International Civil Aviation Organization

Twenty Seventh Meeting of the Communications/ Navigation and Surveillance Sub-group (CNS SG/27) of APANPIRG

Bangkok, Thailand, 28 August – 01 September 2023

Agenda Item 6: Navigation

6.1 Review Report of the Tenth Meeting of Performance based Navigation Implementation Coordination Group (PBNICG/10)

REVIEW REPORT OF THE TENTH MEETING OF PERFORMANCE BASED NAVIGATION IMPLEMENTATION COORDINATION GROUP (PBNICG/10)

(Presented by the Secretariat)

SUMMARY

This paper provides information on the outcomes of the PBNICG/10 held in Bangkok from 19-21 April 2023 for the review by the meeting.

1. INTRODUCTION

1.1 The Tenth Meeting of the Performance Based Navigation Implementation Coordination Group (PBNICG/10) was held in Bangkok from 19-21 April 2023. The meeting was attended by 79 participants from the States, Administration, IATA and ICAO. The relevant presentations and documents are available at following link: https://www.icao.int/APAC/Meetings/Pages/2023-PBNICG10.aspx.

2. DISCUSSION

2.1 The meeting deliberated on the following main Agenda Items:

Agenda Item 1: Election of Chairperson

Agenda Item 2: Global and Regional PBN Updates

Agenda Item 3:	Implementation status of the Regional Transition Plan for RNP APCH Chart Identification from RNAV to RNP
Agenda Item 4:	States' PBN Implementation Progress
Agenda Item 5:	PBN Training for ATC
Agenda Item 6:	Established on RNP AR (EoR)

2.2 Agenda item2: Global and Regional PBN updates

The Secretariat presented global PBN implementation status as available in ICAO iSTARS. ICAO informed that implementation of APV procedures for all instrument runway ends by 2016, key requirement of ICAO Assembly Resolution A37-11, was behind global achievement. However, implementation of PBN SID/STAR were above the global implementation status (Chart 1,2 & 3).

Chart 1. PBN (Approach) Update, as of Dec 2022(as per iSTARS)

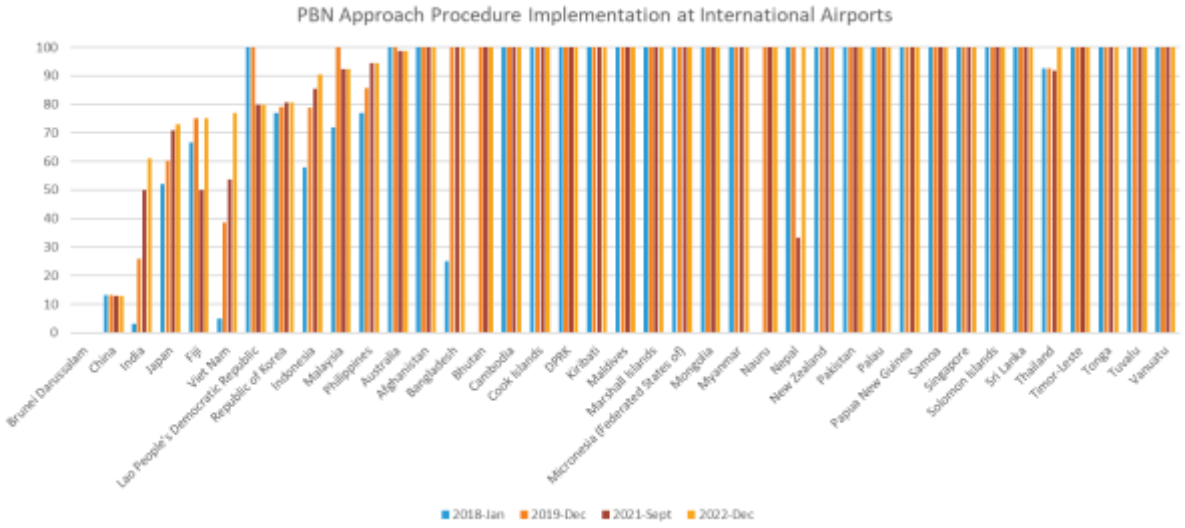


Chart 2. PBN SID Update, as of March 2023(as per iSTARS)

