

**Federal Aviation Administration  
Report on Use of Third-Party  
Developers for Required Navigation  
Performance Procedures**

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## **I. Executive Summary**

The FAA is considering the role of third parties for developing and implementing public Required Navigation Performance Authorization Required (RNP AR) procedures and is making a credible evaluation of their performance. As a first step toward that goal, the FAA designed and implemented a certification process where third parties could show, through specific projects, their capability of developing RNP procedures. This was a necessary step because, before the certification process, third-party vendors had developed only special approach procedures—not public procedures. (Public procedures are developed according to standard design criteria and are published for use by all qualified operators.) Two companies, Naverus (now a GE Aviation company) and Jeppesen (now a Boeing company), entered separate Other Transaction Agreements (OTA) with the FAA in 2007 and qualified to be third-party vendors in 2009 by satisfactorily carrying out certification projects. However, there were no user benefit metrics established with these projects.

The 2012 budget provided \$3 million specifically for demonstration projects involving third parties at five locations. This is an opportunity to evaluate the third-party role in developing and implementing public RNP procedures--called Required Navigation Performance Authorization Required procedures--and assessing the cost benefits of third-party involvement. The FAA's Next Generation Air Transportation System (NextGen) office is the lead for this effort. These projects will provide useful data, making it possible for the first time for the FAA to:

- Clarify the appropriate role for the third parties;
- Determine whether existing FAA roles, guidance, and processes need to be refined to allow third parties to perform seamlessly the full range of activities normally involved in developing and implementing RNP AR procedures; and
- Analyze the costs and benefits of third-party involvement, based on data gathered by both the vendors and the FAA.

## **II. Introduction**

### **A. Scope of This Report**

This report responds to these requests by:

- Describing RNP AR procedures and how they fit into the larger picture of Performance-based Navigation (PBN);
- Summarizing the FAA's historical view on third-party involvement in developing and implementing RNP AR procedures; and
- Reporting on recent steps the agency has taken to use third-party expertise and to evaluate the role and cost benefits of involving third parties in RNP AR procedure development and implementation.

### **III. Background**

#### **A. Explanation of RNP AR**

RNP AR procedures represent a small, but very significant, part of PBN procedures. Currently, there are more than 11,000 PBN procedures in the National Airspace System (NAS). Of this total, 305 procedures are RNP AR approach procedures. PBN is based on specified, system performance requirements for aircraft operating on an air traffic route, an instrument approach procedure, or in designated airspace. Both Area Navigation (RNAV)<sup>1</sup> and RNP aircraft systems meet PBN navigation specifications. While RNAV systems are suitable for most PBN applications, RNP systems offer significant safety, operational, and efficiency benefits. An RNP AR procedure, a type of RNP procedure, is the most demanding PBN navigation specification, requiring both an advanced level of onboard navigational equipment and specialized operational training for flightcrews. These procedures have unique characteristics that require specific aircraft and aircrew approval.<sup>2</sup>

#### **B. FAA's Initial View of Third-Party Involvement in RNP Procedures**

Industry stakeholders suggested that FAA lacked the resources to develop new procedures in a timely manner and recommended use of third party vendors to assist the agency. FAA did not believe that resources were the issue and began examining the process to develop solutions. The FAA realized that it needed to expedite production of RNP procedures to provide tangible benefits to the users by streamlining the process for development and implementation of flight procedures.<sup>3</sup> Using new processes, the agency was confident that it could effectively and efficiently do the work without third-party assistance. That view was based on:

- FAA performance
- Streamlined processes
- FAA skill sets and experience
- The availability of extra resources
- FAA's observations on time required to implement RNP AR procedures

#### ***FAA Performance***

Data revealed the FAA was providing significant benefits to industry, incorporating the advanced features industry had requested, such as shorter track mile procedures than

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<sup>1</sup> Area Navigation (RNAV) is a method of instrument flight rules (IFR) navigation that allows an aircraft to choose any course rather than navigate directly to and from ground-based navigation aids (NAVAIDs). This can conserve flight distance, reduce congestion, and allow flights into airports without NAVAIDs.

