



| ICAO

# INTERNATIONAL CIVIL AVIATION ORGANIZATION

A UN SPECIALIZED AGENCY



**ELEVENTH MEETING OF ASIA PACIFIC PERFORMANCE BASED NAVIGATION  
IMPLEMENTATION COORDINATION GROUP (APAC PBNICG/11)**  
27-29 March 2024, Bangkok

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**WP/02- Global & Regional PBN Updates**

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# Global & Regional PBN Updates

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## Assembly Resolution A37-11

States complete a PBN implementation plan as a matter of urgency to achieve:

- implementation of RNAV and RNP operations (where required) for en route and terminal areas;
- implementation of approach procedures with vertical guidance (APV) (Baro-VNAV and/or augmented GNSS), including LNAV only minima, for all instrument runway ends, either as the primary approach or as a back-up for precision approaches by 2016 with intermediate milestones as : 30 per cent by 2010, 70 per cent by 2014; and
- implementation of straight-in LNAV only procedures, for instrument runways at aerodromes where there is no local altimeter setting available and where there are no aircraft suitably equipped for APV operations with a maximum certificated take-off mass of 5 700 kg or more;



# Global & Regional PBN Updates

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## Declaration of Asia Pacific Ministerial Conference on Civil Aviation (Beijing, China from 31 January to 1 February 2018)

### 2.0 Air Navigation Services

2.1 Commit to implementation by 2022 of the Asia/Pacific Seamless Air Traffic Management (ATM) Plan to enhance ATM capacity and harmonization in the Region, including a focus on:

- (a) Transitioning from Aeronautical Information Service (AIS) to Aeronautical Information Management (AIM) System;
- (b) Performance Based Navigation (PBN) implementation

\*Next Ministerial Conference is scheduled to be held in September 2024 in New Delhi



## PBN Go Team Support Mission

PBN Go Team is a program undertaken by the ICAO APAC Regional Office and Sub Office with a few partners to provide a State with direct on-site assistance and follow-up by a multidisciplinary team.

The constitution of the team is determined after online consultation with the State.

Several PBN Go teams have been undertaken in the past to a number of States in the region.

**In 2023, two PBN Go team support missions were conducted to Brunei Darussalam and Indonesia.**

The objective of the PBN Go Teams is to review the PBN implementation progress in the State, and provide specific guidance to the visited State to address the issues detected, at two levels:

- National planning of PBN (update of the PBN plan) including stakeholders' participation.
- Improve the practices in design, validation, approval and safety assessment of PBN Procedures and operational approval, and oversight of PBN IFPs.

Normally PBN Go team visit is funded by the State, however, these visits in 2023 were funded by ICAO HQ.

States willing to have PBN Go Team support mission to their States may contact [APAC-RSO@icao.int](mailto:APAC-RSO@icao.int).

# Global & Regional PBN Updates

States in APAC region with no PBN Implementation plan, or which has not been received by ICAO:

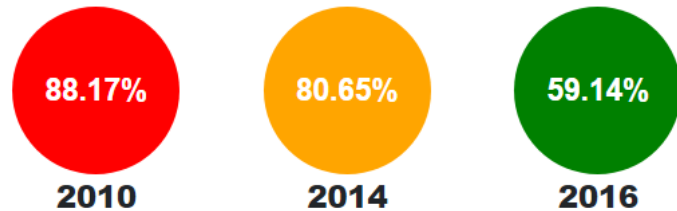
- Afghanistan
- Bhutan
- Brunei Darussalam
- Cook Islands
- Kiribati
- Marshall Islands
- Micronesia (Federated States of)
- Nauru
- Palau
- Samoa
- Solomon Islands
- Timor-Leste
- Tuvalu
- Vanuatu

# Global & Regional PBN Updates

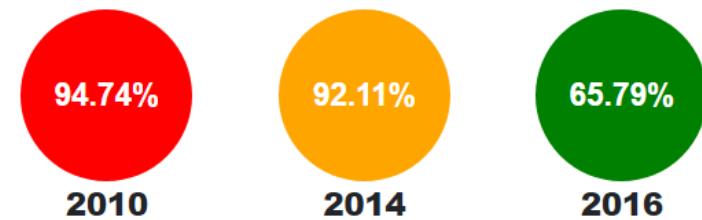
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## PBN Implementation (Approach Procedures) Trend

Percentage of States in World meeting the Resolution Targets for Applicable Years



Percentage of States in APAC meeting the Resolution Targets for Applicable Years



*Note: This data is taken from iSTARS (<https://istars.icao.int/Sites/PBN>), updated as on January 2024 and is for International Aerodromes as listed in the APAC ANP.*



