identify the redundant and unnecessary ones for possible elimination, pending stakeholder review through the applicable processes. A complete removal of circling procedures was determined to not be realistic given how these procedures are utilized by all types of operators, and in some cases, are used to make departures feasible based on meteorological conditions.

To validate the criteria, nine airports of various size and purpose were chosen as case studies. The application of the criteria revealed an average of 60% of circling procedures published at the case study airports would be forwarded for further consideration for cancellation (See Appendix C for additional detail). Further recommendations in this report suggest procedures that are candidates for cancellation should follow the regulatory cancellation procedure which involves a comment period for stakeholders including air traffic control, operators, airports and airport governing bodies.

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\(^{11}\) An example is the VOR-F approach to runway 31 at LGA
The criteria does not include study of published side-step LoM and it would not prevent an operator from conducting a circling maneuver in visual conditions. Additionally, the criteria does not address the impact on airport protected areas or Part 77 criteria.

**Recommendation 2a.** Identify candidate Circling Procedures for potential cancellation according to the criteria in the figure below.

*Figure 5 Decision Tree for Identifying Candidates for Removal of Circling Procedures*

- **Start:** Consider an individual Circling Procedure

  1. Is this Circling procedure one of the designated non-airport procedures?
  
  2. If multiple IAPs serve a single runway end, is this the lowest circling minima for that runway? (If the RNAV circling minima MDA is not the lowest but within 50' of others, give it preference)
  
  3. Does this circling only procedure exist because of high terrain or an obstacle that makes a straight in procedure unfeasible or which would result in the straight in minimum being higher than the circling minima?
  
  4. Is this circling only procedure (1) at an airport where not all runway ends have a straight-in IAP and (2) does it have a FAC not aligned within 45 degrees of a runway which has a straight-in IAP?
  
  5. Will cancellation result in removal of circling minima from all Conventional NAVAID procedures at an airport? (If circling minima exist for multiple Conventional NAVAID procedures, preference to retain ILS circling minima)
  
  6. Will removal result in all circling minima being removed from all airports within 20 NM?
  
  7. Will removal eliminate lowest landing minima to an individual runway?

- **If NO to all questions, is candidate for cancellation**

**Recommendation 2b.** The FAA should coordinate with simulator operators prior to removal of any IFPs, particularly Circling Procedures.

Currently, Part 142 Training Center training specifications list what procedures are usable in simulators for circling proficiency. These procedures are included in the specifications for individual training centers and individual training operators have one certificate management office. However, there is no single NAS-wide list of all procedures approved and utilized for training. Instead, this knowledge is distributed across simulator operators. In 1995, when Denver International Airport (DEN) opened and the old Stapleton Airport closed, certain procedures used for training utilizing Stapleton in a variety of Training Centers and equipment were lost, impacting training NAS-wide. In an effort not to repeat this scenario, the FAA should strive to understand the full set of procedures utilized in simulator training and ensure there is coordination with simulator operators prior to procedure cancellation.
Ground-based Instrument Approach Procedures

NDB, TACAN, VOR and VOR/DME Procedures
Ground-based IAPs are largely being replaced by PBN procedures that offer many advantages except where the ground-based IAP is necessary for access or resiliency\(^{12}\). The group reviewed the FAA’s ongoing process for removal of Non-directional beacon (NDB), Tactical air navigation system (TACAN), VOR and VOR/DME procedures, which has been ongoing since 2013. The FAA first circularized criteria for the reduction of NDB and VOR IAPs in August 2013 with the removal policy finalized in June 2014. (See Appendix D for FAA’s Final Rule on Criteria for Ground Based IAP Cancellation.) An initial 736 IAPs were identified for removal and circularized with stakeholders in April 2015. Of the initial list, approximately 334 IAPs will be removed according to a November 2015 announcement. The FAA began cancelling these IAPs in December 2015 and will complete the effort by March 31, 2016.

The group reviewed the regulatory process undertaken by the FAA to publish criteria for comment and to then publish a cancellation candidate list for comment. The group found it was sound but had room for improvement. Beyond what was already done, the group offers several recommendations below to further improve the process in the future. Additional improvements are included in the section “Recommendations on the Outreach for All Procedure Cancellation” later in this report:

**Recommendation 3a.** For ground-based IAP policy, expand the current criteria “Extensive use by the military for training and/or proficiency” to “Extensive use by civil or military operators for training, flight test and/or proficiency”.

**Recommendation 3b.** Include “No other airport within 20 NM with a similar type of IAP” as an additional factor for consideration in cancellation of ground-based IAPs.

In past studies the FAA had used 20 NM as a reasonable access criteria with other cancelation procedures. After review the group validated this distance as reasonable access and not providing undue burden for the purposes of training.

In the “Additional factors” criteria, the flight training aspect and importance of retaining unique IAPs should be considered.

**Recommendation 3c.** The FAA should modify the title of those Notice of Proposed Rulemaking (NPRM)/Final Rules to better inform the public of what the notice is about. Proposed language would be: “Cancellation of Standard Instrument Approach Procedures as Part of National Procedure Assessment Initiative”.

The Federal Register NPRM/Final Rule announcing mass IAP cancellations uses the same language in the title as that of routine cancellations that are published several times per month. The standard language (Standard Instrument Approach Procedures, and Takeoff Minima and Obstacle Departure Procedures; \(^{12}\) According to the 2016 Draft Performance-Based Navigation (PBN) NAS Navigation Strategy, resiliency is the ability of the NAS to maintain both safety and an acceptable level of service during system failure scenarios or degraded facility conditions, and to prevent or mitigate impact to air traffic operations.)
Miscellaneous Amendments) fails to properly identify this notice as being unique from the routine notice. Additional publicity by the FAA should be brought to these activities to encourage users to read the FAA’s reasoning and to comment. Additionally, attention should be brought via a FAA Safety Team (FAAST) Blast or some other type of public notice such as a press release.

**MLS and TLS Procedures**

**Recommendation 4.** Remove Microwave Landing System (MLS) and Transponder Landing System (TLS) procedure categories.

These are two procedure types in the FAA’s inventory that have zero procedures. These procedures are not expected to be used in the future.

**SDF Procedures**

**Recommendation 5.** Consider remaining SDF procedures for cancellation.

There are few Simplified Directional Facility (SDF) procedures remaining in the NAS. As of October 2015, there were only six remaining. The Task Group did not believe SDF procedures were needed any longer in the NAS.

**PAR and ASR Procedures**

**Recommendation 6a.** Review PAR and ASR procedures at civilian only facilities for cancellation.\(^{13}\)

Precision Approach Radar (PAR) and Approach Surveillance Radar (ASR) procedures represent approximately 1% of all IFPs in the NAS. The Department of Defense maintains a wartime requirement to remain current on these procedures. Joint civilian/military facilities indicate that such procedures are used primarily for military purposes, such as military practice approaches. However, not all existing PAR or ASR procedures are at joint use facilities. Initial analysis by the Department of Defense suggests about 84 out of 221 ASR procedures may fit in this category. An additional 16 may be joint FAA/US Customs procedures.

**Recommendation 6b.** FAA should engage rest of government (Department of Defense (DoD), Customs and Border Patrol (CBP), etc.) to evaluate necessity of PAR and ASR procedures at joint use facilities.

While the DoD maintains a wartime readiness requirement for ASR and PAR procedures, it is still worthwhile for the FAA and DoD to periodically collaborate to assess whether the right mix of ASR and PAR procedures exist across the NAS to enable the DoD’s proficiency.

**Recommendation 6c.** If any procedures are maintained, including but not limited to PAR or ASR, FAA must maintain training and currency of controllers to offer the procedure. If the Facility cannot provide the procedure due to training, the FAA should NOTAM those procedures out of service until such time that staff is trained.

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\(^{13}\) Note that cancellation of an ASR procedure would also remove a corresponding circling procedure.
Currently there may be civilian facilities in the NAS with published PAR or ASR procedures but no air traffic controllers certified to clear aircraft on these approaches given the infrequency of use. This creates potential risk and uncertainty to the operator as to whether a given procedure is available to fly.

**PBN Instrument Approach Procedures**

The PBN NAS Navigation Strategy recommends the replacement of ground-based IAPs with PBN IAPs and the further proliferation of PBN IAPs to those runways ends not already served by a PBN procedure. The benefits of PBN, when compared to legacy ground-based approaches, include greater procedure design flexibility, more efficient routing, the potential for lower minima and reduced costs. When analyzing the opportunity for developing a national strategy of removing redundant PBN IAPs from the NAS, several constraints were identified which limited the logic to define NAS-level PBN procedure reduction criteria. The issues included:

- **PBN NAS Navigation is a priority for the NextGen NAS**

  RNAV (GPS) procedures are intended for use at all airports. RNAV (RNP) (Required Navigational Performance) procedures are intended based on proximity to terrain, obstacles, special use airspace (SUA) or airspace/procedure considerations. Finally, there is a general intent to reduce use of and reliance upon ground based procedures throughout the NAS.

- **Each type of PBN procedures has value. Specifically:**
  - Lateral Navigation (LNAV) LoMs are critical for circling procedures and aircraft not equiped for vertical guidance.
  - LNAV/ Vertical Navigation (VNAV) provide vertical guidance for non-Wide Area Augmentation System (WAAS) aircraft.
  - Localizer Performance with Vertical Guidance (LPV) can provide the lowest minima with vertical guidance (WAAS required).
  - Localizer Performance (LP) approaches can provide the lowest minima if LPV approaches are not possible (WAAS required).
  - RNP (RNP AR) approaches can provide the lowest minima in areas of high terrain/obstructions, and they offer increased efficiency in high traffic environments.
  - RNAV (GPS) Precision Runway Monitor (PRM) offer increased efficiency at certain airports.

- **Not every operator can fly every type of RNAV procedure**

  For example, some General Aviation may not be capable of flying RNAV (RNP) procedures, while most commercial airlines do not have equipage to operate LPV/LP lines of minima.

- **Recommendation 7a.** Flight Procedures Teams (FPTs), in collaboration with other appropriate organizations in the FAA, should examine whether there are any redundant PBN instrument approach procedures and lead any requests for cancellation.

The various types of procedures required for the different operators in the NAS and the importance of PBN to future NAS operations require extra diligence when considering the cancellation of PBN procedures. The NPA Task Group believes there may be obvious cancellation candidates in the PBN category, such as overlay approaches. All air traffic control facilities should evaluate instrument flight
procedures (IFPs) within their area of jurisdiction for utilization and redundancy. IFPs determined to be underutilized and/or redundant should be coordinated with the appropriate Flight Procedures Team for cancellation through the RAPT process. Additionally, the FPTs should evaluate procedures for cancellation anytime they are scheduled to be amended.

Despite the importance of PBN to the future of the NAS, it is also a very large category of procedures and local, targeted examination of procedures remains worthwhile.

**Recommendation 7b.** Continue to replace GPS stand-alone procedures with RNAV (GPS) procedures that offer better minima and are not predicated on design criteria for ground-based procedures.

GPS stand-alone procedures are in the process of transitioning from their original format to current naming conventions. Such efforts should continue throughout the NAS.

**Standard Instrument Departures (SIDs) and Standard Terminal Arrivals (STARs)**

Standard Instrument Departures and Standard Terminal Arrivals include RNAV and conventional procedures. While SIDs/STARs only make up about 5% of the total count of IFPs, these procedures are directly connected with national programs such as VOR MON and Metroplex. For SIDs/STARs, the Task Group started with a review of the FAA’s recent efforts to assess unused or underutilized procedures. This effort, referred to as the Review, Refine and Remove (RRR) effort, examined the utilization of SID/STAR procedures across the NAS and identified candidate procedures for removal or refinement. The RRR effort was developed as part of the FAA’s strategic efforts to “right-size” the NAS. The RRR concept consisted of three options:

- REVIEW: Using available data, review procedure use.
- REFINE: If the procedure is used, but could be improved, refine it.
- REMOVE: If the procedure is not used, remove it.

RRR was executed by a collaborative team called the Procedure Review Refine Remove Team (PRRRT). The PRRRT was formed in late 2013 and was active through the end of 2014. The PRRRT’s initial focus was to examine both RNAV and conventional SIDs and STARs. In its active period, the PRRRT completed a review of CONUS SIDs and STARs, one service area at a time. The PRRRT used a three step approach:

- ANALYZE: Determine how many flights file and fly the SID or STAR using MITRE’s PBN Dashboard data and complete initial “bucketing” of the procedures based on objective criteria. Based on an estimate of how often the procedure was filed, it was identified as a candidate for removal or refinement, or as requiring no action.
- VALIDATE: The initial bucketing was shared with the Service Center and Facilities, along with additional PDARS track data. Facilities were asked to validate the initial classification. All procedures that the operational facilities concurred with removing were forwarded to the next step.
• RECOMMEND: The set of removal candidates with facility concurrence was forwarded to the RAPTs for removal from the NAS.

The PRRRT analysis process identified several hundred candidate procedures, but after Facility validation and review, only 70 SIDs and STARs were recommended for removal (corresponding to 158 airport-specific procedures).

This Task Group examined the approach used in the ANALYZE step of the PRRRT process in developing the recommendations for cancellation criteria. In this step, the PRRRT used a combination of objective data and subjective inputs, but relied primarily on estimates of procedure usage derived from PBN Dashboard data. The PRRRT applied a usage metric\(^{14}\) that estimated a procedure’s frequency of use. The Task Group identified several concerns with usage percentage as the primary criteria:

• Underlying data quality and consistency: Several data quality issues were discussed, specifically the accuracy and operational relevance of the available data. One of the most significant accuracy concerns is the lack of accurate data on procedures that do not appear in flight plans or flight plan amendments, such as vector SIDs. The PRRRT identified this as a major issue in that the data did not reflect the reality of the usage as seen by ATC facilities. Therefore, facilities became very suspect of the data, questioning any conclusion based on it, and making the usage data operationally irrelevant. It was identified that the FAA and MITRE are aware of these limitations in the PBN Dashboard data, and that they are exploring corrective action.

• Percentage threshold: The PRRRT applied a percentage threshold to identify whether a procedure was a candidate for removal. Any procedure that had less than 5% usage was considered as a candidate. While this type of threshold may help manage workload by filtering out the procedures that are routinely and/or regularly used, the value of 5% for all locations was considered arbitrary.

• Usage as stand-alone criteria: Along with data accuracy and relevance issues, the Task Group had significant concerns about usage as stand-alone criteria for SID/STAR removal. Primarily, this type of data cannot sufficiently reflect the fact that some procedures, while utilized minimally, are of high operational value when needed.

The Task Group concluded that usage data should be used to inform and help identify potential procedures for consideration within the cancellation process, but not as a singular criterion as usage is not the only reason to maintain a procedure. A minimum threshold of utility over time is recommended, and the FAA should determine this threshold. Data sources used for this usage evaluation must be accurate and operationally relevant.

Given the concerns with data accuracy and relevance, the Task Group turned its focus to the information gained from the ATC facilities during the VALIDATE step of the PRRRT process. The Task Group reviewed the operational input from the ATC facilities provided as an explanation or justification to the PRRRT for

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\(^{14}\) PRRRT procedure usage percentage = estimate of the number of flights that filed any given SID or STAR divided by the total number of arrivals or departures, over a 16 month period
maintaining procedures that the data had identified as potentially underutilized. Several responses and justifications were documented from the facilities, including:

- The procedure is utilized, but is not represented in the data due to the procedure not appearing in the flight plan (e.g., vector SID).
- The procedure is the only procedure at that airport.
- The procedure is a special event procedure (e.g., The Master’s Golf Tournament).
- The procedure is a noise abatement procedure.
- The conventional procedure is required for non-RNAV aircraft.
- The procedure is primarily a transition for a satellite facility.
- The procedure is a Weather/SWAP procedure.

Using this information and other input from its membership, the Task Group developed the criteria for SID/STAR removal in the figure below. As part of the FAA’s development of the PBN NAS Navigational Strategy document, consideration should be given to incorporating these recommendations for reducing the number of redundant SIDs and STARS.

**Recommendation 8. Identify candidate SIDs/STARS for cancellation according to the criteria in the figure below.**

![Figure 6 Criteria for identifying candidate SIDs/STARS for cancellation](image)

While the figure depicts strict “Y” or “N” decisions on the last step, there may be SIDs/STARS that are “maybes.” Given this potential circumstance, the FAA may want to utilize a NOTAM to designate the SID/STAR as “ATC Assigned Only” as an initial step to test whether full cancellation is warranted.
Recommendations on the Process for Procedure Cancellation

The Task Group examined the processes undertaken by the effort to cancel ground-based IAPs as well as the PRRRT team’s effort to cancel SIDs and STARs. In reviewing these efforts, the group recommended that both the regulatory and non-regulatory paths should follow a similar conceptual approach as listed below:

1) Centrally identify objective criteria to identify procedures for cancellation.
2) Apply these criteria to generate cancellation candidate lists.
3) Review candidate procedures with applicable ATC facilities and flight operators.
4) Execute cancellation according to the existing process for the procedure type.

The clear dichotomy between the cancellation of IAPs and that of SIDs and STARs is the regulatory requirement for public comment for IAPs. Upon considering the experience of the NPA and PRRRT efforts, the Task Group proposed the following concept for a repeatable process for procedure cancellation:

- The first step of criteria development is best handled as a Headquarters activity. Criteria should be similar across the NAS and should be defined centrally.
- Application of these criteria to identify candidates for cancellation is best handled by local ATC facilities with the support of Service Center personnel. Local facilities include Centers, Terminal Radar Approach Control Facilities (TRACONs) and Towers. Whether discussing SIDs and STARs or IAPs, personnel from local facilities are best suited to evaluate the importance and value of procedures.
- Local facilities are resource constrained, so the Service Centers can play a critical role by owning the process of local evaluation of procedures and walking the local facilities through the process.
- There are existing processes for cancellation with the FPTs (SIDs/STARs) and AJV-5 (IAPs) that should continue to be utilized for ongoing procedure cancellation.
Recommendation 9a. Evaluation of procedures should be ongoing and occur on a recurring basis in accordance with the figure below.

Figure 7 Proposed Process for Procedure Cancellation

The Task Group recognizes that the need for this should diminish over time as the NAS evolves to full PBN capability. However, ground-based procedures will remain in the NAS for the foreseeable future and will be part of future cancellation efforts.

The Task Group does not suggest a specific frequency to execute the process but recognizes that conducting such an evaluation too frequently will be counterproductive. The three Service Centers may consider cycling through one of its enroute Centers’ IFPs each year and then moving to another facility the next year. This approach would maintain a continuous stream of activity in the area of cancellation for each Service Center.

Recommendation 9b. Removal criteria should be periodically re-examined by Mission Support or appropriate national office.

The NAS is continuously evolving so the criteria utilized today to identify candidates for cancellation may not be applicable in the future. Hence, the criteria should be reassessed periodically.
Recommendations on the Outreach for Procedure Cancellation

**Recommendation 10a.** Both local ATC Facilities and Operators should be engaged into the regulatory and the non-regulatory cancellation processes.

The greatest shortcoming of both removal processes was the lack of interaction between ATC or users depending on regulatory or non-regulatory paths. In the PRRRT process (non-regulatory), air traffic facilities were involved but not operators. In the Ground Based IAP cancellation process (regulatory), operators had opportunity to comment but air traffic facilities were not involved. Both are critical partners in effective transition of the NAS and should be involved in both tracks. An open question remains as to what the most effective mechanism would be for involving operators.

**Recommendation 10b.** Recommend the new RAPT order include a process step for flight operators to offer comment/feedback on cancellation of SIDs and STARs.

The Task Group recommends that the forum for operator input be an an existing process or industry forum. The process of communication and feedback should not just be electronic, such as through an email distribution list. Additionally, proposed SIDs/STARs for cancellation should be communicated to operators early enough so they can review the content and provide feedback to the FAA before final decisions have been made.

**Recommendation 10c.** Engaging local ATC facilities for feedback is most effectively accomplished in person in order to guide facilities through the process and discussion.

As noted earlier, local ATC facilities have the greatest knowledge to offer meaningful feedback on proposed candidate lists. However, these facilities are resource constrained. The Service Center should take the lead on engaging local facilities and utilize defined in-person workshops to solicit local facility feedback. Additionally, if a Service Center is gathering facility input on Circling Procedures, IAPs and SIDs/STARs, the in-person engagement should be done at one time.

**Recommendation 10d.** The key air traffic facility involved in creation of a procedure should participate in its cancellation.

Finally, if a facility was involved in the original development of a procedure, it should also be involved in its cancellation. Historical background information may be helpful in making cancellation decisions. Key facilities for STARs are typically the Air Route Traffic Control Center (ARTCC), while for SIDs and IAPs, they are typically the TRACON or the appropriate ARTCC if it is the primary air traffic service provider.
Additional Recommendations

The Task Group recognizes that this final category of recommendations is on the edge of the original scope of the task. However, the Task Group elected to include these recommendations with the request that the FAA give these recommendations consideration as they apply to the overall theme of cancellation of procedures:

**Recommendation 11a. Develop a process to ensure any procedures associated with closed airports or decommissioned/restricted NAVAIDs (VORs, NDBs) are removed or amended as appropriate.**

The infrastructure at airports and in surrounding communities is constantly changing and can have lasting impacts on IFPs and their utility. Periodic reviews of NOTAMs and other aeronautical data or engagement of key personnel as part of the coordination process will enhance timely cancellation or modification of associated IFPs.

**Recommendation 11b. Establish a national policy to motivate procedure cancellation.**

Motivating procedure cancellation is challenging and there is no obvious incentive for local facilities to cancel procedures. For the sake of consistency of cancellation across facilities throughout the NAS, consideration should be given to a national policy and/or defined incentives for local air traffic facilities to have a higher level of engagement with this process.

**Recommendation 11c. Further augment FAA’s capacity for procedure maintenance and development through contract support (as needed and subject to availability of budget).**

The Task Group recognizes the challenges to resources within the FAA and the Federal Government at large. However, the utilization of contract resources has proven to be of value in the past, not only to enhance capacity to maintain and develop procedures but also to serve as a training ground to develop the “bench” that will serve as future full time procedure team members within the FAA.

