

INTERNATIONAL CIVIL AVIATION ORGANIZATION



**DRAFT REPORT OF THE EIGHTH MEETING OF THE
ICAO ASIA/PACIFIC GBAS/SBAS IMPLEMENTATION TASK FORCE
(GBAS/SBAS ITF/8)**

Melbourne, Australia 12-14 May 2026

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 Eighth Meeting of the ICAO Asia/Pacific GBAS/SBAS Implementation Task Force (GBAS/SBAS ITF/8) was hosted in Melbourne, Australia, from 12 to 14 May 2026 by the Civil Aviation Safety Authority (CASA) of Australia, the Civil Aviation Authority of New Zealand and Geoscience Australia.

Attendance

2.1 The meeting was attended by 57 participants from Australia, China, Hong Kong China, India, Japan, New Zealand, Pakistan, Philippines, Republic of Korea, Singapore, South Africa, USA, IFALPA, ADB, 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 the 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.

4.2 In the name of the ICAO APAC Regional Director, Mr. MA Tao, the Secretary welcomed all participants to the meeting.

4.3 Mr. Vincent Rooke, Director of SouthPAN at Geoscience Australia, welcomed participants to the meeting.

4.4 The two Co-Chairs welcomed all the participants and thanked Australia and New Zealand for hosting the meeting of the task force.

Documentation and Working Language

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

5.2 A total of 13 Information Papers (IPs), 4 Working Papers (WPs) and 11 Presentations (SPs) were presented in the meeting. The list of papers is provided in Appendix A to this report. The papers are available on the meeting webpage: <https://www.icao.int/APAC/meetingdocs?fid=31749> .

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/8-01: Update on Guidance Document for Implementation of SBAS in the Asia/Pacific Region.

6.3 List of Draft Decisions

Draft Decision GBAS/SBAS ITF/8-01: Request for a GBAS/SBAS Coordination Group (GSCG) in the APAC region

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/01 - 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 and workshops

Agenda Item 3: Review of the guidance documents on SBAS/GBAS implementation and ionospheric threat mitigation

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

Agenda Item 5: Review of remaining Action Item List

Agenda Item 6: Any Other Business

Agenda Item 7: Discussion on the extension of the mandate of the Task Force

Agenda Item 8: Sharing experience with airlines on GBAS and SBAS implementation in Australia and New Zealand

Agenda Item 2: Report of relevant meetings and workshops

2.1 SP/01 – Concept and Benefits of GBAS-SBAS & Summary and outcomes of the workshop in Bengaluru India

The Secretary explained the concept of the ABAS, SBAS and GBAS, the different architectures of SBAS and GBAS systems, as well as the benefits of introducing these systems into ATM for ANSPs, pilots/airlines and ATC.

The ICAO Asia-Pacific SBAS-GBAS Implementation Workshop was held in Bengaluru, India, from 14 to 16 October 2025, with the objective of enhancing airport accessibility and safety during final approach through the use of satellite-based and ground-based augmentation systems. This event was the second workshop of its kind, following the inaugural session organized in Seoul in 2019. It gathered approximately 150 participants onsite and 35 online, representing civil aviation authorities, air navigation service providers, airports, airlines, and industry from States already implementing SBAS and GBAS as well as from neighboring States with an interest in future deployment. The workshop was hosted by the Airports Authority of India and benefited from very high-quality facilities, organization, and strong engagement by all participants.

A visit to the GAGAN SBAS center allowed attendees to gain practical insight into India's operational experience with SBAS. Technical sessions provided comprehensive overviews of SBAS systems and performance, including GAGAN, MSAS, WAAS, EGNOS, KASS, BDSBAS, and SouthPAN, with particular attention to coverage, continuity, availability, and ionospheric effects in the Asia-Pacific region.

GBAS implementation experiences were shared through operational examples from Japan, China, and Australia, illustrating station deployment, operational use, and benefits at major international airports. Discussions emphasized the complementary roles of regulators, GNSS constellation providers, ANSPs, airports, airlines, and manufacturers in certification, approval, procedure design, safety assessment, and operational deployment. ICAO approach classifications and operational minima were reviewed, highlighting the transition from non-precision approaches to APV, SBAS CAT I, and GLS operations.

