U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Air Traffic Organization Policy

**ORDER
7100.41**

Effective Date:
April 3, 2014

SUBJ: Performance Based Navigation Implementation Process

This order provides a standardized five-phase implementation process related to Performance-Based Navigation (PBN) routes and procedures, referred to as the "Performance Based Navigation Implementation Process," which has been deemed compliant by the Office of Safety and meets the requirements set forth by the Federal Aviation Administration (FAA) Air Traffic Organization's (ATO) Safety Management System (SMS).

This order applies to the development and implementation of PBN procedures and routes; specifically, Area Navigation (RNAV)/Required Navigation Performance (RNP) Standard Instrument Departures (SID), RNAV/RNP Standard Terminal Arrivals (STAR), and RNP Authorization Required (AR) Standard Instrument Approach Procedures (SIAP), Q, Tango or "T," and TK (helicopter) Routes, and RNAV/RNP transitions to SIAPs.

Development and implementation of RNAV (GPS, GLS, LPV, etc.) and conventional (ILS, VOR, NDB, etc.) SIAPs, routes, position, and airspace modifications are not covered by this order. This order does not eliminate the SMS process required to decommission existing navigation stations.

This order is to be used in conjunction with and does not supersede other FAA orders and directives related to procedure development and implementation.

Elizabeth L. Ray
Vice President, Mission Support Services

2/7/14
Date Signed

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CHAPTER 1: General Information

1.1. Purpose of This Order. This order provides a standardized development and implementation process, referred to as the "Performance Based Navigation Implementation Process." Following this guidance ensures that Safety Risk Management (SRM) has been considered, addressed, and followed in accordance with Air Traffic Organization (ATO) JO Order 1000.37, and the current version of the ATO Safety Management System (SMS) Manual.

This order applies to the development and implementation of Performance-Based Navigation (PBN) procedures and routes, specifically RNAV/RNP SID, RNAV/RNP Standard Terminal Arrivals (STAR), RNP AR SIAP, Q, Tango or "T," and TK (helicopter) Routes, and RNAV/RNP transitions to SIAPs. Development and implementation of RNAV (GPS, GLS, LPV, etc.) and conventional (ILS, VOR, NDB, etc.) SIAPs and routes are not covered by this order. This order does not eliminate the SMS process required to decommission existing navigation stations.

This process is designed to be used by a PBN Work Group (WG) to develop and implement PBN procedures and routes that upon effective establishment meet agreed-upon project goals. It supports efforts ranging in scale from a single route or procedure to larger projects that integrate multiple procedures and/or routes.
Members of other work groups who are participating in or supporting major airspace redesign projects may find that the document provides an effective process for implementation.

The process is divided into five phases:

(1) Preliminary activities,
(2) Development work,
(3) Operational preparations,
(4) Implementation,
(5) Post-implementation monitoring and evaluation.

The Project Tracking Tool (PTT) described in Appendix C provides a tracking mechanism for recording the development, review, and implementation of routes and/or procedures.

This order is to be used in conjunction with (and does not supersede) other FAA orders and directives related to procedure development and implementation. With the publication of this order, all interim ATO safety guidance pertaining to PBN procedure development and implementation as identified in this order is cancelled.

1.2 Audience. This order applies to the following ATO Service Units: En Route and Oceanic, Terminal, Technical Operations, Mission Support, and System Operations; and ATO Safety and Technical Training.

1.3 Where Can I Find This Order? This order is available on the MyFAA Employee Web site at https://employees.faa.gov/tools_resources/orders_notices/.

CHAPTER 2:   Performance Based Navigation Implementation Process

2-1. Process.

This chapter outlines a standardized, systematic process for developing and implementing PBN procedures and routes as described in Chapter 1. Under each step in the process, the chapter lists the various entities involved in that step and their respective roles and responsibilities.

The proponent of a new procedure or route is expected to submit a proposal via the Project Tracking Tool.

   a. The PBN Implementation Process is broken down into five separate phases with specific steps assigned to each.

   b. This phased process may be shortened for amending existing PBN routes and procedures. At a minimum, the project facilitator will send the amended route or procedure design to the WG and stakeholders for concurrence and confirm that each step in the process has been satisfactorily completed or is not required for the amendment. The project facilitator will coordinate with the Service Area Operational Support Group and affected air traffic facilities in determining which process steps are not required.

   c. Conceptual procedure or route designs, requiring waivers to criteria prescribed by Flight Standards Service and/or other FAA directives, fall outside the scope of this order. In this case, consult applicable directives concerning acceptable methods to meet safety compliance requirements. This includes any procedure developed with the intent to reduce/modify existing separation standards; in this case, a waiver with supporting SRMD would be required.

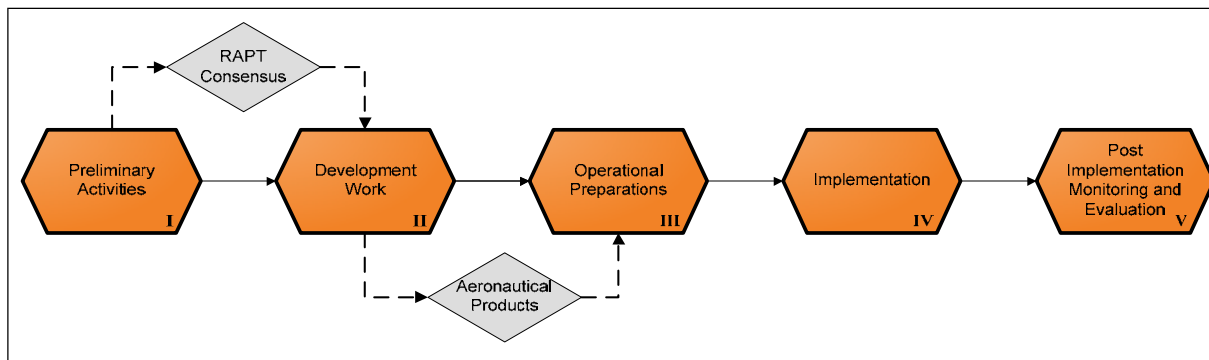   **d.** Figure 1 illustrates the five phases of the PBN development/implementation process.

Figure 1. Performance Based Navigation Development & Implementation Process

2-2. Performance Based Navigation Route/Procedure Development and Implementation Work Group.

The PBN Policy and Support Group provides policy oversight and technical guidance for the implementation of PBN routes and procedures, and recommends the development of supporting design criteria and regulatory standards improvements.

AJV-14 delegates the coordination, development, and implementation of PBN routes and procedures, as described within this document, to personnel assigned to ATO Service Center Operations Support Groups (OSG).

a. **The Core/Full PBN WG:** A project facilitator is responsible for organizing and leading a WG that will carry out the route or procedure development effort. The facilitator sets meeting (virtual, telecom, and/or face-to-face) dates, conducts meetings, develops procedure packages, initiates associated environmental, adheres to the process outline in this order, and ensures that other required development and implementation steps are followed. This includes completing and submitting required documentation and ensures the timely updating of the PTT during each phase of the project. Advancing a project to the next phase indicates that the WG has completed all tasks associated with that phase.

b. **Selection of WG Members:** Appendix A lists the functional positions that should be assigned to the WG and provide subject matter expertise. For example, the group will include a project facilitator, a designated Terminal Area Route Generation, Evaluation, and Traffic Simulation (TARGETS) operator, a lead proponent/operator, OSG specialists, air traffic personnel, and industry representatives. Ensure all stakeholders are included. Appendix A also outlines the roles and responsibilities of each.

2-3. Phase One: Preliminary Activities.

The Preliminary Activities phase is the first phase in the process. In this phase, a work group defines and provides justification for a PBN procedure/route project. During this phase, the WG examines current operations, drafts a mission statement, develops a concept of operations, and records expected benefits. For NAS-wide procedure implementation projects, benefits will be assessed at the program level, not for each individual procedure. This phase begins when a proponent has requested a new route or procedure project and ends when the PBN Policy and Support Group makes a recommendation to the Regional Airspace and Procedures Team (RAPT) based upon the data presented.
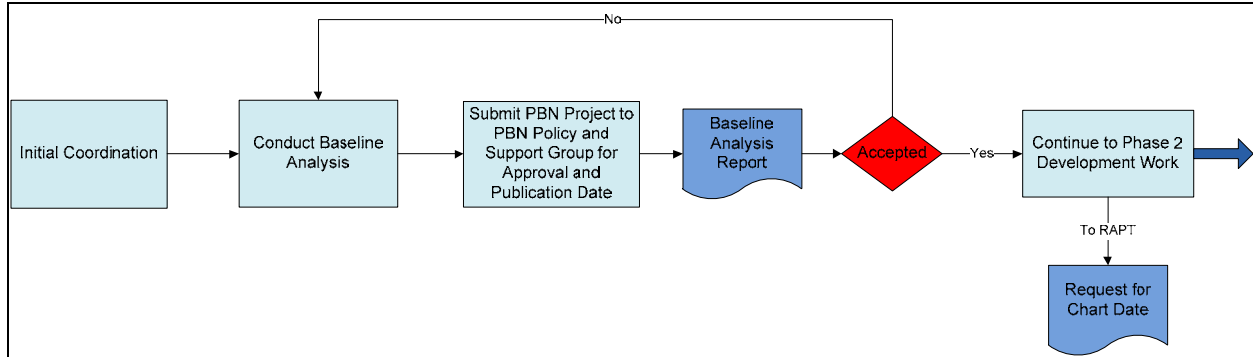
Figure 2. Preliminary Activities

2-3-1. Initial Coordination.