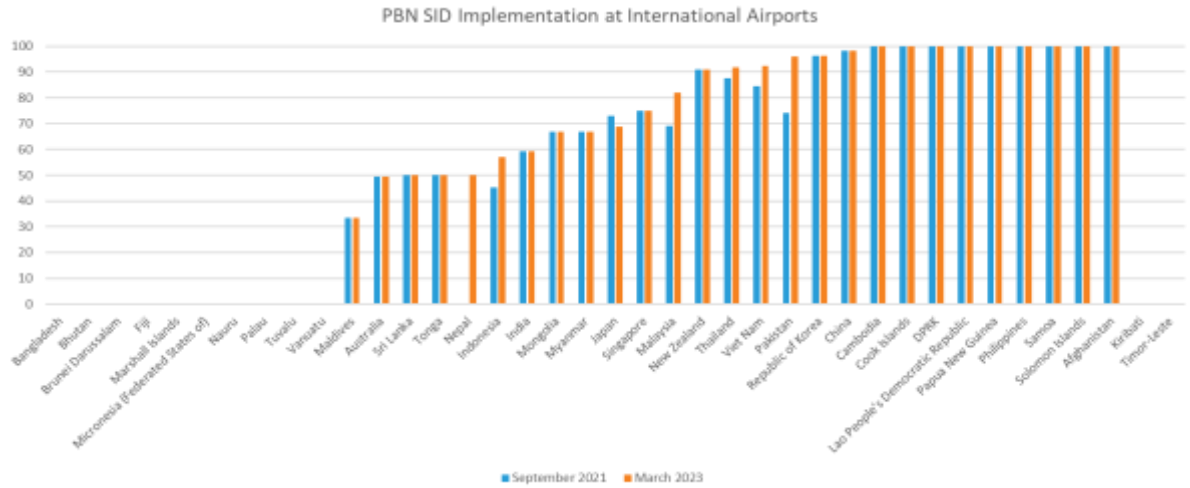
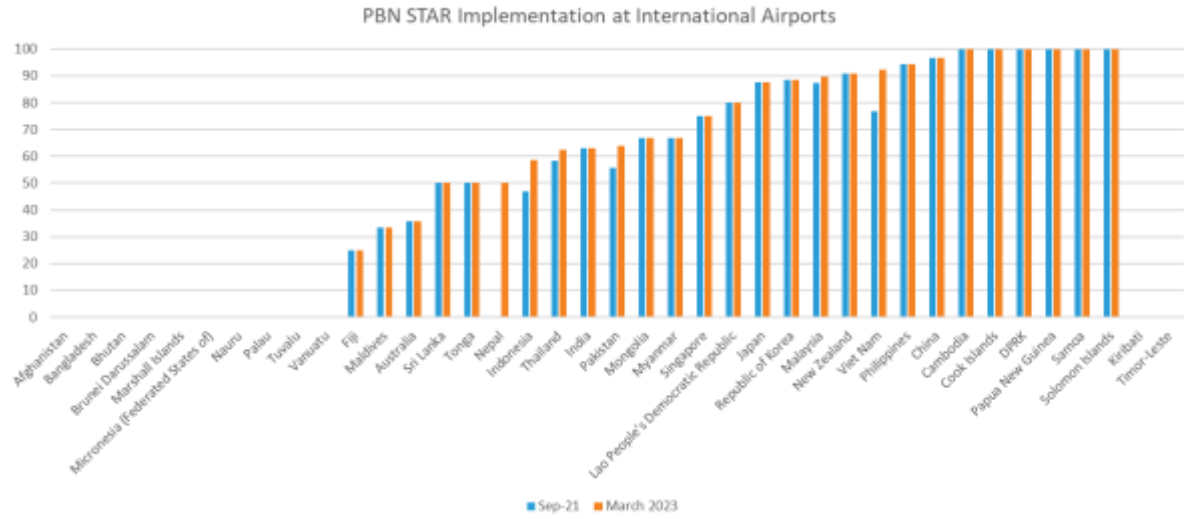


Chart 3. PBN STAR Update, as of March 2023(as per iSTARS)



2.2.3 **Dual Frequency Multi Constellation (DFMC) (Secretariat)**

The Secretariat informed the meeting that ICAO Council adopted ICAO SARPs for dual-frequency multi-constellation (DFMC) GNSS in March 2023 to improve overall safety, capacity and efficiency by providing better navigation performance and availability. The DFMC GNSS SARPs will introduce the next generation of GNSS for aviation, such as; two entirely new GNSS constellations, Galileo (Europe) and BeiDou (China), the existing SARPs for the GPS (USA) and GLONASS (Russia) constellations are being enhanced to introduce a second frequency and modernized technology and the existing satellite-based augmentation system (SBAS) SARPs are being enhanced to introduce a second frequency and the ability to augment the new constellations.