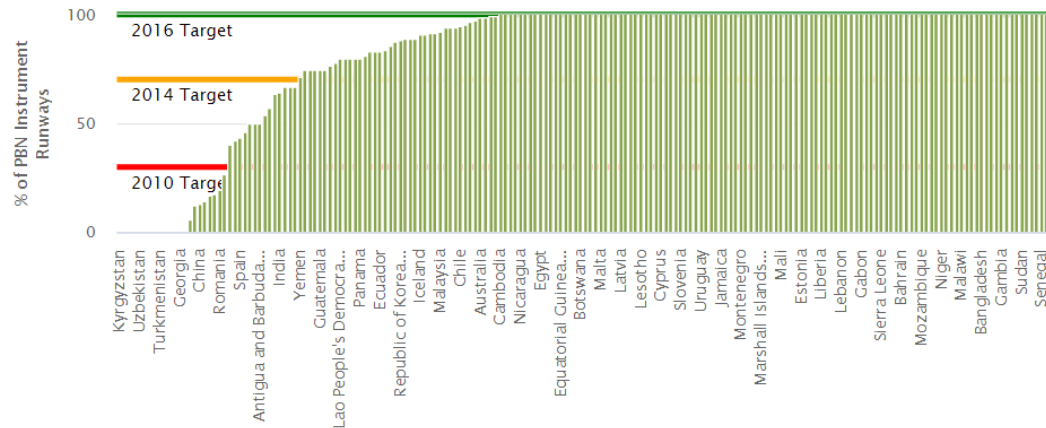
# Global & Regional PBN Updates

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## PBN Implementation (Approach Procedures) Trend

Regional PBN Implementation

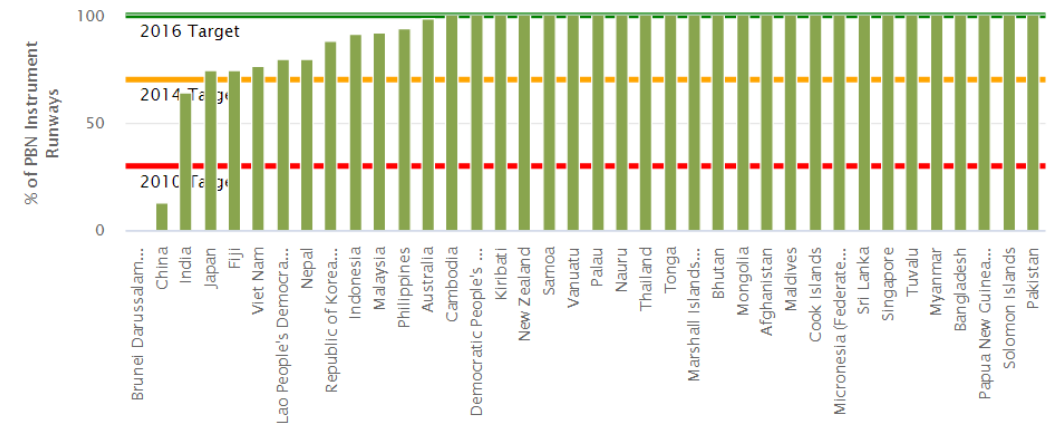
% of PBN Runways per Country for World



States in World	PBN Runway Ends	Intr. Runway Ends	PBN Runway Ends (%)
186	2508	3252	77.12%

Regional PBN Implementation

% of PBN Runways per Country for APAC



States in APAC	PBN Runway Ends	Intr. Runway Ends	PBN Runway Ends (%)
38	472	629	75.04%