In initial coordination, part of Phase One, a Core Work Group (CWG) is established to perform the baseline analysis and finalize the project mission statement. The CWG may meet in person or coordinate by teleconference.

   a. PBN Policy and Support Group:

      (1) Defines the makeup of a CWG that will perform the tasks outlined in this phase. The composition of this group will depend upon the specific project.

      (2) Appoints a Project Facilitator (PF) (in close coordination with OSG).

      (3) Enters the PF and CWG members' names and contact information into the PTT.

   b. Core Work Group:

      (1) Reviews the request for a new project.

      (2) Researches other past/in-progress projects that might impact or be relevant to the project being proposed.

      (3) Finalizes the project mission statement, which is a concise statement of the project goals. The PF enters the mission statement into the PTT.

2-3-2. Conduct Baseline Analysis.

In this step, the CWG collects and analyzes baseline data to ensure that it is sufficient to evaluate benefits of the final product during the Post Implementation and Monitoring phase. The CWG also analyzes and uses information and knowledge gained to identify expected benefits and develop conceptual procedures or routes for the proposed project. The result of this step is a project Baseline Analysis Report (BAR).

a. Core Work Group:

(1) Documents and records baseline data used for analysis.

(2) Identifies and documents expected benefits for the project.

NOTE - Possible benefits may include reduced level offs for arrivals, increased departure efficiency, increased air traffic flow/capacity, operational independence between traffic flows, increase access to airspace or airports, and/or environmental improvements. Other benefits may include a reduction in the number or cost of ground navigation aids. Expected benefits should be measurable, rather than just general statements.

(3) Develops conceptual procedures and routes in TARGETS.

(4) Reviews applicable PBN-related knowledge databases and historical documents (e.g., PDARs, SDAT, Letters of Agreement, CEDAR, ATSAP, ASAP, ASIAS, etc.) to identify potential constraints that may impact and/or influence the design of the procedures and routes.

(5) Consults with the assigned environmental specialist to identify potential environmental issues and concerns. The CWG must ensure that the required environmental analysis is completed in accordance with environmental orders, and that documentation and appropriate signatures are obtained before the procedure or route is coordinated for publication and implementation.

(6) Identifies potential costs and risks associated with the project. For example, the CWG may assess the additional project time needed to pursue an Environmental Impact Statement (EIS) compared to an expected Categorical Exclusion (CatEX). Documentation of risks associated with the procedure must include potential causes and effects and mitigations must be uploaded into PTT as a subpart of the BAR.

b. Project Facilitator:

(1) Compiles the BAR. The BAR includes the mission statement, baseline of current operations, conceptual procedures and routes, perceived benefits, constraints, and potential costs and risks.

(2) Uploads copies of the BAR and any illustrations of the conceptual routes or procedures to the PTT.

(3) If a procedure is proposed that will not be contained within designated airspace, then a full SMS must be completed. (If an RNAV SID exits Class B early or a PBN SIAP descends below Class B airspace, a full SMS will be required).

2-3-3. Submit PBN Project for Approval and Publication Date.

Project goals and a concept of operations based on the findings documented in the BAR are documented during this step. The findings must include a conceptual design of procedures and

routes to be developed. The conceptual procedures and/or routes must be submitted to the RAPT for prioritization and publication dates. (See FAA Order 8260.43.)

NOTE - During the planning process, the PBN Policy and Support Group, OSGs, Aeronautical Products (AeroNav Products), and Flight Inspection Services, coordinate on a plan for PBN development. Agreements among these organizations are signed to manage the workload and funding expectations.

    a. Project Facilitator:

        (1) Confirms CWG consensus with the content incorporated within the BAR.

        (2) Submits the BAR to AJV-14 for review, approval, and advancement of the project from Preliminary Activities (Phase One) to Development Work (Phase Two).

        (3) Reports back to CWG and the project proponent on the status of the project.

        (4) Submits conceptual procedures and/or routes to the RAPT.

        (5) Confirms that all necessary documentation for Phase One has been uploaded to the PTT.

        (6) Ensures that the distribution package is prepared with enough lead time and that Flight Validation resources are available to meet the intended publication cut-off date.

    b. PBN Policy and Support Group:

        (1) Reviews the BAR and determines whether the project should be submitted to the RAPT.

        (2) If the report is not acceptable, provides the PF with a formal response and determines what additional work needs to be done to pursue additional justification for the project or closes the project out completely.

2-4. Phase Two: Development Work.

The purpose of the Development Work phase, the second phase of the process, is to generate a single PBN procedure or a set of PBN procedures and routes that are operationally viable, flyable, and suitable for submission for approval and publication. During this phase, a full WG is formed; the procedures and routes are designed, evaluated, and checked; and the required documentation is assembled. This phase also includes the initial environmental evaluation.

This phase starts with assembling the full WG and holding a formal project-kickoff meeting. It ends with the submission of the procedures and routes to AeroNav Products.

Occasionally, routes or procedures approved by the WG and forwarded to AeroNav Products may require administrative or other minor changes. In those cases, it may not be necessary to reconvene the entire WG and repeat the steps in this phase. The PF should coordinate with the PBN Policy and Support Group and the affected facilities to determine how to proceed. At a minimum, all WG members should be notified of any changes.
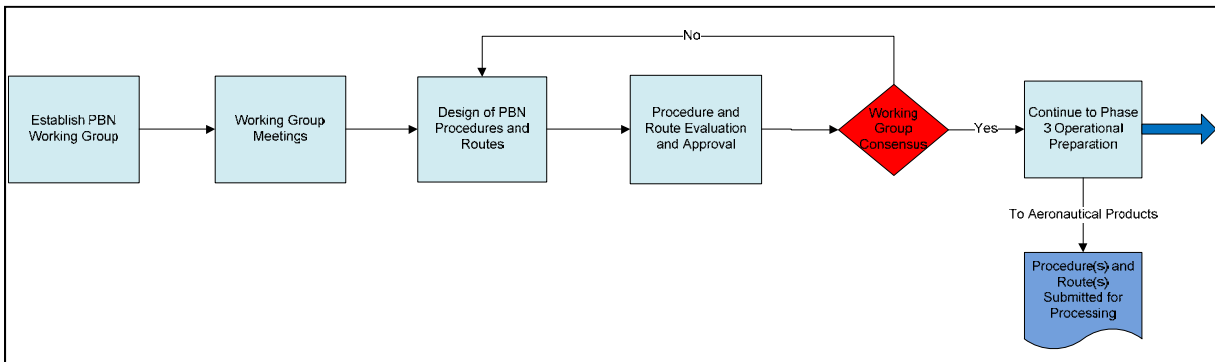
Figure 3. Development Work

2-4-1. Establish PBN Work Group.

The first step in this phase is setting up the WG. For purposes of continuity, this group should include the members of the CWG established in Phase One. The WG may be expanded to include new members and subject matter experts, as needed, to successfully complete the PBN project.

   a. Project Facilitator:

   (1) Coordinates with PBN Policy and Support Group and establishes a WG for the project. Appendix A describes the roles and responsibilities for each WG position and serves as a guide for determining membership composition.

   (2) Schedules a formal kickoff meeting (virtual, telcom, and/or face-to-face) for the members assigned to the WG. The PF should send a formal announcement to WG invitees no later than 30 days prior to the scheduled meeting date. When possible, schedule meetings to allow maximum participation of all stakeholders.

   (3) Maintains a record of those individuals who are invited, as well as those who participate in support of the project. The minutes of meetings/teleconferences should reflect this.

   (4) Ensures the chart date is entered into the PTT when received from the RAPT.

   b. TARGETS Operator:

   The designated TARGETS operator must provide to the PF conceptual procedures and/or routes into a TARGETS file, including sorted radar track data, video maps, and other needed information, as required.

2-4-2. Work Group Meetings.

This section describes the activities involved in planning, conducting, and administering WG meetings. The purpose of the first meeting (kickoff) is to introduce the WG to the proposed

project, including the goals and objectives, perceived benefits, a review of lessons learned from past projects, and (if needed) further refinement of the elements contained in the BAR. The kickoff meeting can also be used to initiate formal procedure and/or route development work. Future meetings of the WG may be conducted via teleconference or face-to-face.

a. Project Facilitator:

(1) Kickoff Meeting Requirements.

