

What Is RNAV?

Area Navigation (RNAV) enables aircraft to fly on any desired flight path within the coverage of ground-or-space-based navigation aids, within the limits of the capability of the self-contained systems, or a combination of both capabilities. As such, RNAV aircraft have better access and flexibility for point-to-point operations.

What Is RNP?

Required Navigation Performance (RNP) is RNAV with the addition of an onboard performance monitoring and alerting capability. A defining characteristic of RNP operations is the ability of the aircraft navigation system to monitor the navigation performance it achieves and inform the crew if the requirement is not met during an operation. This onboard monitoring and alerting capability enhances the pilot's situation awareness and can enable reduced obstacle clearance or closer route spacing without intervention by air traffic control.

Certain RNP operations require advanced features of the onboard navigation function and approved training and crew procedures. These operations must receive approvals that are characterized as Special Aircraft and Aircrew Authorization Required, similar to approvals required for operations to conduct Instrument Landing System Category II and III approaches.

The Bottom Line

RNAV and RNP specifications facilitate more efficient design of airspace and procedures which collectively result in improved safety, access, capacity, predictability, operational efficiency, and environmental effects.

Resources

FAA RNAV/RNP Group Web Site

<http://www.faa.gov/ato?k=pbn>

Roadmap for Performance-Based Navigation

http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/systemops/aaim/organizations/rnav_rnp/media/2006_roadmap.pdf

Highways in the Sky (RNAV/RNP Informational Video)

http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/systemops/aaim/organizations/rnav_rnp/highways/

Federal Aviation Administration

<http://www.faa.gov>

FAA Operational Evolution Partnership

http://www.faa.gov/about/office_org/headquarters_office/ato/publications/oeop/

NextGen Joint Planning and Development Office

<http://www.jpdo.gov/>

ICAO PBN Programme Office

www.icao.int/pbn



Federal Aviation
Administration

Performance-Based Navigation (PBN)

Charting a Course for the Future of Flight

Due to growth in the aviation industry, National Airspace System (NAS) traffic is expected to rise dramatically during the next 20 years, increasing the risk of flight delays, schedule disruptions, choke points, and inefficient flight operations, particularly when unpredictable weather and other factors impact airport capacity.

Through the Next Generation Air Transportation System (NextGen), the Federal Aviation Administration (FAA) is addressing the impact of traffic growth by increasing NAS capacity and efficiency while simultaneously improving safety, environmental impacts, and user access to the NAS. The FAA is implementing new routes and procedures that leverage emerging aircraft navigation capabilities. This initiative is described in FAA's Roadmap for Performance-Based Navigation which charts a course for the transition to NextGen.

Performance-Based Navigation (PBN): A Bird's Eye View

In July 2003, FAA outlined its implementation strategy in the *Roadmap for Performance-Based Navigation* (updated in 2006). The strategy calls for:

- Expediting the development of PBN criteria and standards.
- Introducing airspace and procedure improvements in the near-term.
- Providing benefits to operators who have invested in existing and upcoming capabilities.
- Establishing target dates for the introduction of navigation mandates for selected procedures and airspace, with an understanding that any mandate must be rationalized on the basis of benefits and costs.
- Defining new concepts and applications of PBN for the mid-term and far-term, building synergy and integration with other capabilities toward the realization of NextGen goals.

PBN is a framework for defining navigation performance requirements (embodied in "navigation specifications") that can be applied to an air traffic route, instrument procedure, or defined airspace. PBN includes both Area Navigation (RNAV) and Required Navigation Performance (RNP) specifications. PBN provides a basis for the design and implementation of automated flight paths as well as for airspace design and obstacle clearance. Once the required performance level is established, the aircraft's own capability determines whether it can safely achieve the specified performance and qualify for the operation.

The aviation community is using FAA's *Roadmap for Performance-Based Navigation* to leverage advances in flight deck navigation capability to meet the demands of future air travel. As a collaborative (government/industry) effort, the *Roadmap* focuses on accelerating two key elements of PBN at U.S. airports – RNAV and RNP.

International Accomplishments: A Global Perspective

The aviation community is pursuing the benefits of PBN through the implementation of RNAV and RNP-based air traffic routes and

instrument procedures. The International Civil Aviation Organization (ICAO) recently completed a three-year effort to develop the ICAO *PBN Manual* which involved collaboration with technical and operational experts from several countries. The ICAO *PBN Manual* provides a long-anticipated global harmonization of RNAV and RNP requirements – a leading priority of the aviation stakeholder community worldwide. To promote global awareness and understanding of the new Manual, FAA and the European Organisation for the Safety of Air Navigation (EUROCONTROL), with the ICAO PBN Programme Office, are presenting seminars throughout the ICAO Regions.

KEY:

RNAV 2005 - February 2008

● RNAV ● RNAV with OEP*

RNP 2005 - February 2008

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*Operational Evolution Partnership

