

INTERNATIONAL CIVIL AVIATION ORGANIZATION



**DRAFT REPORT OF THE SEVENTH MEETING OF THE
ICAO ASIA/PACIFIC GBAS/SBAS IMPLEMENTATION TASK FORCE
(GBAS/SBAS ITF/7)**

Bangkok, Thailand, 14-16 May 2025

The views expressed in this Report are those of the Meeting
and not the Organization

Approved by the Meeting
and published by the ICAO Asia and Pacific Office, Bangkok

INTRODUCTION

Meeting

1.1 The Seventh Meeting of the ICAO Asia/Pacific GBAS/SBAS Implementation Task Force (GBAS/SBAS ITF/7) was held in ICAO APAC Regional Office, Bangkok on 14-16 May 2025.

Attendance

2.1 The meeting was attended by 61 participants from Australia, China, Hong Kong China, Fiji, India, Japan, Lao PDR, Malaysia, New Zealand, Pakistan, Philippines, Republic of Korea, Singapore, Thailand, USA, Vietnam, IFALPA and ICAO. The list of participants is provided in Appendix B to this report.

Secretariat

3.1 Mr. Raphael Guillet, Chief of ICAO APAC Regional Sub-Office (RSO), acted as the Secretary for the Meeting, assisted by Ms. Chen YanRu, Programme Assistant at APAC RSO.

Opening of Meeting

4.1 The meeting was conducted by the incumbent Co-Chairs of the ITF, Mr. Susumu Saito, ENRI Japan, and Mr. George Wong, CAD, Hong Kong China. In the name of the ICAO APAC Regional Director, Mr. MA Tao, the Secretary provided opening remarks and welcomed all participants to the meeting.

Documentation and Working Language

5.1 The working language of the meeting and all documentation was in English.

5.2 A total of seven (7) Information Papers (IPs) and seven (7) Working Papers (WPs) were presented in the meeting. The list of papers is provided in Appendix A to this report. The papers are available on the webpage of the meeting: <https://www.icao.int/APAC/Meetings/Pages/2025-GBAS-SBAS-ITF-7.aspx>.

List of Decisions/Conclusions and Draft Conclusions/ Draft Decisions

6.1 The Sub-groups of APANPIRG record their actions in the form of Draft Conclusions, Draft Decisions, Conclusions and Decisions with the following significance:

- 1) Draft Conclusions deal with matters which, by the Sub-Group's Terms of Reference, require the attention of States or actions by ICAO following established procedures.
- 2) Draft Decisions relate solely to matters dealing with the internal working arrangements of APANPIRG and its contributory bodies.
- 3) Conclusions: Those Conclusions adopted by the Sub-group on behalf of APANPIRG on technical matters; and
- 4) Decisions relate solely to matters dealing with the internal working arrangement of the

Sub-group only.

6.2 List of Draft Conclusions

Draft Conclusion GBAS/SBAS ITF 7/01 - Update draft Guidance Document for Implementation
of SBAS in the Asia/Pacific Region.

6.3 List of Draft Decisions

Nil

6.4 List of Decisions

Nil

6.5 List of Conclusions

Nil

REPORT ON AGENDA ITEMS

Agenda Item 1: Adoption of Agenda

1.1 WP/00 - Adoption of Agenda - Secretariat

The following proposed agenda was adopted by the meeting.

Agenda Item 1: Adoption of Agenda

Agenda Item 2: Report of relevant meetings

- Review of national GBAS SBAS focal points
- Delhi Declaration
- Review of the navigation priorities of the APAC Seamless ANS plan
- Review of NSP outcomes
- Review of ICAO APAC Radio Navigation Symposium outcomes

Agenda Item 3: Progress on the work of Expert Group constituted to:

- Draft Guidance Document for Implementation of SBAS in the Asia /Pacific Region

Agenda Item 4: Updates on GBAS/SBAS system and States' implementation status

Agenda Item 5: Review of Action Item List

Agenda Item 6: Any Other Business

Agenda Item 7: Date and Venue of Next Meeting

Agenda Item 2 : Report of relevant meetings

2.1 Review of national GBAS SBAS focal points

Ms. Chen displayed the current list of GBAS SBAS focal points and invited all participants to review the list and to inform her of any change by 16 May 2025.