<sup>2</sup> Examples of advanced procedures: RNP AR procedures use narrow linear obstacle clearance surfaces and provide the ability to fly curved paths, permit the design of procedures that avoid obstacles, airspace, and surface areas. This allows procedure designs that move away from the traditional straight-in approach procedure (required for Instrument Landing System (ILS) or Global Positioning System (GPS) procedures) to a more flexible design that can provide shorter, more direct paths. These advanced approach procedures are becoming more commonly connected to the end of RNAV standard terminal arrival (STAR) procedures to provide a seamless, optimized vertical profile from the en route structure to the runway end.

<sup>3</sup> Final Report of the RTCA Task Force 5, NextGen Mid-Term Implementation Task Force Report, September 9, 2009.

conventional straight-in approaches and RNP AR approaches joined to RNAV standard terminal arrival routes (STARs) for a defined path from top of descent to runway threshold. For example, in October 2006, two RNAV STARs were implemented at Phoenix Sky Harbor International Airport. From implementation through 2008, there was a 38 percent reduction in the time aircraft remained in level flight; this equates to an estimated \$4 million in fuel savings for the user as well as reductions in carbon dioxide emissions estimated at 2,500 metric tons annually. The implementation of the Optimized Profile Descent (OPD) of RNAV STAR EAGUL in October 2006 generated 5 gallons of fuel savings per flight. Further improvement to the procedure in October 2008 resulted in 15-20 gallons of fuel saved per flight. Amendments in 2011 to the same procedure resulted in an additional 20 gallons of fuel saved per flight.

Without third-party contributions, the FAA produces over 50 RNP AR procedures yearly, depending on complexity, project scope, and available funding and resources.

### ***Streamlined Processes***

To make the process for developing and implementing RNP procedures even more efficient and effective, in June 2011, the FAA began the Navigation (NAV) Procedures Project (or NAV Lean). This new process uses “Lean” principles<sup>4</sup> to streamline and improve the process of procedure development from beginning to end.

### ***FAA Skill Sets and Experience***

The FAA further believed that it had the skill sets and experience to advance the program efficiently and effectively.

1. *AeroNav Products*. Aeronautical Navigation (AeroNav) Products<sup>5</sup> (AJV-3), a critical component in developing and deploying RNP procedures, is responsible for the technical designs, development, coordination, publication/charting, quality assurance, and maintenance of all new public RNP instrument flight procedures (IFPs). AeroNav Products has 135 Federal employees fully certified to develop IFPs, including RNP procedures. Supplemented by contract resources, the Federal staff has developed over 300 RNP AR procedures so far.
2. *PBN Policy and Support Group*.<sup>6</sup> The PBN Policy and Support Group (AVJ-14) is staffed with 12 permanent Federal employees and is supported by more than 40 contract resources. The air traffic control experience of personnel in the PBN

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<sup>4</sup> Lean principles focus on creating more efficient and cost-effective value while using fewer resources. To make this happen, an organization must avoid waste by shifting its focus from optimizing separate technologies, assets, and vertical departments to optimizing the horizontal flow of products and services across technologies, assets, and departments.

<sup>5</sup> The AeroNav Products work plan is established through the Regional Airspace and Procedures Team (RAPT) and National Airspace and Procedures Team (NAPT) planning and prioritization processes found in FAA Order 8260.43A, Flight Procedures Management Program.

<sup>6</sup> Previously called the PBN Integration Group.

Policy and Support Group makes it qualified to plan and design PBN procedures that are fully integrated into complex operational environments.

### ***Availability of Additional Resources***

Also, the agency recognized that it had the option to supplement its IFP production workforce with support contractors, as needed, including RNP AR procedures.

### ***Observations on Time Required to Implement RNP AR Procedures***

Even as it took steps to streamline its processes, the FAA recognized that, ultimately, publishing new RNP AR standard instrument approach procedures (SIAPs) was not predicated on who provided the service, but rather on the scheduling and prioritization, determined by the agency itself. FAA scheduling depends on many factors, including systemwide workload, the impact on other IAPs,<sup>7</sup> and coordinated scheduling within preestablished charting and NAV database cycles. The National Airspace Procedures Team (NAPT) may adjust scheduling depending on emergent needs and national priorities. See FAA Order 8260.43 (under revision).