   (a) Introduces the process for developing and integrating PBN procedures and/or routes as outlined in this order.

   (b) Considers introducing design basics, potential benefits, safety, and operational considerations.

   (c) Presents and discusses baseline analysis findings, operational concepts, and conceptual procedures and routes.

   (d) Reviews and refines the project mission statement drafted during Phase One.

   (e) Leads discussion on further development of conceptual PBN procedures and routes.

   (f) Encourages presentations by the proponent and industry representatives on operational goals and the operator's perspective.

   (g) Discuss all identified hazards.

(2) Administrative Requirements.

   (a) Maintains project documentation: meeting notes, participant attendance, and action item status.

   (b) Establishes a meeting schedule.

   (c) Establishes a formal project schedule (including timelines, milestones, etc.).

   (d) Updates the PTT with applicable project-related material, progress reports, and project activities, as required, in a timely manner.

b. TARGETS Operator:

(1) Operates TARGETS during meetings.

(2) Provide project documentation, TARGETS files, and other relevant to the PF to load into the PTT.

c. **PBN Work Group Members (all others):**

(1) Participate in kickoff and subsequent WG meetings.

(2) Consider implementation alternatives (e.g., simple design if air traffic facility is new to PBN or a more complex design for air traffic facilities that have previously implemented PBN).

(3) Consider establishing sub-groups to discuss specific issues.

(4) Develop procedures and/or routes that meet project objectives.

(5) Updates the BAR, as necessary.

(6) Communicate any known or suspected hazards associated with the development and implementation of proposed procedures.

2-4-3. Design of PBN Procedures and Routes.

This section describes the roles and responsibilities of those involved with the design of PBN procedures and routes.

a. **TARGETS Operator:**

(1) Evaluates procedure and/or route design in accordance with the procedure criteria outlined in applicable FAA orders. Notifies the project facilitator when procedure and route design does not meet established standards. Waivers should be considered only as a last resort.

(2) Ensures that the procedure and route pass a TARGETS fly ability evaluation and comply with minimum requirements for segment length.

(3) Completes and provides project documentation, TARGETS files, and other relevant data to the PF for review/submission to the OSG.

b. **Air Traffic Facility:**

(1) Identifies and resolves airspace and other procedure and/or route conflicts. Any airspace and/or position/sector changes required will require a specific SMS for those changes.

(2) Considers automation system requirements.

c. **ATO Service Center Operations Support Group:**

(1) Provides the WG with an initial assessment of the level of effort and type of environmental actions required in support of the project proposal.

(2) Provides information on existing communications, navigation and surveillance services, and coverage available, as well as new service requirements (e.g., Expanded Service Volumes, etc.)

   d. Project Facilitator:

   (1) Organizes meetings and teleconference calls as necessary to reach agreement on procedure and route designs.

   (2) Coordinates procedure design criteria waiver requests with the OSG/Flight Procedures Team, as well as the Regional NextGen Branch (RNGB) Manager.

   (3) Coordinates ATC operational waivers with the OSG to include the SMS for each waiver.

   (4) Reviews all documentation for completeness and accuracy and uploads to the PTT.

2-4-4. Procedure and Route Evaluation and Approval.

This section describes the requirement to evaluate the proposed procedures and routes from a design, safety, and operational perspective.

   a. PBN Work Group Members:

   (1) Review the procedures and routes to ensure they meet the project goals.

   (2) Indicate whether they agree or disagree that the procedure or route meets all requirements and is ready to be submitted for further processing. If the Group indicates disagreement, it must provide rationale in the PTT.

   (3) Review and assess all Risks and Mitigations. Discussion and mitigations must be included in PTT.

   b. Air Traffic Facilities:

   (1) Conduct introductory briefings with the workforce and receive feedback.

   (2) Conduct air traffic/flight simulations/modeling as deemed necessary to evaluate the workability of the proposed procedures and/or routes and identify potential adverse impacts (hotspots, conflicts with opposing traffic, etc.). When possible, include pilots in the air traffic simulations.

   (3) Update or create letters of agreement and/or standard operating procedures as needed to accommodate implementation of the procedures and routes. Further SMS on the change to the LOA/SOPs is not required provided the only changes are the addition/inclusion of the new procedure. If other changes are made, appropriate SMS will be required.

(4) Complete the Air Traffic Initial Environmental Review (see FAA Order 7400.2, Appendix 5) using noise analysis from TARGETS or other environmental studies, for review by the OSG Environmental Specialist assigned to the project.

c. Flight Standards/Industry Representative(s):

(1) Evaluates the procedure and/or route in a flight simulator and completes simulator worksheet, if necessary. (See Appendix B or worksheet in TARGETS software.)

(2) Submits simulator worksheets and reports fly ability results and operational issues to the WG. Fly ability results must take into consideration aircraft that represent the current fleet mix at the airport(s) for which the procedures are designed.

(3) The results of the test must have concurrence of the AFS NextGen Branch Manager. A checklist is included in Appendix B.

NOTE - *The Flight Technologies and Procedures Division, Flight Operations Simulations and Analysis Branch, may conduct simulations.*

d. ATO Service Center Operations Support Group:

(1) Reviews and reports on any necessary environmental actions. This includes what actions may be required and what impact may take place regarding the expected implementation date.

(2) Reviews and processes the completed environmental documentation related to the project.

(3) Ensures adherence to the process outlined in this order for SRM compliance.

(4) Reviews and submits the RAPT consensus form to the RAPT.

(5) Follows the RAPT process outlined in FAA Order 8260.43.

(6) Provides the approved RAPT consensus form and chart date to the PF.

(7) Enters project data into the Project Tracking System for National Airspace and Procedures Team (NAPT) tracking.

(8) Reviews and forwards completed documentation packages to AeroNav Products for further processing and publication.

NOTE – *Some of these functions are performed by the FPT, which falls under the OSG.*

e. **PBN Policy and Support Group:**

(1) Coordinates with the OSG to determine if proposed procedures or routes comply with Categorical Exclusion (CATEX) criteria. If a CATEX is not possible, then a decision should be made to pursue an Environmental Assessment (EA) or EIS. See FAA Order 1050.1 for complete guidance on Environmental Policy and Procedures.

(2) Performs an initial noise screening analysis using the TARGETS/Integrated Noise Model (INM) tool or other tools approved by the PBN Policy and Support Group, when required. Works with Air Traffic to gather the necessary data to perform the analysis (i.e., defines typical day, runway usage, track data, etc.). Provides the results to PF for WG review and processing.

(3) Conducts a Distance Measuring Equipment (DME)/DME assessment, using RNAV-Pro for procedures and routes that are not restricted only to aircraft equipped with Global Navigation Satellite System (GNSS). See FAA Order 7470.1.

(4) Provides the results to the PF.

(5) Applies the "override" capability on the PTT to allow the project to advance without receiving consensus from all WG members, if necessary.

f. **Project Facilitator:**

(1) Confirms that the proposed routes and procedures comply with existing FAA orders and requirements. Waiver requests to procedure design criteria must follow the guidance specified in FAA Order 8260.19. Procedures deviating from established procedures specified in FAAO JO 7110.65 and/or other ATO directives will require evaluation under the SRM process and must be documented, coordinated, and approved in accordance with the FAA's ATO Safety Management System Manual.

(2) Confirms that all necessary documentation developed during the development work phase has been uploaded to the PTT.

(3) The results of the test must be approved by the AFS NextGen Branch Manager. A checklist is included in Appendix 1.

2-5. Phase Three: Operational Preparation.

The goal of the Operational Preparations phase of the PBN Implementation Process is to identify any operational items that need to be put in place prior to publishing the procedures or routes. These operational items are necessary for the successful implementation of the PBN project.