**Recommendation 11d. Continue to invest in automation and technology improvements that have the potential to improve the FAA’s productivity in procedure maintenance and development.**

The Task Group is aware that there are promising technology options, such as modifications to the TARGETs software, to enhance the productivity of procedure maintenance. Such technologies should also receive close consideration in addition to the cancellation efforts. Technology improvements will clearly drive additional cost upfront that will deliver value over time. With the right investments in future automation, near-term cost savings should enable further development of the NAS.
Appendix A: Tasking Letter
Ms. Margaret Jenny  
President  
RTCA, Inc.  
1150 15th 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,

[Signature]

Elizabeth L. Ray
Vice President, Mission Support Services
Air Traffic Organization
# Appendix B: Members of the National Procedure Assessment Task Group

<table>
<thead>
<tr>
<th>Organization</th>
<th>Individual Participant</th>
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<tbody>
<tr>
<td>Air Line Pilots Association</td>
<td>Marc Henegar</td>
</tr>
<tr>
<td>Air Wisconsin</td>
<td>Darrell Pennington</td>
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<tr>
<td>Aircraft Owners and Pilots Association</td>
<td>Michael Perrizo (Co-Chair)</td>
</tr>
<tr>
<td>Air Wisconsin</td>
<td>Michael Stromberg</td>
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<tr>
<td>American Airlines</td>
<td>Rune Duke</td>
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<td>DoD Policy Board on Federal Aviation</td>
<td>Melissa Rudinger</td>
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<td>Federal Aviation Administration</td>
<td>Brian Townsend</td>
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<td>Gerald Lynch</td>
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<td>Robert Novia</td>
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<tr>
<td>Landrum and Brown</td>
<td>Lee Brown</td>
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<tr>
<td>National Air Traffic Controllers Association</td>
<td>Dennis Kelly</td>
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<tr>
<td>National Association of State Aviation Officials</td>
<td>Randy Burdette (Co-Chair)</td>
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<td>Howard Callon</td>
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<tr>
<td>United Airlines</td>
<td>Glenn Morse</td>
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Appendix C: Case Studies on Application of Circling Criteria

To validate the criteria for identifying Circling procedure candidates for cancellation, nine airports of various size and purpose were evaluated as case studies. The application of the criteria revealed an average of 60% of circling procedures published at the case study airports would be forwarded for further circularization and consideration for cancellation. Assumptions for this analysis include the following:

- Category A minima used for comparison
- All circling lines of minima listed for the airport
- Red text indicates candidate for removal
- Percentage indicates amount of lines of minima at airport proposed for removal
- October 26, 2015 MON airport list used
- National Simulator Program IAP listed for retention

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PDK (50% of Circling LoMs candidates for cancellation)

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GAI (33%)

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Either ILS 4L or 4R, depending on local preference, should be retained (Crit 5)

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JFK (58%)

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**TEB (75%)**

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Appendix D: FAA’s Final Policy on Criteria for Ground Based IAP Cancellation
DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration
[DOCKET No. FAA–2013–0265]

Policy for Discontinuance of Certain Instrument Approach Procedures

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of policy; disposition of comments.

SUMMARY: This action adopts with minor modification, the policy proposed in the Federal Register on August 2, 2013. Under this policy, the FAA establishes the criteria to identify certain non-directional beacon (NDB) and very high frequency (VHF) omnidirectional radio range (VOR) instrument approach procedures that can be considered for cancellation. Additionally, the FAA responds to comments received during the comment period on the notice of proposed policy.

FOR FURTHER INFORMATION CONTACT: For questions concerning this action, contact Wayne Eckenrode, Aeronautical Navigation Products, AJV–3, Instrument Flight Procedures Efficiency Group, Manager, Federal Aviation Administration, Air Traffic Organization, 4500 Mercantile Plaza Drive, Fort Worth, TX 76137; telephone (202) 494–8898, email AMC-ATO-IFP-Cancellations@faa.gov.

Background

Right-sizing the National Airspace System (NAS) is an integral part of the FAA’s commitment to deliver the benefits of the Next Generation Air Transportation System (NextGen) through enhanced technology, enhanced capabilities, and more efficient, streamlined services. Focus on improvements in satellite-based navigation based on Global Positioning System (GPS) technology has facilitated the implementation of a large number of Performance Based Navigation (PBN) Instrument Approach Procedures (IAPs) into the NAS. These PBN procedures charted as RNAV (GPS) and RNAV (RNP) IAPs, improve the safety and efficiency of the NAS by providing more precise, repeatable flight paths to the runway. The total number of procedures in the NAS has nearly doubled over the past decade, as legacy procedures based on older, ground-based technology, are maintained alongside the newer, satellite-based procedures. In some cases, the older procedures are redundant or obsolete, and maintaining them unnecessarily increases FAA costs, as well as creates the need for air traffic controllers to train and be proficient on procedures that are not used or needed. Pilots must also maintain proficiency on these procedures and, in some cases, memory limitations in the Flight Management Systems (FMSs) in their aircraft result in the inability to load all the data needed to support the procedures. Removing certain redundant or underutilized IAPs will increase the safety and efficiency of the NAS by streamlining user access and FAA services, allowing the FAA to focus on delivering greater benefits through new technology.

In September 2010, the FAA awarded a grant to the Flight Safety Foundation, to research and provide independent insight on how the FAA should eliminate redundant or underutilized Instrument Approach Procedures (IAPs). The Flight Safety Foundation’s study and recommendations were developed based on interviews and surveys of FAA personnel, and key airspace stakeholders. Among those interviewed were, Aircraft Owners and Pilots Association (AOPA), Air Line Pilots Association, International (ALPA), Air Transport Association (ATA), National Business Aviation Association (NBAA), Regional Airline Association (RAA), and the U.S. Air Force. The study formed the basis for the notice of proposed policy and request for comment (78 FR 47048) published in the Federal Register on August 2, 2013. The notice sought comments on the proposed criteria the FAA would utilize to determine which NDB and VOR IAPs could be considered for cancellation.

Summary of Comments

The FAA received a total of 14 comments from individuals, the Department of Defense (DoD), AOPA, the Maryland Aviation Administration, the Wahoo Airport Authority, and SkyWest Airlines. Several of the comments received concerned the ability to train pilots on NDB or VOR IAPs if the ground-based procedures at an airport were cancelled. AOPA asserted that most flight instructors and pilots rely very heavily on ground-based navigational aids for initial and recurrent instrument flight training activities. This policy will not reduce the ability to train pilots on NDB or VOR IAPs.

Under this adopted policy, one existing ground-based IAP procedure will remain at each airport under this policy. Three commenters were concerned with aircraft operations at an airport during periods of inclement weather if the ground-based procedure to a particular runway was cancelled. AOPA stated that consideration needs to be given to the individual airport operation and if there is a predominant or exclusive general aviation runway at a particular airport, the procedure offering the lowest approach minimums may not provide the greatest access. Based on this situation, AOPA asserted that it may be necessary to preserve the IAP to the general aviation runway for use during instrument training in visual meteorological conditions.

The criteria adopted in this notice ensure that an airport does not lose IAP capability to any runway that already has a published IAP. Additionally, the FAA will consider runway usage and local weather conditions when identifying candidate IAPs for cancellation.

Several commenters questioned whether the FAA will consider community needs for goods and emergency services at certain locations with limited access.

The adopted criteria ensure that at least one RNAV IAP and one ground based IAP will remain published at airports that already have them.

Individuals, AOPA, Wahoo Airport Authority, Maryland Aviation Administration, and SkyWest Airlines, submitted general comments concerning the decommissioning or discontinuance of NDBs and/or VORs.

The decommissioning or discontinuance of NDBs or VORs is beyond the scope of this action. The implementation of this policy will not decommission or discontinue the use of any facility, including NDBs and VORs. The purpose of this policy is to appropriately identify IAPs that can be cancelled.

The DoD commented that the FAA should explore additional methods to reduce costs of maintaining IAPs. The DoD stated that other methods to reduce costs may exist such as reducing the costs of flight checks which form a significant portion of the IAP maintenance costs.

The FAA will continue to examine ways to reduce operating costs associated with the maintenance of IFFPs including reduction in flight check costs.

Many commenters expressed concern with GPS signal interruption, which emphasized, in their view, the need for redundant ground-based IAPs.

Issued in Washington, DC on June 23, 2014.

Albert R. Spence,  
FAA Assistant Information Collection Clearance Officer, IT Enterprises Business Services Division, ASP–110. 

FOR FURTHER INFORMATION CONTACT:
Commenters also noted some geographic areas in the NAS incur GPS signal interference more regularly than others due to U.S. Government testing.

Under this policy, the FAA will ensure that at least one ground based IAP will remain at each airport.

The FAA agrees that the adopted criteria must also consider GPS signal interference. Therefore, the FAA modifies this policy and adds the following as a factor to be considered: “Airports located within an area routinely affected by GPS signal interference testing.”

The DoD stated that if IAPs at a civil airport are extensively utilized by military aircraft for training and/or proficiency, these IAPs should be retained. Additionally, the DoD suggested that DoD facilities should be added to the list of airports that are not considered for NDB or VOR IAP cancellations.

While this policy will not add DoD facilities to the list of airports that are not considered for NDB and VOR IAP cancellation, the FAA agrees to modify the policy so that IAPs used extensively by military aircraft for training and/or proficiency will remain in the National Airspace System.

Policy

After review and evaluation of the public comments received on the policy proposed in the Federal Register on August 2, 2013 (FAA–2013–0265), the FAA adopts the criteria for selecting potential IAPs for cancellation as proposed with two modifications based on the comments received. FAA adds the following to the list of consideration factors: “Airports located within an area routinely affected by GPS signal interference testing” and “Extensive use by the military for training and/or proficiency.”

The NDB and VOR IAPs recommended for cancellation will be selected at airports using the adopted criteria. FAA notes that all airports having existing RNAV and ground-based IAPs will maintain at least one RNAV and one ground-based IAP under this initiative.

Instrument Approach Procedures are incorporated by reference into Title 14 of the Code of Federal Regulations part 97, subpart C, and are promulgated by rulemaking procedures. Once the FAA identifies IAPs that may be cancelled in accordance with the adopted policy noted above, the FAA will follow standard rulemaking procedures including a Notice of Proposed Rulemaking in the Federal Register containing the list of NDB and VOR IAPs recommended for cancellation.

The FAA will consider all public comments before issuing a Final Rule removing selected IAPs.

Airports considered for NDB or VOR IAP cancellation:

—All airports with an NDB IAP.
—All airports with a VOR/DME RNAV IAP, unless it is the only IAP at the airport.
—All airports with two or more ground-based IAPs and an RNAV IAP.
—All airports with multiple, redundant ground-based IAPs (e.g., three VOR procedures).

Additional factors for consideration in determining the list of potential candidates for NDB or VOR IAP cancellation:

—Prevailing wind runways.
—Prevailing runway alignment during adverse weather operations.
—Runways with a published ILS IAP and a ground-based IAP.
—Runways with multiple VOR and NDB IAPs consider IAPs with the lowest minimums (if minimums are within 20 feet of each other), and IAPs that allow for optimum use by all users.
—Airports located within an area routinely affected by GPS signal interference testing
—Extensive use by the military for training and/or proficiency.

Airports not considered for NDB or VOR IAP cancellations:

—Airports with only RNAV/RNP IAPs published.
—Airports with only one ground-based procedure.
—Airports will not be considered if cancellation would result in removing all IAPs from the airport.

Issued in Washington, DC, on June 19, 2014.

Abigail Smith,
Director, Aeronautical Navigation Products.

BILLING CODE 4910–13–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Notice of Proposed Airport Access Restriction and Opportunity for Public Comment

AGENCY: Federal Aviation Administration (FAA), Department of Transportation (DOT).

ACTION: Notice; Request for Comment.

SUMMARY: The Airport Noise and Capacity Act of 1990 (hereinafter referred to as “the Act” or “ANCA”) provides notice, review, and approval requirements for airports seeking to impose noise or access restrictions on Stage 3 aircraft operations that become effective after October 1, 1990. 49 U.S.C. 47521 et seq. This notice is issued pursuant to ANCA and 14 CFR 161.315(b).

The Federal Aviation Administration (FAA) announces that it has determined the application for an airport noise and access restriction submitted by the Los Angeles World Airports (LAWA) for Los Angeles International Airport (LAX) under the provisions of 49 U.S.C. 47524 of the ANCA, and 14 CFR part 161, to be complete. The LAWA application seeks approval to adopt a new ordinance that would require all aircraft operators to comply with prevailing flows whenever LAX is in Over-Ocean or Westerly Operations from midnight to 6:30 a.m. The determination of completeness is not an approval or disapproval of the proposed airport access restriction. FAA will review the application, public comments, and any other information obtained under §161.137(b) and issue a decision approving or disapproving the proposed restriction. FAA intends to issue its decision by November 8, 2014.

Public Comments: Interested parties are invited to file comments on the application. Comments are due 30 days after the publication of this notice in the Federal Register.

FOR FURTHER INFORMATION CONTACT:

James Byers, Planning and Environmental Division, APP–400, 800 Independence Avenue SW., Washington DC 20591.

Email address: jim.byers@faa.gov.

Comments on the application for the proposed noise and access restriction, including the environmental analysis, should be submitted in writing to this contact office.

SUPPLEMENTARY INFORMATION: On January 30, 2013 the Federal Aviation Administration (FAA) received an application from LAWA under 14 Code of Federal Regulations (CFR) Part 161 seeking a Stage 3 aircraft operations that become effective after October 1, 1990. 49 U.S.C. 47521 et seq. This notice is issued pursuant to ANCA and 14 CFR 161.315(b).
The FAA is tasked with distributing Temporary Flight Restriction (TFR) Notices to Airmen (NOTAM) so that they are widely available when pilots are flight planning. A TFR is applicable to a defined geographic area but, as the NOTAM text is not user-friendly, graphics depicting the area of applicability in a user-friendly visual format are very important. The problem is the method and format the TFR data is provided by the FAA is not always suitable for DUATS vendors, avionics manufacturers, and third party vendor’s automation which has led to incorrect graphics.

Several recent TFRs have resulted in a graphic not being depicted or in the graphic being incorrect. It is apparent that the FAA does not have a standardized format when distributing the TFR data file to their own website, DUATS vendors, avionics manufacturers, and third party vendors. Automation relies on consistency so that when the format is changed, with no notice to vendors, the possibility of a graphic being incorrect increases and the opportunity for a pilot to violate that TFR increases tremendously.

- The FAA should engage with aviation stakeholders and the flight planning industry to develop a standard for how TFR data is to be transmitted to allow the consistent development of TFR graphics.
- The FAA should commit to formatting TFR NOTAM text in a manner that will allow them to be depicted graphically.

It is important that pilots can rely on the sites providing graphics; however, most providers issue a disclaimer stating TFR graphics may be incomplete. The FAA’s own website has a disclaimer that states the site is not for flight planning purposes and pilots must call Flight Service for current information.

- The FAA needs to provide an online definitive source for all current TFR’s, and should gather feedback on their TFR website to determine whether the disclaimer can be removed and the information used for flight planning.

Additionally, the FAA should work with industry on finding a user-friendly solution to the following TFR issues:

- Sporting event TFRs’ valid times are currently not provided by the FAA, thus pilots must rely on third party vendors to provide this information.
- Permanent TFRs may be more effective if reclassified, charted, or published elsewhere, these include the: Washington, DC Special Flight Rules Area; speed restrictions near Washington, DC; and Disney World.
- Different ways to make the TFR NOTAM text more user-friendly.

The FAA should formally task RTCA to develop recommendations related to the issues detailed above so that a unified solution can be implemented.
Ms. Margaret Jenny  
President  
RTCA, Inc.  
1150 15th Street NW  
Suite 910  
Washington, DC 20036

Dear Ms. Jenny:

The FAA has made great progress in reducing the number of people around airports that are exposed to significant aircraft noise. Nevertheless, there is an increasing level of public debate, political interest, and litigation related to aircraft noise. Public expectations with respect to noise exposure are changing. While noise levels might be the same or less due to quieter aircraft, the simple volume and concentration of flights over communities (particularly related to NextGen implementation) seems to be shaping perceptions. Dialogue with congressional and community representatives has highlighted a need to review engagement processes and associated guidance materials.

The FAA has initiated several efforts in response to noise concerns. We are developing a Community Involvement Plan for performance based navigation (PBN) to proactively identify and address community concerns during PBN projects and before PBN flight procedures are finalized. The plan also addresses more effective communication of the purpose and potential impacts of PBN projects. Improvements in how outreach is conducted include: early outreach to airport authorities for help in identifying local environmental sensitivities; improved responses and documentation of communication with external individuals and groups; and greater executive-level, in addition to staff-level, interaction when initiating outreach to airport authorities.

Several months ago, the FAA received several detailed, technical suggestions from organized public noise groups involving procedural and/or operational changes proposed to address community noise concerns in Northern California principally associated with operations in and out of San Francisco International Airport (SFO). The FAA was given this information through various political representatives who have continued to engage on behalf of their constituents in the SFO area. The focus of the proposals was in Santa Cruz, Santa Clara, San Mateo, and San Francisco counties. FAA committed to analyze the proposed actions and determine if they are initially feasible, flyable, and operationally acceptable from a safety perspective. The FAA will complete Phase 1 of this initiative and has committed to briefing its findings at the end of March. Phase 2 will likely utilize the PBN Order to do the formal development activities for those procedure proposals determined as feasible in Phase 1. Phase 3 will be the implementation of the procedures from Phase 2 above, as well as the
implementation of other feasible non-procedural proposals. FAA intends to work Phases 2 and 3 with the airport, communities and operators through the SFO Roundtable.

The FAA requests that the TOC Western Regional Task Group (WRTG) perform the following tasks:

Task 1 – Review the six specific suggestions in Section 4 (4a through 4f) of the attached draft of the NorCal Initiative Plan and provide operator feedback on the impact of these specific suggestions. Feedback may be in the form of neutral, negative or positive feedback.

Task 2 – Feedback will describe impacts (if any) and rationale.

Task 3 – Provide any additional ideas/recommendations which might better help address community noise concerns.

Completion of these tasks will provide the FAA with help to inform better decision making moving forward. The FAA will provide subject matter experts as needed to support these tasks.

FAA would like the information/recommendations noted above by March 29, 2016.

Sincerely,

Elizabeth L. Ray
Vice President, Mission Support Services
Air Traffic Organization
FAA Initiative to Address Noise Concerns of Santa Cruz/Santa Clara/San Mateo/San Francisco Counties

Compiled at the Requests of Representatives Farr, Eshoo and Speier

Executive Summary

Northern California airspace is very complex, with traffic from several major airports, smaller regional airports and military activity. All arrival and departure procedures within the Northern California airspace are interconnected, interdependent and were designed to improve safety and efficiency within the National Airspace System (NAS).

Longstanding issues with, as well as changes to, the Northern California TRACON instrument approach and departure procedures have generated noise concerns from local residents of Santa Cruz, Santa Clara, San Mateo and San Francisco Counties. In meetings and correspondence with congressional offices and local community representatives, the Federal Aviation Administration (FAA) has received recommendations to adjust the current published procedures. In response, the FAA has undertaken the following noise initiative to explore such modifications. Airspace and air traffic procedures are highly dependent upon each other within the NAS and must be evaluated collectively to ensure safety and efficiency.
This initiative will be comprised of three phases. During the first phase, the FAA will conduct a
detailed analysis and a preliminary feasibility study focusing on flight procedures criteria and
overall fly-ability of the new Performance Based Navigation (PBN) procedures, potential
procedural modifications including speed/altitude adjustments, airspace changes and possibility
of moving existing waypoints. An assessment of impacts to operations at the surrounding
airports and associated procedures will be completed. In addition, coordination with the local
stakeholders will be conducted during this first phase.

During the second phase, FAA will consider any amendments and/or new procedures that are
determined to be initially feasible, flyable, and operationally acceptable from a safety point of
view. As part of this effort, FAA will conduct the formal environmental and safety reviews,
coordinate and seek feedback from existing and/or new community roundtables, members of
affected industry, and the National Air Traffic Controllers Association (NATCA) before moving
forward with the formal amendment process. During phase three, the FAA will implement
procedures; conduct any required airspace changes and additional negotiated actions, as needed.

In addition to its mandate to ensure the safe and efficient use of the NAS, the FAA complies with
the requirements of the National Environmental Policy Act (“NEPA”). As such, although not
specifically detailed within this noise initiative, the FAA’s procedures and standards for
evaluating noise impacts associated with all potential modifications to currently published
procedures—consistent with FAA Order 1050.1F (effective July 16, 2015)—will be followed
and undertaken before implementing any airspace changes. Finally, this document does not
constitute either a final decision of the FAA or a re-opening of the FAA’s August 6, 2014 final
decision for the Northern California (NorCal) Optimization of Airspace and Procedures in the
Metroplex (OAPM).
Initiative:

Phase one: Initial Analysis, Feasibility, and Coordination

1. Instrument Flight Procedures/Airspace:

   Planned Action: The FAA will conduct a detailed analysis to include preliminary feasibility from a procedures/criteria perspective and fly-ability from an aircraft perspective. Procedures will be analyzed, modeled, and flown in flight simulators. An assessment of the impact to operations and other procedures will be completed. The analysis should indicate whether the potential procedural changes could be made to effectively reduce noise.

   a. Altitude adjustments: Raising the floor and/or ceiling of existing procedures may allow the FAA to do the same for other procedures and reduce noise concerns in certain locations.

      i. Analyze raising the floor and ceiling of existing SERFR and BRIXX arrivals. (AJV-WOSG)

         a) Evaluate raising the altitude at MENLO waypoint to 5,000 feet or establish a new waypoint to allow for crossing the MENLO area closer to 5,000 feet.

         ii. Analyze reducing impacts of SSTIK, WESLA, and CNDLE departures. (AJV-WOSG)

   Status: Analysis began October 2, 2015

   Completion Date: TBD

   b. Track adjustments: Where possible, tracks should be adjusted away from areas of concern and moved over water versus land.

      i. Analyze moving the SSTIK and PORTE departures more over water. (AJV-WOSG)

      ii. Analyze reducing the impacts of SSTIK, WESLA, and CNDLE departures. (AJV-WOSG)
iii. Analyze moving the ILS/Visual Approach to Runway 28L offshore. (AJV-WOSG)

iv. Analyze offsetting Visual Approaches until passing the San Mateo Bridge. (AJV-WOSG)

v. Analyze the impact of non-charted visual approaches to RWY 28 (AJV-WOSG)

NOTE: There are three charted visual approaches to San Francisco (SFO). Two are FAA published approaches, the TIPP TOE VISUAL and the QUIET BRIDGE VISUAL. The third approach is owned by United Airlines and is a special charted visual, also available to other airlines. If changes are made to the procedure, the FAA would request that United Airlines and each airline that uses this procedure update their databases.