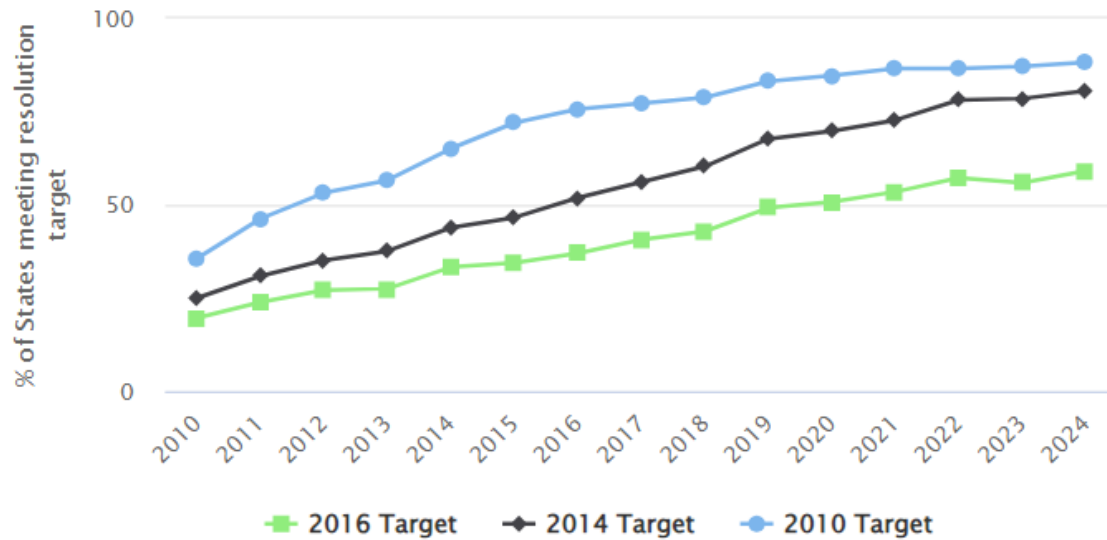
# Global & Regional PBN Updates

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## PBN Implementation (Approach Procedures) Trend