2.2.4 **Moving to True North (Secretariat)**

The Secretariat informed the meeting that Canada presented working papers with a proposal to move from a magnetic to a True North reference for heading and track in air operations, at the Twelfth and Thirteenth Air Navigation Conferences, in 2012 and 2018 respectively, to enhance safety and reduce the considerable cost of maintaining magnetic variation (MAGVAR) tables.
Issues being faced in the existing system of working in Magnetic North:

- Differences between magnetic variation values in aircraft avionics systems and published magnetic variation values on charts can lead to pilot misinterpretation and potentially unsafe conditions during precision approaches and Autoland.
- Regular updating of magnetic variation data in aircraft, ATC systems and aeronautical charts.
- Maintaining runway signage and numbering to match magnetic orientation.
- Rotating VORs and TACANs periodically to account for magnetic variation; and
- Inconsistency of wind direction being reported in magnetic north by ATC but reported in true north by MET services, which can lead to errors when magnetic variation is significant.

ICAO conducted a survey through State Letter AN 11/57-22/87 to seek feedback from States and their aviation industry on the level of support for ICAO to commence work on changing from a magnetic to True North reference for heading and track in air operations. The survey aimed to identify any concerns or challenges that may need to be addressed if True North reference is implemented.
ICAO also conducted two webinars on Moving from Magnetic to True North on 8th September and 27 October 2022 to raise awareness on the subject. Webinar material link.
https://www.icao.int/safety/OPS/OPS-Section/Documents/ICAO%20TN%20Webinar.pdf

The survey result indicates substantial participation, with 564 responses from 103 States, accounting for 53% of the 193 ICAO Contracting States. Responses were from diverse groups, such as, CAAs, air operators, ANSPs, aerodromes, OEMs, flight procedures designers, training organizations, and the military. There was considerable support for moving to true north within a realistic timeframe; with 61% of total respondents either strongly in support (38%) or somewhat in support (23%) of a change. The majority of respondents estimated that it would take their sector 10 years or less to implement true north in their State.
ICAO has to develop a CONOPS, along with a transition plan and timeframe, considering all stakeholders' needs, as a first step towards transitioning to a true north reference system. An ICAO interdisciplinary group, such as a Study Group or inter-panel group, may be needed to assist the ICAO Secretariat with developing these documents and to assist in creating a realistic and safe framework for a true north transition.

2.2.5 **Revised Navigation Strategy of APAC Region**

The Secretariat informed the meeting that ICAO APAC Regional Office sent a State letter in January 2023 to review the Revised Navigation Strategy for Asia/Pacific Region, which was revised in 2016 by the Twentieth Meeting of Communications, Navigation and Surveillance Sub-group of APANPIRG

(CNS SG/20) and adopted via Conclusion APANPIRG/27/37: Revised Navigation Strategy for the Asia/Pacific Region. In view of the latest developments in the field of navigation, a revisit of the strategy was needed. The meeting was invited to discuss the matter and arrive at consensus on Revised Navigation Strategy for the APAC region, which will also be reviewed by GBAS-SBAS ITF before being placed in CNS-SG for recommendation to APANPIRG for adoption.
The Secretariat explained to the meeting that this Navigation strategy along with other similar strategy on communication, surveillance, ATM etc. would form the basis to update the current seamless ANS plan and therefore decision of the group was critical for the navigation strategy of the region.
The revised navigation was deliberated upon in detail and a consensus was reached for a final version of the strategy. A separate WP will be presented on the subject for consideration at the meeting.

2.3 Agenda Item 3: Implementation status of the Regional Transition Plan for RNP APCH Chart Identification from RNAV to RNP

2.3.1 The Secretariat presented the Implementation status of the regional transition plan for RNP APCH chart identification from RNAV to RNP, Asia/Pacific Regional Transition Plan for RNP APCH Chart Identification from RNAV to RNP as adopted by APANPIRG/30 vide Conclusion APANPIRG/30/14 (CNS SG/23/8-PBNICG/6/1). Most of the States have already completed the transition and a few States are on track as per the plan. The Secretariat reminded the States about target date as November 2022 for RNP transition. The plan is available at the following link on ICAO APAC webpage: https://www.icao.int/APAC/Documents/edocs/APX.%20B%20-%20Regional%20Transition%20Plan%20for%20RNP%20Chart%20Identification.pdf.