Status: Analysis began October 2, 2015
Completion Date: TBD

c. Waypoint Adjustments:

i. On the SERFR arrival, analyze moving EPICK waypoint south to approximately 36 54 52.8N and 121 56 32.7W, add restriction to speed of 280 knots and altitude of 15,000 feet. (AJV-WOSG)

ii. Analyze making adjustments to PORTE departure to maximize offshore routing. (AJV-WOSG)

iii. Evaluate adding a new waypoint roughly over the Highway 17 summit area, between EPICK and EDDYY, with at least a 10,000 feet and 250 knot restriction. (AJV-WOSG)

Status: Analysis began October 2, 2015
Completion Date: TBD

d. Speed Adjustments:

i. Analyze moving speed adjustments over water instead of over land. (AJV-WOSG)
ii. Analyze reducing the speed on the current SERFR arrival. (AJV-WOSG)

iii. Analyze data to determine compliance with the requirement to maintain 250 knots or less below 10,000 feet Mean Sea Level (MSL). (AJV-WOSG)

**Status: Analysis began October 2, 2015**

**Completion Date: TBD**

e. **Holding Patterns**

i. On the SERFR arrival, study current use of the holding pattern at EPICK and the possibility of moving the holding pattern to WWAVS. (AJV-WOSG)

**Status: Analysis began October 2, 2015**

**Completion Date: TBD**

f. **PBN Procedures:**

i. Evaluate proposed PBN arrival procedures from local community groups for feasibility, fly-ability and safety concerns. (AJV-WOSG)

ii. Evaluate the effect of dispersing flight tracks over a wider range. (AJV-WOSG)

iii. Study the feasibility of creating new transitions for the NIITE departure for airports to southbound destinations. (AJV-WOSG)

iv. Study the possibility of new SFO RNP approaches that will serve Runways 28 L/R that follow the Big Sur ground track, curved out over the Bay crossing MENLO at 5000-6000 feet. (AJV-WOSG)

**Status: Analysis began October 2, 2015**

**Completion Date: TBD**
2. Air Traffic Control:

   **Planned Action:** The Western Service Center, on behalf of the Air Traffic Director of Operations, will work with the facilities to assess what opportunities exist to modify operations. Part of this assessment will include looking at the possibility of adjustments during reduced volume night operations, even if day operations cannot be changed. If changes can be made there will need to be a safety assessment, controller training, pilot briefings, and the SFO community roundtable may need to be engaged.

   a. **Sequencing and Vector Points:** There may be actions air traffic controllers can take to reduce noise concerns such as assessing whether changes can be made to vectoring aircraft over water more.

      i. Analyze adjusting air traffic activity in the vicinity of Woodside VOR including altitudes. (AJT, AJV-WOSG)

      ii. Analyze adjusting air traffic to eliminate early turns over land. (AJT, AJV-WOSG)

         a) Focus on leaving aircraft over water as long feasible.

         b) Keep aircraft on the SSTIK departure until the SSTIK waypoint before turning.

         c) Keep aircraft on the NIITE departure to at least the NIITE Waypoint as much as possible.

      **Completion Date:** TBD

   b. **Use of Descend Via:**

      i. Increase use of descend via procedures. (AJT, AJV-WOSG)

      ii. Increase use of descend via procedures for international flights. (AJT, AJV-WOSG)

      **Completion Date:** TBD

   c. **Class B Containment:** Some current procedures, as designed, are not fully contained within the existing SFO Class B airspace.
i. Analyze current versus historic data to determine trends and risks to aircraft exiting and reentering Class B airspace. (AJT, AJI, AJV-WOSG)

ii. Analyze current RNAV arrival and departure procedures to determine necessity and feasibility of redesign. (AJT, AJI, AJV-WOSG)

iii. Analyze current RNAV arrival and departure procedures to determine necessity and feasibility of redesigning Class B airspace. (AIJ, AJV-WOSG)

Status: Ongoing
Completion Date: TBD

d. Speed Brakes:

i. Study the potential reduction and/or elimination of the use of speed brakes and conduct a track analysis to determine flight characteristics, utilizing the Aviation Safety Information Analysis and Sharing (ASIAS) database. (MITRE CAASD)

ii. Work with stakeholders to determine feasibility of reducing the use of speed brakes and other surface controls over land.

Status: Ongoing
Completion Date: TBD

e. Runway Usage:

i. Study the feasibility of increasing the use of Runway 10. (AJT)

ii. Study the feasibility of increasing the use of RWY 01 for Departures (AJT). Study the feasibility of proceduralizing the 050 departure heading off RWY 01 at night. (AJT)

iii. Study the necessity of extending nighttime operations at SFO. According to the SFO Standard Operating Procedure, the preferred Runway for operations between 0100 and 0600 local time is departing Runway 10 and landing Runway 28. (AJT)
iv. When weather conditions permit, study the increase in use of the Shoreline 7 Departure off RWY 28R or 28L. (AJT, AJV-WOSG)

Completion Date: TBD

f. Instrument Flight Procedures (IFP):

i. Study the feasibility of creating new transitions for the NIITE departure for airports to southbound destinations. (AJV-WOSG)

ii. When weather operations permit, study the use of the Shoreline7 departure off of Runway 28R or 28L. (AJT, AJV-WOSG)

iii. Study the use of offset visual approaches in lieu of straight in visual approaches. (AJT, AJV-WOSG)

iv. Study the usage of GAP departure. (AJT, AJV-WOSG)

v. Study whether international and domestic aircraft are handled the same by Air Traffic Control (ATC). (AJT, AJV-WOSG)

vi. Study the feasibility of increasing the use of the SSTIK departure during the day and the NIITE departure at night. (AJT, AJV-WOSG)

Completion Date: TBD

g. Opposite Direction Operations (ODO): Operational changes related to ODO may have increased noise concerns at night in certain locations.

i. Review recent implementation of ODO procedures and their impacts in the San Francisco Bay area. (AJT, AJI)

ii. Assess potential options for night operations. (AJT, AJI)

Completion Date: TBD

3. Traffic Management

Planned Action: The Western Deputy Director of System Operations, on behalf of the Air Traffic Director of Operations, will work with the Western Service Center and local facilities to evaluate the actions and suggestions below. During the analysis, the focus will be on use of traffic management tools and initiative to ensure current practices are as effective and efficient as possible for the potential reduction of noise concerns.
a. **Equitability:** Concentration of noise should be reviewed, especially during nighttime operations.
   
   i. Review the current nighttime operations to determine if they adequately address preferential Runway usage. (AJT, AJV-WOSG)

   NOTE: According to the SFO Standard Operating Procedure, the preferred Runway for operations between 0100 and 0600 local time is departing Runway 10 and landing Runway 28.

   ii. Evaluate the effect of dispersing flight tracks over a wider range or developing multiple parallel RNAV procedures. (AJT, AJV-WOSG)

   **Completion Date:** TBD

b. **Interactions and agreements:** Facility agreements between Northern California TRACON (NCT), Oakland Air Route Traffic Control Center (ARTCC) (ZOA), and Los Angeles ARTCC (ZLA) might be amended to reduce the need for off-course vectors and speed adjustments to potentially reduce noise concerns in certain locations.

   i. Review facility agreements for possible changes to aircraft set up and sequencing. (AJT, AJV-WOSG)

   ii. Review facility agreements to ensure they are effective and efficient with regard to routing and speeds. (AJT, AJV-WOSG)

   **Completion Date:** TBD

c. **Time Based Flow Management (TBFM):** The use of TBFM to enhance sequencing may reduce the need for off course vectors and speed adjustments and may reduce noise concerns in certain locations.

   i. Review the current and projected status of using TBFM procedures. (AJT, AJV, AJR)

   ii. Review the impact of using TBFM on current noise issues. (AJT, AJV, AJR)

   **Completion Date:** TBD

d. **Nighttime Offloads/Routes:** Communities want a focus on reducing noise concerns at night.
i. Review nighttime operations. (AJT)

ii. Review cargo flight operations to determine if previous actions have adequately addressed all issues. (AJT)

iii. Review utilizing the current Big Sur for late night cargo arrivals. (AJT, AJV-WOSG)

iv. Review the current nighttime operations to determine if they adequately address preferential Runway usage. (AJT, AJV-WOSG)

NOTE: According to the SFO Standard Operating Procedure, the preferred Runway for operations between 0100 and 0600 local time is departing Runway 10 and landing Runway 28.

Completion Date: TBD

4. Operators:

Planned Actions: AJV will engage Airlines for America (A4A) and The International Air Transport Association (IATA) nationally to solicit perspective and input into defined issues. Operator involvement needs to be discussed, especially if the FAA does not utilize the roundtable concept to work issues with stakeholders. It is assumed that the Office of the Associate Administrator for Airports (ARP) would want some level of input or engagement as SFO should also be involved directly in these conversations.

a. Use of speed brakes: Operators can focus on reducing the use of speed brakes. Pilots have the sole responsibility to determine when speed brakes should be used. (A4A, IATA)

Completion Date: TBD

b. Runway choices: Operators may request more “fly friendly” Runways, especially at night, to reduce noise concerns in certain locations. (A4A, IATA, SFO)

Completion Date: TBD

c. IFP choices: Operators can file “fly friendly” procedures, especially at night, to reduce noise concerns in certain locations. (A4A, IATA, SFO)

Completion Date: TBD
d. **Nighttime Offloads/ Routes:** Communities want a focus on reducing noise concerns at night. (A4A, IATA, SFO)

   **Completion Date: TBD**

e. **Early Turns:** Operators can assist ATC in ensuring as much as possible of a flight is over water versus over land by not requesting early turns on course. (A4A, IATA)

   **Completion Date: TBD**

f. **International air carrier execution of Optimized Profile Descents (OPDs):** AJV will reach out to IATA to discuss and get input and perspective on this issue. (IATA)

   **Completion Date: TBD**

5. **Community Engagement**

   a. **Community Forums:** Addressing noise concerns in a densely populated and operationally complex area like Northern California is best done in a forum (such as existing and/or new roundtables) that includes community leaders and is supported by the FAA and Bay Area Airports. (AWP, AGI)

   b. **San Carlos Airport:** Apart from the efforts described in this report, there are TBD conversations with communities around the airport that are concerned about the increase in flights and noise. (AWP)

**Phase two: Modifications and Review**

Based on the outcome of the initial analysis, feasibility and coordination, modifications may be made to the proposed procedures and/or airspace or operating procedures using the guidance found in current FAA Orders, directives and labor agreements which includes conducting the Environmental Review; Safety Risk Management (SRM); and appropriate public outreach.

**Completion Date: TBD**
Phase three: Implementation

Based on the outcome of the modifications and review phase and assuming the proposed procedure(s) meet the purpose and need, as well as all applicable environmental laws and requirements, the controller workforce and operators will be trained/briefed on any operational or procedural changes before publication and operational use.

Completion Date: TBD
Approved by the Tactical Operations Committee March 2016

Improving Awareness, Planning and Execution of Airport Construction

Report of the Tactical Operations Committee in Response to Tasking from the Federal Aviation Administration

March 2016
Improving Awareness, Planning and Execution of Airport Construction

Contents

Introduction ............................................................................................................................................ 4
Task and Approach ................................................................................................................................. 5
Executive Summary ................................................................................................................................ . 6
Key Assumptions ..................................................................................................................................... 8
Overview of Airport Construction and Key Stakeholders .......................................................................... 8
Types of Construction Projects ............................................................................................................ 8
Key Stakeholders in Construction ......................................................................................................... 9
Airport Operators .................................................................................................................................... 9
FAA ................................................................................................................................................ 11
Flight Operators ................................................................................................................................... 14
Summary of Stakeholder Overview .................................................................................................... 16
Critical Gaps and Recommendations in Airport Construction ................................................................ . 17
Awareness of Planned Construction .................................................................................................. 18
Background and Motivation .............................................................................................................. 18
Observations from Case Studies ..................................................................................................... 20
Construction Clearinghouse Concept ............................................................................................. 21
Promising Information Sources for Airport Construction ................................................................ 23
Recommendations for Awareness of Airport Construction ................................................................ 24
Consistent Planning of Complex Construction .................................................................................... 26
Background and Motivation .............................................................................................................. 26
“Ideal” Complex Construction Timeline ...................................................................................... 28
Recommendations for Complex Construction Planning ................................................................ 29
Repeatable Construction Execution ................................................................................................ 34
Airport Construction and Instrument Flight Procedures ................................................................ 34
Additional Recommendations Associated with Construction Execution .................................................. 40
Safety-Focused Recommendations for Airport Construction .................................................................. 42
Recommendations for FAA Tools, Process and Guidance in Airport Construction .............................. 46
Introduction

Airport construction is critical to maintaining, improving and modernizing aviation. Significant drivers of airport construction include 1) maintenance and modernization of aging infrastructure, including runways, taxiways, terminals and navigational aids, 2) capacity enhancement efforts to accommodate increased traffic demand, increase airport efficiency or reduce delay and 3) safety-driven construction for improvement and compliance with new standards and requirements.

While necessary, airport construction projects can have adverse operational impacts due to temporarily reducing runway capacity or creating taxiway limitations. They also have the potential to affect safety due to the temporary introduction of new risk into the system when construction is on or near the airport. Over the last five years, significant construction projects have been completed at some of the most complex, constrained, and heavily travelled airports in the NAS, including John F. Kennedy International Airport (JFK), LaGuardia Airport (LGA), Newark Liberty International Airport (EWR), San Francisco International Airport (SFO), Hartsfield–Jackson Atlanta International Airport (ATL), Dallas/Fort Worth International Airport (DFW), O’Hare International Airport (ORD) and Los Angeles International Airport (LAX).

Airport construction planning is a diverse and varied process involving many key stakeholders. Federal FAA (Federal Aviation Administration) guidance exists in the form of orders, advisory circulars, and other publications related to design, operational safety during and funding of construction. However, there is a lack of overarching guidance in regards to the planning and execution process as well as the roles of different stakeholders throughout. As a result, coordination, management, and execution of construction projects are subject to wide variation due to numerous factors such as the expertise and experience level of the various stakeholders involved, airport size and governance, and the type of construction. Further, as airport construction involves many stakeholders with diverse backgrounds and perspectives, ensuring proper and timely communication among all stakeholders is challenging. The current diffuse approach, while seemingly workable at the local level, does not support a consistent, repeatable and systemic process and may result in unnecessary or avoidable operational impacts or introduce unwanted risk.

General awareness of construction projects is also an issue, particularly at locations outside of the Core 30 airports. The lack of awareness may leave some stakeholders with too little time to plan and execute mitigations to construction impacts as well as missed opportunities to optimally sequence and implement other related projects, capital improvements, NAVAID upgrades or planned preventive maintenance.

Based on the challenges experienced accommodating recent construction projects, NAS users requested that the FAA initiate a tasking for the RTCA Tactical Operations Committee (TOC) to evaluate and improve the airport construction lifecycle. In a letter dated November 21, 2014, to Margaret Jenny, President, RTCA, FAA ATO Vice President, Mission Support Services, Elizabeth L. Ray asked the TOC to develop a set of recommendations related to airport construction coordination and implementation that will support a more consistent, transparent planning process engaging the right stakeholders at the
right time and ensuring operational impacts are minimized and safety risk is managed to the extent practicable. (See Appendix A for the full tasking letter.) The task is intended to enhance the understanding of all stakeholders as it relates to the role they play in delivering a well-planned, coordinated and safe construction project. This report serves as the TOC’s response to the FAA’s task request on Airport Construction.

Task and Approach
The FAA’s Tasking Letter to the TOC requested recommendations in the following areas, intended to capture expressed shortfalls in the airport construction lifecycle:

1. Review select past airport construction projects and associated data and identify lessons learned and recommend best practices for future projects. This would include the review of available safety and efficiency data where construction issues were noted as a factor. Please recommend a mechanism to ensure we capture and share lessons learned from future projects.

2. Identify and evaluate current strategic planning initiatives/tools used by FAA stakeholders at the Headquarter, Service Area/Region, and Service Delivery Point levels and provide recommendations on a best approach.

3. Assess the use of agency orders, advisory circulars, and internal processes currently being used to guide airport sponsors in their management of airport operations during construction and provide recommendations on a best approach.

4. Identify all stakeholders internal and external to the FAA needed and define their roles in the coordination and implementation processes.

5. Describe needed outreach strategies associated with each stakeholder and include a recommended timeline for outreach for major, long term projects.

6. Identify a set of recommendations on how safety risk should be better managed for aircraft operations impacted by airport construction projects.

In response, the TOC leadership established the Airport Construction Task Group, representative of the broader aviation community, which developed and agreed upon the following general approach to adequately address the issues identified within the tasking:

- Compile broad team of subject matter experts (SME) impacted by or have natural involvement in airport construction, including airport operators; flight operators; technical, analytical and operational units within the FAA, including the Airport Construction Advisory Council (ACAC); as well as other key constituencies such as the National Air Traffic Controllers Association (NATCA) and the Airline Pilots Association (ALPA). The full set of participants are included in Appendix B.
- Conduct SME interviews to gather perspectives of stakeholders on gaps in the construction process.
- Study variety of case studies (recent projects) to further understand gaps in construction process.
- Develop and document recommendations and solutions based on gaps and insights gained.
Executive Summary

Airport construction is critical to maintaining, improving and modernizing the National Airspace System (NAS). Airport construction involves numerous stakeholders in the NAS, making the process very complex. Participants in construction planning and execution come from multiple offices within airport operators, the FAA and flight operators. The aviation industry has experienced a number of challenges with airport construction and the RTCA Tactical Operations Committee was tasked to provide a series of recommendations to improve the process of airport construction.

Three major challenges were identified for airport construction. These challenges, or gaps, include maintaining awareness of all planned construction at airports outside of the Core 30, consistent planning of complex construction projects and consistent execution of construction. Each of these gaps is discussed in detail in this report, including relevant case studies and recommendations.

For the gap Awareness of planned construction at airports outside of the Core 30, case studies are presented in which flight operators became aware of planned construction only days to weeks ahead of the start of construction. Such scenarios may have significant operational impact on operators, including rebasing aircraft or restricting the number of seats sold on revenue flights. In each case study, there were organizations at the airport operator, within the FAA, or even at some flight operators that were aware of the planned construction many months to years in advance. However, information on the project did not disseminate broadly out to the aviation community. This report recommends establishing a Construction Clearinghouse, or database, which will ingest planned construction information from multiple sources and make this information available to the aviation industry. The Clearinghouse would require multiple input sources to avoid single points of failure as well as sound quality control of the underlying data.

For the gap Consistent Planning of Complex Construction, case studies presented in the report highlight the inconsistent experience of planning complex construction throughout the NAS. Some are well coordinated between stakeholder while others lacked in certain areas. Complex construction projects are those at some of the largest airports in the NAS as well as some at smaller airports that are particularly difficult, such as projects in which taxiways are temporarily converted to runways while a runway is closed for reconstruction. Existing templates and checklists for airport construction should be enhanced and integrated to guide a consistent process for such complex projects, and such templates should be continuously improved upon based on experience from previous projects.

Additionally, processes are required to identify which project are particularly complex, and these projects should be regularly brief these to industry, starting as early as 24 months prior to construction. Ultimately a core leadership team made up of key stakeholders including the airport operator, FAA Air Traffic Manager, FAA Technical operations and flight operators, is necessary to drive coordination between stakeholders. The FAA also needs an entity that centrally owns, manages and improves templates and guides teams leading complex projects on best practices.

For the gap Repeatable Construction Execution, multiple challenges associated with Instrument Flight Procedures in context of airport construction are discussed. In order to develop or amend procedures for use during or after construction, accurate and timely data, including the airport survey and obstacle
information, is required. However, aligning required data with the development process is a consistent challenge in the NAS, and procedures which are otherwise ready are often unavailable (via NOTAM) until data alignment is achieved. For temporary obstructions, such as cranes, processes that drive publication of NOTAMs about the impact of obstructions on IFPs are different for on-airport and off-airport obstructions. These processes require alignment. Utilizing technology or process to enhance knowledge of the status of obstructions and their impacts on IFPs may help minimize the operational impact of construction on flight procedures. The Crane Tracker is one particular tool that has offered valuable information on obstruction status and impact, and it should be funded going forward. Finally, there are numerous challenges associated with off-airport construction that are highly complex and go beyond the scope of this effort. A new Working Group is recommended to advise on managing the impacts of off-airport construction.

During Construction Execution, provision of timely and robust information on construction status to operators is critical. Status information includes both the NOTAMs that include obstacle location and impacts as well as ongoing construction progress and schedule. There are multiple opportunities to enhance such information, including publishing additional information in NOTAMs about detail that already exists on obstacle location, providing draft NOTAM information earlier, standardizing construction schedule status information and making information updates real-time.

In addition to the gaps reviewed above, recommendations related to safety during airport construction are presented. System safety during construction would improve by providing visual notification to both pilots and controllers of what changes to expect during construction. This may be achieved through simulation for controllers and as well as visualization of impacts to pilots via publications or EFBs. Additionally, there are challenges, noted above, around aligning airport and obstacle data with publications and procedures. Any inconsistency can create confusion for flight operators, and recommendations are provided to reduce the chance for such inconsistency either through increased frequency of publication or provision of clearer, more detailed NOTAMs that advise on what resources are unavailable. Finally, the process of establishing and executing Safety Risk Management Panels may be improved, including ensuring appropriate participation and improving accessibility to the panels for participants.

To improve construction in the NAS, the FAA needs to identify a single entity for NAS-level coordination of construction. Responsibilities at the NAS level include development and management of a clearinghouse, determining which projects are complex, development and maintenance of a construction management template and providing guidance to projects throughout the NAS. The Airport Construction Advisory Council (ACAC) has made progress on many of these issues since its formation, and the ACAC should be evaluated as a model for and potential owner of these NAS-level responsibilities.

Additionally, successful airport construction projects for all stakeholders requires a consistent leadership team for airport projects at a local level. A committed leadership team comprised of key stakeholders such as, but not limited to, the airport owner, the Air Traffic Manager, FAA Technical Operations and flight operators, is necessary to ensure coordination throughout a project’s lifecycle.
Key Assumptions
- The Task Group focused on planned construction and not emergency repairs. Emergency repairs are unpredictable and thus out of scope of this effort.
- The Task Group focused on construction projects that affect airfield operations. Such work includes airfield projects (e.g., runway, taxiway, and apron construction, navigational aid or airfield lighting system projects) as well as some terminal construction projects that can affect the availability of aircraft parking positions or taxiing operations to reach these positions. It is noted, however, that the majority of projects impacting airfield operations are airside. Additionally, the group discussed off-airport construction, which may introduce obstacles that affect airport operations of flight procedures. Ultimately off-airport construction was deemed to be beyond the scope of this report (additional detail is provided later in this document).
- Although most on-airport construction projects are sponsored by the airport, they may also be sponsored by others, notably flight operators, the FAA, and third party facility operators (e.g., private cargo terminal developers, airline consortia, fixed base operators).