Fleet readiness presentations showed that a growing proportion of Airbus, Boeing, and ATR aircraft were capable of SBAS LPV and GLS operations. Extensive question-and-answer sessions addressed regulatory approval challenges, inspector training, ATC awareness, NOTAM practices, system availability, ionospheric risks, parallel approaches, autoland potential, and regional service extensions. A serious incident at Paris CDG in May 2022 involving incorrect QNH transmission during an APV Baro-VNAV approach was presented as a safety lesson, prompting reflection on similar risks in the APAC region and on the adequacy of current operational minima.

Overall, the workshop achieved strong knowledge and experience sharing, fostered valuable networking among stakeholders, and reinforced regional cooperation on SBAS and GBAS implementation. All presentations were made available through the ICAO APAC website <https://www.icao.int/APAC/MeetingDocs?fid=25224#block-icao-page-title> to support continued learning and follow-up action.

2.2 **SP/02** – Outcomes of SBAS IWG webinar series

The Secretary reported that he attended the third webinar organized by the SBAS Interoperability Working Group (IWG/Group of SBAS providers) on 23 April 2026 with presentations by JAL, JCAB, Geoscience Australia and ICAO APAC RSO. This was a good opportunity to have an interaction with airlines for the introduction of LPV in APAC and also learn from the other regions. From the discussion of the third webinar, the Secretary had prepared a mind mapping for the benefits of LPV. He also suggested each State keeping a list of the fleet equipage for LPV and GLS.

The meeting agreed that the idea of a mind mapping to present the benefits of LPV for airlines/pilots in one slide could be a good tool to promote the SBAS to airspace users in the region. ICAO will then share the draft mind mapping with all the participants for review. Australia added that this should also be addressed to airports.

2.3 **IP/02** – Report of Navigation System Panel activities

Since the 7th meeting of the GBAS/SBAS Implementation Task Force, there were two NSP meetings, the 15th meeting of the ICAO NSP Joint Working Groups Meeting (NSP JWG/15) (10-20 November 2025) and the 8th full panel meeting of the ICAO NSP (NSP/8, 26 January-6 February 2026). Regarding GBAS, Baseline Development SARPs (BDS) for DFMC GBAS is under development and will be delivered to NSP/9 in June 2027. The first draft of the new GBAS Manual was presented to NSP/8 and will be delivered to NSP/9. Regarding SBAS, SARPs for automatic landing with SBAS has been approved by NSP/8. SBAS Message Authentication SARPs will be finalized for approval by NSP/9. GNSS Manual (Doc9849) update related to GNSS RFI, Galileo OSNMA, and V-ARAIM were also discussed. The 2nd Vice Chair of the NSP was elected from the APAC region. A new rapporteur of the Validation Working Group was appointed from the APAC region. The next NSP meeting (JWG/16) is scheduled for November 2026.

Australia asked whether DFMC GBAS was targeting CAT II or for improving the ionosphere corrections. The Co-Chair Mr. Susumu Saito, replied that the aim was CAT III all over the world. Australia also asked if the authentication developed for Galileo and for SBAS were the same concept. Mr. Susumu added that they were different.

Australia requested further clarification on the meaning of Baseline Development Standards. The Co-Chair, Mr. Susumu Saito, explained that they were intermediate SARPS by technical analysis. A second phase, operational validation is then required and could be composed of prototyping and field testing. Then SARPS may need to be updated and then the new version will be submitted to ANC.

As 2nd Vice Chair of the NSP, Mr. Gao Shu, also invited SBAS providers in APAC to share their feedback on the work of the NSP.

2.4 **IP/04** – Report of Instrument Flight Procedure Panel activities

The Secretary presented the Electronic Bulletin EB 2026/13 which had been sent out by ICAO to all States on 29 April 2026 following the Instrument Flight Procedure Panel (IFFP) meeting from 16 to 27 March 2026 in Beijing, China. The EB is about the reassessment of the missed approach assumptions for the SBAS procedures.