2.2 WP/01 - Outcomes of Second APAC Ministerial Conference on Civil Aviation

Ms. Soniya Nibhani, ICAO APAC ANS(CNS) Implementation officer, reported that the Second Asia Pacific Ministerial Conference on Civil Aviation was held from 11 – 12 September 2024 in New Delhi, India. In the Conference, the APAC Ministers reviewed commitments made under the Beijing Declaration and agreed to another set of commitments to high-priority aviation strategic objectives in the form of the Asia Pacific Ministerial Declaration on Civil Aviation (Delhi). Presented in Appendix A of the WP, the Delhi Declaration has added some new commitments with respect to the Beijing Declaration, which is mainly based on the APAC Seamless ANS plan for the Air Navigation Services. These commitments cover Aviation Security and Facilitation, Gender Equality, Resourcing for Civil

Aviation, Aviation Environment Protection and Ratification of International Air Law Treaties. The meeting noted that GBAS and SBAS do not appear as such as commitment but are covered under the following commitment: “Performance Based Navigation (PBN) implementation in accordance with ICAO Assembly Resolution A37-11 on Global PBN Goals.”

2.3 **WP/02 - Review of the Expected Implementation Priority for ASBU NAVS Block 0 Elements within the APAC region**

Mr. Mior Sallehhuiddin, ICAO APAC ATM Regional Officer, presented the expected implementation priority of the Aviation System Block Upgrade (ASBU) Navigation Systems (NAVS) module Block 0 elements in the Asia/Pacific Seamless Air Navigation Service (ANS) Plan Version 4.0 adopted by APANPIRG last November 2024. The meeting was invited to review the new proposal from ICAO APAC office: **keep priority 2 for NAVS-B0/1 GBAS and NAVS-B0/2 SBAS as some APAC States do not have access to such systems, and to change the priorities of NAVS-B0/3 ABAS and NAVS-B0/4 Nav. MON to Priority 1.** After some discussion, especially on ABAS and Advanced RAIM, the meeting supported this proposal which will be communicated to CNS SG in June 2025.

2.4 **WP/03 - Current status of NSP GBAS working group activities**

Mr. Susumu Saito updated the meeting on the outcomes of the ICAO Navigation Systems Panel (NSP) GBAS Working Group (GWG) held from 29 April to 2 May 2025. The development of the dual-frequency and multi-constellation (DFMC) GBAS standards is ongoing and expected to have Operationally validated SARPs proposal ready for proposal to NSP by 2030. The new service type based of the DFMC GBAS is called “GBAS Approach Service Type (GAST) E.” It is deemed to be able to provide availability even under severe ionospheric conditions. MOPS will be developed in parallel of GAST-E standards and would allow Cat II/III.

To support the deployment of existing GBAS (GAST-C and D), GWG works on updates and maintenance of existing ICAO standards, guidance materials, and manuals. GWG started to work on a new manual on GBAS (GBAS Manual) which will include contents on ionospheric anomaly mitigation.

Mr. Saito added that GAST-C based on GPS L1 was operational in Australia, Japan and Germany and that more than 100 GAST C stations based on GLONASS had been deployed in Russia.

2.5 **WP/04 - Review of ICAO APAC Radio Navigation Symposium outcomes**

ICAO Secretariat presented the key outcomes of the ICAO APAC Radio Navigation Symposium, which was held in New Delhi, India, from 07-09 April 2025. The theme of the Symposium was **GNSS RFI: Collectively Bridging Gaps and Shaping the Path Forward.**

The list of key recommendations discussed during the Symposium can be accessed by this [link](#). The final list of recommendations resulting from the Symposium, along with the safety bulletin, will be published by ICAO HQ in due course.

The Meeting agreed that, from the technical side, there were a lot of significant topics related to GNSS RFI that required more research to get a comprehensive understanding. For instance, the identification of GNSS RFI as a root cause of a particular occurrence is the key. Other instances, such as issues in satellite constellation and avionics issues, can pose the same effect, and it is not easy to isolate the real cause of the problems identified. In addition, how to correct GNSS RFI issues and associated legal implications is a significant point of discussion.

India shared information about Advisory Circular Ref. DGCA-21040/1/2023-ANS dated 24 11.2023 issued by DGCA, India. The meeting noted that the purpose of this circular was (a) to increase awareness among aviation personnel about potential threats of GNSS Interference; (b) establish roles

and responsibilities of different stakeholders in monitoring and mitigating threats; (c) establish an unambiguous channel for reporting GNSS Interference; and (d) establish a threat monitoring and analysis network. More details can be accessed by this [link](#).

Agenda Item 3: Progress on the work of Expert Group

3.1 WP/05 - Review on Draft SBAS implementation guidance document

The two co-chairs presented the draft SBAS implementation guidance document prepared through multiple rounds of discussion among Expert Group members and representatives of States/Administrations. A detailed review of the document was conducted on 15 May 2025 to finalise the draft SBAS Implementation guidance document for onward endorsement.