Overview of Airport Construction and Key Stakeholders
Numerous stakeholders are involved in the construction process. Careful planning, scheduling, and coordination of construction activities among stakeholders can minimize disruption of normal aircraft operations and avoid situations that compromise the airport’s operational safety. Stakeholders need to understand how construction activities, scheduled interruptions to NAVAIDs, and aircraft operations affect one another to be able to develop an effective plan to complete the project.

Types of Construction Projects
Airport operators, the FAA, and occasionally airport tenants undertake a variety of construction projects that affect aircraft operations. Construction and infrastructure rehabilitation projects in airport movement areas—which include new runway and taxiway construction and rehabilitation; airfield lighting and signage installation and upgrade; provision or enhancement of runway safety areas; and on-airport obstruction removal among other projects—are typically undertaken directly by the airport operator and their contractors. The FAA also undertakes construction projects in or adjacent to movement areas involving federally-owned and operated navigational aids, approach lighting systems, and other equipment. All of these projects can affect aircraft operations, safety, and airport capacity due to the closure or alteration of runways, taxiways, airfield lighting systems, or navigational aids while construction or rehabilitation activities are underway.

In non-movement areas, the airport or airport tenants—including airlines, fixed base operators, and third party developers—undertake a range of projects including aircraft parking apron construction and rehabilitation, taxi lane construction and rehabilitation, fueling system projects, lighting and utility

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1 The FAA defines “movement area” as “The runways, taxiways, and other areas of an airport/heliport which are utilized for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports with a tower, specific approval for entry onto the movement area must be obtained from ATC. By contrast “non-movement areas” are taxiways and aprons areas not under the control of air traffic.
projects, and terminal and support building construction and rehabilitation. All of these projects can result in changes to aircraft taxiing patterns, taxi lane as well as capacity constraints, particularly if apron/aircraft parking position projects limit airport gate capacity.

A final group of projects of interest to the Task Group are those that take place on airport property outside of the airfield environment but involve temporary obstructions such as cranes. These projects include the construction and expansion of airport terminals, parking garages, rental car facilities, roadways or transit ways, and air traffic control towers among others. As noted above, construction off airport involving temporary obstructions is outside of the scope of the Task Force’s work.

Key Stakeholders in Construction

At a macro level, there are three primary stakeholders in construction: the airport operator, the FAA and the flight operators.²

Airport Operators

In the United States, almost all commercial service airports and many general aviation airports are owned and operated by local or state governments, independently incorporated public authorities, or multipurpose port authorities. These public entities are the most typical sponsors of construction on airports. The following diagram presents a notional overview of the key steps and timing involved in an airport operators’ process for planning construction:

*Figure 1 Airport Operator Timeline for Construction³*

<table>
<thead>
<tr>
<th>5 to 20 years in advance</th>
<th>3-5 years in advance</th>
<th>2-3 years in advance</th>
<th>1-3 years in advance</th>
<th>3-12 months in advance</th>
<th>3-6 months in advance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport Master Planning</td>
<td>Project Planning leading to decision to proceed with design</td>
<td>Environmental review</td>
<td>Design process</td>
<td>Finalize design, submit and receive approval for Constr. Safety Phasing Plan</td>
<td>Complete project bidding process</td>
</tr>
</tbody>
</table>

Airport operators typically develop master plans that address long term airport needs and have lead-times that range from 20 years to 5 years. These master plans are used as the basis for the development of airport capital improvement plans (CIPs) that identify specific construction projects planned in the near to mid-term future—typically over the next 5 years. CIPs typically include a brief description of the projects to be undertaken, the planned timeline for their construction/implementation, and anticipated project costs.

² There are a number of other stakeholders that may also need to be involved depending on the project including project contractors/designers and third-party developers. For brevity, these stakeholders and their responsibilities are not described in detail in this section.

³ This is a generalized timeline that will vary depending on the complexity and magnitude of the project under consideration. It does not apply to unplanned of emergency construction projects, such as those that are undertaken in response to unanticipated infrastructure degradation or failure.
Project planning typically occurs about 3 to 5 years ahead of construction. This effort involves a high level assessment of the intended project, considering the anticipated costs as well as the benefits. Planning concludes with a decision to proceed with project design. Before construction design is initiated for a project, environmental reviews are typically required, and the environmental decision may impact scope or planned phasing of the project. Design of larger construction projects begins approximately 18 to 24 months prior to construction.\(^4\) This is the critical point in time that coordination with stakeholders should begin. Advisory Circular (AC) 150/5370-12, Quality Management for Federally Funded Airport Construction Projects, provides comprehensive guidance on safely managing construction projects from design through completion. Design is typically finalized between 3 and 6 months before construction begins.

A key component of project design includes development of a Construction Safety Phasing Plan (CSPP) which is a comprehensive safety management strategy that identifies and mitigates increased risk during construction activities on an active airfield. A CSPP, as described in AC 150/5370-2, Operational Safety on Airports During Construction, is required for federally funded projects, including those funded with Passenger Facility Charges (PFCs), and assists airport operators in complying with the provisions of Federal Aviation Regulation (FAR) Part 139, Certification of Airports. The CSPP is a tool used by the airport operator to identify, mitigate and manage the risks associated with a project to ensure a safe operational environment. A subset of the sections of the CSPP include the following:

- Phasing for the project
- Areas and Operations Affected by Construction Activity
- Navigation Aid (NAVAID) Protection
- Contractor Access
- Wildlife Management
- Foreign Object Debris (FOD) Management
- Hazardous Materials (HAZMAT) Management
- Runway and Taxiway Visual Aids
- Marking and Signs for Access Routes
- Hazard Marking, Lighting and Signing
- Protection of Runway and Taxiway Safety Areas

There is variability in the design process across different airport operators. Some have engineering and project management staff in house, while others outsource all design and related work. Airports may also have variations in staff experience with complex airfield projects and available resources. Finally, the flow of information about the project design may vary as well. Some information is proprietary in nature and may not be released until the project is more mature; this may be due to politics with the local community, funding or environmental issues.

\(^4\) While approximate timelines are included in this report, in reality, every construction project is different and the timeline is an approximation. Additionally, these timelines are relevant for planned construction and not emergency or “pop-up” projects.
Once design is completed, airport operators schedule Pre-Bid meetings and make bid packages available to interested contractors. This typically occurs a few months ahead of construction. Variations in airport governance and/or regulatory structures may impact the bid and decision making process. Once the bid is awarded, a Pre-Construction meeting is held with stakeholders prior to the start of construction.

A key challenge for airport operators is the uncertainty and timing of funding for construction. Airports typically combine multiple funding streams together for construction projects, including FAA Airport Improvement Program (AIP) funding, local share, state share, etc. Any of the funding sources may or may not be available when the airport has finished design. The airport may have a project that is fully designed and available to be advertised for bid but lacks the funding necessary to award it, and result in the project to be placed on hold.

Another challenge for airport operators is the significant number of organizations and individuals involved in the planning process. Planning a construction project often involves the airport, consultants for design, project management, contractors, flight operators and multiple offices within the FAA. Airport leadership throughout the process is critical for a smooth and timely completion. Additionally, with the number of people involved across all stakeholders, projects may suffer from regular turnover in critical positions and new people coming into the construction process throughout the life cycle of the project. Keeping all stakeholders aware of the project plan and status is a significant challenge.

A third challenge is the fact that unexpected or new information about construction may emerge throughout the project. For example, new information about construction site conditions may be uncovered during the design or even construction phase and drive changes to the construction phasing. This risk reinforces the need for ongoing coordination amongst stakeholders.

**FAA**

The FAA has a number of different organizations that are involved with the planning and execution of airport construction.

**FAA Office of Airports (ARP)** develops advisory circulars (ACs) for airport sponsors to provide guidance and safety standards for managing airport construction projects and to ensure the safety of airport construction activities. AC 150/5370-2, Operational Safety on Airport during Construction, and AC 150/5370-12, Quality Management for Federally Funded Airport Construction Projects, provide comprehensive guidance on safely managing construction projects from design through completion. Scheduling a Pre-Design meeting with the affected stakeholders, as described in AC 150/5370-12, and early development and coordination of a Construction Safety Phasing Plan (CSP), as described in AC 150/5370-2, ensure a safe, cost effective and operationally viable construction plan that minimizes the impacts on airfield operations. Some of the critical elements to be identified for an incident free construction project are the ability of the airport construction manager to properly coordinate, phase, identify affected movement areas, protect for navigation aids, and how to access construction area with minimum disruption to airport operations. ARP also provides guidance on wildlife management and preventing foreign object damage. Notification, inspection, maintenance of safety areas, marking,
lighting and protection to runways and taxiways during construction are all critical elements addressed in the CSPP to ensure the sponsor is prepared to address them properly.

The **Airport District Office (ADO)** staff collaborates with the sponsor’s staff in both Pre-Design and Design/Phasing of construction. ADOs conduct early review and coordination of the CSPP among several internal and external stakeholders. It is advantageous for the airport operator to engage early with local FAA Air Traffic and Technical Operations staff to assess the magnitude of preparedness required to maintain smooth support by the FAA during construction. ADO staff carefully reviews CSPPs with Air Traffic subject matter experts to determine whether any phase of the construction may require a change from the normal day-to-day activity. The ADO monitors the sponsor’s construction progress.

The **Air Traffic Organization (ATO)** has a vested interest and responsibility to assess the impact of all proposed NAS facility/service interruptions, and to provide system impact reports (SIRs), as required, with respect to NAVAID outages, runway or taxiway closures, or other losses of air traffic services. Multiple groups within the ATO are impacted by construction, including those that manage equipment, information and flight procedures as well as daily operations.

The **ATO Technical Operations Services** installs, maintains, modernizes, and operates NAS systems and services used for Air Traffic Control. Technical Operations utilizes a Strategic Event Coordination (SEC) application to manage scheduled interruptions of ATO NAS equipment over 24 hours in duration as a result of airport-sponsored or Technical Operations initiated projects. The SEC application is utilized for final tactical coordination by multiple FAA organizations for performing risk assessments, identifying affected instrument flight procedures, issuing Notices to Airmen (NOTAM), coordinating flight inspections, and developing system impact reports within 30 days of the project start date.

**Aeronautical Information Services (AIS)** collects, validates, stores and maintains aeronautical data for the U.S and its territories. AIS develops and maintains all public Instrument Flight Procedures and airways. AIS serves as the FAA’s aeronautical charting authority for the development, publication, and dissemination of aeronautical charts and products to support aviation and to meet demand for increased capacity, efficiency, and predictability in the airspace, routes, and airports of the NAS. Airport construction changes have a high potential to affect aeronautical data and procedures. Timely notification and planning are needed to allow for amended and new procedures to be delivered on time.

The **Airport Construction Advisory Council (ACAC)** is dedicated to ensuring the safety of all stakeholders operating in the NAS during all runway and taxiway construction projects. The ACAC is tasked with developing strategies and risk mitigations for Air Traffic Managers (ATMs) to employ. These strategies enhance surface safety and ensure that communication is complete and consistent. The ACAC serves as a conduit for sharing good operating practices among managers throughout the NAS. The ACAC is responsible for transforming appropriate strategies and best practices into future Air Traffic Organization policy to perpetuate operational safety during all construction projects. The ACAC supports collaboration between the FAA and Airport Operators, and all other stakeholders. The ACAC and System Operations Services (AJR) work in parallel with each other to support airport construction and efficiency, sharing information, tools and initiatives. Core members include individuals from Runway Safety, Air
Traffic Managers from each of the Service Areas and Alaska, Flight Standards, System Operations and FAA Airports.

**System Operations Services (AJR)** is the focal point for stakeholder interaction through periodic national and regional customer engagement opportunities and serves as the FAA’s Customer Advocate. AJR facilitates strategic planning for upcoming construction projects. System Operations, Performance Analysis, and Surface Efficiency work together with both FAA and other stakeholders on these projects. There are six Deputy Directors of System Operations (DDSOs) located in each of the three service centers that work closely with their associated ATC facilities. AJR performs fast-time simulation modeling and analysis to quantify the impacts of construction on multiple key operational metrics (throughput, taxi out and taxi in times). Results serve to assess the benefits of alternative project phasing and other proposed procedural mitigations developed to mitigate the impact and improve efficiency and decrease surface congestion. The results can be used to inform all stakeholders of expected arrival and departure rates under varying wind and weather conditions and to provide the basis for schedule negotiations with air carriers (if needed). The results of the modeling and analysis are communicated at airport or FAA sponsored customer focus meetings, and are used to develop SIRs.

The **Flight Procedures Team (FPT)** evaluates and plans any required flight procedure changes dictated by NAVAID outages or runway layout changes (temporary or permanent). They also initiate development of new or alternate procedures when requested by Air Traffic or others, or when dictated by changes associated with the construction project. The Flight Procedures team coordinates with Aeronautical Information Services to issue Procedural NOTAMs if required and provides an estimated procedure completion date which may include flight inspection.

The **Operations Support Group (OSG)** is responsible for coordinating with the appropriate Traffic Management Officer(s) (TMOs) for the affected ATC facilities to provide an organizational response. When requested by ATC facilities, the OSG coordinates with Flight Procedures Team for alternate procedures. The OSG requests System Impact Report (SIR) information and indicates concurrence from Terminal, En Route, and System Operations for each strategic event, as required, and submits the SIR information to the Air Traffic Control System Command Center (ATCSCC) for national coordination and dissemination to the customers. These SIRs include input from the TMOs and Terminal and En Route specialists at the facilities indicating the impact the interruption will have on the NAS and ensure local coordination with customers. For runway type construction projects, Technical Operations support is critical for timely installation, flight inspection and commissioning of navigational equipment.

Service Center **NAS Planning Integration (NPI) Teams** within the Planning and Requirements (P&R) Groups provide project and construction briefings to other Air Traffic Organization units on any airport project/activities that impact NAS facilities. Additionally, they provide information on services or results in an airport runway closure (full or partial) and/or significant taxiway closures. NPI teams get involved early in the construction process to understand impacts such as shutdown of equipment, pavement closures and associated integration opportunities. These teams pursue ongoing relationships with airport operators and ADOs, acting as a liaison to FAA’s efforts to improve NAS equipment and maintain service availability. When airport construction has an impact to FAA facilities (localizers, approach
lighting systems, etc.), NPI develops reimbursable agreements. These agreements document and fund any needed FAA facility work and ensure the facility is protected, modified or relocated as necessary during construction.

**Flight Operators**

Airport construction impacts all types of flight operators throughout the NAS. Major projects that have been coordinated and discussed with operators early in the design process have proven to be successful, and least intrusive to airport operations and the traveling public. The operator needs to know when construction will be occurring, what facilities will be affected, what the expected capacity and other operational impacts will be, and what safety measures will be put in place while construction is in progress. Examples of specific flight operator concerns include:

- **Efficiency:** Will flight times be affected? Will Traffic Management Initiatives (TMIs) be necessary to manage demand? Will runways or taxiways be affected? Will taxi in/out times be significantly impacted?
- **Safety:** Which NAVAIDs will be lost? Is runway length reduced? Are there new obstructions to be considered when computing takeoff or landing performance?
- **Capacity:** Will a schedule reduction (or slot allocations where applicable) be necessary due to a loss of NAVAIDs, reduced runway availability, or reduced runway length? Can a different aircraft type be used to accommodate the changes that are needed? Do those aircraft resources exist in the operator’s fleet? Is there adequate lead-time to make these changes? Are crew resources available and flexible enough to make these changes? (Note, fleet changes that will be in effect for a month or more require a significantly longer planning horizon.)
- **Rebasing Aircraft:** Will the construction impact access or facilities at an airport where general or business aviation aircraft are based thereby limiting operations? (Note, most general and business aviation aircraft rely on specific airports to base aircraft).

Commercial flight operators have Corporate Real Estate (CRE) departments that generally become aware of construction first at an airport. Typically, operator CRE representatives are intimately involved in planning and financial activities at FAR Part 139 airports. As a consequence, they usually have the earliest visibility into future airfield construction. Local operator station management also regularly interacts with the airport and may get early advice of upcoming construction, particularly if it will directly impact the operator’s leasehold. At large hubs, flight operators tend to obtain the best information about construction work. For projects where communication and the working relationships are strong, engagement with the flight operators occurs early. Ideally, and as recommended in AC 150/5370-12, the operators will have an opportunity to provide input to the airport operator early in the design process and well before bid documents for a project are completed. Development of the CSPP also presents another opportunity during the design process where flight operator input should be obtained. This engagement tends to occur more frequently at the Core 30 airports.

Flight operators have many groups within Network Planning that evaluate the impacts of construction and other operational factors on published schedules. This evaluation can occur as early as one year or more before departure. While the operator would like notification of potentially negative effects as
soon as possible, a final understanding of any major external impacts on future schedules is required approximately 18 to 24 months beforehand at a large hub and six months before the start of construction at second tier stations and smaller. Generally speaking, the flight operator can still make final corrections to schedules, such as schedule reductions, fleet type changes, or block time adjustments, three to six months before the activity. Anything closer in than 100 days becomes more challenging for the operator to adjust as seats for sale, aircraft routing and maintenance requirements and flight crew pairings are being finalized. The diagram below depicts the sequence of events for schedule development at one major commercial airline.

Figure 2 Commercial Airline Schedule Development Timeline

<table>
<thead>
<tr>
<th>&gt;12 Months</th>
<th>12-6 Months</th>
<th>5-4 Months</th>
<th>3-2 Months</th>
<th>45 Days</th>
<th>45-0 Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy Vision</td>
<td>Market Analysis</td>
<td>Create Schedule Plan</td>
<td>Make sure schedule works</td>
<td>Finalize Schedule</td>
<td>Minor Adjustments (if necessary)</td>
</tr>
<tr>
<td>* Fleet / Hub Strategies</td>
<td>* Market Entries</td>
<td>* Develop Lines of Flying</td>
<td>* Incorporate Holiday and Special Event Changes</td>
<td>Mainline / Regional Schedules Complete</td>
<td>* Last Minute Schedule Adjustments</td>
</tr>
<tr>
<td>* Mergers / Acquisitions Planning</td>
<td>* Market Exits</td>
<td>* Implement Day of Week Flying</td>
<td>* Coordinate Schedule with Ops Teams</td>
<td>* Critical Ops Changes</td>
<td></td>
</tr>
<tr>
<td>* Competitive Impacts</td>
<td>* Frequency Planning</td>
<td>* Coordinate Schedule with Ops Teams</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Airports</td>
<td>* Maintenance</td>
<td></td>
<td></td>
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<td></td>
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</tbody>
</table>

* Schedules are sold 330 days out from start date

During engineering design, other departments within the flight operator will also evaluate the effects of a construction project and its impacts on the airport and flight operations. Performance engineering evaluates the impact of construction on payload and range with a focus on whether runway closures or reductions to available runway length limit the seats that can be sold or the ability to operate non-stop to the planned destinations under all wind and weather conditions. They also evaluate whether there are better aircraft available to serve the market while construction is in progress. In some cases, airport operators have made specific requests to airline Performance Engineering groups to assess the impacts of project alternatives to minimize the adverse effects on the operators and traveling public. This occurred frequently during the design of projects required to comply with the runway safety area mandate.

Pilot groups also evaluate the impacts of expected construction and develop training and educational materials for pilots who will ultimately operate on the airport in close proximity to active construction areas. This will frequently include publication of special airport diagrams identifying construction areas and any special procedures developed to enhance safety during the project. Finally, with the advent of Safety Management Systems within the operator community, multiple elements of a construction project may be subject to formal safety review to ensure any known risks are mitigated to acceptable levels from the operator’s perspective.
During the construction event, many of the same parties remain involved, including flight operations, flight dispatch, passenger services and station/hub management. These parties manage daily flight operations in the face of the construction and work to mitigate on-going operational impacts.

**Summary of Stakeholder Overview**
The table below depicts different organizations within each of these stakeholders that play a role in airport construction:

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Organizations that Participate in Airport Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport Operators</td>
<td>• Airport owner/municipality&lt;br&gt;• Finance&lt;br&gt;• Engineering and Designers&lt;br&gt;• Consultants&lt;br&gt;• Contractor&lt;br&gt;• Airport operations</td>
</tr>
<tr>
<td>Federal Aviation Administration</td>
<td>• Airports Organization &amp; Airport District Offices&lt;br&gt;• Air Traffic Organization&lt;br&gt;</td>
</tr>
<tr>
<td></td>
<td>• Aeronautical Information Services&lt;br&gt;   • System Operations Services&lt;br&gt;   • Performance Analysis&lt;br&gt;   • Slot Administration&lt;br&gt;   • Local/Adjacent ATC&lt;br&gt;   • Airport Construction Advisory Council&lt;br&gt;   • Tech Ops / Engineering Services&lt;br&gt;   • Service Center&lt;br&gt;   • Flight Procedures Teams&lt;br&gt;   • Operations Support Groups&lt;br&gt;   • NAS Planning and Integration Teams</td>
</tr>
<tr>
<td>Flight Operators</td>
<td>• Corporate real estate&lt;br&gt;• Station management&lt;br&gt;• Air Traffic group&lt;br&gt;• Performance engineering&lt;br&gt;• Network planning&lt;br&gt;• Crew scheduling&lt;br&gt;• Flight crews&lt;br&gt;• Flight dispatch&lt;br&gt;• Operations control</td>
</tr>
</tbody>
</table>

The following graphic depicts a generic construction process and where and when different stakeholders generally participate in the construction process.
Recommendation 1. Develop training materials and/or videos that provide education around the different stakeholder perspectives and processes involved in airport construction.

Airport construction involves numerous stakeholders interacting over an extended timeline. Few of these stakeholders hold deep knowledge of the issues that motivate the actions and priorities of the other stakeholders. Additionally, with potentially long timelines for construction efforts, it is likely some stakeholders will have changes in the individual personnel involved in airport construction. All individuals participating in airport construction would benefit from available or additional enhanced training materials that provide insights on the different participants, their perspectives and the processes involved with airport construction planning and execution.