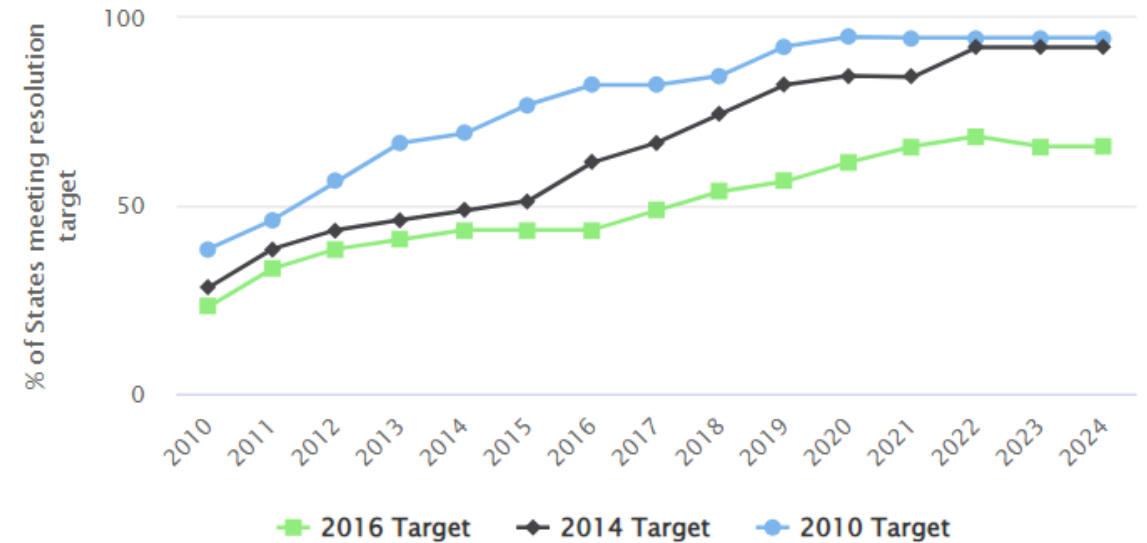
### Resolution Target Trends

% of States in World meeting the respective Resolution Targets



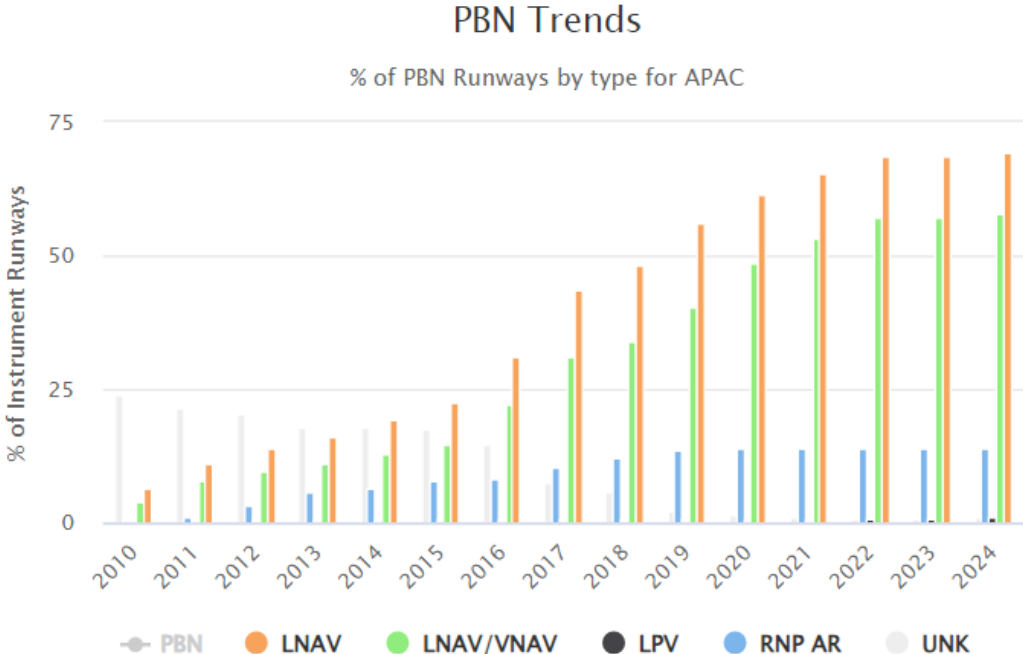
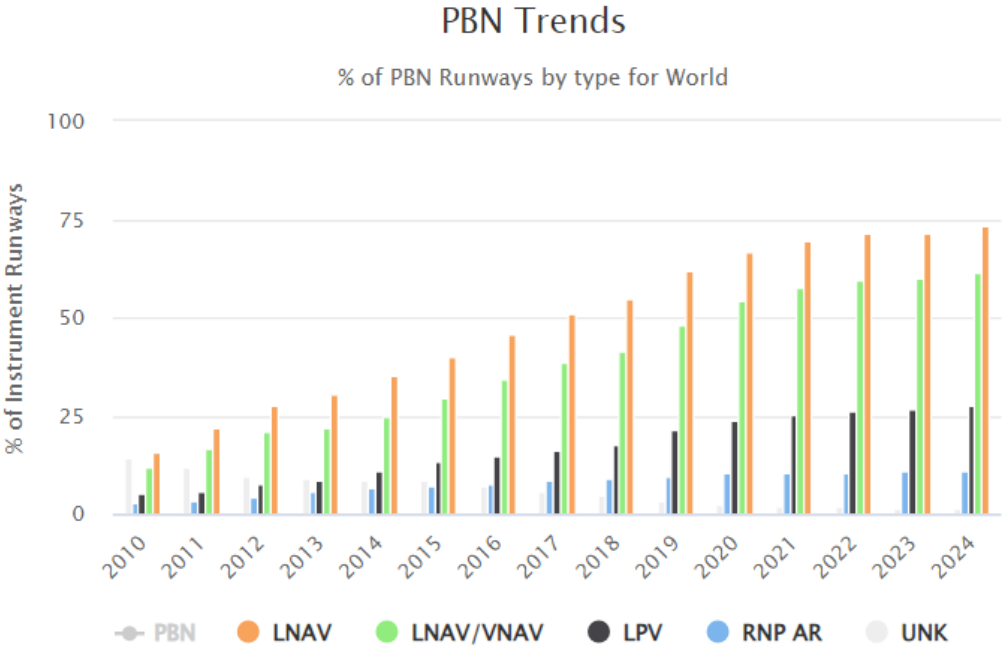
### Resolution Target Trends