Aircraft systems are based on the Minimum Operational Performance Standards (MOPS) for airborne navigation equipment (2D and 3D) using the Global Positioning System (GPS) augmented by SBAS contained in RTCA DO-229F. Based on the MOPS, some navigation systems revert to terminal mode at the lateral navigation (LNAV) missed approach point (MAPt), or when no MAPt exists, at the landing threshold point/fictitious threshold point, applying scaling and alerting functions based on a 1.0 NM navigation accuracy requirement throughout the missed-approach phase. As such, on a missed-approach predicated on a 0.3 NM navigation accuracy requirement up to the first missed-approach waypoint, the change to 1.0 NM navigation accuracy may not ensure the intended level of protection. States were invited to reassess their operational minima for RNP APCH including LPV.

India added that the DGCA (CAA) has asked the Airports Authority of India (ANSP) to conduct such assessment of published LPV procedures.

2.5 **SP/03** – Outcomes from ICAO A42/ANC/APANPIRG/CNS/SRWG

The Co-Chairs and Secretary presented the outcomes of different ICAO meetings which are of interest for the Task Force, covering mainly the GNSS RFI and the update of the GANP.

The Co-Chair, Mr. Susumu Saito, added that the 6th edition of the GNSS Manual under preparation by NSP was mainly covering GNSS RFI reporting. India also complemented by explaining the process put in place for the reporting from the pilot to ATC, to the analysis by ANSP then to the reporting to DGCA and then to the Frequency Management Agency. Australia also added that the Surveillance Panel was considering the use of ADS-B to report GNSS RFI to the ground.

Agenda Item 3: Review of the guidance documents on SBAS/GBAS implementation and ionospheric threat mitigation

3.1 **WP/02** – Update of the SBAS implementation guidance

This paper presented the updates of the Guidance Document for Implementation of SBAS in the Asia/Pacific Region which was previously approved by CNS SG. It was proposed to add the guidance material on APV and LPV prepared by Australia as Appendix 3. A table of contents had also been added. The proposed updated document is provided as Attachment A to this WP/02 paper.

Following some discussion, the meeting agreed on the following Draft Conclusion :

Draft Conclusion GBAS/SBAS ITF/8-01: Updates of the Guidance Document for Implementation of SBAS in the Asia/Pacific Region	
What: the updated guidance document for implementation of SBAS in the Asia/Pacific Region developed by the APAC GBAS/SBAS ITF and provided in Attachment A of the GBAS/SBAS ITF/8 Meeting Report is ready for endorsement by CNS SG	Expected impact: <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Ops/Technical
Why: To provide updated guidance to States for the implementation of SBAS	Follow-up: <input type="checkbox"/> Required from States
When: 14 May 2026	Status: Draft to be adopted by CNS SG
Who: <input checked="" type="checkbox"/> CNS Sub group <input checked="" type="checkbox"/> APAC States <input type="checkbox"/> ICAO APAC RO <input type="checkbox"/> ICAO HQ <input type="checkbox"/> Other:	

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

4.1 SP/10 - SouthPAN programme update

SouthPAN is an SBAS programme led by Australia and New Zealand to enhance GNSS accuracy, integrity, and availability across multiple sectors including aviation. The system provides Open Services today, while L1 SBAS Safety-of-Life (SoL) services for aviation are planned from 2028. Services include L1 SBAS, DFMC SBAS, and precise point positioning (PPP), with improved accuracy, availability, and performance over time. The system architecture integrates ground stations, GNSS reference networks, satellites (Inmarsat/Viasat), and user access via signal-in-space and data services. SouthPAN has achieved key milestones including IOC phases, data access services, and satellite payload development. Performance reports show high availability (around 99.9%) and metre- to centimetre-level accuracy depending on service type. Aviation deployment aims to support en-route, terminal, and APV (LPV) operations aligned with ICAO standards. Implementation strategy focuses on stakeholder engagement, infrastructure readiness, aircraft equipage, and scalable rollout across aerodromes. The programme could enable over 240 aerodromes to implement LPV procedures, improving safety and accessibility, especially in regional areas.