Critical Gaps and Recommendations in Airport Construction

After examination of a series of case studies related to airport construction, three major gaps were identified for airport construction. The three areas are:

1. Awareness of Planned Construction
2. Consistent Planning of Complex Construction Projects
3. Consistent Construction Execution
These are summarized in the following figure and described in further detail in the sections below (along with the relevant case studies):

*Figure 4 Summary of Key Gaps in Airport Construction*

<table>
<thead>
<tr>
<th>Key Gap</th>
<th>Awareness of Planned Construction</th>
<th>Consistent Planning of Complex Construction Projects</th>
<th>Consistent Execution of Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issues</td>
<td>Information about planned construction at smaller airports can “slip through the cracks”</td>
<td>Planning for complex construction, generally at the largest airports, does not follow a standard template and the process may be ‘reinvented’ each time</td>
<td>Maximum available capacity at airport during construction is not always available; also completion of construction not always synchronized with efforts to ensure resources are available to operators at the conclusion of construction</td>
</tr>
<tr>
<td>Applicability</td>
<td>Primarily airports outside of the FAA’s Core 30 Airports⁵</td>
<td>Applicable to construction at most Core 30 airports in NAS as well as highly complex projects outside of the Core 30 airports</td>
<td>Applicable to all construction projects</td>
</tr>
<tr>
<td>Need</td>
<td>Need reliable, centralized information flow on construction effort and status at least 6 months ahead of construction</td>
<td>Need consistent, repeatable engagement process across all stakeholders planning a complex project</td>
<td>Need consistent, repeatable engagement process across all stakeholders during execution</td>
</tr>
</tbody>
</table>

**Awareness of Planned Construction**

**Background and Motivation**
Three case studies are presented to demonstrate the challenges associated with maintaining stakeholder awareness of construction projects at airports other the Core 30 large hub commercial service airports. These “second tier” facilities include the 484 commercial service airports classified as medium hubs, small hubs, non-hubs, or non-primary commercial service airports, as well as general aviation airports with substantive business aviation use in the National Plan of Integrated Airport Systems (NPIAS). Outside of the Core 30 large hub airports, there is less frequent or consistent interaction between the airport sponsor and airlines/general aviation operators, so lack of awareness of upcoming construction projects has been a recurring issue, as demonstrated in the following case studies.

⁵ Definitions of airport groupings are included in Appendix C.
Case Study: Daytime Construction on Longest Runway at Small Hub Airport

A commercial service airport, classified as a “Small Hub” in the FAA’s NPIAS, initiated construction on its longest runway in the third quarter of 2015. The construction was done in response to a finding from an FAA Letter of Correction in April 2014 that the Runway Safety Area had a drainage problem. The Airport Operator originally added the project to its Capital Improvement Plan in April 2014 and submitted a Construction Safety and Phasing Plan in September 2014. However, grant funding did not become available until late 2014 to the airport, so the project was put on hold. In June 2015, the CSPP was approved and in mid-August 2015, flight operators learned that construction was to begin in early September.

The construction was during the daytime on the longest runway at the airport, so flight operators had to restrict payload on their aircraft operating into this airport to accommodate operations on the secondary runway. One flight operator using 50-seat regional jets had to block 16 seats from sale during construction. Blocking seats reduces revenue opportunity for commercial operators, and the revenue impact is exacerbated by the fact that passenger fares purchased closer to the day of travel tend to be the highest fares. Additionally, some operators had to inconvenience customers who had already purchased tickets on the flights for which seat caps became applicable. This resulted in a service delivery failure and the need for re-accommodation and compensation.

With only two to three weeks of notice on the construction, flight operators were unable to make meaningful changes to their flight schedules to respond to the construction event. One operator indicated that with only a few more weeks’ notice, they would have scheduled a different aircraft type into this airport. The alternative fleet type has improved performance characteristics and could have operated into this airport without seat restrictions, even on the secondary runway.

A timeline of events associated with construction at this airport are presented in the graphic below. Note that prior to August/September 2015, certain parties were aware of the construction event but that information about the construction did not permeate out to the broader stakeholder community.

Figure 5 Timeline of Case Study of Awareness of Runway Construction at Small Hub Airport
**Case Study: Runway Reconstruction at Primary Runway at National GA Airport**

A “National GA” Airport, as classified in the FAA NPIAS, initiated construction on its longest runway in the third quarter of 2015. In this case study, business aviation operators were primarily impacted. This operational community became aware in mid-July 2015 that construction was planned to begin on July 27, 2015. Business aviation operators with aircraft based at this airport were forced to temporarily re-base aircraft during this construction and had only a 10 day notice to identify alternative locations.

The full timeline of events associated with this construction is depicted below. Note in this case that there were multiple stakeholders who were aware of this intended construction years in advance, but the information did not flow through to the impacted operators until approximately 10 days prior to the start of construction.

**Figure 6 Timeline of Case Study of Awareness of Runway Construction at National GA Airport**

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**Case Study: Temporary Taxiway Conversion at Small Hub Commercial Service**

Finally, a Small Hub Commercial service airport began runway construction in November 2015. This construction involved temporary conversion of a taxiway into a runway. Different air carriers became aware of the details of this construction at different times. One large carrier was aware of the construction in July 2015 and had begun internal coordination from that time, including dedicating special aircraft to this airport in its schedules. Other large carriers became aware of this construction only one week before construction began. This case study highlights the fact that with no central data source on construction, different industry stakeholders can have very different levels of awareness on the same project.

**Observations from Case Studies**

These case studies demonstrate that even when many individual stakeholders are aware and involved with planning airport construction, information does not always flow out to the broad operator community that needs to plan schedules and mitigations during construction. Mitigations may include rebasing aircraft, changing fleet types, schedule times, increasing flight block time, reducing schedules, or in a worst case scenario, reducing payload, that is, blocking seats or restricting cargo.
Early and frequent communication between the airport and flight operators is a critical component to enable this flow of information. When an operator has a large operational presence at an airport, regular communication channels are well established and robust and may occur through multiple operator units such as Corporate Real Estate, airline ATC managers, local station management, or chief pilots. The small airport environment, however, is a challenge as there is less daily communication between the flight operators’ central operations and the local airport station personnel. In addition, local station management may be from an affiliated regional carrier and not tied directly to the larger operator’s headquarters. For commercial operators, the station manager may learn of potential projects from the airport but not necessarily be aware of the need to pass this information back to headquarters organizations such as network planning. This is a critical path in the communication of such projects. Flight operators recognize that better training of its internal staff on best practices for reporting construction projects is a key area of improvement, however this mechanism should not be the sole means of communicating and coordinating the planning for airport construction projects.6

Today in the NAS there is no one standard for notification of flight operators about construction. This means flight operators may be unaware of planned construction, and most probably have not had an opportunity to participate in the project design. Even when aware, the operators may not know the specifics of the timing and potential impacts. The issue is most relevant for airports outside of the Core 30, which tend to have monthly or quarterly construction working groups that meet to review future projects.

**Construction Clearinghouse Concept**

There is a need in today’s NAS for standardization related to construction planning and notification. A potential solution would be a construction clearinghouse accessible to various stakeholders with information available at various levels of granularity depending on the particular need or involvement of the stakeholder. Project initialization within the clearinghouse would “send up a flare” that construction is being planned for an airport. This should alert interested parties in the aviation community to engage to learn more about what construction is being planned and what level of involvement is appropriate. The following diagram depicts the clearinghouse concept:

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6 Additionally, flight operators also recognize the opportunity to adjust future lease agreements with airports to include requirements for notification of construction. Operators are considering working with their trade associations (A4A, IATA) to institutionalize such an approach.
The following key tenets are necessary for a successful clearinghouse concept:

- Keep the required data to populate the Clearinghouse to a minimum to make it as quick and simple as possible for submission;

- Information should be submitted by the project sponsor before the start of engineering design in conjunction with the scheduling of project pre-design meeting to allow meaningful engagement during the design process by interested stakeholders;

- Ensure information on project phasing is posted to the clearinghouse at least six months ahead of construction to enable flight operators to plan mitigations; for projects that require any procedural changes, ensure information is populated at least 18 months ahead of construction. Additionally, the draft CSPP should be entered with an associated web link or point of contact;

- Allow multiple stakeholders to submit entries into a clearinghouse to avoid a single point of failure on the flow of information;

- Use the best source of information available for construction project planning and coordination; in most cases the project sponsor or representative design engineering consultants should always be the first choice as the underlying source of information;

- Identify an entity in the FAA that would accept inputs and provide oversight and quality control for the clearinghouse, validation, avoid duplicate records, delete outdated records, etc;

- Maintain valid and accurate contact lists for the airports and other entities planning construction. The intent of the data is to “send up a flare” about intended construction and provide points of contact to obtain more detailed information about projects. Project sponsors also struggle with maintaining valid contact lists for operators. A Clearinghouse would derive
additional value if interested operators had a mechanism to provide contact information to project owners as it pertains to specific projects. The challenge for all contact lists is to ensure they remain current and do not become stale.

The TOC recognizes that a Clearinghouse would not provide 100% awareness of all construction project scenarios. There are historical examples, such as stimulus funding during the Great Recession or last minute grant funding, in which “shelf” projects may be moved from standby to active status by the project sponsor in a short time frame. However, in this scenario, the clearinghouse still supports the concept of communicating the plan, duration and impact of the project during the design process so that general awareness and continuing follow up can occur and notification of start of actual construction occurs as soon as practical. The goal of the clearinghouse is to capture the majority of construction work and provide a single point of reliable information to relevant stakeholders.

Promising Information Sources for Airport Construction

As noted in the case studies above, different stakeholders have information on construction at different times. In these examples, information on construction was known to “somebody” months or years in advance of the project. After examination of the case studies, the following promising information sources were identified for construction information. The TOC anticipates a successful clearinghouse concept could be enacted if and when multiple stakeholders from the following list (or beyond this list) are submitting construction information. Note that the ACIP would be an excellent source of information but neither the FAA’s version nor the airports’ versions are expected to be made available to a clearinghouse.

Figure 8 Promising Information Sources for Construction Clearinghouse

<table>
<thead>
<tr>
<th>Information Source</th>
<th>Type of Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport Operators</td>
<td>• Provides the best source of information when the Airport Operator is the sponsor of the project</td>
</tr>
<tr>
<td></td>
<td>• Establishes Reimbursable Agreements when appropriate; ideally done 6-9 months in advance of construction</td>
</tr>
<tr>
<td>NAS Planning and Integration Teams in FAA Service Areas</td>
<td>• Gathers airport development plans, construction schedules and surface outage information to distribute within FAA</td>
</tr>
<tr>
<td></td>
<td>• Determines impacts of construction projects to FAA facilities and leads development of mitigation plans</td>
</tr>
<tr>
<td></td>
<td>• Has reliable information based on communication, network and frequent meetings with Airport Operators, State Aviation Departments and ADOs; information currently managed within NPI teams in spreadsheets</td>
</tr>
<tr>
<td></td>
<td>• Establishes Reimbursable Agreements when appropriate; ideally done 6-9 months in advance of construction</td>
</tr>
<tr>
<td>Airport District Offices</td>
<td>• Maintains close working relationship with Airport Authorities</td>
</tr>
</tbody>
</table>

7 A “shelf” project is one in which the contracting authority has done much of the preparatory work for the project and the project is placed “on the shelf” until funding is made available. As presented in one of the case studies, a project may remain on the shelf for more than a years’ time (or more) before funding is available.
• Evaluates early drafts of CSPP so have earliest indication within FAA of upcoming construction

Air Traffic Managers
• Informs the Airport Construction Advisory Council about any expected airport construction, as required by FAA Order 7210.3
• Maintains close working relationships with local airport staff so another promising source that is close to the sponsor of the project

Technical Operations/SEC Database
• Receives SEC coordination form informing Tech Ops about timing needed to shut down equipment associated with airport construction
• Current requirement is 30-45 days but many submissions occur much earlier than the required time. The SEC process is in its first few years of maturity and data from 2015 suggests that already approximately ¼ of all submissions were made ahead of the 45 day deadline.

OE/AAA Website
• Provides Construction Safety Phasing Plans as well as obstacle evaluations.

Airport Construction Advisory Council
• Receives notification from Air Traffic Managers and other industry stakeholders about construction and compiles into a living document about future construction.

FAA Corporate Workplan
• Provides NAS-level information that both informs and is informed by the Clearinghouse

Recommendations for Awareness of Airport Construction

Recommendation 2. Develop a notification process and clearinghouse for intended construction.

The clearinghouse concept, detailed above, should be implemented as a web portal requiring a minimal set of information. Most construction would be reported initially between 18-24 months before actual start of construction during engineering design, but no later than 6-12 months in advance of construction when final phasing has been established and the project is ready for bid. While operators are capable of adjusting schedules closer in than 6 months, the 6-12 month notification window allows operators to integrate construction information into their existing planning cycles. Projects that drive changes to instrument flight procedures and more complex projects require 2 years’ advance notice at the start of design to allow stakeholder engagement and the development of impact mitigation strategies.

The notification process may require project sponsors to submit the information when the CSPP is at 20-30% maturity, which is the stage sponsors already provide early CSPP submissions as stated in AC 150/5370-2. As not all construction projects require a CSPP, consideration must be given as to how to ensure all sponsors reliably submit information into a clearinghouse.

A NAS-wide clearinghouse is a significant effort. To more easily roll out a portal, the FAA may consider staged implementation. The TOC recognizes that rolling out a new database is a complex and challenging endeavor and it takes time for such systems to “ramp up”. Both the FAA and aviation stakeholder community at large should exercise patience for a clearinghouse to become successful.
Ultimately, the vision of such a clearinghouse is to be a “one stop shop” that includes all relevant information about construction – from planning through execution as well as post-construction analysis to measure success and understand lessons learned. This may eventually include construction plans, construction notice diagrams, updated calendars for complex projects, etc. However, the vision of a one stop shop should not impede progress on a portal that includes basic construction planning awareness information as a first step.

**Recommendation 3. Have multiple sources of submission into a construction information clearinghouse.**

There is high variability in the size, resources and experience among airport operators as well as flight operator personnel working at airports. Given this variability, there is risk of single points of failure in the flow of construction information. Permitting and encouraging multiple submitters into the clearinghouse will serve to mitigate this risk. As noted above, there are multiple engaged stakeholders that could enter relevant data into a clearinghouse, including the project sponsor, sponsor’s consulting engineers, local ATM, ACAC, NPI teams, ADOs, Tech Ops, etc.

**Recommendation 4. Define one organization within the FAA to establish and manage a construction clearinghouse.**

The clearinghouse will be successful only if a central entity manages the quality of the data, including removal of duplicate records, removal of stale records and entry of new data. While the FAA will make the final determination of which entity owns the clearinghouse, the TOC suggests the FAA give consideration at a minimum to ARP, supported by individual ADOs, ATCSCC, the Airport Construction Advisory Council, the Tech Ops/SEC team and the NPI teams as possible central owners of the data. These parties are suggested for consideration as today they play important roles in airport construction. Additionally, the entity managing the Clearinghouse should involve industry participants such as National Business Aviation Association (NBAA), Aircraft Owners and Pilots Association (AOPA), Airport Council International – North America (ACI-NA), American Association of Airport Executives (AAAE), National Association of State Aviation Officials (NASAO), Airlines 4 America (A4A), International Air Transport Association (IATA) and others to assist in informing and quality checking the data.

**Recommendation 5. Make construction portal information accessible to any user authorized through password protection.**

The clearinghouse may be housed under the faa.gov domain for ease of access of the information and should include training modules to understand the information. All authorized users should be able to sign up for updates and alerts, via email, for specific airports and projects.

**Recommendation 6. Develop a one page “desk reference” or check list for airport operators to understand their full suite of reporting requirements.**

A desk reference or check list is intended to provide an easily understood and straight-forward overview of all required and recommended airport reporting requirements. It could be used to emphasize
outreach and coordination responsibilities and associated points of contact. Having a simple, comprehensive guidance document that describes required reporting and outreach should assist all airports. It would be particularly helpful with identifying long lead time items like instrument flight procedures that can have lead times of 18 months or more and require close coordination with construction activities to ensure no loss of instrument capability when the project is finished.

**Recommendation 7.** Engage key airport trade organizations such as ACI-NA, AAAE and NASAO to collectively develop educational materials and help roll out any new process improvements to the airport operator and consulting community.

### Consistent Planning of Complex Construction

**Background and Motivation**

The NAS has experienced a number of highly complex construction projects at the core 30 airports over the last decade. This has included full runway rehabilitation projects at JFK and EWR, runway safety area projects at SFO and LAX, and opening new runways at ORD and Fort Lauderdale–Hollywood International Airport (FLL). There have also been complex projects at other airports with single runways where the runway was closed for reconstruction and a parallel taxiway was converted to a temporary runway. These included Palm Springs International Airport (PSP), Juneau International Airport (JNU), Asheville Regional Airport (AVL) and Quad City International Airport (MLI).

Over the last ten years, the industry has been moving in a positive direction in terms of collaboration among the different stakeholders in planning such complex projects. Although existing FAA Orders and Advisory Circulars provide guidance to airport operators to ensure the highest level of safety, there is room to grow, and there is still no template or comprehensive guidance on how to execute complex construction planning in a consistent and repeatable format. Such guidance should include definition of necessary participants and their roles in construction planning.

The following case studies present some of the challenges and successes experienced during recent complex construction projects:

**Case Study: Runway Construction at Large Hub East Coast Airport**

Planning for the runway reconstruction, which included the airport operator, several FAA lines of business and operational stakeholders was initiated almost 3 years prior to the start of construction. The project’s key challenge was the absence of a defined leader of the process across stakeholder groups. With no single point of leadership, stakeholders lacked understanding of the status of different aspects of the project. In one example, stakeholders felt that modeling of airport capacity and delay and associated arrival and departure rates started many months later than ideal. Communication to the stakeholders about the status of the project and related modeling was included as a recurring agenda item during regularly scheduled metro area delay reduction meetings rather than a focused topic driving the coordination process specific to the construction in a separate forum.
Case Study: Runway Construction at Large Hub West Coast Airport
Air Traffic and flight operator representatives were engaged late in the planning process and met with resistance when suggesting changes to phasing and other project elements. When the Airport Construction Advisory Council and System Operations Services engaged, progress ensued and playbook development was initiated with all parties participating. Other large hub airports indicated that playbooks were not developed for similar projects, highlighting the lack of standardization of process for all aspects of construction planning.

Case Study: Runway Construction at Primary Diversion Airport on East Coast
During this rehabilitation project, NAVAIDs providing vertical guidance on published Instrument Approaches were taken out of service due to multiple reconfigurations of the primary runway. The primary operators at the airport attempted to engage the project sponsor early enough in the planning process to develop temporary Area Navigation (RNAV) procedures associated with the proposed construction phasing. Unfortunately, insufficient lead time and resources were available to publish the temporary procedures. Ultimately, the project phasing was adjusted to minimize operational and safety impacts on the operators, and a temporary Precision Approach Path Indicator (PAPI) was installed to provide visual vertical guidance to the relocated landing threshold. While an acceptable mitigation was reached, earlier engagement and a more collaborative process could have addressed the identified issues in a more proactive and effective way.

Case Study: Runway Construction at Large Hub East Coast Airport
The Airport Operator included all stakeholders early in the design process. Numerous stakeholder meetings were conducted during design and before the contract was advertised for bid. FAA Air Traffic, Tech Ops and Airports were partners with the airport engineering and operations staff. The airport also briefed many other airports and construction engineering firms at airport industry association conferences.

These case studies suggest some of following challenges in effectively planning complex construction:

- Having clear leadership on a project, either in a specific individual or a team comprised of multiple stakeholders, that has clearly defined responsibility, accountability and authority (RAA) for the project;
- Sustaining focused and consistent engagement by the project sponsor with FAA and industry stakeholders;
- Establishing early involvement in the design process to allow evaluation and development of safety or efficiency related mitigations, and, if necessary, modifications to design or construction phasing; and
- Ensuring all appropriate stakeholders from the flight operators and FAA are aware of, and included in the design process.
“Ideal” Complex Construction Timeline

The TOC reviewed the planning process for several major construction projects and proposed an “Idealized” timeline for complex construction projects. The following are the key elements of an idealized timeline:

- Engage the right group of stakeholders with the appropriate lead time during engineering design reviews and initiate modeling work if airport capacity will be adversely impacted;
- Allow for operator input into the design, and provide time for operators to provide feedback and adjust operating schedules, when necessary;
- Provide time for the FAA to develop temporary instrument approach procedures or other procedural mitigations as appropriate;
- Require pro-active leadership from the airport operator to engage the appropriate organizations to support complex construction, which is paramount for enacting such an idealized timeline.

In the depiction below, the initiation of planning for complex construction needs to begin about 2 years prior to the Notice to Proceed (NTP) (for construction) with involvement from the broader stakeholder community, including the airport sponsor, air traffic control, technical operations and flight operators. During the first 12 to 18 months of planning, the focus is on developing design options and iterating and modeling those options. Modeling may be done by either the airport operator or FAA or both for analyzing surface operations, developing alternative instrument flight procedures, determining hourly arrival and departure capacity rates, and quantifying potential delay scenarios. Modeling results may impact the phasing of the construction or establish the need to make unilateral or negotiated schedule changes to minimize the impacts to the traveling public. This effort involves all stakeholders, including airport consulting engineers, flight operators, ATC and Tech Ops. Throughout this design effort, the ADO and airport operator continue to coordinate on the phasing and other elements of the draft CSPP. As the project design approaches 90-100%, flight operators, Air Traffic and System Operations Services should have the requisite parameters to plan flight schedules, adjust aircraft fleeting, and develop operational playbooks and required SIRs. Additionally, the NPI teams should have the appropriate information to finish planning any required NAVAID relocations or alterations and reimbursable agreements.

Approximately 6 to 9 months before the NTP, that is start of construction, the process transitions from a design and development phase to one focused on execution: Air Traffic develops and tests alternative procedures and prepares to train controllers, temporary flight procedures are finalized and confirmed for timely publication, Technical Operations plans for shutdown of equipment and flight operators make final adjustments to schedules, aircraft, and crews.