% of States in APAC meeting the respective Resolution Targets



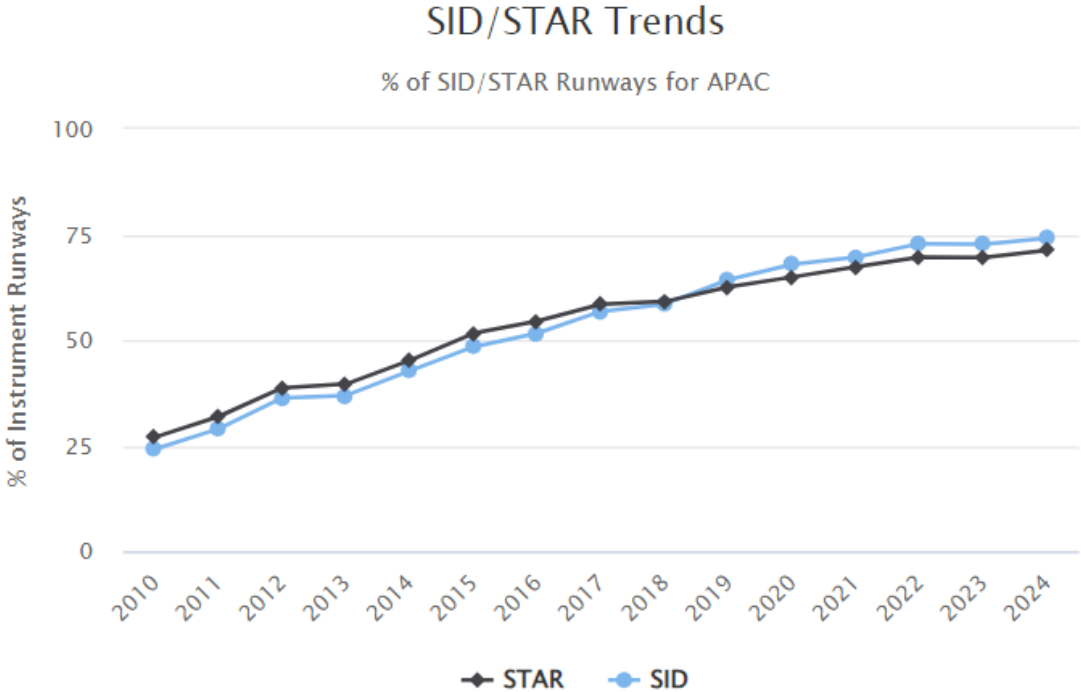
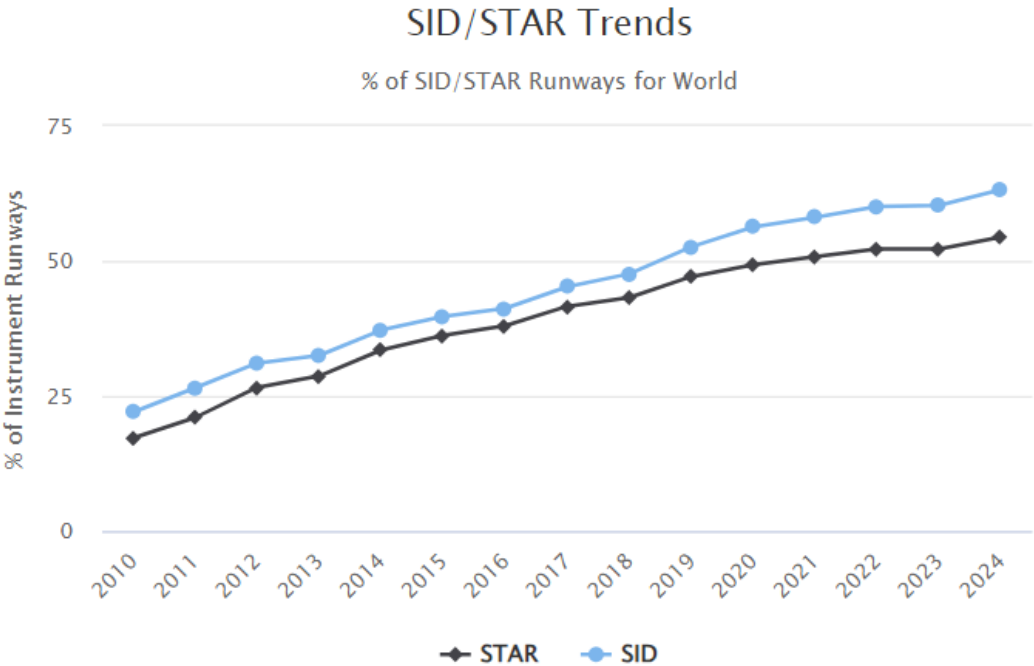
# Global & Regional PBN Updates