During this phase, a series of operational steps, such as training, issuing notifications, considering automation issues, updating video maps, and processing documents, is completed. This phase concludes when all the necessary operational steps have been completed and an implementation date has been set by the WG.
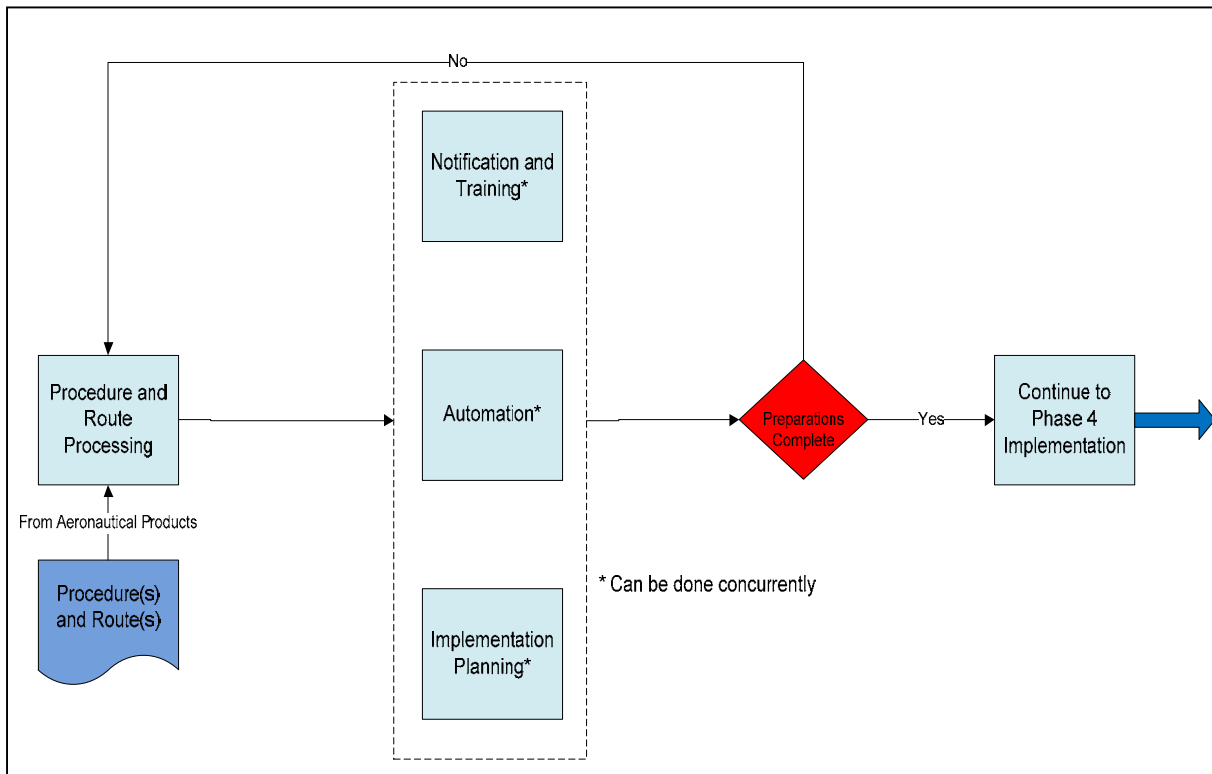
Figure 4. Operational Preparations

2-5-1. Procedure and Route Processing.

This step describes the actions needed to process a procedure or route once the WG finalizes its design.

   a.   ATO Service Center Operations Support Group:

   (1) Coordinates any necessary airspace actions with the Airspace and Rules Group for any rulemaking actions associated with the project. (See FAA Order 7400.2.)

   (2) Airspace chart dates and the procedure publication must match. This action is to ensure new procedures and required controlled airspace is in place at the same time.

b. Project Facilitator:

(1) Maintains close coordination with AeroNav Products to ensure that the procedure and route development is on schedule to meet the chart date, and updates the PTT.

(2) Facilitates the resolution of any issues identified by AeroNav Products.

(3) Monitors the NAPT List and updates the PTT ensuring that dates have been coordinated.

(4) Assists the OSG in preparing documentation required to support airspace or rulemaking actions.

(5) Maintains close coordination with service area and headquarters communications and with navigation and surveillance organizations to ensure that services are available on schedule to meet the chart date, and updates the PTT.

c. AeroNav Products:

(1) Follows the process as outlined in FAA Order 8260.19.

(2) For Q, T, and TK routes, confirms that the final rule and published route chart date coincide.

d. Air Traffic Facilities:

Reviews and provides comment on draft procedures and/or routes.

e. Industry Representative(s):

(1) Confirms that Flight Management System (FMS) navigation database coding and the published charted procedure match FAA-published procedure data.

(2) Reviews applicable chart(s) for errors and omissions.

2-5-2. Notification and Training.

This step provides guidance for notification and training for pilots, dispatchers, and controllers.

a. Air Traffic Facility:

(1) Provides route and procedure information as necessary to develop training.

(2) Verifies that formal training has been completed.

(3) Uses simulation tools as needed for controller familiarization.

(4) Develops controller training material that includes (but not be limited to) the following:

(a) Description of the operational concept.

(b) Phraseology and procedure changes as necessary.

(c) Updated Letters of Agreement, Standard Operating Procedures, and waivers (if applicable).

(d) Timeline for implementation.

(e) This training must include an overview of RNAV/PBN to include latent vulnerabilities.

(5) Completes controller training in accordance with bargaining unit agreement.

(6) Uses the industry representative(s) as a resource to assist with the training to provide the flight crew perspective.

b. Industry Representative(s):

(1) As needed, prepares and distributes pilot training aides and notification material.

(2) Coordinates with other industry representatives as needed on the project.

(3) Should assess their capability to navigate in case of failure of critical DME while airborne. (See AC 90-100 preflight requirements.)

c. ATO Service Center Operations Support Group:

Advises industry groups (Air Transport Association, Regional Airlines Association, National Business Aircraft Association, etc.) of new procedure and/or route development and conducts meetings as necessary to explain the work.

2-5-3. Automation.

This step provides guidance on automation activities to be completed prior to the procedure and/or route implementation. Generally, a 6-month lead time is needed for automation personnel in preparation for implementation. This period may vary depending on workload and complexity of the implementation.

a. Air Traffic Facility:

(1) Ensures that coordination occurs between all affected facilities, including first and second tier facilities. Determines each participating facility's specific automation requirements.

(2) Ensures that data tags and scratch pad requirements have been identified and addressed. Coordinates with adjoining facilities, which is required to ensure that the fix-pair information is the same at all facilities.

(3) Reviews inter/intra-facility handoff procedures for possible modifications.

(4) Evaluates the impact of the new procedure and route relevant to the flight plan filing system to ensure that identified issues have been resolved.

(5) Obtains and installs updated video maps in preparation for implementation.

(6) Coordinates with the OSG to determine if any further SMS is needed.

2-5-4. Implementation Planning.

This step describes factors to consider when developing the plan to implement procedures and/or routes.

a. PBN Work Group:

(1) Determines a date to implement the new routes/procedures.

(2) Considers validation flights with operators prior to wide-scale implementation. This provides a controlled atmosphere to identify unanticipated operational/ATC issues and permits initial data collection of flight tracks and profiles.

b. Industry Representative(s):

If needed, updates the flight planning system database and company-stored preferred routes.

c. Project Facilitator:

(1) Coordinates with the OSG to confirm that all required safety, environmental, flight inspection, and rulemaking activities are complete.

(2) If a Go-Team is needed, then a full SRMP must be established with corresponding SRMD. The Go-Team will be on site during the initial implementation to address any ATC or operator issues. Participants of a Go-Team may include a cross section of disciplines, such as operators, Flight Standards personnel, air traffic facility representatives, WG members, etc. The Go-Team is a sub group of the WG.

2-6. Phase Four: Implementation.

The goal of the Implementation Phase of the PBN Implementation Process is just that—implementing the routes and/or procedures as designed. This phase starts with confirmation by the WG that all steps required up to this point have been completed; it ends when the PBN-based procedures and/or routes are published and implemented.
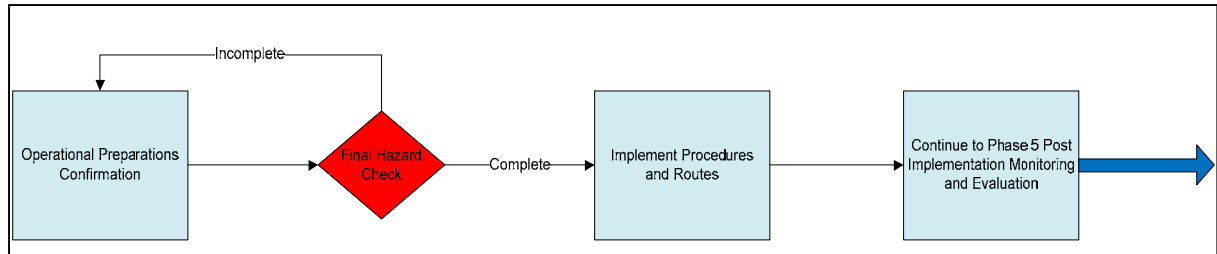
Figure 5 Implementation

a. **Operational Preparations Confirmation**.

This step describes the actions taken just prior to the use of the new/revised procedures and routes.

(1) **PBN Work Group:**

(a) Confirms that all activities required for the safe implementation of the routes and/or procedures in this project have been completed.

(b) Reviews PTT to ensure completeness.