4.2 IP/05 - Updates on SBAS system and implementation status in Japan

This information paper provided an update on the SBAS implementation status in Japan, focusing on the MSAS system. MSAS was upgraded to Version 3 in March 2025, improving positioning accuracy and service stability. SBAS services are currently delivered through a dual-satellite configuration using QZS-3 and QZS-6. LP/LPV approach procedures have already been implemented at 25 airports across Japan.

Japan plans for transition to a three-satellite configuration from 2027, enabling further service improvements. The introduction of LPV200 approach procedures is planned for 2027 to enhance operational capability under challenging conditions. Vertical position accuracy is being continuously evaluated to support LPV200 service provision. Corrective measures have been implemented to address local environmental effects impacting reference stations, improving accuracy. MSAS integrity has remained at 100 per cent, confirming strong system performance. LP/LPV usage is increasing, with several hundred operations conducted monthly. Japan has introduced RNP-to-LPV procedures, allowing more flexible and efficient approach designs. MSAS prediction information is provided via NOTAM, and outages require suspension of LP/LPV operations. The number of prediction NOTAMs has decreased following the system upgrade and reduced solar activity. Ionospheric effects, particularly in southern regions, remain a challenge and can affect service continuity. Operational mitigation measures and flight planning requirements have been implemented to ensure safety and reliability.

To a question of Australia on the evaluation period to be used for the vertical accuracy assessment required to transition from LPV250 to LPV200, Japan replied that it is expected to be roughly one year.

With reference to paragraph “9. Operational Requirements - In accordance with regulatory guidance, operators are required to file flight plans such that either the destination aerodrome or the alternate aerodrome does not rely on GNSS-based approach procedures.”, Australia was wondering whether this requirement was put in place before MSAS or was specific to MSAS. Japan replied that it had been in place before the implementation of MSAS.

Australia also inquired about the number of GEO satellites to provide LPV200. Japan replied that 2 GEO satellites were enough. The Secretary complemented that redundancies in the different parts of the SBAS system need to be considered to ensure compliance with performance requirements as per ICAO Annex 10.

To question of the Secretary about the impact of the Electronic Bulletin 2026/13 just published by ICAO Secretary General, Japan replied that the assessment of the published LPV procedures was on going.

4.3 **IP/07 - KOREAN SBAS (KASS) Operations using 2nd GEO satellite**

The Republic of Korea has successfully completed the development of the Korea Augmentation Satellite System (KASS), led by the Ministry of Land, Infrastructure and Transport (MOLIT). KASS provides accurate and reliable navigation services by augmenting GPS signals in compliance with international ICAO and RTCA standards, benefiting aviation and next-generation industries like Urban Air Mobility (UAM).

KASS consists of 7 reference stations, 2 control stations, 2 processing stations, 3 uplink stations, and 2 geostationary satellites (PRN134 and PRN142). The second GEO (PRN142) was successfully launched in November 2024. After an inspection for acquisition of the performance compliance certificate during 6 months, KASS V1.4.0 has officially begun operation since February 18, 2026 (UTC).

Currently, Safety-of-Life (SoL) service for APV-I class approaches is valid at Muan, Ulsan, and Jeju airports, maintaining high accuracy with a horizontal accuracy in approximately 1.28m and a vertical average in approximately 2.15m.

In the future, the government plans to strengthen monitoring of performance degradation caused by solar activity. In addition, MOLIT plans to serve KDAS system which provides real-time correction data by the internet to minimize shaded areas.

The Secretary noted that ROK had published in its AIP ENR4.3 the SBAS GEO Satellites. To a question

of the Co-Chair on the impact of ionosphere on KASS performance, ROK is still studying the potential impact of ionosphere on KASS performance.

4.4 **IP/13** - PAK-SBAS implementation status

Pakistan launched the Pak-SBAS programme in 2019 under SUPARCO, with aviation support from PCAA and PAA. The system provides SBAS services for aviation and other sectors using GPS and BeiDou constellations. It offers both public augmentation services and precise positioning (PPP) for authorized users. Pak-SBAS is designed to comply with ICAO Annex 10 and international SBAS standards. The architecture includes one GEO satellite, ground stations, and processing and uplink facilities. The payload was launched in May 2024 and services were commissioned in September 2024. The system is now available for testing and integrated into ICAO Annex 10 (Service ID 10). Future plans include a second satellite and progressive implementation in the aviation sector.