## PBN Implementation (Approach Procedures) Trend

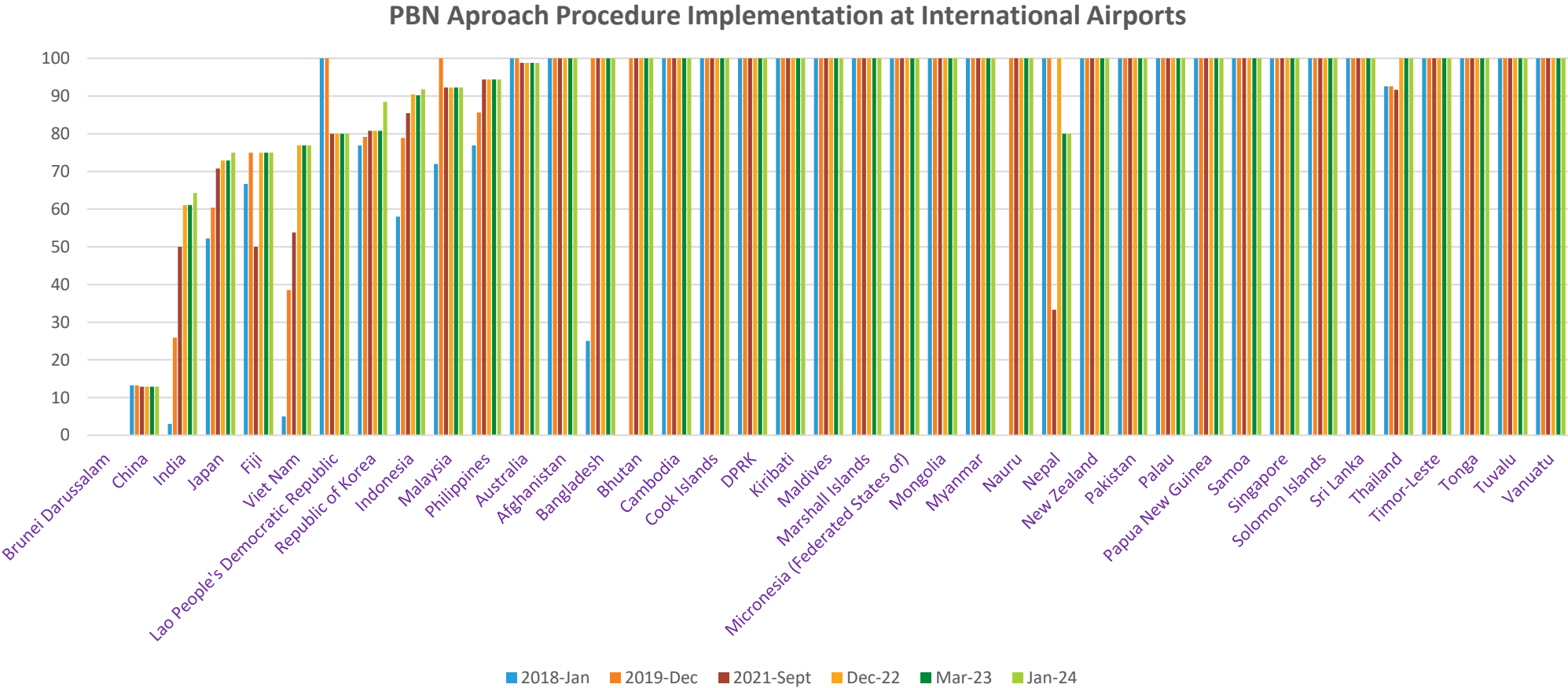


# Global & Regional PBN Updates

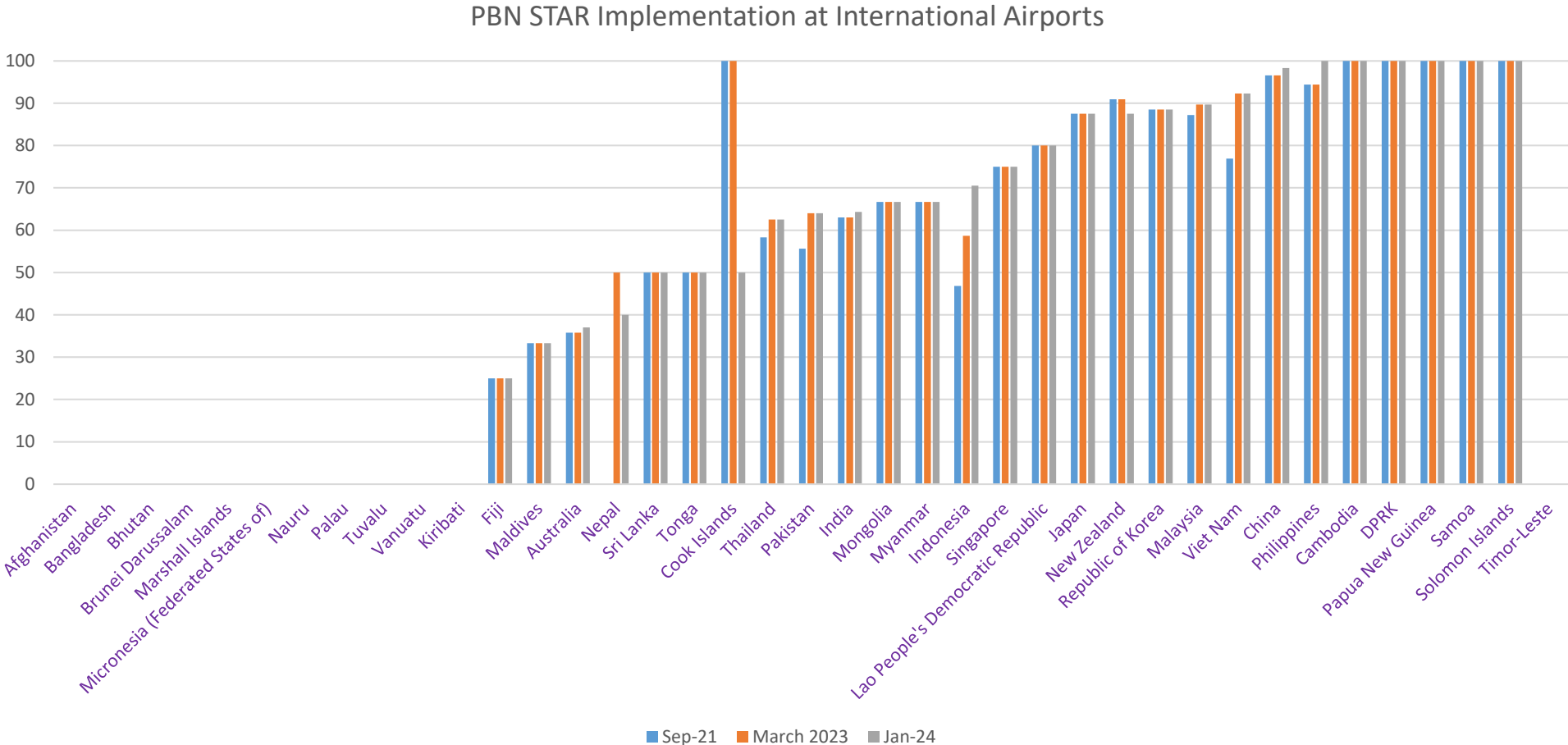
## PBN Implementation (Terminal Procedures) Trend