2.4 Agenda Item 4: States' PBN Implementation Progress

2.4.1 Australia, Bangladesh, Brunei Darussalam, India, Indonesia, Malaysia, Myanmar, Pakistan and Philippines presented PBN Implementation status including RNAV to RNP transition in their States. During discussion IATA informed the meeting about the fleet equipage survey data available with them and that IATA was willing to collaborate with States on this to improve the PBN implementation in a given airspace. Upon query from a State, the Secretariat explained to the meeting that ICAO Doc 9905 provides adequate guidance for design of RNP AR APCH, however its implementation may need support of some experienced State, agency, or a vendor.

2.5 Agenda Item 5: PBN Training for ATC

2.5.1 The Secretariat informed the meeting that although Baro-VNAV approaches provide significant safety benefits over conventional LOC, NDB and VOR approaches as they provide vertical guidance; however, they are significantly less robust than geometric PBN approaches enabled by SBAS, and GBAS as they depend on temperature & QNH setting. The main vulnerability of Baro-VNAV approaches lies in their dependence on correct altimeter setting, which involves multiple human interventions such as,

- determination of the local QNH by the meteorological service provider,

- publication of the local QNH in ATIS,

- transmission of the local QNH by ATC to the flight crew,

- altimeter setting by the flight crew, and

- correction for the effects of temperature on the atmospheric pressure at aircraft altitude.

Moreover, several reports of unsafe situations in the final approaches due to incorrect QNH setting have come to light over the years in various parts of the world. Mitigation for this is PBN training for ATC especially importance of correct QNH setting in Baro-VNAV needs more emphasis.

2.5.2 Nav-Canada explained the training methodology used for PBN training of ATCOs in terminal and approach procedures, including significance of correct QNH setting and temperature limitation in Baro-VNAV procedures. This presentation also covered PBN training for ATC for implementation of RNP AR and EoR.

2.5.3 India presented a paper, which describes the PBN training approach/practice followed for ATCOs in India. The Indian ATCOs are being sensitized on various PBN concepts prior to implementations of PBN procedures at the Airports considering ATC is the most critical link for safe and effective implementation of PBN being associated with real time operations.

2.5.4 Indonesia presented an update on the progress of Indonesia's PBN Training for ATC. The objective of the training is to facilitate the application of PBN procedures through the improvement of understanding of the PBN concept and the PBN procedures by air traffic controllers.

2.6 Agenda Item 6: Established on RNP AR (EoR)

2.6.1 The secretariat introduced to the meeting the concept of Established on RNP AR APCH, which is a procedure for simultaneous parallel independent approach that takes advantage of benefits of RNP AR. The operation considers aircraft stabilized on an RNP AR APCH to be similarly established to aircraft flying an ILS for the purpose of simultaneous parallel approach separation. Vertical separation is not required between an aircraft "Established" on a RNP AR APCH after a nominated point and an aircraft established on the approach course or track to an adjacent parallel runway. Benefits of EoR is flexibility in the design of simultaneous approach operations, shorter track miles and optimized descent profiles compared to traditional SOIR, increased operational efficiency in terms of runway or airspace capacity and environmental benefits such as a reduction in noise and greenhouse gas emissions.

2.6.2 Nav-Canada provided a detailed presentation of various aspects of EoR implementation at two busy airports in Canada, Calgary and Toronto Pearson International Airports. The presentation covered Initial concept development, Regulatory process, Design consideration, Operational consideration, Safety aspects and additional deployments to implement EoR at these airports. ATC Training for EoR implementation was also explained. In Calgary, each RNP AR approach reduces flying time by 3-4 minutes over conventional "straight in", Saving approximately 9-11 track miles. This resulted in saving 250 000 track miles and consequent reduction of 4.1 million kg CO2 emissions.

2.6.3 NAVBLUE presented an overview of EoR concept covering operational requirements, such as, Aerodrome requirement including minimum distance between the parallel runways, ATS requirement for Monitoring controller in case of parallel runway operational and Instrument approach

procedures consideration in respect of evaluation of PAOAS (parallel Approach Obstacles Assessment surface) to protect the breakout procedures. NAVBLUE also presented requirements for RNP AR operation approval process as per Approval for RNP AR operations based on EASA AIR-OPS Nov 2022 including Flight Operations Safety Assessment (FOSA).

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) Note the information contained in this paper;

b) Consider the endorsement of the report, and

c) Discuss any relevant matters as appropriate.

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