



सत्यमेव जयते

नागर विमानन मंत्रालय, भारत सरकार
MINISTRY OF CIVIL AVIATION, GOVERNMENT OF INDIA



ICAO APAC SBAS-GBAS IMPLEMENTATION WORKSHOP FOR AIRSPACE USERS

“Enhancing airport accessibility and safety on final approach with SBAS and GBAS”

14th to 16th October 2025
Bengaluru, India



GBAS SBAS Implementation Task Force outcomes and deliverables

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Outline

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History

History of the GBAS/SBAS ITF

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Guidance on the ionosphere

Updated guidance documents on mitigation of ionospheric threats for GBAS and SBAS

3

Guidance on implementation

New guidance documents on implementation of GBAS and SBAS

4

Information sharing platform

Collection of information relevant to GBAS/SBAS implementation

5

Remaining actions

Remaining action items

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Summary and next steps

Summary, next meetings

GBAS/SBAS Implementation Task Force (ITF)

Background

- Established under the CNS Subgroup of ICAO APANPIRG (Asia-Pacific Air Navigation Planning and Implementation Regional Group) in 2019.
- Background
 - Worldwide deployment of GBAS and SBAS
 - Implementation in the APAC region (as of 2019)
 - GBAS: Australia (Sydney, Melbourne)
 - SBAS: MSAS, GAGAN
 - Increased aircraft equipage of GBAS/SBAS receivers
 - Increasing interests of the APAC region and needs for a forum to exchange information and experiences

GBAS/SBAS Implementation Task Force (ITF)

Objectives

- Keep abreast of the latest global developments in GBAS/SBAS
- Facilitate implementation enhancements, operation and maintenance of GBAS/SBAS
- Ensure continuous and coherent development of the GBAS/SBAS
- Review, identify and address major issues in technical, operational, safety and regulatory aspects in relation to GBAS/SBAS.

GBAS/SBAS Implementation Task Force (ITF)

Deliverables

- Guidance documents
 - GBAS safety assessment guidance document related to anomalous ionospheric conditions
 - SBAS safety assessment guidance document related to anomalous ionospheric conditions
 - GBAS implementation guidance in the APAC region
 - SBAS implementation guidance in the APAC region
- Information sharing platform
 - ICAO APAC GBAS-SBAS Implementation website
 - Workshops (for Airspace Users, Regulators, etc.)

GBAS/SBAS Implementation Task Force (ITF)

History of activities (1)

- June 2019: GBAS/SBAS implementation workshop (Seoul, ROK)
- September 2019: Established under ICAO APAC CNS-SG
 - Draft ToR
- June 2020: GBAS/SBAS ITF/1 (online)
 - Brain storming, list of desired outcomes
- September 2020: GBAS/SBAS ITF/2 (online)
 - ToR in line with GBAS/SBAS ITF/1 outcomes
- September 2021: GBAS/SBAS ITF/3 (online)
 - Information sharing platform (web)

GBAS/SBAS Implementation Task Force (ITF)

History of activities (2)

- May 2022: GBAS/SBAS ITF/4 (online)
 - Draft of guidance documents for anomalous ionosphere mitigation
- June 2023: GBAS/SBAS ITF/5 (Tokyo, Japan)
 - Guidance documents for anomalous ionosphere mitigation for GBAS/SBAS delivered
 - Site visit to GBAS at Tokyo Haneda Airport
- May 2024: GBAS/SBAS ITF/6 (Bangkok, Thailand)
 - GBAS implementation guidance delivered
- May 2025: GBAS/SBAS ITF/7 (Bangkok, Thailand)
 - SBAS implementation guidance delivered



The Seventh Meeting of the GBAS-SBAS Implementation Task Force (GBAS/SBAS TF/7)
ICAO Asia and Pacific Regional Office, Bangkok, Thailand, 14 - 16 May 2025



Guidance on the ionosphere

Why the ionosphere matters?