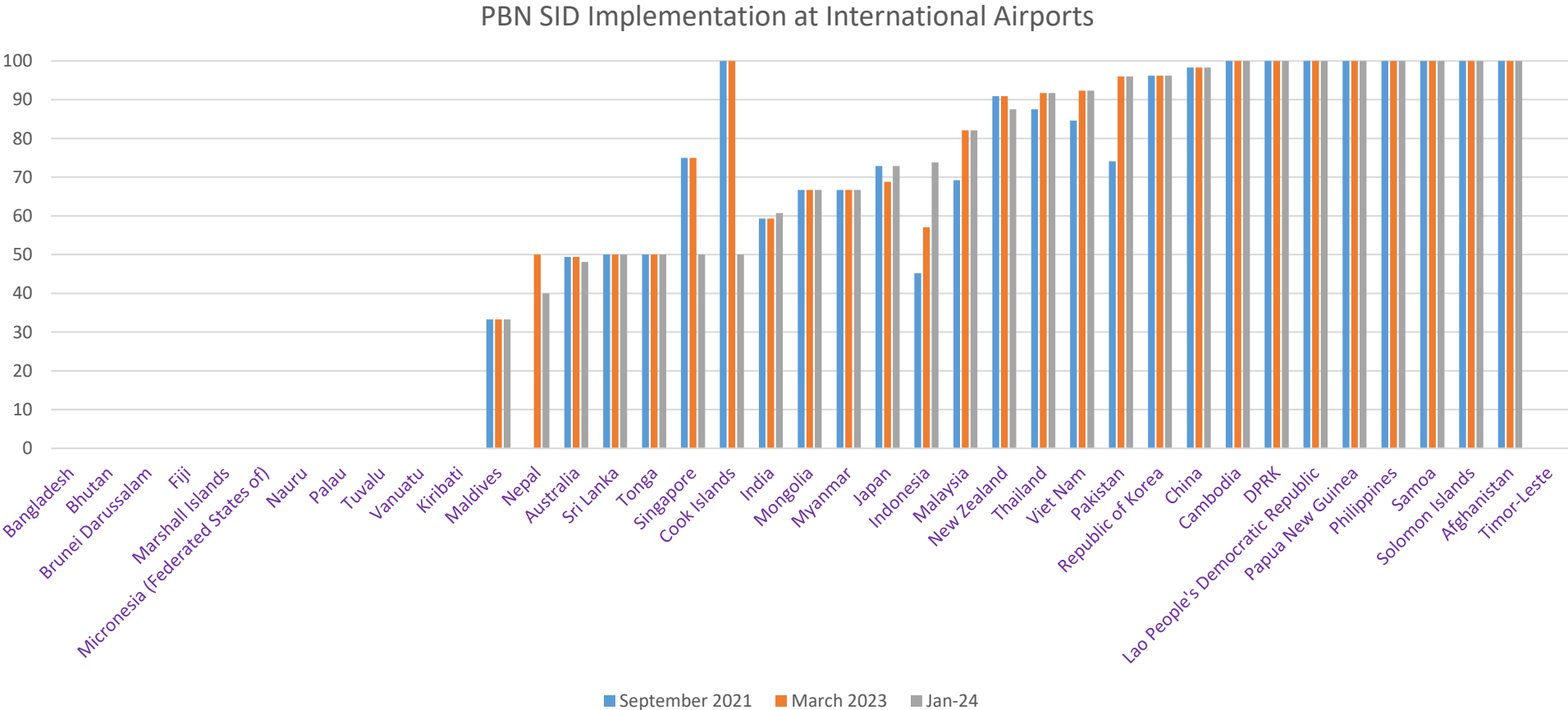
## PBN Implementation (Approach Procedures) APAC Trends



## PBN Implementation (Terminal Procedures) APAC Trend



## PBN Implementation (Terminal Procedures) APAC Trend



# Global & Regional PBN Updates

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## PBN Procedures Implementation Analysis