Australia asked for clarification on the meaning of SBAS Conops. Pakistan replied that they were working on a Conops to define clearly the responsibilities of all involved stakeholders. Pakistan has 40 airfields and SBAS can be beneficial without adding infrastructure.

4.5 **IP/08** - GBAS Status in Japan

This paper outlines the current status of GBAS development and operations in Japan. At Tokyo International Airport (Haneda), official CAT-I GBAS operations commenced in January 2025 and are primarily conducted during nighttime hours. Flight trial results confirmed that GBAS provided more stable approach performance compared to conventional ILS. Since service launch, its usage has steadily expanded among both domestic and international airlines. Although an event suspected to be caused by GNSS interference was observed, it had no impact on flight operations.

Japan has developed unique mitigation technologies to address ionospheric effects characteristic of low-latitude regions. In addition, research and development are ongoing for next-generation systems, including CAT-III equivalent high-accuracy GBAS and DFMC GBAS. Further efforts are also being made to enhance airport operational efficiency and reduce environmental impact through advanced GBAS-enabled operations, positioning Japan as a global leader in GBAS innovation.

4.6 **IP/10** - Research activities related to GBAS and SBAS in Japan

This paper presented the research and development activities related to GBAS and SBAS in Japan. For GBAS, GAST D performance enhancement, DFMC GBAS standardization, and advanced operations utilizing GBAS are being studied. The ionospheric field monitor (IFM) was shown to be effective in implementing GAST D in the low latitude regions. The DFMC GBAS testbed at Ishigaki, Japan is used for DFMC GBAS standardization to make it available under active ionospheric conditions. Advanced operations utilizing GBAS is an important topic to accelerate implementation of GBAS. The DFMC SBAS prototype has been developed by ENRI and used as a core system of its research. ENRI is contributing to validation of the SBAS message authentication schemes. Extending services to very high latitude by using SBAS messages broadcast from non-GEO satellites are being exploited.

Australia inquired about the location of the ionospheric field monitor. Japan replied that it depended on the configuration of the airport and the location of the GBAS ground station.

Singapore suggested that the IFM should be mentioned in ICAO document. The Co-Chair, Mr. Susumu Saito, replied that ICAO Annex 10 Vol I Att D mentions IFM as one of the means of mitigation to ionosphere threat.

4.7 **SP/09** - Research activities of advanced operations utilizing GBAS in Japan

This paper presented research activities in Japan on advanced GBAS-based airport operations led by the Electronic Navigation Research Institute. The programme runs from 2022 to 2027 and focuses on both system development and operational improvements. A key objective is to enhance airport capacity and efficiency beyond conventional ILS operations. Research includes the use of GAST-D to improve runway throughput under low visibility conditions. Reduced aircraft separation enabled by GLS operations contributes to increased capacity. Studies at Narita airport demonstrate potential time savings from improved arrival and departure handling. The development of advanced approach procedures, including IGS (Increased Glide Slope) and SRAP (Secondary Runway Aiming Point), is another important focus. These concepts support noise reduction, obstacle avoidance, and optimized runway usage. Simulation and flight experiments confirm benefits such as reduced noise with steeper approach paths. Additional experiments are planned to further validate operational improvements at multiple airports in Japan.

4.8 **IP/03** - Continued Ionospheric Gradient Study for GBAS at Singapore Changi Airport

This information paper presented the continued ionospheric gradient study supporting GBAS implementation at Singapore Changi Airport. The study addresses ionospheric disturbances that may impact GNSS performance in equatorial regions. Such disturbances can generate significant positioning errors and affect GBAS integrity and availability. Ionospheric monitoring stations were deployed to collect ionospheric data across Singapore and its offshore islands. The entire analysis covers data from August 2024 to March 2026, extending previous studies. Results show strong seasonal variations, with higher instability during equinox periods. Significant anomalies were observed in February, March, September and October of 2024 and 2025, mainly linked to equatorial plasma bubbles. Later data shows generally stable conditions, with only isolated anomalies identified. Some anomalies were linked to satellite behavior rather than ionospheric disturbances. The study recommends continued monitoring to support safe and reliable GBAS operations in low-latitude environments.

