International Civil Aviation Organization

Twenty Seventh Meeting of the Communications, Navigation and Surveillance Sub-group (CNS SG/27) of APANPIRG
Bangkok, Thailand, 28 August - 1 September 2023

Agenda Item 6: Navigation

6.3 Review of Revised Navigation Strategy for Asia Pacific Region

REVISED NAVIGATION STRATEGY FOR ASIA PACIFIC REGION

(Presented by Secretariat)

SUMMARY

This paper presents Navigation Strategy for Asia/Pacific Region, which was revised in 2016 by CNS SG/20 and adopted via Conclusion APANPIRG/27/37. In view of latest developments in GNSS navigation, Revised Navigation Strategy for the Asia/Pacific Region was reviewed by PBNICG/10 and GBAS-SBAS ITF/5 and it is placed before the meeting for discussion and possible recommendation to APANPIRG/34 for adoption.

1. INTRODUCTION

1.1 ICAO APAC Regional Office sent a State letter in January 2023 to review 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 especially GNSS navigation, a revisit of the strategy is needed.

2. DISCUSSION

2.1 Navigation Strategy for Asia/Pacific Region 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. Since this was revised in 2016, there have been significant developments in the field of navigation, particularly GNSS navigation. Therefore, there is a need to review the navigation strategy for the region.

2.2 Accordingly, ICAO APAC Regional Office sent a state letter no. T8/5-AP021/23(CNS) on 27 January 2023 to suitably review the Strategy for currency and applicability to the latest Navigation requirements in the Region. The copy of the State letter is placed as Attachment-1. The last date for the feedback from States was 7 April 2023. The draft Navigation strategy including the feedback from the States was deliberated in PBNICG/10 meeting. PBNICG/10 suggested that comments of ICAO NSP secretary should be obtained on the draft. The draft was forwarded to the NSP Secretary for review and any comments. A final draft navigation strategy as agreed by PBNICG/10 meeting, reviewed by the NSP secretary and GBAS-SBAS ITF/5 is placed as attachment II.

2.3 The meeting is invited to discuss the draft revised navigation strategy of APAC region in view of latest development in GNSS navigation. The draft version of the navigation strategy may be

recommended for adoption in APANPIRG/34. It may also be noted that navigation strategy will form the basis for amendment of APAC Seamless ANS plan.

<table>
<tr><td colspan="3">Draft Conclusion – CNS SG/27/XX - Revised Navigation Strategy- APAC</td></tr>
<tr><td colspan="2">What: Draft Revised Navigation Strategy-APAC</td><td>Expected impact:
☐Political / Global
☐ Inter-regional
☐ Economic
☐Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To update revised Navigation Strategy-APAC</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
<tr><td>When: 30-Aug-23</td><td colspan="2">Status: Draft to be adopted by PIRG</td></tr>
<tr><td colspan="3">Who: ☒ Sub groups(CNS SG) ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☐Other: XXXX</td></tr>
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3. ACTION REQUIRED BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper; and
b) discuss any relevant matters as appropriate and adopt a draft conclusion as stated in para 2.3 on Revised Navigation Strategy - APAC.

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REVISED NAVIGATION STRATEGY FOR THE ASIA/PACIFIC REGION

(Adopted by APANPIRG/27)

Considering:

a) the material contained in the Performance Based Navigation Manual (Doc 9613) for enroute, approach, landing and departures operations;

b) operators are qualified for PBN operations;

c) GNSS is the primary navigation system for RNP;

d) APV operations may be conducted with either BARO-VNAV or augmented GNSS;

e) Augmented GNSS is available to support Category I, and will be able to support Category II and III operations by 2018;

f) ILS is capable of meeting the majority of requirements for precision approach and landing in the Asia-Pacific Region;

g) ILS CAT III is operational;

h)the need to maintain aircraft and ground interoperability both within the Region and between the Asia/Pacific Region and other ICAO regions and to provide flexibility for future aircraft equipage;

i) single-frequency GNSS may be susceptible to radio frequency interference and ionospheric disturbances and use of multi-frequency, multi-constellation GNSS may mitigate risks caused by narrow band frequency interference and ionospheric disturbances.

