The Information Paper of the
China’s PBN implementation roadmap

Table of Contents
News Briefs  Page 1
Milestones of Roadmap Development  Page 2
International Communion and Promotion  Page 3
Overview of China’s PBN Implementation Roadmap  Page 4

News Briefs

China has officially published Civil Aviation PBN Implementation Roadmap
Civil Aviation Administration of China (CAAC) has officially published China Civil Aviation
Performance-Based Navigation Implementation Roadmap recently. The Roadmap is a scientific
development blueprint of new navigation technology domain, showcasing that China civil aviation has
kept pace with the development of state-of-the-art technologies.
Performance-based navigation (PBN) is a new operational mode and air traffic management concept
presented by the International Civil Aviation Organization (ICAO). PBN implementation will play an
important role in enabling continuous civil aviation safety, increasing airspace capacity, reducing ground
infrastructure investment, effectively improving energy saving and emissions, environmental protection,
etc. It serves as one of the core technologies to develop China’s next generation air transportation
system.

To expedite the applications of PBN, CAAC established
in October 2008 a PBN Implementation Steering Team
headed by Li Jian, Vice Minister of CAAC, for all-round
systematic guidance of PBN implementations.
Based on gradual application of PBN technologies and
notable safety and economic benefits initially obtained,
CAAC, as per ICAO requirements, decided to develop
China’s PBN implementation planning consistent with
ICAO guiding principles and international practices. To
this end, CAAC PBN Office has organized

technological experts of various fields from CAAC,
CAAC regional administrations, airlines, air traffic
management bureau, universities, institutes, support
organizations, etc to finish Drafting China Civil Aviation
PBN Implementation Roadmap after a number of

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PBN Implementation Roadmap after a number of
justifications and centralized formulations.
The Roadmap, combining the actual situations of civil aviation in China, specifies the basic principles, main objectives, tasks, implementation schedule, responsibilities of stakeholders, etc of PBN implementation up to 2025. It provides guidance on PBN operations to civil aviation administrator, air operators, air traffic management service providers and airports, presents the future navigation development planning for the whole industry, and assists the stakeholders to make transition plans and investment strategies. The relevant Chinese civil aviation organizations will be guided by the Roadmap to make specific work plans and implement the Roadmap planning based on their own conditions.
The Roadmap not only complies with China civil aviation development but also serves as a communication and exchange tool in harmony with international standards.
CAAC plans to perfect the Roadmap through revision when appropriate in the future.

The Roadmap is available for downloading at the official website of CAAC:

Milestones of Roadmap Development

Kickoff meeting
(first steering team meeting)
On October 29-30, 2008, CAAC established
• “PBN Implementation Steering Team”, assuming overall responsibilities for making decisions on China civil aviation PBN implementation;
• “PBN Implementation Steering Team Office”, responsible for developing China Civil Aviation PBN Implementation Roadmap as one of its missions;
The outline of the Roadmap and its development schedule were specified at the meeting.

Second steering team meeting
On March 20, 2009, the participants discussed the Roadmap draft and voiced their opinions on revision.

Third steering team meeting
On July 1, 2009, the participants approved the Roadmap draft after discussion and review and began to solicit comments from the general public.
Meeting on Roadmap revisions for a final version
On August 23, 2009, all the opinions on revision were summarized to formulate the final version of Roadmap.

Publication
On October 27, 2009, the Chinese and English versions of China Civil Aviation PBN Implementation Roadmap were officially published.

International Communion and Promotion
ICAO APAC PBN Task Force Meetings
China Civil Aviation PBN Implementation Roadmap Drafting Group has participated in the latest two ICAO APAC PBN Task Force meetings, and APAC PBN implementation workshops. The Group has discussed PBN implementation with the participating nations and introduced to the participating members China Civil Aviation PBN Implementation Roadmap (Draft).

Civil Aviation System Modernization Symposium
On July 22-23, 2009, CAAC and Boeing jointly hosted the Civil Aviation System Modernization Symposium. The American aviation experts introduced the present high and new technologies and their applications in the world aviation industry. The Chinese and American experts addressed the development direction of new navigation technologies for China civil aviation, and meanwhile explained in details China Civil Aviation PBN Implementation Roadmap (Draft for soliciting comments)
Overview of China’s PBN Implementation Roadmap

Purpose of China’s PBN Implementation Roadmap
China develops the PBN implementation roadmap to

- Ensure consistency between RNAV and RNP operations in China and the concept of PBN,
- Provide guidance on PBN implementation for the regulatory authorities, air operators, air navigation service providers and airports,
- Offer the planning of future navigation development for the whole industry, and
- Assist the stakeholders in making their transition plans and investment strategy.