- The ionosphere can cause errors in GNSS ranging and sometimes make it difficult to track signals.
- Large part of the APAC region is in the low magnetic latitude region where the ionospheric activity is high.
- ICAO APAC Ionospheric Studies Task Force (ISTF, 2011-2016) worked on addressing the regional issues.
 - First editions of guidance for GBAS and SBAS were published in 2016.
 - APAC ionospheric threat model for GBAS was also adopted in 2016.
- Updates needed
 - More experiences gained
 - More advanced standards defined (GAST D, DFMC SBAS)

Guidance on the ionosphere

Consideration for GBAS

- GBAS safety assessment guidance related to anomalous ionospheric conditions, 2nd Edition
 - Ionosphere conditions to consider for GBAS safety analysis
 - Development and validation of the threat model
 - Post-implementation activities
- <https://www.icao.int/sites/default/files/APAC/Documents/edocs/Revised-GBAS-safety-assessment-guidance-related-to-anomalous-ionospheric-condition.pdf>

Guidance on the ionosphere

Consideration for SBAS

- SBAS safety assessment guidance related to anomalous ionospheric conditions, 2nd Edition
 - Mitigation strategy against anomalous ionospheric conditions
 - Approval of SBAS
 - Examples of ionospheric algorithms
- <https://www.icao.int/sites/default/files/APAC/Documents/edocs/Revised-SBAS-safety-assessment-guidance-related-to-anomalous-ionospheric-conditions.pdf>

Guidance on implementation

Overview

- Provide guidance to States
 - implementing GBAS/SBAS and certifying GBAS/SBAS installation
 - approving GBAS/SBAS based service within the APAC region.
- Sources of contents
 - Experiences of States in the region
 - ICAO documentations
 - Other publicly available documents/information

Guidance on implementation

Implementation of GBAS

- Guidance Document for Implementation of GBAS in the Asia /Pacific Region
 - Roles and Responsibilities of stakeholders
 - Performance indicators
 - Implementation process of GBAS
 - Post implementation activities
 - Experiences shared by States/Administrations
- <https://www.icao.int/sites/default/files/APAC/Documents/edocs/CNS/GBAS-APAC-Implementation-Guidance-Document-July-2024-Edition-1.pdf>

Guidance on implementation

Implementation of SBAS

- Guidance Document for Implementation of SBAS in the Asia/Pacific Region
 - Roles and Responsibilities of stakeholders
 - Performance indicators
 - Implementation process of SBAS
 - Framework, phases and elements of SBAS implementation process
 - Implementation types
 - Experiences shared by States/Administrations
- <https://www.icao.int/sites/default/files/APAC/Documents/Guidance-Documents-for-Implementation-of-SBAS-in-the-Asia-Pacific-Region.pdf>

Information sharing platform

- <https://www.icao.int/APAC/GBAS-SBAS>
 - Applicable and Reference Documents
 - Introduction of GBAS and SBAS concept
 - Update on the GBAS and SBAS Programme per APAC State
 - List of National Focal Points
 - Map of GLS/LPV procedures in the APAC region

GBAS/SBAS ITF: Remaining actions

31 actions in 5 categories have been identified as a basis of the TF work.

Develop awareness and information sharing

- Meeting for regulators, list of mandates
- Additional workshops for airspace users may be organized, if desired.

Experience sharing

- GBAS/SBAS site visits for discussion (already done at Tokyo Haneda GBAS, MSAS)

Technical issues

- ATC interface and NOTAM matters, performance demonstration

Quick guides and references

- Technical support for certification

Training

- Sharing information on training of ATCO

Summary

- ICAO APAC GBAS/SBAS ITF is continuously working on facilitating implementation of GBAS/SBAS in the APAC Region.
- Four guidance documents have been delivered.
 - Anomalous ionosphere mitigation for GBAS/SBAS
 - Implementation of GBAS/SBAS
- Serving as a forum to exchange information and experiences for GBAS SBAS implementation
- Additional workshops for airspace users may be held if desired
- Next GBAS/SBAS ITF Meeting: Planned in March-May 2026 (location: TBD)
 - Participation and contribution by States/Administrations/Organizations are welcome



Thank You!