Singapore is of the opinion that, with these refined ionospheric monitoring stations, the GBAS availability will be improved. The Co-Chair, Mr. Susumu Saito, underlined that the example of Singapore using external ionosphere monitoring stations was good to fine tune the ionospheric threat model. Singapore added that they would be happy to share more with the region.

4.9 **IP/12** – GBAS Certification in China

The certification mechanic of GBAS ground subsystem was established by CAAC. Some GBAS ground subsystems were set up for type certification in Tianjin, Zhoushan and Lasha airport. Two Types of GBAS were certificated to meet the performance requirements of GBAS Approach Service Type C (GAST-C), and the provisional certification of approval was issued by CAAC.

Australia asked how much time was required to go from provisional to the formal certification. China replied that commissioning was first needed and then a period of 12 months for reliability testing was also required before the submission for formal certification. China also added that all the documents defined in 2.5 a) to e) were needed to obtain the formal certification. To a question of the Secretary and Singapore, China replied that the two GBAS stations were for testing by two different suppliers and had not been installed and certified yet for commercial flights. The Co-Chair, Mr. Susumu Saito, asked what the process for renewal of the final certification was as it was valid for 5 years. China replied that it was then needed to explain what the new changes in the GBAS station were so that it could be reviewed and evaluated by CAAC to get this extension of validity.

BDSBAS is scheduled to be upgraded, which covers both the monitoring stations and the data centers with the software and hardware upgrades. The BDSBAS SF service will be enhanced in the ionospheric monitoring capabilities, and the LPV procedure will be available around 2029.

4.10 **IP/11** - Potential use of SBAS in Singapore

The meeting was presented with an information paper outlining the potential use of Satellite-Based Augmentation Systems (SBAS) in Singapore. The paper provided an overview of SBAS capabilities and global implementations and examined potential aviation and maritime use cases relevant to Singapore's dense and complex operational environment. SBAS was highlighted to enhance GNSS accuracy, integrity, continuity, and availability, with emerging Dual-Frequency Multi-Constellation (DFMC) SBAS offering further robustness.

For aviation, SBAS was discussed as an enabler for GNSS-based instrument flight procedures across all phases of flight, as well as a supporting capability for advanced airport surface operations. For maritime operations, SBAS was presented as a potential complement or future alternative to existing DGPS services, offering wider coverage and scalability, while supporting future concepts such as autonomous vessels. The meeting was invited to note the information and share views on potential SBAS use cases across aviation and other sectors.

The Co-Chair Mr. George Wong noted that Singapore has presented IPs on both GBAS and SBAS solutions and enquired on the preference for implementation. Singapore replied that the plan is to deploy GBAS at Changi Airport for operations. The use of SBAS services to support both aviation and non-aviation users is also being considered. Within ASEAN, member States are currently evaluating SBAS implementation for operations, with two options under consideration: extending existing SBAS services or developing a dedicated ASEAN SBAS solution.

4.11 **SP/08** - ADB's Technical Assistance on Advancing SBAS for ASEAN

ADB is implementing a Technical Assistance (TA) initiative to support the advancement of SBAS across ASEAN countries. The programme aims to strengthen analytical work, institutional capacity, and preparedness for future SBAS investments. It focuses first on developing ASEAN-wide SBAS guidelines covering technical, operational, institutional, and financing aspects. A regional feasibility study will assess technical viability, economic benefits, and operational applications of SBAS. Capacity building is a core component, targeting operations and maintenance of SBAS systems. This includes training, workshops, and study visits to share international best practices. Familiarization programmes will also be conducted for pilots, air traffic controllers, and regulators. Another key output is the development of SBAS infrastructure master plans for selected countries. These plans will define technical specifications and regulatory frameworks required for implementation. They will also include timelines and cost estimates for future SBAS deployment. The implementation is planned in phases from 2026 to 2029. Initial activities include consultant mobilization and preparation of draft guidelines in 2026. Capacity-building activities will continue progressively through 2029. The TA is currently progressing, with initial workshops being planned alongside ASEAN meetings. Next steps include securing country approvals and launching feasibility and capacity-building activities.