While projects requiring IFP (Instrument Flight Procedure) modification or new publication are not by themselves necessarily complex, the airport needs to identify the procedure requirements early and begin advanced coordination on the IFP development two years in advance of when the procedures are needed, given current development timeframes and resource commitments. In the event less time is available, there are alternatives such as engaging the services of a third party procedure developer, or in some cases, an individual flight operator to expedite the availability of procedures.
Recommendations for Complex Construction Planning

**Recommendation 8. Develop a process for classifying expected construction as “complex”**.

This process is intended to identify those projects with the highest operational impact in the NAS since it takes resources to align the many stakeholders involved in planning complex projects.

First, criteria are required for classifying a project as complex. While the TOC does not suggest definitive criteria, these could include (but are not limited to) some combination of the following parameters:

- **Type of Airport**
  - Core 30
  - Slot controlled or schedule facilitated airports (or with possible construction-induced delays that could necessitate such actions)
  - Part of a busy Metroplex (congested/complex airspace)
  - Single runway airport
  - Other pool of critical airports (namely diversion airports, busy spoke airports, tech stops, cargo hubs, any airport part of an ETOPS plan, related airport categories in Performance Based Navigation (PBN) Strategy document)
  - Key airports for business aviation

- **Type of Construction**
o Runway rehabilitation or reconstruction, construction involving displaced/relocated
   thresholds or shortened runways resulting in declared distances
o Taxiway to runway conversions
o New runway construction or runway decommissioning
o New or revised IFPs needed (but not a single factor)

Along with some of the criteria above, the FAA may consider leveraging criteria used in ARP’s AIP
Construction Plans and Specifications (P&S) review matrix as another mechanism to categorize projects.
The P&S criteria use type of project, primary/Part 139 versus non-primary airport and cost of project to
parse projects for the level of review required by ADO staff. Certain levels of review may be used as the
basis for establishing complexity.

An evaluation or assessment process should be required to determine if a construction project meets
the criteria to be designated as complex. It must occur early in the design process, preferably at the
initial pre-design meeting and before the initial draft CSPP is developed. The evaluation team should
include the ATM, the airport, local flight operators and Tech Ops, at a minimum. Any stakeholder should
have the option to bring a project to the table for consideration as this is ultimately a subjective
assessment. This assessment may be best accomplished at existing periodic FAA/industry engagements
such as National Customer Forum (NCF) or TOC Committee meetings. Periodic engagements of TOC
Regional Task Groups, Deputy Directors of System Operations and NPI teams in the Service Areas may
also serve as opportunities to make initial project assessments between industry and the FAA.

**Recommendation 9.** Plans for complex projects should be briefed to industry at least two years in
advance of the NTP and on a well-defined schedule linked to project design.

The monthly NCF meeting is a logical venue for hosting such briefings using data from the construction
clearinghouse. A minimum of two NCF meetings per year could include individual airport complex
construction briefings, with more scheduled if volume warranted. The individual airport operators could
be invited to present project overviews, or alternatively, the briefing could be lead by the local ATM or
System Operations representative. The ACAC may be a valuable resource in organizing and scheduling
these briefings to industry.

**Recommendation 10.** Identify and document key roles and RAAs for engagement of key stakeholders
during planning and design.

There is a need to define RAAs for key stakeholders at the local level for project coordination. Key
stakeholders may include the airport operator as the project sponsor, local Air Traffic for feedback,
guidance and playbook development, System Operations for modeling, ACAC for overall process
guidance, operators for engagement and input into design and modeling, etc. A key question is how
such RAAs would be institutionalized to be effective for complex projects.

Additionally, RAAs are intended to define required roles for effective project planning and the roles may
be assumed by different people in different airport projects. For example, in previous complex projects,
the ‘Ombudsman’ role has been owned by leadership from System Operations in Headquarters as well
as by the Manager of Tactical Operations (now known as the DDSO). The intent of this recommendation
is not to be prescriptive on exactly which individual should fill which role but instead to identify the
critical roles and ensure a process exists to identify individuals to fill those roles.

**Recommendation 11. Identify a leadership team for the effort to drive schedule, manage process,
keep participants on task, etc.**

At a minimum, a leadership team should include FAA participation (examples include, but are not
limited to DDSO, Regional Administrator, local ATM, Service Center, etc.) and the airport operator. If the
project sponsor is Tech Ops, this team should also include Tech Ops. For slot controlled or large hub
airport projects, System Operations (represented by the DDSO) must also be part of the leadership
team. Finally, the FAA may consider involving operators through a lead operator concept. The leadership
team should be institutionalized in the RAAs.

This leadership team should review the FAA’s Corporate Workplan early in its construction design
process. The Corporate Workplan may include information on opportunities to synchronize airport
construction with other NAS requirements that may reduce future operational disruptions. For example,
in some airports Tech Ops has taken advantage of runway construction to replace underground cabling
at the same time.

In addition to RAAs, the FAA and airport operator partners may also consider a documented Structured
Teaming that formally establishes an agreement among participants. Such agreements have been used
successfully in recent complex projects, including a current effort at LAX. The Structured Teaming
between the FAA and Los Angeles World Airports (LAWA) is included in Appendix D to this document.

**Recommendation 12. Develop an Airport Construction Action Plan (ACAP) template with checklists,
timelines and associated requirements that facilitates coordination of any
construction projects deemed “complex”**.

Currently there are multiple checklists available in support of airport construction. The Runway
Template Action Plan (RTAP) is used during new runway construction, the ACAC has multiple checklists
for different project types, System Operations has developed checklists and FAA Advisory Circulars
include them as well. Existing checklists may be integrated to develop a master library of checklists.
These can be applied to different construction projects as appropriate. In addition to checklists, the
template should include approximate timelines that indicate which types of stakeholders should be
involved at what times in the process. The ACAP would be applicable for any type of project but
required for complex projects. The goal of an ACAP is to foster a collaborative environment with
stakeholders and instill awareness of the processes so that even smaller airport operators can use them.
Sample checklists are included in Appendix E of this report.

The TOC recognizes that there would be a need for identifying an organization within the FAA that owns
and continuously improves a construction action template. The TOC suggests the FAA consider
expanding the scope and staffing of the Airport Construction Advisory Council to own such a template.

**Recommendation 13. Ensure complex project sponsors schedule monthly or bi-monthly stakeholder
meetings.**
Previous complex projects with successful outcomes have been characterized by a cadence of regularly scheduled planning meetings. Many large airports already have existing meeting formats and have utilized these forums for regular construction coordination meetings. Other airports that do not have an existing monthly or bi-monthly meeting may need to schedule a series of ad hoc meetings to effectively coordinate complex construction projects. It is imperative that all members of a complex project team regularly participate in monthly or bi-monthly stakeholder meetings. The concept of stakeholder meetings is also included in the Advisory Circular “Quality Management for Federally Funded Airport Construction Projects.” Finally, these meetings should start as early as 24 months in advance of construction in a kickoff predesign meeting where project scope is reviewed to ensure operators, the ATM and other stakeholders have time to provide input into the project phasing and consider impact mitigations. The frequency of meetings may even have to escalate based on the level of activity in the planning cycle.

**Recommendation 14.** There should be a mechanism for complex projects to report to FAA HQ Leadership (on an exception basis) if high level attention is required.

Historically, the RTAP, which has focused on new runway construction, has found that periodic high level Headquarters attention helps to keep the construction process moving effectively. Currently, the ACAC does provide updates to Air Traffic Services, Safety and System Operations Vice Presidents in the Air Traffic Organization. The FAA should consider expanding this reporting for “at risk” projects to bring necessary attention to avoidable consequences from a wider set of executives in the FAA, including ATO, Flight Standards, and Airports.

**Recommendation 15.** Ensure awareness of modeling efforts and sharing of assumptions among FAA, airports and flight operators.

**Case Studies: Two Large West Coast Hub Projects**

An Airport Operator conducted preliminary modeling of several phasing alternatives to quantify expected delays and costs of construction. Ultimate phasing was a compromise among those elements. The FAA did additional modeling to support scheduling discussions with the air carriers at the airport and mitigate expected delays. The timing was such that the air carriers were able to make needed schedule adjustments.

Another major airport embarked on a multi-year construction program and conducted none of its own modeling. It relied on the FAA to model various runway closures and identify delay levels and expected Airport Acceptance Rates (AARs) and Airport Departure Rates (ADR). Additionally, although the FAA was brought late into the process, it was able to develop its model and results quickly. All of this occurred late enough in the design process that it did not support timely schedule adjustments by the air carriers.

Different types of modeling are needed by different organizations for different purposes. Modeling is of particular importance at the Core 30 airports. Each type of modeling has its own unique value and purpose, and there is no need for one model to govern them all. Examples of modeling include:
• Airport modeling to assess impacts of construction phasing alternatives;
• Air traffic modeling to estimate arrival and departure rates for use during construction in different configurations and weather conditions;
• For slot constrained airports (or those with possible slot implications), modeling impact to NAS of systemic delay and to assess mitigation with different schedule options between operators.

When different stakeholders conduct modeling for different purposes, there is risk of inconsistent or divergent results. There is a need to improve the consistency of modeling results among the different stakeholders to ensure all parties fully understand the impacts of the construction on airport capacity and delay and to accurately portray the costs and benefits of alternative phasing strategies. At a minimum, awareness of different modeling efforts by stakeholders is worthwhile to avoid duplication of effort and allow for comparison of input parameters that may affect the results. As different stakeholders conduct different types of modeling for different purposes, it is unlikely that coordination on modeling efforts would result in only one coordinated modeling effort. However, coordinating modeling efforts by sharing data, parameters and assumptions should serve to reduce the differences between the results. System Operations Services develops capability briefings in an effort to educate and tie the FAA and the airport operator more closely together. Smart sheets (output data) and briefings show the types of modeling and results: throughput rates, estimated taxi in and taxi out times, estimated airborne delay, anticipated surface movements and comparisons of alternative phasing plans developed to mitigate delays and improve efficiency during construction.

The sharing of assumptions and inputs as applicable can speed up and improve coordination between multiple modeling efforts. This should help to increase awareness and foster collaboration among the various stakeholders; and ultimately, improve the overall modeling process. Finally, whenever any modeling is pursued, a point of contact from Air Traffic should be immediately identified to provide input into the modeling.

Earlier recommendations suggest the need for RAA’s to define the mix of roles and responsibilities in construction planning. RAAs should include reference to which parties are responsible for different types of modeling.

**Recommendation 16. Proactively seek opportunities to integrate NextGen capabilities during construction.**

The FAA and industry are pursuing a transition to a NextGen PBN NAS and airport construction clearly affords an opportunity to enable change. Recent extended runway closures at Atlanta and JFK provided an incentive for early implementation of Wake Recategorization (ReCat) at those terminals to reduce the delays associated with the loss of runway capacity. In both cases, significant delay reductions were realized minimizing the impacts to the air carriers and the traveling public. Special RNAV procedures were developed for EWR, SFO, LAX and JFK to increase efficiency, enhance safety, deconflict airspace, reduce delay, and provide an instrument approach with lower minimums for use during runway closures. All of the procedures developed were used effectively during the construction. Identifying NextGen solutions during construction may aid in managing the operational impacts from the
construction event and also in furthering NextGen implementation itself by demonstrating measurable benefits.

**Repeatable Construction Execution**

**Airport Construction and Instrument Flight Procedures**

Instrument Flight Procedures are designed and developed using the Current Obstacle database for procedures. There are currently over 17,000 Instrument Flight Procedures in the National Airspace System including Standard Instrument Departures (SIDs), Standard Terminal Arrivals (STARs), RNAV, Required Navigational Performance (RNP), legacy Instrument Approach Procedures (IAPs) and Obstacle Departure Procedures (ODPs). There are two kinds of effects to procedures caused by construction: 1) permanent changes that drive re-development or new development of procedures and 2) temporary restrictions that are captured by NOTAMs. Improper or untimely handling of NOTAMs for construction on or near airports has unnecessarily limited the use of critical instrument approach procedures and caused delays or diversions.

**Data Issues**

In order for the AIS Instrument Flight Procedures (IFP) Group to develop new or amended procedures that are either needed temporarily during the construction or once it is complete, there has to be considerable advanced planning. New or amended procedures may require up to 18 months for development and publication based on the Procedures Production Pipeline. Challenges in timely procedure development in the past have been driven by inaccurate or incomplete data needed for development. Airport and obstacle data is the foundation for procedure development. As data accuracy has greatly improved over time, however, the timing of data availability is critical to construction execution. This issue should be highlighted in any template or checklist associated with construction in the future. Note that in a later section of this document focused on recommendations related to improving safety during construction, data again emerges as a significant item.

**As-Built Surveys**


The safety of instrument flight procedures relies on accurate and timely data. One specific data issue that has been identified is differences between pre-construction surveys, which are often used to develop procedures, and as-built, or post construction surveys. If the difference exceeds certain threshold criteria, then it may be necessary to cancel the procedure, that is NOTAM it unusable until the procedure can be modified. Hence, there is a need for AIS to receive as-built surveys, including associated coordinates and elevations, on a timely basis from the airport operator. Unfortunately, this does not always occur as described in the case study below. This is not an isolated incident and occurs frequently in the NAS.

| Case Study: Small GA Airport and 3rd Party Survey Data |

A small GA airport extended a runway and raised its elevation. An initial survey was conducted in 2014. The FAA Flight Procedures Team received the initial survey data from the airport operator, but there
were concerns from the airport that the survey data was not correct. As a result, a Notice to Airmen (NOTAM) was issued indicating the new RNAV (GPS) procedure to the runway was Not Available (N/A).

To reconcile the issue and potentially activate the procedure, a new, as-built, aeronautical survey is required, however the airport indicated a new survey will not be done until the summer of 2016, over a year after construction was completed. Given challenges in aligning data from multiple stakeholders, the IFP Team regularly “NOTAM” procedures “N/A” until the IFP, airport and construction processes are all aligned.

Another issue that causes problems is the fragmented manner in which the airport surveys are processed to Aeronautical Information Services. In many cases the Airport and Obstacle Survey data are split up and arrive in the database with no alignment to the production cycle. The disjointed process of gathering data and development of procedures drives additional workload and introduces delay. Aeronautical Information Services has made some progress in aligning these processes but additional effort is required. Ideally in the future, data should not be processed if it is not aligned with the procedure production cycle. The current approach to “N/A” procedures may be improved by acquiring the right data at the right time as input into the procedure development or evaluation process. Ultimately the option to “N/A” procedures due to evaluation against tolerances should be the exception instead of the standard, as it is currently.

The FAA should continue to support existing Working Groups that are identifying the details of how to synchronize the various processes associated with survey data and procedure publication.

**Magnetic Variation**

**Recommendation 18. Prepare the Magnetic Variation Letter and send it to Aeronautical Information Services far in advance of planning any required marking or signage changes and coordinate airfield changes with instrument flight procedure revision cycle.**

Issues continue to be encountered with uncoordinated Magnetic Variation changes affecting instrument flight procedures, and airport signing and marking. It is important for an airport to know in advance if the airport and NAVAIDs will be having a Magnetic Variation change based on the EPOCH Year of record. Flight Standards mandates updating Magnetic Variation when out of tolerance. If the Magnetic Variation is not properly planned it can result in a difference between published aeronautical data and visual aids on the airport, which requires re-painting and installing new airport signage. Other industry Working Groups, including the PBN Aviation Rulemaking Committee (PARC), have also identified shortfalls in current processes related to Magnetic Variation. The PARC report states: “It is recommended that a standard way of providing runway magnetic bearings be established that allows its application consistent with the procedure updates.”

Determining changes in Magnetic Variation is somewhat predictable and should be known years in advance. While information on Magnetic Variation is available earlier, the Magnetic Variation letter is prepared today just three months before procedures are published. The letter of notification to Airport

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Operators needs to happen earlier in the process. If the letter can be accomplished as much as 1 to 2 years in advance, Magnetic Variation changes could be synchronized with the charting cycle, construction projects, and any required airfield changes.

Finally, Magnetic Variation changes can be tied to previous recommendations. It should be included as a checklist item in an Airport Construction Activity Plan template as well as be part of any Desk Reference for Airport Operators to understand their full set of requirements.

**Process for Temporary Obstructions/Cranes for On-Airport Construction**

Airport construction projects may require placement of numerous temporary obstacles in the vicinity of airport movement areas that may affect approach and departure surfaces, especially during periods of instrument meteorological conditions (IMC). Most of these obstructions are cranes. Lessons learned from a large hub airport in early 2015 (see case study below) show that insufficient control or management of temporary obstructions can have a major impact on operations during all weather conditions. Control of obstructions implies a documented system or effective plan to continuously monitor the status of temporary obstructions and to ensure timely removal (lowering) when necessary to mitigate the impacts to Instrument Flight Procedures. Effectively managing temporary obstructions is made more complex because only one NOTAM may be published for each IFP. When there are multiple Cranes in an area around the airport with constantly changing conditions, the process can be difficult to control.

**Case Study: Impact of Crane on Arrivals at a Large Hub Airport**

In early 2015, during construction at a large hub, temporary cranes on the airport surface necessitated Flight Data Center (FDC) NOTAMs restricting instrument approach procedures to two runways. The NOTAM for the CAT II/III IAP to XXX was as follows:

“FDC X/XXXX – XXX ILS RWY XXX (CAT II/III) Procedure N/A: Temporary Cranes up to 267 MSL beginning 936 feet northeast of RWY XX”

On one specific day, weather at the airport degraded such that operators could no longer operate the instrument approaches to two key runways according to these NOTAMs. At 0400 local time, the project contractor left a voice message to the airport and the FAA’s local Airport District Office that the crane was down. The message was not submitted into the process for NOTAM cancellation, and the CAT II/III arrival remained NA with the FDC NOTAM still published even though the associated crane was down. The weather at the airport worsened such that CAT II/III minimums were required for aircraft to land at the airport. Arriving aircraft began to divert as the CAT II/III IAP was NA.

At 0545 local, the airport operator conducted a visual search to verify that the crane was still up. At 0715 local, the Air Traffic Control tower requested the NOTAM be cancelled, as the airport operator was unable to locate the crane. By that time, there were 32 diversions, many of which were wide body international aircraft. There were 611 total minutes of holding, average delays of 121 minutes due to ground stops and average delays of 74 minutes from ground delay programs.
Recommendation 19. Ensure there is a 24/7 NOTAM response to notification of changes in status for on-airport obstacles.

The way temporary obstructions are handled today depends on whether the obstruction is on or off airport property: on-airport obstacles are evaluated at the Flight Procedures Team at the Service Centers; off airport obstacles are evaluated by Aeronautical Information Services (AIS) and then forwarded to the Instrument Flight Procedures Group team, both of which are in Oklahoma City. These impacts are required to be at the IFP Team 72 hours prior to the obstruction being in place so that the IFP Team can evaluate the impact to procedures and issue a Temporary NOTAM. Currently, the FPTs, which handle on-airport obstacles, are available during standard business hours, Monday through Friday. For AIS to receive the same impact information for on airport obstacles outside of standard business hours that they do for off airport, either the FPTs would need to offer 24/7 service or the responsibility (contact point) could be moved to Aeronautical Information Services (AIS).

Recommendation 20. Require project proponent (owner of 7460 submission) to work with crane operators to notify the Tower, TRACON and/or Airport Operator when raising or lowering a crane.

The Obstruction Evaluation / Airport Airspace Analysis (OE/AAA) application is the tool used to coordinate information on obstacles, and is also used by proponents to cancel the Obstacle/Crane activity. During normal duty hours the process appears to work well but recent instances across the NAS, such as the case study about the impact of cranes on arrivals, have shown that cancellation of active NOTAMs can be challenging. Air Traffic Control has resorted to “work arounds” to mitigate the effect of NOTAMS. These include notes on the NOTAM saying “Unless Otherwise Authorized by ATC” or similar tactical solutions. These work arounds do not solve problems for operators in many cases because, during planning, operators are required to comply with the NOTAM as published. When notified by ATC that the obstruction is not in place, it is often too late for flight operators to adjust. Potential flight operator impacts from NOTAMs related to IFPs, such as reducing payload, are not easily reversible decisions. If the Obstruction/Crane operators do not lower the Crane and notify the FAA through the formal process, then the impact on the procedures will be in place until the situation is resolved.

As the crane case study demonstrates, simple verification of crane status can be challenging. Improvements to notification of crane status and contact information for crane operators should assist in improving this process as well.

Recommendation 21. The Instrument Flight Procedures Group should continue to maintain a tracking system that details all Temporary Restrictions to Navigation and their effects on Flight Procedures (Crane Tracker).

Since the events described in the case study above the Aeronautical Information Service Instrument Flight Procedures Group put together a plan to develop an application to better track temporary obstructions and to assist in quickly evaluating the effects and returning minimums whenever possible.
After hours, the 24/7 NOTAM office, whose primary duty is to issue NOTAMS in response to NAVAID outages, responds to NOTAM requests due to crane status that effect on-airport operations. Priority is given to the high impact 45 airports. This change in operations has helped to mitigate potential problems and additional operational advantages may be gained with some further modification of processes. Some of the recommendations here will be easy to implement, others will require a change in culture and possibly effect where certain functions are accomplished and by whom.

The Crane Tracker tool, developed following the case study from early 2015, assists in identifying the greatest impact on flight procedures based on the status of all cranes in an area. The tool documents NOTAM actions to be taken with special emphasis on the core 30 airports and additional 15 high impact airports. The IFP group developed and deployed this tool in response to the NOTAM problems in from the crane case study in early 2015, and it is showing progress. This tool will continue to be a critical component to ensuring effective management of the impacts of temporary obstructions, however no out-year funding is currently allocated to it. Funding should be allocated to sustain this capability.

### Recommendation 22. The Contingency plan for all On-Airport temporary obstacles that impact instrument flight procedures should be developed and implemented for all major airport construction.

Although there are requirements for airport operators to have a plan for management of temporary obstacles case studies demonstrate that issues still arise in management of obstructions. Given the potential impacts of temporary obstacles on IFPs, a contingency plan should be in place for mitigating obstacle impacts during IMC. Note that a contingency plan for airport construction is much broader than just obstacles and IFP impacts. Whenever the weather goes below minimums, there are multiple contingency concerns that should be included in a general contingency plan. Such a plan should be included as part of an Airport Construction Action Plan template.

Additionally, both on and off airport obstacles impact IFPs and operations. This recommendation is focused on on-airport obstacles. This is not intended to reduce the importance of off-airport obstacles, but managing and mitigating impacts of off-airport obstacles is significantly more complex. This topic is addressed in the next section.

Active management of construction-related obstructions should include the responsible party (“Crane Sherriff”) to confirm cranes are down. Such a plan should be maintained for all airport construction involving a temporary obstacle and go into effect when the weather is forecasted to go below lowest minimums. When this occurs, cranes will typically not operate for construction purposes, and flight operations will be best served if cranes are lowered and unnecessary obstacles to flight procedures are removed.