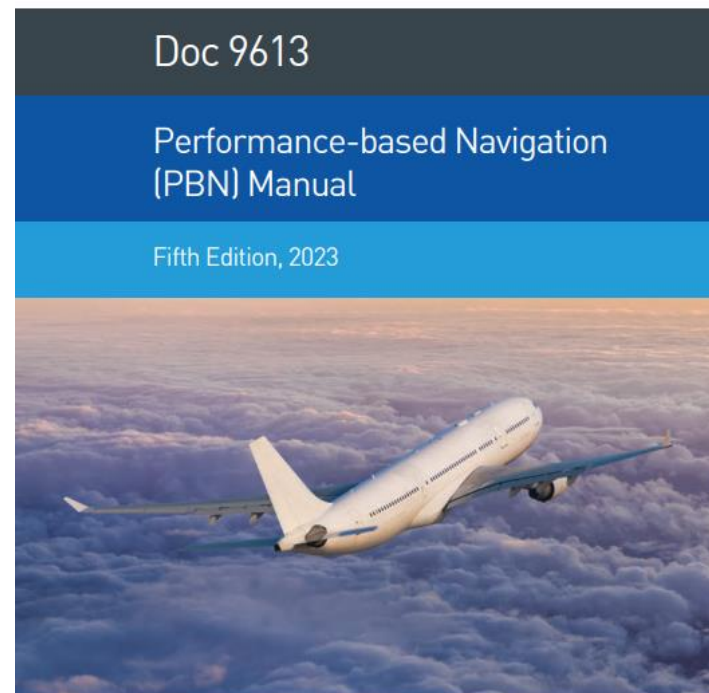
- Implementation of PBN Approach procedures in APAC is still lagging (75.04% vs. 77.12% for World)
- Incase of LNAV-VNAV, it is 58 % in APAC vs 61.4 % globally.
- APAC Regions is ahead of the global average in PBN SID/STAR implementation
  - 74.1% for SID and 71.2% for STAR
  - Global average 63.2%(SID) & 54.4%(STAR)



# Global & Regional PBN Updates

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## 5<sup>th</sup> Edition of PBN Manual



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# Global & Regional PBN Updates

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## 5<sup>th</sup> Edition of PBN Manual

The 5th Edition has been updated to reflect new requirements, such as the use of RF legs and the introduction of RNP AR departures, as well as to provide additional or revised guidance on a range of subjects. Specific changes include:

- Addition of RNP AR DP criteria and a complete update of RNP AR APCH criteria.
- Recognition of GBAS as a positioning sensor
- Dual frequency multiple constellation(DFMC)
- clarification of the distinction between RNAV and RNP and related functionality, such as; speed restriction in RNP system.
- changes to the Advanced RNP navigation (A-RNP) specification & additional guidance on the implementation of A-RNP;
  - final approach segment no longer considered a part of A-RNP; and

# Global & Regional PBN Updates

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## 5<sup>th</sup> Edition of PBN Manual

- updates and additions to aircraft systems and equipment performance, functionality and capability reflecting RTCA or EUROCAE documents
- refinement regarding use of the radius to fix(RF) leg
- development of GNSS reversion capability;
- review of applicable path terminators for navigation specifications, and guidance on combinations of such path terminators in procedure design;
- RNP 0.3 navigation specification now explicitly defined as helicopter only;
- guidance on air traffic control (ATC) status monitoring for GNSS; and
- clarification on the definition and the use of holding capabilities.



# Global & Regional PBN Updates

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## 4<sup>th</sup> Edition of GNSS Manual



### NEW TOPICS:

- Reporting of GNSS Performance Parameters
- Addition of Galileo & BDS In the Existing Constellation

Doc 9849

Global Navigation Satellite  
System (GNSS) Manual

Fourth Edition, 2023



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INTERNATIONAL CIVIL AVIATION ORGANIZATION

## Questions for discussion

1. What are the constraints for the States in the region to reach 100% PBN implementation as per Assembly resolution A37-11 and Beijing Declaration?
2. In view of only 58% APV(LNAV-VNAV & LPV) implementation in the region, whether the States in the region are satisfied with the quality of procedures published i.e. if LNAV-VNAV/LPV or only LNAV have been published knowing that full benefit of PBN approaches can be obtained only with APV?
3. What is the usability of PBN procedures, if not being fully utilized, what are the roadblocks?
4. Whether Safety Assessment with all the stakeholders is being carried out before publication/implementation of the procedures?
5. Whether ATCOs are adequately trained for the implementation of PBN procedures?
6. What kind of system States use to capture incidents during execution of PBN procedures and what are the mitigation methodology?
7. Whether the operational approval is in sync with the implementation of PBN Procedures?
8. What should be the strategy for the region in PBN procedure implementation as is being adopted in some other region?



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Thank You!