Agenda Item 4: Updates on GBAS/SBAS system and States' implementation status

4.1 WP/06 - GBAS Status Update and Operational Experiences in Australia

Australia presented the updates on GBAS implementation, operational experiences, information on in-service observations in the preceding 12-month period, results from a review of the Ionosphere Threat Model and an update on the number of GLS capable aircraft operating into GBAS equipped airports in Australia.

Philippines asked about the frequency to review the Ionosphere threat model. Australia replied that review of data was required after severe ionosphere event. Singapore asked for information of the D Max at 23 NM. Australia replied that in 2018 ICAO Standards had changed the definition of D Max and that was not related to integrity anymore. Australia added that all GLS procedures were within 23 NM. Australia detailed that the statistics on GLS capable aircraft were data extracted from the flight plan and that effective flown GLS procedures were not recorded as it was assumed that, if an aircraft had filed GLS capable, they will request GLS procedure.

India asked whether Australia had a flight validation system for the GLS procedure. Australia replied that they used a commercial transport aircraft for this purpose.

China asked about flight inspection commissioning and Australia detailed that 6 flights were conducted per runway end and routine flight inspection was conducted every 5 years, with only one approach profile.

In response to a question from Japan, Australia explained that there was no ionosphere field monitor in real-time because the static model was protecting the worst case.

4.2 WP/07 - Ionospheric Gradient Study for GBAS at Singapore Changi Airport

Singapore presented the paper on ionospheric gradient study for future GBAS implementation at Changi Airport. Singapore explained that the ionosphere model continuous monitoring was not integrated into the GBAS system and it aimed at making analysis to improve the ionosphere model.

The analysis conducted by Singapore indicates that the baseline distances between the Ionospheric Monitoring Stations has a significant effect on the calculated ionospheric gradients. Errors in estimating

the ionospheric delay are amplified when the baseline is short. On the other hand, if the baseline is too long, a localised ionospheric disturbance may not be detected. Co-chair supplemented that the characteristics of error also depended on analysis methods.

Regarding the proposed action item d, Co-chair supplemented that there was no enough information to conclude any particular amendment to be made into the GBAS guidance document as reference to States in APAC Region. Singapore explained that this case was a user case for ionosphere gradient analysis to support ICAO GBAS guidance material and no amendment was required in the guidance document. Additionally, Singapore will support the ICAO NSP Ionospheric Gradient Mitigation (IGM) ad-hoc group in its work, which will be updated in future ICAO APAC GBAS implementation document.

4.3 IP/02 - Progress Report on GBAS-SBAS in Fiji

Fiji presented the paper on its ongoing efforts to establish a national Instrument Flight Procedure (IFP) capability and provided an update on the country's strategic roadmap for SBAS by 2028 and GBAS from 2030 onwards. These initiatives are part of Fiji's broader modernization strategy under its Air Navigation Service Plan 2013–2028, particularly within the framework of PBN.

4.4 IP/03 - SouthPAN Program Status Update

Australia presented a brief summary of the SouthPAN program, which will provide a SBAS aeronautical radio navigation service to Australia and New Zealand by 2028. In response to a request of possibility for Fiji to take benefits of SouthPAN, Australia replied that Fiji would be within the coverage area of SouthPAN but outside the Safety of Life service area.

4.5 IP/04 - GBAS Status Update in Japan

Japan updated the meeting on its GBAS development. Japan Civil Aviation Bureau (JCAB) had completed the trial operation of CAT-I GBAS at Tokyo International Airport (HND) from 2020 to 2024, and started the official CAT-I GBAS operation at HND from January 23, 2025. The Electronic Navigation Research Institute (ENRI) has contributed to the improvement of GAST-D performance in low latitude regions. Currently, ENRI is engaged in research and development activities related to GBAS, including contribution to the DFMC GBAS standardization and advanced operations with GBAS.

In response to a question of Singapore on any possible request of regulator to have ionosphere monitoring, Japan replied that the ionosphere field monitor was part of the GBAS system. Japan added that the GLS approaches were conducted at night which explained the low number of 49 GLS approaches from 23 January to 31 March 2025.

IFALPA added that simultaneous ILS approaches are conducted at HND airport and asked whether this could also be possible with GLS runways 22 and 23. Japan replied that it would check and consider the matter based on the valuable information.

Japan also presented a map of the MSAS LPV availability coverage in Japan and around.