(2) **Go-Team:**

Locates itself on-site, or is readily available, for the initial implementation of the routes and/or procedures.

b. **Implementation of Procedures and Routes.**

Routes and procedures are typically available to be flown on their chart date in order to coincide with new or current database installations in both the facility systems and the aircraft. However, there are times when circumstances dictate delaying implementation to a date beyond the chart date. The implementation milestone is considered to have been met when the procedures and/or routes are available to be flown.

2-7. Phase Five: Post Implementation Monitoring and Evaluation.

During the final phase, Post Implementation Monitoring and Evaluation, the operation of the procedures and/or routes are observed to ensure they perform as expected and meet the mission statement finalized during the Development phase. Post-implementation activities also involve collecting and analyzing data to ensure that safe and beneficial procedures were developed.

This phase starts with the use of the procedures and routes, including the monitoring of the initial usage. The phase ends with the completion of the PBN Post Implementation Analysis Report and the closing of the project.
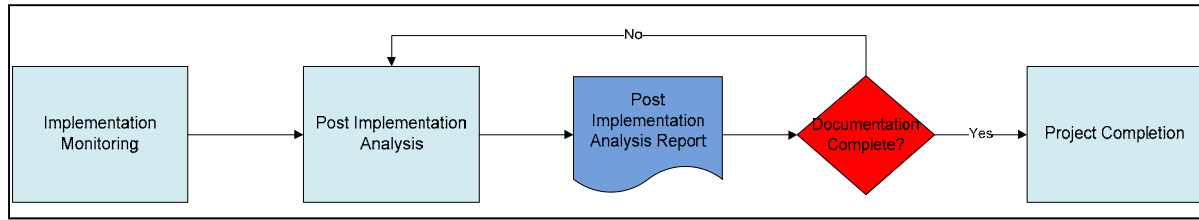
Figure 6. Post Implementation Monitoring and Evaluation

2-7-1. Implementation Monitoring.

Implementation monitoring comprises the steps required for the initial monitoring of the routes and/or procedures. This process starts with the first operational use of the procedures and/or routes. The WG will monitor implementation of the procedure and/or route for approximately 60 sixty days and then transfer those responsibilities to the affected facility/facilities. The monitoring must include a review of ASAP, ATSAP, MOR, EOR, PD reports, ASIAS, etc. data.

    a. Project Facilitator:

        (1) Documents any issues with the initial usage of the routes and/or procedures.

        (2) Conducts face-to-face meetings or teleconference calls to discuss implementation issues and overall performance.

        (3) Recommends issue resolutions to the WG.

        (4) Must mitigate causes of all events/concerns associated with the procedure.

        (5) Ensure appropriate notification to all stakeholders of the impending implementation to include notification of additional amendments that arise.

    b. Air Traffic Facility:

        (1) Collects radar track, dependent surveillance location/track information, and other data for post-implementation analysis.

NOTE – Collect data from the service center concerning CNS related issues and/or anomalies that affect the route or procedure.

        (2) Documents operational incidents in accordance with FAAO JO 7210.632, *Air Traffic Organization Occurrence Reporting.*

        (3) Coordinates procedure and/or route design concerns with the Project Facilitator for possible redesign or mitigations.

(4) Implements changes as necessary to resolve problems (NOTAM N/A, alternate ATC instructions, etc.).

2-7-2. Post Implementation Analysis.

This section describes the steps necessary to conduct a post-implementation analysis study once the procedures and routes have been published and are being used. The goal of this study is to verify that the new procedures and/or routes met objectives (e.g., efficiency, safety, controller workload, capacity, etc.) and to collect lessons learned. The results of the post-implementation analysis study should be published in the Post Implementation Analysis Report (PIAR) within four months of the implementation date.

a. **PBN Work Group:**

(1) Gathers data from the affected facilities (dependent surveillance location/track information, radar track data, issues/anomalies, ASAP, ATSAP, MOR, EOR, PD reports (FAA Form 8020-17, and FAA Form 8020-18) etc.).

(2) Estimates the benefits derived from the project using the metrics defined in the Phase One.

(3) Interviews operators and air traffic control personnel and gathers lessons learned.

(4) Drafts the Post Implementation Analysis Report.

(5) Recommends process and implementation improvements.

b. **Air Traffic Facility:**

(1) Provides radar track data for flights using PBN project procedures and routes to the CWG.

(2) Discusses any issues or anomalies, areas of possible improvement, and any lessons learned.

(3) Follows the aforementioned guidance specified in 2-7-1 (b) (3), as necessary, to document unusual occurrences pertaining to the procedure implementation.

c. **Project Facilitator:**

(1) Uploads the PIAR to the PTT.

(2) Enters lessons learned into the PTT.

(3) Submits the PIAR, including lessons learned, to AJV-14 .

2-7-3. Project Completion.

This marks the end of the project.

    a. The PF confirms that all required documentation is complete and that all required project files and documentation have been uploaded to the PTT.

    b. The PBN Policy and Support Group closes out the project.

2-8. Documentation Requirements.

This paragraph lists the documentation that must be completed and retained. All documentation, both original and revised, must be entered into the PTT.

    a. Baseline Analysis Report.

    b. PBN WG Contact List.

    c. Flight Simulator Worksheet, when required.

    d. Procedure and route documentation including, but not limited to, Terminal Area Route Generation, Evaluation, and Traffic Simulation (TARGETS) files.

    e. TARGETS distribution packages.

    f. FAA forms.[1]

    g. Waiver(s) from FAA standards,[2] when required.

    h. RAPT consensus form.

    i. Records of environmental reviews, actions, and decisions.

    j. Flight Inspection Procedure Control Form.

    k. Post Implementation Analysis Report.

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[1] Refer to the appropriate FAA Order for instructions for completing these forms.
[2] Refer to FAA Order 8260.19 (criteria)/FAA ATO SMS Manual 2.1 for instructions to complete a waiver.

Appendix A. PBN Work Group Roles and Responsibilities.

1. Purpose.

This appendix contains a list of the principal participants of the PBN Work Group (WG) and prescribes the roles and responsibilities that each must fulfill to ensure the successful coordination, development, and implementation of PBN procedures and/or routes.

NOTE - Other parties not listed who may have a vested interest in the route or procedure may also be included in the WG (e.g., user groups, Flight Management Computer (FMC) manufacturers, chart and database suppliers, etc.).

2. Proponent.

The proponent is the organization or individual who originally requests implementation of a new route/procedure.

Primary roles and responsibilities include:

   a. Submitting the proposed procedure and/or route.

   b. Participating in the WG meetings, especially to provide background information and justification for the requested route and/or procedure, and assisting in the drafting of the Project Mission Statement and Baseline Analysis Report.

3. Project Facilitator.

The Project Facilitator is appointed through coordination between the OSG/PBN Policy and Support Group and serves as the focal point for coordinating WG activities, both internal and external to the WG.

Each facilitator should be trained in SMS and facilitation. Because of the highly technical nature of the project facilitator and because following the process is mandated to ensure proper SMS compliance, each facilitator should receive specific SMS training.

Primary roles and responsibilities include:

   a. Using the PTT to update project progress, ensuring that all necessary actions are complete, and archiving all relevant project documentation and files.

   b. Leading meeting/teleconference discussions, updating the project schedule, and maintaining all project documentation.

   c. Tracking open or completed issues and tasks.

   d. Providing updates to the WG on procedure and/or route status as needed.

   e. Providing assistance to the Go-Team to identify, track, and resolve issues.

4. TARGETS Operator.

The TARGETS operator is assigned based upon coordination between the OSG, the air traffic facility, and the PBN Policy and Support Group. Typically, the TARGETS operator is a person from the air traffic facility involved in the project. In addition, other TARGETS operators may be assigned to support the primary TARGETS operator, as needed.

Primary roles and responsibilities include:

a. Operating and updating TARGETS software.

b. Installing current data such as video maps, obstacle and terrain data, and national aviation databases ensuring that all databases referenced are current.

c. Provides project documentation, TARGETS files, and other relevant data to the PF.

5. ATO Service Center Operations Support Group (OSG).

Provides effective oversight and support for procedures, changes to the NAS, affecting operations, NAS effectiveness and efficiency, and special activities within the NAS for ATO Service Units, and other FAA organizations as requested to align with and support FAA's NAS objectives.

Primary roles and responsibilities include:

a. General.

(1) Reviewing procedure/route proposal requests and prioritizing the same in accordance with FAAO 8260.43.

(2) Ensuring that a chart date for the procedure/route has been established.

(3) Providing assistance to air traffic facilities to support procedure/route design and implementation.

(4) Assigning an environmental specialist to assist the WG in complying with environmental policies and issues related to the project. Ensuring that the environmental specialist reviews the preliminary package to determine that proper environmental guidance has been applied to the proposed route/procedure.

(5) Coordinating with the air traffic facility to complete an airspace review to ensure that the proposed procedure is compatible with existing procedures and contained wholly within controlled airspace. If the OSG determines that the proposed route or procedure is not compatible, it consults FAA Order 8260.19 and coordinates actions to comply with the requirements stated therein.