### Temporary Obstructions/Cranes for Off-Airport Construction

#### Recommendation 23. Establish a Working Group with key stakeholders (Airport Operators, FAA, airlines, jurisdictions, construction industry, etc.) to develop a robust process for managing the impacts of off-airport construction in a manner that does not overly restrict local growth while also maintaining flight safety and efficiency.
Similar to on-airport obstacles, off airport construction also poses a potential impact to Instrument Flight Procedures and airport operations. For off airport construction, however, the complexity of managing obstacle impacts to operations is significantly more complex than for on airport. The safety and efficiency impacts to flight operations are no different.

The importance of off airport obstructions was highlighted by recent events related to a construction crane near the final approach course for a runway at a key large hub airport in the NAS. This prompted the Task Group to discuss the impact of off airport obstructions and draft recommendations related to off airport construction, recognizing the topic was potentially outside the scope of this group. The primary recommendation is creation of a broad industry working group to address this topic. Key points raised during discussion of off airport construction included:

- Inconsistent knowledge of and compliance with FAA form-7460 requirements by off airport project sponsors.
- Clarification of legal authority for airspace decisions. As documented in AC 150/5300-139, airport operators have responsibility for airspace including impacts but do not have property rights beyond airport limits.
- Consideration of outreach and education for contractor or crane operator industry associations on FAA form-7460 requirements.
- Consideration of whether there are opportunities to influence OSHA guidance to crane operators to better inform such operators of their aviation-related requirements.
- Investigation of whether enforcement action is feasible or required for operators that are out of compliance with their 7460 requirements, especially in cases that pose a significant risk to flight operations.
- Operator concerns regarding the safety and efficacy of mitigations proposed to accommodate off airport obstructions in close proximity to arrival and departure flight paths.
- Consideration of whether FAR Part 121 (and others) operator one engine inoperative (OEI) takeoff performance should be considered as part of the Obstacle Evaluation/Airport Airspace Analysis (OE/AAA) process. These OEI surfaces are currently not considered in the impact assessment of proposed structures, and there is a gap between what FAA requires of operators (FARs) and what adverse impacts are included in obstruction evaluation.
- Explore establishment of local or regional airport working groups comprised of flight operators, airport operators, FAA, and local political jurisdictions to aid in review of proposed off airport construction projects, potential impacts, and appropriate mitigations.

**Level of Detail in Information on Obstacles**

**Recommendation 24.** Include the OE/AAA number and Latitude and Longitude of Obstacles impacting flight procedures.

9 See: paragraph 104, Airport operator responsibilities, Section b. Maintenance of obstacles clearance surfaces on page 26 in AC 5300-13A, change1.
Currently the latitude and longitude of temporary obstacles are included in most NOTAMs worldwide but are not included in US NOTAMs. When flight operators do not have the precise details for an obstacle, they must make conservative assumptions about the obstacle location and possibly the height that may drive unnecessarily large impacts on takeoff performance (takeoff weight) due to the requirement to consider one engine inoperative performance for obstacle clearance. In an effort to minimize adverse impacts on takeoff weights and to harmonize with the procedures used outside the U.S., it is recommended that latitude and longitude information be integrated into FDC NOTAMs. This would not replace any information currently published in obstacle NOTAMs. Also, this recommendation is consistent with a recommendation made by Operational Working Groups of the International Air Transport Association. ¹⁰

**Recommendation 25.** Provide flight operators with draft information on temporary and permanent obstruction impacts to IFR flight procedures earlier than the current 72 hour prior timeframe whenever possible.

Current procedures specify that procedure changes caused by temporary obstacles are published by NOTAM about 72 hours prior to the obstacle being in place. For flight operators, having impact information sooner would assist in making tactical adjustments in response to these NOTAMs, such as fleet swaps if, for example, GPS is required due to equipment outages. A flight operator needing to make a fleet swap would benefit from having this information prior to the 72 hour in advance publication timeline.

The Crane Tracker may have promise as a mechanism to share such information between FAA and industry outside of the NOTAM publication cycle. The FAA is using the Crane Tracker to evaluate obstacle impacts and draft NOTAMs within that system. It is worth exploring whether enabling access to draft impacts within the Crane Tracker data base may address this request. Also, by providing such information earlier to flight operators, it may enable a dialogue between operator and the FAA on the impacts that may have been missed or not fully identified when the obstacle was circulated for comment.

**Additional Recommendations Associated with Construction Execution**

**Information Sharing During Construction**

**Recommendation 26.** Develop repeatable approach to share construction status information throughout execution, especially for complex projects.

Information on construction project status is important for operational stakeholders, especially for complex projects with multiple phases and changing impacts. Operators need to understand current status and projections of what airport resources will be available and when, before NOTAMs are issued. Currently there is no standardized format for providing runway declared distances, NAVAID availability

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and other operational data to stakeholders before and during construction. During recent multi-phase runway closures at JFK, operational data were disseminated to the airport community via a “Runway Availability Matrix,” that was updated and distributed a weekly basis. An example of this is included below:

Figure 10 Sample Runway Availability Matrix from Construction at JFK (partial list of runways)

<table>
<thead>
<tr>
<th>Stage</th>
<th>Start Date</th>
<th>End Date</th>
<th>Runway Available Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>4L</td>
</tr>
<tr>
<td>Pre-Construction/Existing</td>
<td>January 1, 2014</td>
<td>August 8, 2014</td>
<td>11,251</td>
</tr>
<tr>
<td>Stage 1 Completed</td>
<td>December 10, 2014</td>
<td>March 14, 2015</td>
<td>9,780</td>
</tr>
<tr>
<td>Stage 2</td>
<td>March 15, 2015</td>
<td>April 23, 2015</td>
<td>9,100</td>
</tr>
<tr>
<td>Stage 3</td>
<td>April 24, 2015</td>
<td>September 21, 2015</td>
<td>CLOSED</td>
</tr>
<tr>
<td>Stage 3 Completed</td>
<td>September 22, 2015</td>
<td>December 9, 2015</td>
<td>11,251</td>
</tr>
<tr>
<td>Final</td>
<td>December 10, 2015</td>
<td></td>
<td>11,251</td>
</tr>
</tbody>
</table>

Any information template should be included as part of the construction action plan template described in Recommendation 12 above. In the JFK example noted above, the information was maintained and provided by the Airport Operator via email distribution lists as well as through posting on its website. The information was updated weekly and included clear highlighting of what had changed relative to the previous week. Additionally, different reports provided declared distances, runway closures and taxiway impacts. Operational stakeholders have described this model of information sharing as timely, not onerous, highly comprehensive, and functional.

**Updating Construction Status**

Recommendation 27. Update airport construction diagrams using Federal NOTAM System (FNS) to ensure depictions are real-time, current and accurate.

Construction notice diagrams are already a valuable source of information for flight operators. If these diagrams are enhanced with real time information from NOTAMs, such as obstacle location, operators believe the value of these diagrams would be enhanced. This may be accomplished using the Federal NOTAM System to update the diagrams in real time. Current graphics are updated daily but can have stale information. Initially, graphics should be updated with airport movement area information (declared distance, etc) NOTAMs, but temporary on-airport obstructions should also be considered.

Given the increased utilization of Electronic Flight Bags (EFBs) and digital delivery of aeronautical information to the cockpit, there is strong potential to use those media to provide real-time construction NOTAMs and updated construction diagrams; and ultimately enable integration directly into airport moving map displays.
**Electronic Reporting of Crane Locations**

**Recommendation 28.** Explore software, OE/AAA system automation enhancements or GPS technology to report the height, latitude, and longitude of cranes in real time.

Cranes on or in the vicinity of an airport are obstacles that may impact flight procedures, aircraft performance, operational reliability and safety of flight. Understanding whether cranes are up or down can be challenging, particularly for those that are mobile and move throughout the day or have multiple vertical positions. The group would suggest consideration of installing technology on cranes, similar to that applied today for ground equipment at a number of airports, to provide real time information on crane status (location and height). This recommendation is intended to provide situational awareness only and not to replace official NOTAM data sources.

**Safety-Focused Recommendations for Airport Construction**

Aviation accident causation has been modeled by James Reason as “a series of slices of randomly-holed Swiss Cheese.” The holes represent individual weaknesses or risks in a component of the system. Historical analysis of aviation accidents has demonstrated that there is no one causal factor; instead, accidents materialize in the rare cases in which multiple individual risks occur at the same time. In the Swiss cheese model, this is represented in the cases in which a line can pass through a series of slices. This is depicted by the red line in the diagram below. The yellow line demonstrates that while in individual operations certain operational risks may materialize, in nearly 100% of operations the trajectory of a potential accident is averted.

*Figure 11 Reason’s Swiss Cheese Model*

Airport construction impacts operational safety both through temporary and permanent changes in airport infrastructure and operational procedures. Airport construction contributes a layer of Swiss cheese into the model depicted above. These changes may introduce new risk into airport operations that must be mitigated through the safety management process. Operational change is of particular concern for the operators that regularly operate into a specific airport for which construction has changed the operating environment, either through runway closures, shortened runways, alternative...

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taxi procedures, unavailable instrument procedures, NAVAID outages, etc. Information synchronization and dissemination is of particular significance to enhancing safety during construction. Note that the issue of timely and accurate information dissemination was mentioned above in the section on Construction Execution.

The Airport Construction Advisory Council, which the FAA established in the last decade, has made tremendous progress in systematically managing risk that airport construction contributes to the NAS. The ACAC industry focus has been on staying ahead of safety concerns by proactively identifying risk mitigations that resolve issues before they impact operations. Improving safety requires collaboration, communication and clarity among a diverse set of stakeholders. The issue is not unique to air traffic controllers, flight operators and their pilots or Airport Operators. It is a joint endeavor involving all of these stakeholders.

While progress has been made, there is more work to be done and the following recommendations are offered to further enhance safety during construction:

**Recommendation 29. Utilize ATC simulation capabilities to evaluate procedures and to prepare and train controllers for construction playbook.**

To ensure consistency during construction across an entire staff of controllers, simulation is helpful to identify and refine a consistent way of managing changes during construction. Facilities should utilize available simulation tools and capabilities\(^\text{13}\) to train controllers on new procedures, which should be catalogued in a playbook for dealing with each construction project. Simulation does take time and resources from multiple stakeholders, so facilities should consider a range of simulation options and utilize the appropriate tool based on the complexity of the project.

Collaboration on construction simulations between Air Traffic facilities and pilots or other airport operational stakeholders would enhance the safety benefit. All parties who operate in or control the movement area will have different perspectives to offer on a particular construction project. Additionally, participation among various stakeholders encourages buy-in and a shared sense of ownership of the construction project.

Finally, when possible, such simulations should be conducted early in the design process, to inform and refine the project phasing. The section on Complex Construction above discussed a number of other potential modeling efforts to be included in planning construction. Air traffic controller training could be another tool in this modeling and simulation portfolio. The earlier simulation can be accomplished during design, the higher its value in guiding phasing decisions, reducing risk, and preparing air traffic and flight operators to use alternative procedures.

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\(^{13}\) These may include a range of technical capabilities from table-top exercises all the way through interactive air traffic simulation systems
Recommendation 30. Allow the update of the Airport/Facility Directory (A/FD) and Instrument Flight Procedures during the 28 day Change Notice (CN) process.

Occasionally, construction (paving) of new runways, taxiways, or ramps is completed before it is charted, marked, signed or lighted. It may be possible to open the pavement, but during this time, there is potential for pilot and controller confusion as available documentation may differ from the actual airfield configuration. For example, if a new taxiway is completed, but not open and is closed via NOTAM, and not properly barricaded, pilots may get confused at night or in low visibility conditions. Conversely, if charts are revised prematurely, before the pavement is officially open, similar confusion may occur.

As noted earlier in the discussion on Instrument Flight Procedures, a number of elements must line up for construction to be complete and infrastructure to be available to the operation – completion of the construction itself, updates to navigational databases, updates to charts, etc. If any one of these is out of alignment, the resource may be considered unavailable or uncharted for the operation and confusion may ensue.

Currently the A/FD publishes every 56 days. Instrument Flight Procedures are published every 56 days in the Terminal Procedures Publication (TPP), but can have changes included during the Change Notice (CN) at the midpoint of the cycle, that is, 28 days after the TPP. It is recommend that the policy be changed to allow A/FD and IFP changes during the CN process thereby cutting the time in half between updates.

Recommendation 31. When there is a gap between completion of construction of a facility and its availability to the operation, provide clear information about what resources are unavailable, and ensure areas are properly demarcated.

As noted earlier, information on new, uncharted resources may create confusion. NOTAMs should include descriptive information about what resource is closed (i.e., Taxiway Juliet, which is North of Echo and South of Foxtrot, is closed). Additionally, low profile barricades should be used to physically block any resource unavailable to the operation.

Recommendation 32. Continue to communicate risk management culture to air traffic controllers, dispatchers and pilots, even during construction projects with seemingly minimal impact.

The FAA and Industry should continue to support a safety culture in air traffic facilities and operator communities that emphasizes caution during construction even if the construction is apparently limited in scope. Controllers see the airport operating environment throughout their shift and quickly adjust to the new conditions during construction. Pilots, however, may not operate into the airport frequently and even for those that do, any given flight may be the first time the pilot is interacting with new

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14 The A/FD is going to be renamed Chart Supplement in Spring 2016
operational conditions from construction. All operational personnel need to recognize that any flight could be the least familiar user of the airport at any point through the construction process.

**Recommendation 33. Prioritize and promote visualization of construction impacts and mitigations to the pilot community.**

Accurate and timely visualizations to the pilot on the flight deck can help mitigate risk during construction. Pilots may have expectation bias if they are flying into an airport regularly, and visualization of what has changed can be helpful to adjust expectations and increase situational awareness.

Visualization of construction can include multiple forms:

- Improving awareness among pilots of the availability of construction notice diagrams
- Provide pilots with charts or other renderings showing the location of cranes or other temporary obstructions. For current construction at a large hub with a key off-airport crane, the most effective method for one operator was to show pilots a Google Earth image with overlay of the location of where the crane is. Proactive visualizations to pilots aid in ensuring pilots are aware of such scenarios.
- EFB integration of D-NOTAMs and charts to identify closed or changed areas on the airport field.
- Integration of cranes and other obstacles on construction notice diagrams to provide a more complete picture to the pilot.
- Layer multiple components of information on one page and offer the option to the pilot to declutter by removing some layers from the display

**Recommendation 34. Make fast track slots available in the charting cycle to respond to safety needs.**

Airport construction in general, and runways and taxiways in particular, may prompt the need for expeditious changes to aeronautical data and charting. Often construction duration will be impacted by weather or other factors beyond the control of the airport or contractor, or by acceleration clauses in the contract. Alternatively, if temporary procedures are desired to improve safety or restore lost capacity, expedited access to the charting cycle will minimize risk from non-standard airfield configurations or the unavailability of instrument procedures.

The process for developing new or temporary instrument flight procedures takes approximately 18 months in the NAS today. Some construction projects impact existing flight procedures and may, for example, temporarily disable all procedures with vertical guidance during construction. In these scenarios, flight safety would be enhanced by temporary procedures that include vertical guidance. However, if a construction project did not initiate the IFP process early enough, having such procedures available during construction would not be an option. These changes may not always become evident until late in the design process or may be related to projects that were required on a rapid timeline. In either case, timely charting can be a challenge.
Having a portion of IFP production slots dedicated to responding to safety-critical needs for temporary procedures during construction would enhance system safety. There would be challenges to holding such “fast track” slots in reserve and ensuring they were solely dedicated to enhancing system safety.

**Recommendation 35. Identify and solicit participation of a mix of subject matter experts for construction Safety Risk Management Panels that represent all key stakeholders in airport operations, air traffic operations and safety.**

Currently there is only general guidance on what stakeholders or skillsets are required in a Safety Risk Management (SRM) assessment. As a result, participants in SRM panels vary across the NAS, with some including a broad cross section of stakeholders with high levels of operational knowledge and others lacking appropriate representation. Other panels have less representation or may be over-represented by one stakeholder group. There is a need to identify the cross-section of representative stakeholders for an SRM panel and provide this guidance. Such information could be included in an airport construction template.

Airport operators are particularly important participants in the SRM panel. As noted in AC 150/5370-2F, Operational Safety on Airports During Construction, the airport operator has responsibility to coordinate with the appropriate FAA Airports Regional or District Office early in the development of the CSPP to determine the need for SRM documentation. If the FAA requires SRM documentation, the Airport Operator provides documents necessary to conduct the SRM, participates in the SRM process, provides a representative to the SRM panel and ensures all applicable SRM identified risk elements are recorded and mitigated within the CSPP.

**Recommendation 36. Consider improvements to SRM process to make it more effective.**

The current SRM process is often scheduled as an in-person, review meeting and as a one-time event. Subject Matter Experts participating in SRM panels are often resource constrained individuals who are involved in many industry meetings and activities. To make SRM panels more effective, offering remote access and participation would improve the process. Additionally, if the process were scheduled as iterative sessions that developed a cohesive safety-focused team over time, it would further enhance the results of the panel’s work.

**Recommendations for FAA Tools, Process and Guidance in Airport Construction**

The following offers a summary of high level recommendations for the FAA as they relate to airport construction:

**Single Entity for NAS-Level Coordination of Construction**

Airport construction is often described today as diffuse with no central information or authority source, though the ACAC has made strides as an emerging central authority.

The industry needs a NAS level single entity that owns the following activities:
The Construction Clearinghouse to drive awareness of planned construction
Drive the NAS assessment of which future projects are complex and require special attention
Establish structured teaming arrangements between project owners, the FAA and flight operators for particularly complex projects
Manage and improve upon templates for planning and managing construction
Interface with local teams leading construction projects to provide guidance on enhancing safety and efficiency during construction
Ongoing evaluation of stakeholder requirements to mature and evolve construction processes in the future. This may include evolving the clearinghouse into a future construction portal that includes all relevant data around the planning and execution of airport construction.

As noted above, the ACAC has already made progress on some of the above and is believed to be the logical entity to take ownership of NAS level purview of airport construction. Whether the ACAC takes on these duties or not, there are a number of questions the FAA will have to address:

Any organization that acts as the central point of contact for airport construction should have an appropriate set of dedicated resources.
This organization should not necessarily be a Headquarters Program Office. The intent could be met with field staff that are assigned with appropriate responsibilities and liaison flexibility. For example, the ACAC has been structured as a field driven organization with Air Traffic Managers working on a peer level with other ATMs. This model has worked for the ACAC and the FAA should evaluate this previous experience to help inform the right working model for the future.
Management of the construction clearinghouse will require technical and database management skills that may require involvement of other organizations within the FAA that manage the tool.
Effective ways to further involve and integrate non-FAA operational personnel into the FAA’s central process of tracking and managing airport construction. In particular this is relevant for airport operators, airport trade associations (ACI-NA, AAAE) as well as the FAA’s own Airports organization.

Local Leadership Teams for Complex Construction
Airport construction will benefit from increased cross-functional project leadership. Across all construction projects there are as many as four key parties that could serve as critical parties in planning construction: the project sponsor (generally the airport operator), the FAA’s Air Traffic Manager, the FAA’s Manager of Technical Operations and Flight Operator(s) that operate at the airport. The recommendations in this report suggest the FAA seek mechanisms to build local teams that collaborate to bring the key stakeholder perspectives to construction planning and management and will serve to enhance construction coordination in the future. Structured teaming is one tool the FAA may wish to utilize to accomplish this goal.

Processes for Managing Obstacles
As discussed in the Recommendation 19, there are two processes today for tracking and managing obstacle status. One process relates to obstacles on an airport surface and the other relates to obstacles
that are off airport. The recommendations in this report call for aligning these two processes for managing obstacles. This recommendation is an indicator of the level of stakeholder interest in obstacles, both on and off airport.

**Synchronization of Aeronautical Information**

Multiple recommendations in this report discuss information as the foundation of operations and that information is necessarily changed during and after airport construction. Any confusion or lack of synchronization of information can increase risk as well as introduce inefficiency and operational disruptions. There is an overarching need to improve upon the flow of information and ensure that the underlying data is synchronized and appropriately communicated to operators during and at the completion of construction.
Appendix A: Tasking Letter
Ms. Margaret Jenny  
President  
RTCA, Inc.  
1150 15th Street NW  
Washington, DC 20036

Dear Ms. Jenny:

Construction projects of various sizes are going on all the time in the National Airspace System (NAS). Construction activities can range from major, long-term projects such as adding or improving runways or taxiways to relatively minor, short-term projects such as EMAS maintenance projects. Efficiency is usually most obviously impacted as Air Traffic adjusts arrival and departure rates to accommodate reduced available capacity or taxi in/out times increase. A more subtle impact involves introducing short term safety risk when a project takes a procedure with vertical guidance out of service for a period of time or increases pilot and/or controller workload complexity.

The FAA Office of Airports, Flight Standards, Regional Administrators, and the Air Traffic Organization work together with local airport authorities and aviation stakeholders at the Service Area, regional, and local levels during airport construction. While some impacts may be unavoidable, we can minimize unnecessary disruption and safety risk if risk identification and risk mitigation through planning, design and early collaboration and coordination are done effectively. The key to minimizing the impact of airport construction activities is ensuring the following:

- The right stakeholders are involved.
- Stakeholders understand risks and mitigations.
- There is a clear understanding among stakeholders of project roles and responsibilities to maintain safe airport operations during construction.
- There is a sharing and use of best practices and lessons learned.
- There is a transparent process to coordinate, track approvals, and implementation details.

There are many examples of projects where implementation went very well. However, there are other examples where coordination and collaboration could have been improved. Airports and the FAA organizations take different approaches to manage and mitigate construction safety risks and efficiency impacts. Best practices and lessons learned for each project may not be well understood or shared across projects or with stakeholders. The roles of the various FAA entities involved may differ or may not be clear enough to all stakeholders. Local airport authorities may not engage to the extent needed or early enough in the process. Aircraft operators may also not be included early enough in the process. Finally, we may not effectively engage the surrounding community to explain temporary shifts in aircraft noise or frequency. Incomplete or untimely coordination or involvement by key stakeholders may preclude the identification and implementation of effective mitigations to reduce safety risk and efficiency impacts.
To help the FAA address the issues noted above, we request the TOC to provide recommendations in several key areas related to airport construction coordination and implementation. They include:

1. Review select past airport construction projects and associated data and identify lessons learned and recommend best practices for future projects. This would include the review of available safety and efficiency data where construction issues were noted as a factor. Please recommend a mechanism to ensure we capture and share lessons learned from future projects.