It also presents the overall strategic objectives and time frame; specifies the operational requirements for PBN implementation in China; describes the PBN navigation specifications; defines PBN operational requirements upon the CNS/ATM system; and addresses integration PBN with other pertinent technologies.

Implementation Time Frames
The CAAC will implement PBN in three phases:

Near term (2009–2012), the near-term phase focuses on selected applications of PBN,

Medium term (2013–2016), the medium-term phase focuses on overall application of PBN

Long term (2017–2025), the long-term phase targets integration of PBN with communication, avigation, and surveillance/air traffic management (CNS/ATM), the foundation for China’s “new generation air transportation system.”
Near Term (2009—2012)

<table>
<thead>
<tr>
<th>Airspace</th>
<th>Recommended Navigation Specifications</th>
<th>Acceptable Navigation Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Route - oceanic</td>
<td>RNP-4</td>
<td>RNAV-10</td>
</tr>
<tr>
<td>Route - remote continental</td>
<td>RNP-4</td>
<td>RNAV-10</td>
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<tr>
<td>Route - continental</td>
<td>RNAV-2, RNAV-5</td>
<td>RNAV-2, RNAV-5</td>
</tr>
<tr>
<td>Terminal area - arrivals and departures</td>
<td>RNAV-1 (radar coverage and sufficient navigation aids)</td>
<td>RNP APCH with Baro-VNAV at some airports</td>
</tr>
<tr>
<td></td>
<td>Basic RNP-1 (no radar coverage)</td>
<td>RNP APCH to be implemented at airports with operational requirements</td>
</tr>
<tr>
<td>Approach</td>
<td>RNP APCH (with Baro-VNAV) at some airports</td>
<td>RNP APCH</td>
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Medium Term (2013—2016)*

<table>
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<tr>
<th>Airspace</th>
<th>Recommended Navigation Specifications</th>
<th>Acceptable Navigation Specifications</th>
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<tbody>
<tr>
<td>Route - oceanic</td>
<td>RNP-2*, RNP-4</td>
<td>RNAV-10</td>
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<tr>
<td>Route - remote continental</td>
<td>RNP-2*</td>
<td>RNAV-2, RNP-4, RNAV-10</td>
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<td>Terminal area - arrivals and departures</td>
<td>RNAV-1 or RNP-1</td>
<td>RNP APCH (with Baro-VNAV)</td>
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<td>RNP AR APCH at airports with operational benefits</td>
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<td>Introduced landing operations using GNSS and its augmentation systems</td>
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</tbody>
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*The CNS requirements and operational procedures related to RNP-2 application are to be defined

Long Term (2017—2025)

PBN operations will be primary in all phases of flight, and co-existence of conventional operations and PBN operations will evolve into full PBN operations within this time frame.

Principles for a Safe Transition

CAAC considers taking the following safety principles in implementation:

- During the coexistence period, sufficient conventional navigations systems will be retained to provide services for aircraft without PBN equipage,
• The operators and other airspace users are encouraged to install PBN avionics to become PBN-capable,
• The CAAC will conduct safety assessment and periodic safety inspections and make emergency plans to ensure continuous operational safety,
• Through operation monitoring will be implemented, including the operator qualifications, aircraft navigation performance, navigation error, etc, and corrective measures will be formulated,
• Harmonized conventional procedure and PBN flight procedure shall be considered in flight procedure design to reduce the risk of procedure conflict while conventional operations and PBN operations coexist,
• The air traffic control agency shall enhance trainings to controllers and have control plans and safety measures in place for blended operation environment to ensure safe separation,
• The operators shall be informed as early as possible before PBN operations are to be implemented at the airports or en route and airworthiness and operational approval to the domestic and foreign air carriers shall be actively conducted,
• The CAAC will start to mandate PBN operations firstly at the airports with operational benefits.

**About the information paper**

This information paper is published by the CAAC PBN Implementation Steering Team