(6) Coordinating with the Airspace and Rules Group as necessary. Regulatory route actions are submitted to Airspace and Rules Group for processing in accordance with FAA Order 7400.2 guidance.

(7) Assisting the RNGB in disseminating procedure and route data to industry for review and ensuring that operators are notified of implementation.

(8) Coordinating ATC operational waivers with FAA Headquarters.

b. Flight Procedures Team.

(1) Providing technical assistance on procedure and route development.

(2) Reviewing the design for compliance with criteria.

(3) Coordinating with the Regional NextGen Branch Manager to develop any required waivers from criteria.

(4) Reviewing procedure documentation for completeness and accuracy and forwarding the procedure package to AeroNav Products.

6. Regional NextGen Branch.

The NextGen Branch provides standardization, and it supports the Flight Standards Division Manager in the following areas: Development and Implementation of Communications, Navigation, and Surveillance & Air Traffic Management Technologies, Domestic Category II & III Approach Procedures, Surface Movement Guidance Control System Operations, Airman and Aircraft Certification for Reduced Visibility Flight Operations, including CAT II & III Operations, Special Instrument Approach Procedures, Instrument Flight Procedures Waivers, Foreign Instrument Approach Procedures, Airport Airspace Analyses, Modifications to Airport Standards, Obstruction Evaluations, National Airspace System Change Proposals, and Unmanned Aerial Systems.

Primary roles and responsibilities include:

a. Assisting industry representatives and Principal Operations Inspectors (POI) in assessing the fly ability of the procedure, including flight deck human factors and training issues.

b. Assisting the FPT with developing requests for waivers from criteria and determining an equivalent level of safety.

c. Providing technical assistance on the development of new or significantly modified existing PBN procedures. This assistance must be focused on the operational, human factors, and crew training aspects of the procedure during development and post-implementation evaluation.

d. Assisting industry representatives and POIs with the identification of likely participants and the distribution of related pilot/dispatch training aids materials and operator bulletins and briefings.

e.   Assisting in notifying operators of procedure and route design, clearance requirements, and any other relevant issues.

f.   Participating in "Reach Out" programs for new PBN procedures and routes.

7.   AeroNav Products.

The Aeronautical Products organization serves as the FAA's aeronautical charting authority for the publication of aeronautical charts and products. It assembles and constructs products from authoritative aeronautical sources. It is an accountable source for the development and maintenance of instrument flight procedures, and it plans and directs the construction and maintenance of aeronautical charts and products to meet the operational requirements of the FAA and ATO.

Primary roles and responsibilities include:

a.   Supporting OSG personnel as requested.

b.   Providing guidance if a procedure does not meet criteria (e.g., excessive leg lengths, turn radii, bank angle, etc.). If a procedure cannot be designed to conform to current criteria due to local air traffic or environmental reasons, AeroNav Products provides direction on waiver options and assists in waiver development and submission.

c.   Processing procedures and routes that have been submitted. Forwarding a copy of the completed documentation and flight inspection results to the originating OSG, NFDC and organizations, as requested.

d.   Providing procedure packages to Flight Inspection Services for flight inspection that include data required to accomplish the flight validation.

e.   Coordinating priorities for publication and changes to the chart dates with Flight Inspection Services.

8.   Industry Representative(s).

Typically, an industry representative is identified by AJV-14 and is asked to represent operational perspectives on the project. Several industry representatives may participate on a WG. Although participation of at least one industry representative is highly encouraged, it is not mandatory. For purposes of continuity and consistency, the industry representative(s) should be available throughout the life cycle of the project and speak for Industry as a whole.

Primary roles and responsibilities include:

a.   Providing feedback on procedure design, fly ability, and potential Flight Management System (FMS) operational considerations. FMS expertise is recommended for industry representatives.

    b.   Conducting simulations to assess fly ability, flight crew human factors, and operational issues before a procedure is submitted to AeroNav Products for review. A Flight Simulator Worksheet for PBN procedures is provided in Appendix B.

    c.   Disseminating procedure and route data to other operators for review and simulation in additional aircraft types, ensuring that the Flight Simulator Worksheet is submitted to the project facilitator and distributed to other operators.

    d.   Coordinating simulator and flight crew simulator evaluations, with RNGB and, as appropriate, with the FAA Principal Operations Inspector (POI).

9. Air Traffic Facilities.

All air traffic facilities, affected by the procedure and /or route development and implementation should participate on the WG. The facility most directly affected by the procedure and route may be designated as the lead air traffic facility.

Primary roles and responsibilities include:

    a.   Serving as the focal point for ATC-related coordination and providing assistance in resolving problems identified during the development process.

    b.   Providing information to the WG regarding traffic flows and operational considerations (e.g., arrival/departure routes, aircraft types and characteristics, minimum instrument flight rules [IFR] altitudes, airspace boundaries, sector requirements, and standard operating procedures SOP).

    c.   Providing data to the WG (e.g., radar track data, letters of agreement, standard operating procedures, etc.), which contain information on current or anticipated flight operations in order to define flight profiles and/or separation procedures.

    d.   Addressing and coordinating facility concerns regarding procedure design and implementation requirements. At a minimum, this must include evaluation of the need for training and notification, new ATC procedures, phraseology, equipment, and changes to automation.

10. Airport Authority.

Primary roles and responsibilities include:

    a.   Providing input on procedure and route design, including any potential operational or environmental impacts to the airport and surrounding communities.

    b.   Providing information concerning planned airport construction that may impact procedure and/or route implementation.

    c.   Providing current airport obstacle data to the WG, as required.

11. Flight Inspection Services.

Primary roles and responsibilities include flight inspection and flight validation in accordance with FAA Order 8200.1, ICAO Document 8071, and ICAO Document 9906.

12. PBN Policy and Support Group:

Primary roles and responsibilities include:

a. Making an initial determination whether a proposed procedure and route project should be undertaken and submitted to the RAPT for approval.

b. Assisting the WG as needed.

c. Coordinating with the OSG to define core and WG membership.

d. Verifying and validating SMS compliance during the lifecycle of procedure and route development.

Appendix B. Flight Simulator Worksheet and Instructions

(1) Operator Name:					
(2) Procedure Name:		(3) Date:			
(4) Type (e.g., CARJ/F):		(5): LNAV/VNAV Engage Point:			
(6) FMC/GPS Manufacturer:		(7) FMC/GPS Software Version:			
(8) Initial Wind Setup:					
(9) Rwy and En Route Transition Flown:					
(10) Max allowable Takeoff Wt. of A/C:					
(11) Takeoff Thrust used:					
(12) Max Surface Tailwind (SID only):					
(13) Temperature (ISA):					
(14) Type of Guidance:					
(15) Navigation Source:					
(16) Other:					
(17) Remarks:					
(18) Completed by:			(19) Phone Number:		
(20) Attach a print out of the FAA LEG TYPE coding and a copy of the lateral and vertical track from the procedure flown.					

Figure 7. Flight Simulator Worksheet

(21) Procedure Name			(22) Run #		

FLIGHT SIMULATOR WORKSHEET.

These instructions are for completing the simulator worksheet by Lead Operator personnel. This worksheet may be used by any operator involved in the development of procedures. Once completed, a copy of the worksheet must be distributed to the WG for review.

BLOCK 1.   OPERATOR NAME.   Enter the name of the airline/facility conducting the simulation.

BLOCK 2.   PROCEDURE NAME. Enter the RNAV procedure name (e.g., PAIGE RNAV Five Departure).

BLOCK 3.   DATE.   Enter the date simulations were accomplished.

BLOCK 4.   TYPE.   Enter the aircraft type and equipment suffix (e.g., CARJ/F).

BLOCK 5.   LNAV/VNAV ENGAGE POINT.   For Standard Instrument Departures (SID), enter the point at which LNAV/VNAV is engaged (as specified in operator operations manual).

BLOCK 6.   FMC/GPS MANUFACTURER.   Enter the FMC or GPS Stand-Alone manufacturer's name (e.g., Honeywell, Smiths, etc.).

BLOCK 7.   FMC/GPS SOFTWARE VERSION.   Enter the FMC or GPS Stand-Alone software version.

BLOCK 8.   INITIAL WIND SETUP.   Use historical wind data when available. If historical wind data is not available, use in-flight Tailwind of 30 knots. at 1,000 feet and increase by 10 kts. every 2,000 feet until reaching 80 kit tailwinds. Record the wind used in Block 8.

BLOCK 9.   RUNWAY AND EN ROUTE TRANSITION FLOWN.   Enter the runway and en route transition flown.

BLOCK 10.   MAX ALLOWABLE TAKEOFF WT. OF AIRCRAFT.   Enter the takeoff weight – Fly procedures at maximum allowable takeoff weight.