4.6 IP/05 - Implementation of LPV (GAGAN) approaches in India and IP/05b - GAGAN (SBAS) Based LPV Procedure Implementation Update in India

India gave a presentation of the two IPs. At present, 57 LPV approaches are in various stages of implementation, with 23 already published. Kishangarh was the signature airport in Rajasthan, India where the LPV approach was implemented first on 14 July 2022. Normally, airports with short runways

are served by aircrafts such as Q400/ATR 72, which are capable of conducting LPV approaches. Implementation of LPV approaches at such airports will result in an improved access (equivalent to ILS) for non-precision runway, with DH of order 250 ft. India also detailed the OPS approval process in 5 phase process.

India will host the SBAS/GBAS Workshop for Airspace Users in Bengaluru on 14 –16 October 2025, bringing together global aviation stakeholders to advance the implementation of satellite and ground-based augmentation systems. All ICAO Member States are warmly invited to participate in this collaborative platform aimed at promoting PBN adoption and enhancing airspace efficiency.

Philippines asked about existence of RFI in India, India replied that there are some reports in the north part of India. However, no such RFI reports have been received at regional airports where LPV procedures have been published.

4.7 **IP/06 - SBAS(KASS) Operations and 2nd GEO satellite Launch**

The Republic of Korea presented the current status of the Korean SBAS (KASS, Korea Augmentation Satellite System). The Ministry Of Land, Infrastructure and Transport (MOLIT) plans to gradually increase the publication of approach procedures to use KASS service. As of April 2025, flight procedures for APV-I approach have been published at three airports (Muan, Ulsan and Jeju).

Japan asked which aircraft type and operators are capable of flying LPV procedures in ROK. ROK will reply later.

4.8 **IP/01 - PAK-SBAS Implementation Status**

Pakistan presented the latest status of Pakistan Space Based Augmentation System (Pak-SBAS) program, which is being undertaken by Pakistan Space and Upper Atmosphere Research Commission (SUPARCO) in cooperation with Pakistan Civil Aviation Authority (PCAA) and Pakistan Airports Authority (PAA). Pak-SBAS Public service augments GPS L1 signal and utilize GPS & BDS for L5 Dual Frequency Multi Constellation (DFMC) signal. A Joint Working Group (JWG) of SUPARCO, PCAA and PAA has been formed for the implementation of Pak-SBAS in aviation sector in Pakistan.

4.9 **WP/05 SBAS guidance document, final review**

The meeting conducted the review of the SBAS guidance document and adopted the following Draft Conclusion:

Draft Conclusion 07/01 - Draft Guidance Document for Implementation of SBAS in the Asia/Pacific Region	
What: the draft guidance document for implementation of SBAS in the Asia/Pacific Region developed by the APAC GBAS/SBAS ITF and provided in Attachment A of this GBAS SBAS ITF/7 Meeting Report is ready for endorsement by CNS SG	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic

Draft Conclusion 07/01 - Draft Guidance Document for Implementation of SBAS in the Asia/Pacific Region	
☐ Environmental ☒ Ops/Technical	
Why: To provide guidance to States for the implementation of SBAS	Follow-up: ☐ Required from States
When: June 2025	Status: Draft to be adopted by CNS SG
Who: ☒ CNS Sub group ☐ APAC States ☒ ICAO APAC RO ☐ ICAO HQ ☐ Other:	

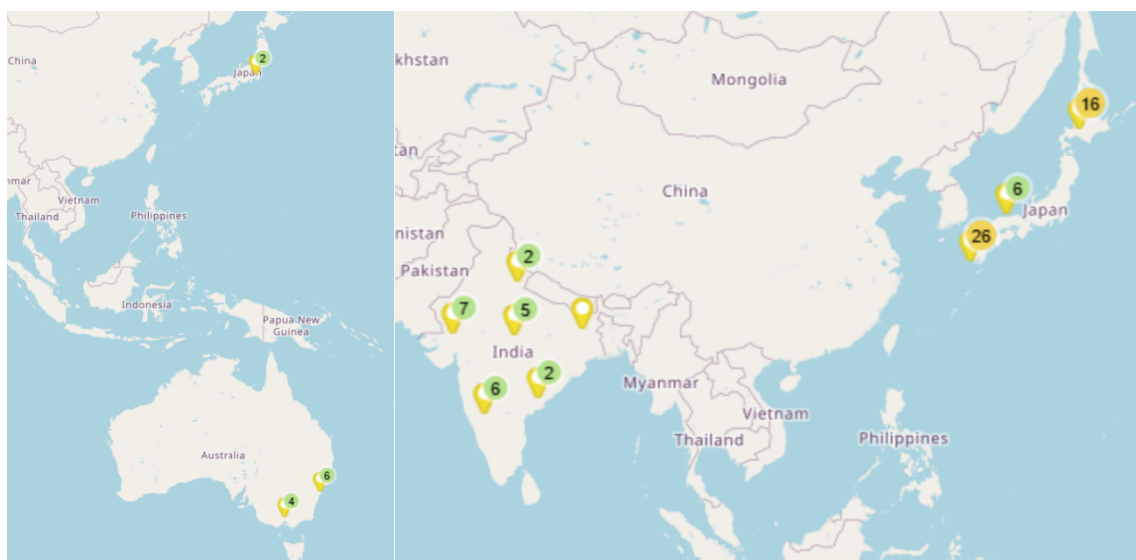
Agenda Item 5: Review of Action Item List