## **C. FAA Commitment to Evaluation of Third-Party Results**

While the FAA was confident that it could effectively and efficiently deliver RNP AR procedures without third-party assistance, it also recognized the need to evaluate whether, in fact, third parties might add value to the process. For that reason, the FAA committed to conduct a credible evaluation. Before the agency could collect data and undertake an assessment of this kind, processes and guidelines had to be established that would permit third-party vendors to develop and implement RNP AR procedures.

# **IV. FAA Response to Third Party Requests**

## **A. Certification of Third Parties Under Other Transaction Agreements**

As a first step toward facilitating third-party involvement and evaluating its performance, in 2007, the FAA established agency goals (*FAA Flight Plan 2007-2011*) to qualify third-party procedure designers to develop, implement, and maintain RNP AR procedures.<sup>8</sup> This was a necessary step because, although third-party procedure designers had created

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<sup>7</sup> The development of a new procedure must be integrated with other instrument approach procedures (IAPs) --e.g., RNAV STARS, RNAV standard instrument departures (SIDs), and other types of RNAV SIAPs--as well as with ground-based NAVAIDs procedures. This ensures the integration of user requirements (routes, descent profiles, etc.), fleet mix considerations, and operational considerations (existing traffic flows, airspace restrictions, environmental constraints, etc.) within the scope of the project. In fiscal year (FY) 2011, AJV-3 confirms there were 828 new procedures and 2,981 amendments to existing procedures. A review of the FAA's Procedure Tracking System (PTS) for airports with RNP AR projects in FY 2012 indicates that, for every RNP AR SIAP developed, roughly three more procedure development tasks have been required to support it. A review of the current schedule for FY 2013 indicates that this ratio remains constant.

<sup>8</sup> Formerly called Required Navigation Performance (RNP) Special Aircraft and Aircrew Authorization Required (SAAAR) instrument approach procedures. The name was changed in FAA Order 8260.52 and in harmonization with the International Civil Aviation Organization (ICAO) PBN Manual (Doc 9613).

*special* procedures,<sup>9</sup> none had ever developed, published, or maintained *public* procedures, which, by definition, require Government oversight.<sup>10</sup> Until that time, the FAA (through AeroNav Products) had played an exclusive role in producing public procedures for the national airspace system (NAS). A certification process was needed to ensure the selected third parties could produce (with established internal processes) safe and repeatable public procedures, with oversight provided by the FAA.

The purpose of the initial RNP AR development projects for the selected third parties was only to show their capability of completing all the steps required to produce functional public procedures. No user-benefits metrics were established.

These projects were conducted largely at third-party expense. The vendor agreed to reimburse the FAA for expenditures for charting, other procedure amendments, radar video maps, and services under the agreement.

To create the legal framework for this unprecedented effort to enable third parties to develop public RNP AR procedures for the NAS, the FAA entered separate OTAs with two vendors in 2007: Naverus (now a GE Aviation company) on March 29, 2007, and Jeppesen (now a Boeing company) on August 15, 2007. By definition, an OTA is not a procurement contract, grant, or cooperative agreement. Rather, it provides a pathway for third parties to seek future work developing and implementing RNP AR procedures. Once certification has been completed under the OTA, outside vendors can be hired by any entity—private or governmental.

## **B. Oversight Organization**

The FAA also established, in 2007, an oversight organization for third-party procedure developers. Specifically, the Flight Procedures Implementation and Oversight Branch (AFS-460)<sup>11</sup> was fully staffed to administer the third-party program.

## **C. Third-Party Certification Projects**

Two years later, after an initial public RNP AR development project at Bradley International Airport, in Connecticut, in support of its application for the OTA, Naverus received a Letter of Qualification (LOQ) from the FAA (September 2009). Jeppesen received its LOQ at the same time after an initial qualification project at Savannah Hilton Head International Airport, in Savannah, Georgia.