BLOCK 11.   TAKEOFF THRUST USED. Enter the takeoff thrust used – List either the reduced or the maximum takeoff setting used (Max allowable per conditions).

BLOCK 12.   MAX SURFACE TAILWIND. Enter the surface tailwind – Initiate takeoff with 10 kt tailwind component.

BLOCK 13. TEMPERATURE ISA.   Enter the ISA temperature – Fly the procedure at Average Max Summer temperature for the airport and use indicated climb gradients.

BLOCK 14.   TYPE OF GUIDANCE. Enter the type of flight guidance used. The preferred flight guidance is the autopilot. List others if used (e.g., Flight director or CDI).

BLOCK 15.   NAVIGATION SOURCE. Not required for PBN.

BLOCK 16.   OTHER. Enter any work group-specified conditions (e.g., crosswind component).

BLOCK 17.   REMARKS.   Enter any remarks about the procedure design or fly ability.

BLOCK 18.   COMPLETED BY.   Enter the name of the person completing the form.

BLOCK 19.   PHONE NUMBER.   Enter an appropriate contact phone number of the person completing the form.

BLOCK 20.   ATTACHMENT.   Attach a print out of the LEG TYPE coding and lateral/vertical track for each run flown.

BLOCK 21.   PROCEDURE NAME.   This block should be identical to Block 2.

BLOCK 22.   RUN NUMBER.   Enter the sequential number of this run. Blocks 21 through 27 should be completed for each run.

BLOCK 23.   WAYPOINT NAME.   Enter the name of waypoint passed by the aircraft (Complete sheet for each run completed).

BLOCK 24.   ALTITUDE.   Enter the aircraft altitude as it passes the waypoint listed in Box 21.

BLOCK 25.   AIRSPEED/GROUNDSPEED.   Enter the aircraft air/ground speed as it passes the waypoint listed in Block 23.

BLOCK 26.   TURN ANTICIPATION DISTANCE.   Enter the aircraft turn anticipation distance passing the waypoint listed in Box 21.

BLOCK 27.   WIND.   Enter the wind direction and velocity as the aircraft passes the waypoint listed in Block 23.

Appendix C. Project Tracking Tool.

1. Purpose.

The purpose of this appendix is to describe the use of the Project Tracking Tool (PTT). The PTT provides a tracking mechanism to expedite the development, review, and implementation of PBN procedures and routes. It provides project management functionality for the WG, along with access to view the progress of the PBN projects.

The PTT is designed to follow the process defined in Chapter 2 of this order. It includes an archival function for the project documents. This tool keeps a log of all the interactions, including the date, time, and name of user entering or modifying the information. All of these features are needed to satisfy the SMS requirements.

2. Using the Project Tracking Tool.

The PTT is designed to be used by WG participants and others who are involved with the actual development and implementation of the PBN procedures and routes or by those who provide program management of safety oversight.

This section outlines how to use the tool.

a. **Proponent:**

   (1) Initiates the project by requesting a project.

   (2) Monitors progress of the development of the procedures and/or routes.

b. **Project Facilitators:**

   (1) Uses the PTT for PBN project management.

   (2) Ensures that expected completion dates are maintained throughout the project.

   (3) Ensures that all of the required items listed in the PBN Implementation Process are updated and uploaded to the PTT.

   (4) Advances the project to the next phase, when required items and information for the current phase are completed.

c. **PBN Work Group Members:**

   (1) Updates information as required in the PBN Implementation Process.

   (2) Conducts electronic correspondence via the PTT email/discussion feature.

   (3) Confirms consensus with the submission of the conceptual routes/procedures to the RAPT.

   (4) Agrees to progression from Phase Two to Phase Three, or provide rationale for dissent.

    d. PBN Policy and Support Group:

      (1) Responds to Proponent's requests for a PBN projects.

      (2) Monitors project progress and reports status of all assigned PBN projects.

      (3) Confirms completeness of specific documents and information entered.

      (4) Approves project requests.

      (5) Manages access to the PTT and defines business rules for its use.

      (6) Provides instruction to users on the use of the PTT.

3. Information to be Entered into the Project Tracking Tool.

This section describes the information that is required to be entered into the PTT during each phase of the development process. The information is a minimum requirement in order to satisfy the SMS process. Additional information on how to gain access to the tool and the specifics on how to use the tool can be found by contacting the PBN Policy and Support Group.

The following terms are used to describe specific actions:
- **Enter** means to add text to a specific field.
- **Indicate** means to check a box and enter a date when the task is complete.
- **Update** means to modify existing information.
- **Upload** means to attach a file using the Attachments tab in the tool.

WG members should conduct electronic correspondence through the PTT email/discussion feature.

    a. Submitting the PBN Project Request:

    Some general information is required to begin the PBN project. This information is provided by the proponent.

      (1) A mission statement that describes the project and its goals.

      (2) The project proponent's name and contact information.

      (3) A requested procedure and route information, including the procedure or route type, and airport and runway information, if applicable.

      (4) The requested publication date for the procedures and routes.

    b. Preliminary Activities:

    Once the PBN Policy and Support Group accepts the proposed request, the project will transition to the preliminary activities phase.

      (1) Enter the CWG members' names and contact information.

(2) Enter the project facilitator's name and contact information.

(3) Update the project mission statement.

(4) Upload the conceptual procedures and routes information (i.e., TARGETS files or graphical representation).

(5) Upload meeting notes, including a list of attendees.

(6) Upload the Baseline Analysis Report.

(7) Indicate CWG consensus with the submission of the conceptual routes/procedures to the RAPT.

c. Development Work:

Once the Conceptual Routes/Procedures request has been submitted to the RAPT, the project facilitator transitions the project to the Development Work phase.

(1) Indicate that the RAPT consensus form has been received and uploaded.

(2) Enter the WG members' names and contact information.

(3) Enter kickoff meeting date.

(4) Upload meeting notes, including a list of attendees.

(5) Update project summary, procedure and route information, and WG information as needed.

(6) Indicate flight simulations are complete, when applicable, and upload results.

(7) Indicate air traffic simulations are complete, when applicable, and upload results.

(8) Indicate DME/DME assessment is complete, and upload results when applicable.

(9) Indicate whether there is a waiver request, and upload supporting documentation when applicable.

(10)   Indicate the Initial Environmental Review is complete, and upload results.

(11)   Enter WG member consensus, with project advancing to next phase.

(12)   Indicate routes and procedures have been submitted for processing.

d. Operational Preparation:

Once the procedures and routes are submitted for processing, the project facilitator transitions the project to the Operational Preparations phase.

(1) Procedure and Route processing.

(a) Indicate rulemaking activities are complete, if applicable.

(b) Indicate procedure and/or route process has been completed by AeroNav Products.

(c) Indicate the date when the procedure and/or route flight inspection are complete.

(2) Notification and Training

(a) Indicate ATC training and notification are complete.

(b) Indicate operator readiness is complete.

(3) Automation

(a) Indicate air route traffic control center (ARTCC) automation updates are complete.

(b) Indicate terminal automation updates are complete.

(c) Indicate operator flight planning system updates are complete.

(d) Indicate video maps updates are complete.

(4) Implementation Planning

(a) Confirm database and chart match the FAA source data.

(b) Enter date when the procedure and routes will be implemented.

(c) Enter Go-Team roster.

e. Implementation:

Once the operational preparation phase is complete, the project facilitator transitions the project to the Implementation phase.

(a) Enter confirmation that Operational Preparation items are complete.

(b) Enter the date when procedures and routes were implemented.

f. Post Implementation Monitoring and Evaluation:

Once the Implementation phase is complete, the project facilitator will transition the project to the post implementation monitoring and evaluation phase.

(a) Indicate that the project review is complete.

(b) Upload the post implementation analysis report.

(c) Close the project and enter project final remarks.

Appendix D. Acronyms, Terms, and Definitions.

Acronym/Term	Definition
A/C	Aircraft
AFS	Flight Standards Service
ATSC	Air Traffic Service Center
RNAV	Area Navigation. A method of navigation that permits aircraft operation on any desired flight path within the coverage of station-referenced navigation aids or within the limits of the capability of self-contained aids or a combination of both.
ARTCC	Air Route Traffic Control Center
ASAP	Aviation Safety Action Program
ASIAS	Aviation Safety Information Analysis and Sharing
ATC	Air Traffic Control
ATO	Air Traffic Organization
ATS	Air Traffic Service
ATQA	Air Traffic Quality Assurance. Formerly known as the National Airspace Incidents Monitoring System, the ATQA database is a collection of databases specific to certain subjects (near midair collisions, pilot deviations, vehicle/pedestrian deviations.
ATSAP	Air Traffic Safety Action Program. ATSAP is a non-punitive, voluntary reporting program for ATC employees modeled after the Aviation Safety Action Program (ASAP). It allows employees to submit safety concerns and deficiencies so issues can be resolved before a major error occurs.
ASIAS	Aviation Safety Information Analysis and Sharing. ASIAS is a data warehouse and integrated database system. It enables users to perform queries across multiple databases and display queries in useful formats.
CATEX	Categorical Exclusion
CDI	Course Deviation Indicator
CEDAR	Comprehensive Electronic Data Analysis and Reporting. CEDAR is a tool that provides air traffic management with an electronic means of assessing air traffic employee performance, managing resources, and capturing safety-related information and metrics. The tool provides a standard interface for the collection, retrieval, and reporting of data from

multiple sources. It also automates the creation, management, and storage of facility activities and events; briefing items; Quality Assurance Reviews; technical training discussions; and FAA forms.