2. Identify and evaluate current strategic planning initiatives/tools used by FAA stakeholders at the Headquarter, Service Area/Region, and Service Delivery Point levels and provide recommendations on a best approach.

3. Assess the use of agency orders, advisory circulars, and internal processes currently being used to guide airport sponsors in their management of airport operations during construction and provide recommendations on a best approach.

4. Identity all stakeholders internal and external to the FAA needed and define their roles in the coordination and implementation processes.

5. Describe needed outreach strategies associated with each stakeholder and include a recommended timeline for outreach for major, long term projects.

6. Identify a set of recommendations on how safety risk should be better managed for aircraft operations impacted by airport construction projects.

We believe the above work will lead to improvements in the coordination and implementation of airport construction projects and will lead to an increased ability to mitigate impacts to efficiency and safety. Such work will benefit the full range of aviation stakeholders. We will provide the subject matter expertise, including a representation from the Airport Construction Advisory Council (ACAC), available as needed.

We look forward to the results of this important work. We will work with TOC Leadership to provide a list of past airport construction projects as discussed in Sub-Task #1 above to help the task group identify projects to review. We will also provide safety and efficiency data as requested as well as orders and other documentation. Subject Matter Experts from various FAA lines of business will be available.

The FAA requests this tasking be completed by the 2nd Quarter, FY2016 TOC meeting. Once the task group is established, we will work with TOC Leadership to determine the schedule for interim reporting deliverables and milestones.

Sincerely,

Elizabeth L. Ray
Vice President, Mission Support Services
Air Traffic Organization
Appendix B: Members of the TOC Airport Construction Task Group

Steve Jangelis, Air Line Pilots Association
Frank Oley, Airlines for America
Chris Oswald, Airports Council International (ACI North America) (Co-Chair)
Eric Silverman, American Airlines, Inc.
Justin Towles, American Association of Airport Executives
Mark Hopkins, Delta Air Lines, Inc. (Co-Chair)
Jim Marcoux, Delta Air Lines, Inc.
John Dermody, Federal Aviation Administration
Kent Duffy, Federal Aviation Administration
Pedro Franceschi, Federal Aviation Administration
Freddie James, Federal Aviation Administration
Jeffrey Jones, Federal Aviation Administration
Khalil Kodsi, Federal Aviation Administration
Andrew Lamb, Federal Aviation Administration
Vered Lovett, Federal Aviation Administration
Jennifer Morris, Federal Aviation Administration
Pat Mulqueen, Federal Aviation Administration
Susan Pfingstler, Federal Aviation Administration
Terry L Rhea, Federal Aviation Administration
Dave Siewert, Federal Aviation Administration
Tony Tisdall, Federal Aviation Administration
Beverly Tulip, Federal Aviation Administration
Lynn Williams, Federal Aviation Administration
Greg Yamamoto, Federal Aviation Administration
Bill Murphy, International Air Transport Association
Lee Brown, Landrum and Brown
Celia Fremberg, Landrum and Brown
Paul Shank, Maryland Aviation Administration
Vincent Cardillo, Massachusetts Port Authority
Ric Loewen, National Air Traffic Controllers Association
Ralph Tamburro, Port Authority of New York & New Jersey
Trin Mitra, RTCA, Inc.
Bob Flynn, The MITRE Corporation
Glenn Morse, United Airlines, Inc.
Appendix C: Glossary of Terms Associated with Airport Grouping

<table>
<thead>
<tr>
<th>Airport Grouping</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core 30 Airports</td>
<td>1% or more of total U.S. enplanements (DOT’s “Large Hub”) or 0.75% or more of total U.S. non-military itinerant operations. Includes 30 airports – 29 Large Hubs and 1 Medium Hub. (Note: OEP originally had 35 airports. The five airports removed from OEP are CLE, CVG, PDX, PIT and STL)</td>
</tr>
<tr>
<td>Secondary Focus Airports (54 total)</td>
<td>Between 0.25% and 0.99% of total U.S. enplanements, between 0.50% and 0.74% of U.S. non-military itinerant operations, or in one of the 7 flight plan metro areas and having an ATC tower and either scheduled passenger service, at least 100 based aircraft, or at least one runway &gt; 5000 ft. Includes 36 medium hubs, 4 small hubs, 2 non-hubs and 12 reliever airports.</td>
</tr>
<tr>
<td>Focus Airports</td>
<td>The entire list of both Core and Secondary Focus Airports, as defined above</td>
</tr>
<tr>
<td>Enplanement</td>
<td>A single revenue-generating passenger departing from an airport</td>
</tr>
<tr>
<td>Large Hub</td>
<td>An airport that handles 1% or more of the country’s annual enplanements</td>
</tr>
<tr>
<td>Medium Hub</td>
<td>An airport that handles between 0.25% and 1% of the country’s annual enplanements</td>
</tr>
<tr>
<td>Small Hub</td>
<td>An airport that handles between 0.05% and 0.25% of the country’s annual enplanements</td>
</tr>
<tr>
<td>Non-Hub Primary</td>
<td>An airport that handles over 10,000 passengers but less than 0.05% of the country’s annual enplanements</td>
</tr>
<tr>
<td>Reliever Airport</td>
<td>Large general-aviation airports located in a metropolitan area that serve to offload small aircraft traffic from hub airports in the region</td>
</tr>
<tr>
<td>Metro Area</td>
<td>A population center consisting of a large metropolis and its adjacent zone of influence, or of multiple closely adjoining neighboring central cities and their zone of influence. In this case, the metro area is an area with at least one Major Hub airport with surrounding airports that may have a direct effect on air traffic</td>
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<td>Itinerant Operations</td>
<td>Operations performed by an aircraft, either IFR, VFR, or SVFR, that lands at an airport after arriving from outside the airport area, or departs an airport and leaves the airport area</td>
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<td>ASPM 77 Airports</td>
<td>Developed by ATO Chief Operating Officer in an effort to include smaller but significant airports near other major airport groups. For example, Islip (ISP) and Teterboro (TEB) were included in the ASPM 77 to represent the New York area</td>
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Source: “Defining a New Set of ‘FAA Focus Airports’”, By AJG-6, Jim Littleton and Frank Soloninka, May 26, 2010
Appendix D: Structured Teaming Agreement Example
BACKGROUND: The Federal Aviation Administration (FAA) Western-Pacific Regional Administrator and Los Angeles World Airports Executive Director agree, to a strong communications process to provide both organizations with proper and timely coordination on all airside projects and runway safety work at Los Angeles International Airport (LAX). LAX continues to undergo major construction upgrades that will impact all runways at some point and will have a runway closed or shortened a majority of time through 2019.

PURPOSE: This plan documents the ongoing commitment between the two agencies to maintain an active and open dialogue. It ensures timely communications during the planning and execution stages of airfield construction at LAX and it provides project planners with a resource and venue to brief issues up to executives through their senior managers. This plan encourages frequent and routine communications among the existing levels and provides for a structured and organized process of open communications.

PARTICIPANTS: There are three levels of this structured communications plan; they are the executive level, the senior manager’s level and the project planning level. Representation at the executive and senior manager level meetings must include the primary or alternate listed in the contacts section. Any substitutions to this must be coordinated in advance with each level respectively. See Attachment A for contacts of record. Project planning levels are not affected by this communication protocol.

MEETINGS FREQUENCY & LOCATION: The executive level will meet quarterly. The senior managers will meet monthly and when determined by them, will switch to every other month. Meetings for these two levels will be held on site at LAX airport conference rooms, upon availability, however may be moved with prior notice and may last 1 ½ hours. The next meeting will be scheduled at the conclusion of each meeting. Project planning level meeting’s focus and schedules are not changed and participants are encouraged to continue attending routine meetings and conducting business as usual.

BRIEFING & COMMUNICATION NORMS: Discussion and briefings on other relevant aviation programs may be introduced in this forum. Senior managers will maintain frequent communications with immediate executive level and subordinate project planning leads within their organization and if necessary, will brief on current activities at the appropriate meetings. Subject matter experts may be invited on an ad hoc basis and a telecon bridge will be set up for the briefing or discussion. Nothing about this plan is intended to impede other communication channels.

Glen A. Martin
Regional Administrator
Federal Aviation Administration
Date: Oct. 07 2015

Deborah Flint
Executive Director
Los Angeles World Airports
Date: Aug. 27, 2015
Appendix E: Sample Checklists
## Taxiway Re-labeling Checklist

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<td>Review/reproduce diagram(s)</td>
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<td></td>
<td>Contact facility personnel to discuss new changes</td>
<td>X</td>
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<td>Update materials list with new changes</td>
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</tbody>
</table>
Attachment 9 – Recommendation on Improving Awareness, Planning and Execution of Airport Construction

From AC 150/5370-2 - This checklist is intended as an aid, not as a required submittal:

<table>
<thead>
<tr>
<th>Coordination</th>
<th>Reference</th>
<th>Addressed</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for predesign, prebid, and preconstruction conferences to introduce the subject of airport operational safety during construction are specified.</td>
<td>205</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operational safety is a standing agenda item for construction progress meetings.</td>
<td>206</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scheduling of the construction phases is properly addressed.</td>
<td>206</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any formal agreements are established.</td>
<td>205</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drawings showing affected areas are included.</td>
<td>207.a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Closed or partially closed runways, taxiways, and aprons are depicted on drawings.</td>
<td>207.a(1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access routes used by ARFF vehicles affected by the project are addressed.</td>
<td>207.a(2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access routes used by airport and airline support vehicles affected by the project are addressed.</td>
<td>207.a(3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underground utilities, including water supplies for firefighting and drainage, are addressed.</td>
<td>207.a(4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approach/departure surfaces affected by heights of temporary objects are addressed.</td>
<td>207.a(5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads are properly depicted on drawings.</td>
<td>207.a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The airport operator's FOD procedures are described.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Access to taxiways, aprons, or helipads is restricted.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to taxiways, aprons, or helipads is properly coordinated with ARFF personnel.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The location of stocked construction materials is depicted on drawings.</td>
<td>209.a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordination with ARFF personnel response are addressed.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The hospital, and other medical facilities are identified.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detours for ARFF and other airport vehicles are identified.</td>
<td>207.b(2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance of essential utilities and underground infrastructure is addressed.</td>
<td>207.b(3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temporary changes to air traffic control procedures are addressed.</td>
<td>207.b(4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Critical areas for NAVAIDs are depicted on drawings.</td>
<td>208</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effects of construction activity on the performance of NAVAIDS, including unanticipated power outages, are addressed.</td>
<td>208</td>
<td></td>
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</tr>
<tr>
<td>The required distance and direction from each NAVAID to any construction activity is depicted on drawings.</td>
<td>208</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procedures for coordination with FAA ATO/Technical Operations, including identification of points of contact, are included.</td>
<td>208</td>
<td></td>
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</tr>
<tr>
<td>The CSSP addresses areas to which contractor will have access and how the areas will be accessed.</td>
<td>209</td>
<td></td>
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</tr>
<tr>
<td>The application of 49 CFR Part 1542 Airport Security, where appropriate, is addressed.</td>
<td>209</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The location of stockpiled construction materials is depicted on drawings.</td>
<td>209.a</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Coordination | Reference | Addressed | Remarks |
--- | --- | --- | --- |
Temporary changes to taxi operations are addressed. | 207.b(1) | Yes | No |
Detours for ARFF and other airport vehicles are identified. | 207.b(2) | Yes | No |
Maintenance of essential utilities and underground infrastructure is addressed. | 207.b(3) | Yes | No |
Temporary changes to air traffic control procedures are addressed. | 207.b(4) | Yes | No |
Critical areas for NAVAIDs are depicted on drawings. | 208 | Yes | No |
Effects of construction activity on the performance of NAVAIDS, including unanticipated power outages, are addressed. | 208 | Yes | No |
Protection of NAVAID facilities is addressed. | 208 | Yes | No |
The required distance and direction from each NAVAID to any construction activity is depicted on drawings. | 208 | Yes | No |
Procedures for coordination with FAA ATO/Technical Operations, including identification of points of contact, are included. | 208 | Yes | No |
The CSSP addresses areas to which contractor will have access and how the areas will be accessed. | 209 | Yes | No |
The application of 49 CFR Part 1542 Airport Security, where appropriate, is addressed. | 209 | Yes | No |
The location of stockpiled construction materials is depicted on drawings. | 209.a | Yes | No |

Coordination | Reference | Addressed | Remarks |
--- | --- | --- | --- |
The airport operator’s hazardous materials management procedures are addressed. | | | |
Procedures for the immediate notification of airport user and local FAA of any conditions adversely affecting the operational safety of the airport are detailed. | | | |
Maintenance of a list by the airport of responsible representatives/points of contact for all involved parties and procedures for contacting them 24 hours a day, seven days a week is specified. | | | |
A list of local ATO/Technical Operations personnel is included. | | | |
A list of ATCT managers on duty is included. | | | |
A list of authorized representatives to the OCC is included. | | | |
Procedures for coordinating, issuing, maintaining and cancelling by the airport operator of NOTAMs about airport conditions resulting from construction are included. | | | |
Provision of information on closed or hazardous conditions on airport movement areas by the airport operator to the OCC is specified. | | | |
Emergency notification procedures for medical, fire fighting, and police response are addressed. | | | |
Coordination with ARFF personnel for non-emergency issues is addressed. | | | |

Coordination | Reference | Addressed | Remarks |
--- | --- | --- | --- |
The requirement for stockpiles in the ROFA to be approved by FAA is included. | 209.a | Yes | No |
Requirements for proper stockpiling of materials are included. | 209.a | Yes | No |
Construction site parking is addressed. | 209.b(1) | Yes | No |
Construction equipment parking is addressed. | 209.b(2) | Yes | No |
Access and haul roads are addressed. | 209.b(3) | Yes | No |
A requirement for marking and lighting of vehicles to comply with AC 150/5310-5, Painting, Marking and Lighting of Vehicles Used on an Airport, is included. | 209.b(4) | Yes | No |
Proper vehicle operations, including requirements for escorts, are described. | 209.b(5), 209.b(6) | Yes | No |
Training requirements for vehicle drivers are addressed. | 209.b(7) | Yes | No |
Two-way radio communications procedures are described. | 209.b(9) | Yes | No |
Maintenance of the secured area of the airport is addressed. | 209.b(10) | Yes | No |

Wildlife Management

<table>
<thead>
<tr>
<th>Coordination</th>
<th>Reference</th>
<th>Addressed</th>
<th>Remarks</th>
</tr>
</thead>
</table>
The airport operator’s wildlife management procedures are addressed. | 210 | Yes | No |

Foreign Object Debris Management

<table>
<thead>
<tr>
<th>Coordination</th>
<th>Reference</th>
<th>Addressed</th>
<th>Remarks</th>
</tr>
</thead>
</table>
The airport operator’s FOD management procedures are addressed. | 211 | Yes | No |

Hazardous Materials Management

<table>
<thead>
<tr>
<th>Coordination</th>
<th>Reference</th>
<th>Addressed</th>
<th>Remarks</th>
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</thead>
</table>
The airport operator’s hazardous materials management procedures are addressed. | 211 | | |

Notification of Construction Activities

<table>
<thead>
<tr>
<th>Coordination</th>
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<th>Remarks</th>
</tr>
</thead>
</table>
The required distance and direction from each NAVAID to any construction activity is depicted on drawings. | | | |

Procedures for coordination with FAA ATO/Technical Operations, including identification of points of contact, are included. | | | |

The CSSP addresses areas to which contractor will have access and how the areas will be accessed. | | | |

The application of 49 CFR Part 1542 Airport Security, where appropriate, is addressed. | | | |

The location of stockpiled construction materials is depicted on drawings. | | | |
## Runway Closure Delay Mitigation Checklist

### Planning

<table>
<thead>
<tr>
<th>Start Date</th>
<th>Action</th>
<th>POC</th>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 months</td>
<td>Define expected AIRACs</td>
<td>ATCT/TRAAC/ATCS</td>
<td>Identify runway data from FACCs and AIRACs for each</td>
<td>Complete</td>
</tr>
<tr>
<td>6 months</td>
<td>Identify non-technical demand management initiatives (e.g., scheduling changes)</td>
<td>FAA SOG</td>
<td>Modify the effect of personnel or required</td>
<td>In Progress</td>
</tr>
<tr>
<td>6 months</td>
<td>Establish Delay Mitigation (DEM) Team</td>
<td>MTO</td>
<td>Develop an operational plan for airport surface/</td>
<td>Complete</td>
</tr>
<tr>
<td>6 months</td>
<td>Develop contact list</td>
<td>MTO</td>
<td>Communicate the intent and need for each contact</td>
<td>Complete</td>
</tr>
<tr>
<td>6 months</td>
<td>Schedule meetings for all stakeholders</td>
<td>MTO</td>
<td>Communicate the intent and need for each contact</td>
<td>In Progress</td>
</tr>
<tr>
<td>6 months</td>
<td>Provide construction status information</td>
<td>Airport Authority</td>
<td>Provide stakeholders with information about the</td>
<td>On Going</td>
</tr>
<tr>
<td>6 months</td>
<td>Identify required airport modifications</td>
<td>ATCT/Airport Authority</td>
<td>Provide stakeholders with information about the</td>
<td>Complete</td>
</tr>
<tr>
<td>6 months</td>
<td>Negotiate SAA Access</td>
<td>MTO/OCC</td>
<td>Identify special activity airspace access</td>
<td>Complete</td>
</tr>
</tbody>
</table>

### Procedures

<table>
<thead>
<tr>
<th>Start Date</th>
<th>Action</th>
<th>Contact</th>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 months</td>
<td>Develop construction vehicle movement flow strategies</td>
<td>Airport Authority/ATCT</td>
<td>Develop construction vehicle movement flow strategies</td>
<td>Complete</td>
</tr>
<tr>
<td>12 months</td>
<td>Establish air traffic control procedures to manage aircraft departures delays</td>
<td>ATCT</td>
<td>Develop and continuously monitor plan to segregate construction vehicles from normal traffic</td>
<td>Complete</td>
</tr>
<tr>
<td>4 months</td>
<td>Identify surface staging guidance</td>
<td>ATCT</td>
<td>Update and continually monitor plan to segregate</td>
<td>Complete</td>
</tr>
<tr>
<td>4 months</td>
<td>Develop operational procedures for departure space layout</td>
<td>ATCT</td>
<td>Identify surface staging guidance for the airfield.</td>
<td>Complete</td>
</tr>
<tr>
<td>6 months</td>
<td>Review operational procedures</td>
<td>ATCT</td>
<td>Establish operational procedures for departure</td>
<td>Complete</td>
</tr>
<tr>
<td>6 months</td>
<td>Obtain access to ATCT simulator</td>
<td>ATCT</td>
<td>Obtain access to ATCT simulator to practice new procedures</td>
<td>Complete</td>
</tr>
<tr>
<td>12 months</td>
<td>Identify special activity airspace access</td>
<td>ATCT</td>
<td>Identify special activity airspace access</td>
<td>Complete</td>
</tr>
<tr>
<td>12 months</td>
<td>Develop VMC/IMC flow plans</td>
<td>ATCT/TRAAC</td>
<td>Develop VMC/IMC flow plans</td>
<td>Complete</td>
</tr>
<tr>
<td>12 months</td>
<td>Continue to identify and track items for the construction schedule, changes and operational impacts</td>
<td>Airport Authority</td>
<td>Continue to identify and track items for the</td>
<td>Complete</td>
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</tbody>
</table>

### Training

<table>
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<tr>
<th>Start Date</th>
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<th>POC</th>
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<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 months</td>
<td>Develop controller training materials</td>
<td>TRACON/ATCT</td>
<td>Develop controller training materials and</td>
<td>Training</td>
</tr>
<tr>
<td>6 months</td>
<td>Secure ATCT simulator</td>
<td>ATCT</td>
<td>Secure ATCT simulator to be used as a</td>
<td>Complete</td>
</tr>
<tr>
<td>6 months</td>
<td>Develop pilot training materials</td>
<td>AAR/RAAN/AIAA</td>
<td>Develop pilot training materials and</td>
<td>Complete</td>
</tr>
</tbody>
</table>

### Communications

<table>
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<tr>
<th>Start Date</th>
<th>Action</th>
<th>Contact</th>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 month</td>
<td>Develop/Submit HATAC</td>
<td>Airport Authority</td>
<td>Prepare closure d.o.s. for airport closure</td>
<td>Ready in</td>
</tr>
<tr>
<td>1 month</td>
<td>Develop/Submit Impact Statement</td>
<td>TRACON</td>
<td>Provide ACAS information to all relevant</td>
<td>Ready in</td>
</tr>
<tr>
<td>1 month</td>
<td>Develop/Submit Letter to Aircraft</td>
<td>ATCT/Airport Authority</td>
<td>Prepare closure detail statement that should be</td>
<td>Ready in</td>
</tr>
<tr>
<td>1 month</td>
<td>Develop/Submit ‘Closure for Construction’ (or equivalent)</td>
<td>ATCT/Airport Authority</td>
<td>Provide ACAS information to all relevant</td>
<td>Ready in</td>
</tr>
<tr>
<td>1 month</td>
<td>Prepare surface diagram</td>
<td>NEXCO</td>
<td>Prepare surface diagram for each</td>
<td>Ready in</td>
</tr>
<tr>
<td>1 month</td>
<td>Provide air traffic flow plans</td>
<td>ATCT</td>
<td>Provide air traffic flow plans for each</td>
<td>Complete</td>
</tr>
<tr>
<td>1 month</td>
<td>Establish procedures for and conduct daily planning telecon</td>
<td>MTSA/TRAAC</td>
<td>Establish procedures for and conduct</td>
<td>Complete</td>
</tr>
<tr>
<td>1 month</td>
<td>Complete and distribute playbook</td>
<td>MTSA/TRAAC</td>
<td>Complete and distribute playbook</td>
<td>Complete</td>
</tr>
<tr>
<td>1 month</td>
<td>Develop/Submit Letter to Aircraft</td>
<td>ATCT/Airport Authority</td>
<td>Develop/Submit Letter to Aircraft</td>
<td>Complete</td>
</tr>
</tbody>
</table>

### Issues to Resolve

<table>
<thead>
<tr>
<th>Action</th>
<th>Contact</th>
<th>Status</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify and track specific issues to resolve</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>