j) The region has developed an ionospheric threat model for GBAS

Strategy

i) Convert from traditional terrestrial-based instrument flight procedures to PBN operations in accordance with the Asia/Pacific Seamless ATM Plan;

ii) retain ILS as an ICAO standard system for as long as it is operationally acceptable and economically beneficial;

iii) implement GNSS with augmentation as required for APV and precision approach or RNP operations

where it is operationally and economically beneficial;

iv) Implement the regional ionospheric threat model for GBAS as appropriate

v) implement the use of APV operation in accordance with the Asia/Pacific Seamless ATM Plan;

vi) rationalize terrestrial navigation aids, retaining a minimum network of terrestrial aids necessary to maintain safety of aircraft operations;

vii) protect all the Aeronautical Radio Navigation Service (ARNS) frequencies through education, appropriate regulation and the active detection and elimination of intentional and unintentional interference sources.;

viii) ensure civil-military interoperability; and

ix) continue monitoring the development of GNSS elements and alternative position, navigation and timing.

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REVISED NAVIGATION STRATEGY FOR THE ASIA/PACIFIC REGION

NOTES ON THE PRESENTATION OF THE PROPOSED AMENDMENT

1. The text of the amendment is arranged to show deleted text with a line through it and new text highlighted with grey shading, as shown below:

a) ~~Text to be deleted is shown with a line through it.~~	text to be deleted in
b) New text to be inserted is highlighted with grey shading.	new text to be inserted in
c) ~~Text to be deleted is shown with a line through it~~ followed by the replacement text which is highlighted with grey shading.	new text to replace existing text

Considering:

a) ~~the material contained in the Performance Based Navigation Manual (Doc 9613) for enroute, approach, landing and departures operations;~~ Performance Based Navigation (PBN) as a means to support ICAO's strategic objectives of Safety and Air Navigation Capacity and Efficiency.

b) PBN implementation in Approach and Terminal area as one of the key ASBU elements to achieve capacity and efficiency.

c) ICAO Assembly resolution A37-11 on PBN Global Goals to implement PBN in all phases of flight.

d) the guidance/provisions contained in the Performance Based Navigation Manual (Doc 9613) for enroute, approach, landing and departures operations;

e) Operators are ~~qualified~~ certified for PBN operations as applicable;

f) GNSS is the primary navigation system for RNP;

g) APV operations may be conducted with either Baro-VNAV or ~~augmented GNSS~~ SBAS;

h) ~~Augmented GNSS is available to support Category I, and will be able to support Category II and III operations by 2018~~; GBAS and SBAS are able to support Category I operation, and ICAO SARPs for GBAS to support up to Category II and III operations are available.

i) ~~ILS is capable of meeting the majority of requirements for precision approach and landing in the Asia Pacific Region~~ ILS is capable to support precision approach and landing including Cat II/III operations.

j) the need to maintain aircraft and ground interoperability both within the Region and between the Asia/Pacific Region and other ICAO regions and to provide flexibility for future aircraft equipage;

k) single-frequency GNSS may be susceptible to radio frequency interference and ionospheric disturbances and use of dual-frequency multi-constellation(DFMC) GNSS may mitigate risks caused by narrow band frequency interference and ionospheric disturbances.
j) ~~The region has developed an ionospheric threat model for GBAS.~~

Strategy

i) ~~Convert from traditional terrestrial-based instrument flight procedures to PBN operations in accordance with the Asia/Pacific Seamless ATM Plan~~. Transition from traditional terrestrial-based instrument flight procedures to PBN operations in En-route, Terminal and Approach.

ii~~) implement GNSS with augmentation as required for APV and precision approach or RNP operations where it is operationally and economically beneficial~~. Implement APV operation with Baro-VNAV or SBAS(LPV).

iii) implement SBAS/GBAS for precision approach Cat I and GBAS for Cat II/III where it is operationally and economically beneficial.

iv) ~~retain ILS as an ICAO standard system for as long as it is operationally acceptable and economically beneficial.~~ Retain ILS for precision approach especially for Cat II/III operations as long as it is operationally acceptable and economically beneficial.

v) rationalize terrestrial navigation aids, retaining a minimum network of terrestrial aids necessary to maintain safety of aircraft operations.

vi) protect all the Aeronautical Radio Navigation Service (ARNS) frequencies through education, appropriate regulation and the active detection and elimination of intentional and unintentional interference sources.

vii) ensure civil-military interoperability so that military aircraft is also capable of operation in PBN environment as far as practicable;

viii) continue monitoring the development of GNSS constellations and augmentations, including DFMC technology, and alternative position, navigation and timing;

ix) ~~strengthen protection on the ILS Critical and Sensitive Areas in three-dimensional volumes in accordance with ICAO Annex 10~~.

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