Chart Date   Publication date for route/procedure. The date is based on a 56-day cycle.

CNS   Communications, Navigation, and Surveillance

DME   Distance Measuring Equipment

DME/DME Coverage   Distance Measuring Equipment. DME Coverage is the area where the availability of DME facilities permits the minimum standard RNAV system performance, as defined in FAA Advisory Circular 90-100 or AC90-105.

EA   Environmental Assessment

EIS   Environmental Impact Statement

EOR   Electronic Occurrence Report

FAA   Federal Aviation Administration

Fix   A generic term used to define a predetermined geographical position used for route definition. A fix may be a ground-based NAVAID or a waypoint, or it may be defined by reference to one or more radio NAVAIDs.

FMC   Flight Management Computer

FMS   Flight Management System

FPT   Flight Procedures Team

Go-Team   An "if needed" sub group of the WG established to monitor or address any ATC or operator issues associated with the turning on of a procedure(s). The team can be in place or telecom.

GNSS   Global Navigation Satellite System

GPS   Global Positioning System

ICAO   International Civil Aviation Organization

ID   Identification

IMC   Instrument Meteorological Conditions

INM   Integrated Noise Model

IFR   Instrument Flight Rules

Industry Representative(s)   One or more operators who have agreed to serve as the focal point for the development of an airport project for designing and implementing PBN routes/procedures. Industry representatives agree to help develop the procedures and routes and ensure fly ability by all aircraft expected to use the routes/procedures.

ISA   International Standard Atmosphere

Kt   Knot

Leg Type   See "Path and Terminator" below

LNAV   Lateral Navigation

MOR   Mandatory Occurrence Report

MSL   Mean Sea Level

NAS   National Airspace System

NDB   Nondirectional Radio Beacon

NFDC   National Flight Data Center

NOTAM   Notice to Airmen

NRS   National Reference System

OSG   Operations Support Group

PDC   Pre-Departure Clearance

Path and Terminator   A set of two alphabetic characters: The first identifies the type of flight path, and the second indicates where the route leg terminates, e.g., TF, DF, CF, VI, VM. The term is defined in ARING 424, the Navigation System Data Base Standard, an international standard file format for aircraft navigation data.

PD   Pilot Deviation (FAA Form 8020-17/-18)

PBN   Performance-Based Navigation

PDARS   Performance Data Analysis and Reporting System. PDARS calculates a range of performance measures, including traffic counts, travel times, travel distances, traffic flows, and in-trail separations. Based on these data points, PDARS:
- Automatically collects and analyzes radar tracks and flight plans;
- Automatically generates and distributes daily morning reports;
- Shares data and reports among facilities; and
- Provides support for exploratory and causal analysis.

PIAR   Post Implementation Analysis Report

POI	Principal Operations Inspector
PTT	Project Tracking Tool
Proponent	The originator of a PBN procedure and route project. This may be an individual, user group, ATC, AeroNav Products, or other appropriate government agency.
Q Route	RNAV routes available for use by RNAV-equipped aircraft between FL 180 and FL 450 inclusive. Q routes are RNAV-2 except when specifically charted as RNAV-1.
QA	Quality Assurance
RAPT	Regional Airspace and Procedures Team, comprising representatives of Air Traffic, Flight Inspection Services, Flight Standards, and Airports. The RAPT evaluates requests that may have an impact on airspace, airports, or flight procedures.
RNAV	Area Navigation
RNGB	Regional NextGen Branch
RNP	Required Navigation Performance. A statement of the navigational performance accuracy necessary for operation within defined airspace.
SAAAR/AR	Special Aircraft and Aircrew Authorization Required, also known as Authorization Required (AR).
SID	Standard Instrument Departure
Significant Benefits	Tangible or intangible advantages resulting from the implementation of a PBN procedure and route, such as fuel savings from reduced flight tracks and time, reduced inter/intra facility coordination, reduced communication between ATC and pilots, and increased flexibility of airspace management and sectorization.
SMS	Safety Management System
SOP	Standard Operating Procedures
SRM	Safety Risk Management
SRMD	Safety Risk Management Document
SRMDM	Safety Risk Management Decision Memorandum
SRMP	Safety Risk Management Panel

STAR	Standard Terminal Arrival. A preplanned instrument flight rule (IFR) air traffic control arrival procedure published for pilot use in graphic form. STARs provide transition from the en route structure to an outer fix or an instrument approach fix/arrival waypoint in the terminal area.
STARS	Standard Terminal Automation Replacement System
T Route	Low-level RNAV ATS route available for use by RNAV-equipped aircraft from 1,200 feet above the surface (or in some instances higher) up to, but not including, 18,000 feet MSL. T routes are RNAV-2 except when specifically charted as RNAV-1.
TARGETS	Terminal Area Route Generation, Evaluation, and Traffic Simulation
TERPS	United States Standard for Terminal Instrument Procedures (Order 8260.3)
TK Route	Low-level IFR RNAV Helicopter Route
UTC	Coordinated Universal Time
VMC	Visual Meteorological Conditions
VNAV	Vertical Navigation
VOR	VHF Omni-directional Radio
VORTAC	VOR and Tactical Air Navigation
WP	Waypoint. A predetermined geographical position used for route/instrument approach definition, progress reports, published VFR routes, visual reporting points, or points for transitioning and/or circumnavigating controlled and/or special-use airspace that is defined relative to a VORTAC station or in terms of latitude/longitude coordinates
Wt.	Weight

Appendix E. Related Publications.

AC 20-138, Airworthiness Approval of Positioning and Navigation Systems

AC 25-15, Approval of Flight Management Systems in Transport Category Airplanes

AC 70/7460-2K, Proposed Construction or Alteration of Objects That May Affect the Navigable Airspace

AC 90-100, U.S. Terminal and En Route Area Navigation (RNAV) Operations

AC 90-105, Approval Guidance for RNP Operations and Barometric Vertical Navigation in the U.S. National Airspace

Aeronautical Information Manual (AIM)

Air Traffic Organization Safety Management Manual

ARINC Specification 424-18 Navigation System Database

ICAO Annex 11, Air Traffic Services

ICAO ATM 4444, Air Traffic Management

Order 1050.1, Environmental Impacts: Policies and Procedures

Order 1100.161, Air Traffic Safety Oversight

Order 6050.32, Spectrum Management Regulations and Procedures Manual

Order 7100.9, Standard Terminal Arrival Program and Procedures

Order 7110.65, Air Traffic Control

Order 7130.3, Holding Pattern Criteria

Order 7210.3, Facility Operation and Administration

Order 7350.8, Location Identifiers

Order 7400.2, Procedures for Handling Airspace Matters

Order 7400.8, Special Use Airspace

Order 7400.9, Airspace Designations and Reporting Points

Order 7470.1, Distance Measuring Equipment (DME)/DME Infrastructure Evaluation for Area Navigation (RNAV) Procedures and routes

Order 7610.4, Special Military Operations

Order 7930.2, Notice to Airman (NOTAM)

Order 8200.1, United States Standard Flight Inspection Manual

Order 8240.32, Request for Flight Inspection Services

Order 8240.36, Instructions for Flight Inspection Reporting

Order 8260.3, United States Standard for Terminal Instrument Procedures (TERPS)

Order 8260.19, Flight Procedures and Airspace

Order 8260.23, Calculation of Radio Altimeter Height

Order 8260.26, Establishing and Scheduling Civil Public-Use Standard Instrument Procedure Effective Dates

Order 8260.40, Flight Management System (FMS) Instrument Procedures Development

Order 8260.43, Flight Procedures Management Program

Order 8260.46, Departure Procedure (DP) Program

Order 8260.53, Standard Instrument Departures That Use Radar Vectors to Join RNAV Routes

Order 8260.58, United States Standards for Performance Based Navigation (PBN) Instrument Procedure Design

RTCA, Document DO-187, Minimum Operational Performance Standards for Airborne Area Navigation Equipment Using Multi-Sensor Inputs

RTCA, Document DO-236, Minimum Aviation System Performance Standards: Required Navigation Performance for Area Navigation.