5.1 SBAS GBAS implementation workshop for airspace users 14-16 Oct 2025 in India

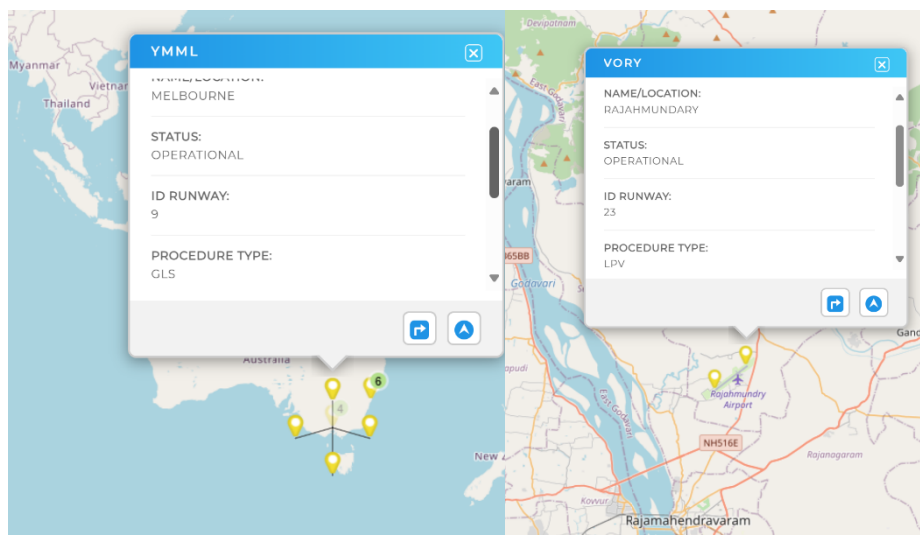
ICAO Secretariat presented the draft programme of the workshop and invited all participants to consider attending. Some speakers were proposed on the different proposed topics (See Appendix C for the draft programme).

5.2 Review of published GLS and LPV procedures in the APAC region for display on a map

ICAO Secretariat presented the map of LPV and GLS procedures published (or planned) in APAC as of May 2025. All this information is available on <https://www.icao.int/APAC/Pages/GBAS-SBAS-MAP.aspx>. States are invited to share with the Secretariat their updates on a 6-month basis.



Published GLS and LPV procedures



For each procedure, airport, runway end, type of procedure, Lat and Long are displayed

For information, the WAAS LPV procedures in US are available in this excel file :  MasterRNAVs 2025-04-17.xlsx and in Canada here [NAV CANADA Facility Map Procedures Page LPV e](#). The EGNOS LPV procedures published in Europe are available on this map : [EGNOS Procedures Availability | EGNOS User Support Website](#).

5.3 National GBAS SBAS focal points

6.6 States were invited to share their update of GBAS SBAS focal points with the Secretariat within one week after the meeting. The updated Focal Point list for the national GBAS SBAS programmes is provided in Appendix D to this report.

5.4 List of ITF tasks

ICAO Secretariat presented the list of open tasks of the ITF (See Appendix E). It was proposed to address the following topics at the next GBAS SBAS ITF meeting in 2026 : ATC interface and NOTAM matters, GBAS SBAS performance demonstration (acc,int,avail,cont,time to alarm, data collection, simulation,...) , Syllabus for ATCO's training.

Agenda Item 6: Any other business

6.1 No topic was discussed.

Agenda Item 7: Date and Venue of Next Meeting

7.1 The next meeting is planned for the period between March and May 2026.

7.2 If a State wishes to host the next meeting, please inform the Secretariat. ICAO APAC office could also be a solution for hosting.

7.3 The co-chairs thanked all the participants of the task force for their engagement in the fruitful discussions and concluded the meeting.