Since the initial qualification projects by Naverus and Jeppesen, the only additional public RNP AR procedures produced under the OTA process have been at Deadhorse,

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<sup>9</sup> Special procedures do not need to comply with standard design criteria, are not published by rulemaking, and are not normally available to more than one operator. Designers of special procedures may leverage more of the specific operator's aircraft capabilities and thereby offer the customer an operational advantage.

<sup>10</sup> Public procedures are developed according to standard design criteria and are published for use by all qualified operators by Federal rulemaking action (title 14, Code of Federal Regulations, part 97).

<sup>11</sup> Situated within the Flight Technologies and Procedures Division (AFS-400).

Alaska, in 2011. The two Deadhorse RNP AR procedures were developed by Naverus in collaboration with ConocoPhillips, Alaska Airlines, and other stakeholders.

In January 2011, the FAA contracted with Naverus to develop RNP AR procedures for use in a NextGen demonstration and evaluation project featuring a prototype metering tool for air traffic arriving at Dallas Love Field Airport (DAL), Dallas, Texas. The approaches have been used in simulations only and were never published or flown because of FAA concerns about an environmental evaluation and potential interference with the ongoing North Texas Optimization of Airspace and Procedures in the Metroplex (OAPM) project.

#### **D. Oversight Guidance**

In 2011, to further support its efforts to engage third parties in developing and implementing RNP AR procedures, the FAA also provided oversight guidance to third-party vendors who might be interested in being certified by the FAA to do the work. The following three advisory circulars (ACs) were published by AFS-460:

- AC 90-110: *Authorization Guidance for Development of Required Navigation Performance Procedures with Authorization Required by Third Party Instrument Flight Procedure Service Providers* (6/21/2011) – provides guidance on how to become authorized by the FAA to develop public RNP AR approaches;
- AC 90-111: *Guidance for the Validation of Software Tools Used in the Development of Instrument Flight Procedures by Third Party Service Providers* (6/22/2011) – provides guidance on ensuring the software tools used by third-party vendors are validated by the FAA; and
- AC 90-113: *Instrument Flight Procedure Validation (IFPV) of Satellite-based Instrument Flight Procedures* (10/14/2011) – provides guidance for conducting instrument flight procedure validation of satellite-based PBN procedures, focusing on nongovernmental service providers.

#### **E. Demonstration Project**

The fiscal year 2012 budget specified \$3 million for demonstration projects involving third parties at five locations. The \$3 million specifically authorizes the FAA to use third parties, in a demonstration project, “to design, deploy, and maintain public use RNP procedures at five mid-sized airports where aircraft flying RNP arrivals would achieve measurable benefit.” In May 2012, the FAA awarded a contract to ITT Excelis (with GE Aviation as a subcontractor) to perform this work. Initial coordination for the first site, Syracuse, NY, began in June 2012. The FAA's NextGen office is the lead for this effort.

These demonstration projects differ in significant ways from the certification projects completed in 2009. The purpose of the initial RNP AR certification projects for the selected third parties was only to show their capability to produce functional public procedures. By contrast, the upcoming demonstration project for third parties will be fully funded by the FAA, and the outcomes will be subject to a cost-benefit analysis.

#### **F. Assessment of Third-Party Performance**

The demonstration projects will provide useful data on the third-party role, allowing the FAA to:



- Help clarify the appropriate role for the third parties, based on the experience of both the vendors and the FAA;
- Assess existing FAA roles, guidance, and processes needed to allow third parties to perform the range of activities normally involved in developing and implementing RNP AR procedures seamlessly; and
- Analyze the costs and benefits of third-party involvement, based on data gathered by both the vendors and the FAA.

## **V. Conclusion**

Once the third-party demonstration projects are complete, the FAA will be well-positioned to determine to what extent, and in what ways, it can most effectively and efficiently use third parties. At that point, the FAA will have a better grasp on the appropriate role for third-party vendors and a clear understanding of the cost and benefits of their involvement in developing and implementing RNP AR procedures.