ADB added that a workshop would be conducted in Oct 2026 and experts of SBAS would be more than welcome to share their experience and suggestions.

4.12 **SP/06** - GBAS-SBAS Procedure Design Training at APAC FPP

Procedure design training is the core activity of APAC FPP. To support the implementation of GBAS-SBAS in the region, FPP incorporates relevant procedure design sessions in both PBN Procedure Design and Procedure Design Refresher training courses. GBAS SBAS procedure design itself is not technically challenging, as it shares strong similarities with ILS procedure design. The main challenge is the regulatory approval of such procedures. FAS data block is a distinctive and unique element of GBAS-SBAS procedures. The accuracy, resolution and integrity of FAS data block are critical components of the overall quality assurance.

Australia asked whether APAC FPP had some suggestions or inputs to provide to States following the publication of the Electronic Bulletin. The coordinator of APAC FPP replied that one FPP instructor attended the last IFPP meeting in Beijing and was well aware of the development. This point will be added in the FPP courses too.

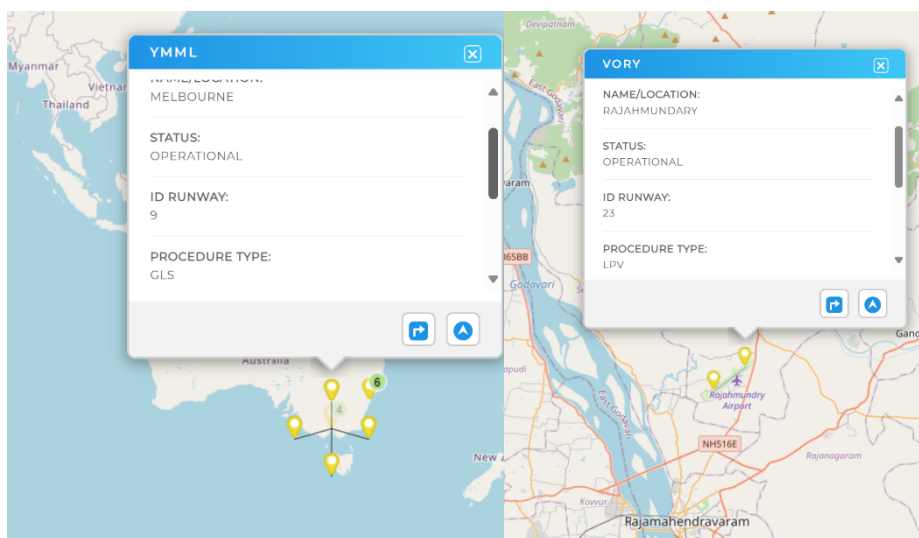
The Co-Chair, Mr. Susumu Saito, asked how to ensure all the requirements of integrity for the data specified in the FAS Data Block. Australia explained all the steps from the requirements given to the supplied conducting the survey to the integration of the FAS DB into the GBAS station.

4.13 Map of the LPV and GLS procedures published in APAC (ICAO)

The Secretary presented the map of LPV and GLS procedures published (or planned) in APAC as of May 2026. All this information is available on <https://www.icao.int/APAC/GBAS-SBAS/MAP>. 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 here <https://www.faa.gov/about/officeorg/headquartersoffices/ato/navigation-programs/masternavs-11272025-gpswaas-approaches> 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](#).

States are also invited to review the Focal Point list for the national GBAS and SBAS programme as provided in Appendix C.

Agenda Item 5: Review of remaining Action Item List

5.1 IP/09 – GBAS Safety Assessment in Japan

This document summarized the safety assessment process for GBAS in Japan. Based on long-term research and operational validation by the Electronic Navigation Research Institute (ENRI), full-scale GBAS operations were successfully launched at Tokyo International Airport (Haneda) in 2025.

The safety assessment had been conducted in a systematic manner in accordance with ICAO standards, international regulations, and Japan-specific requirements. It covered all lifecycle phases, from initial design to pre-operational validation. This included step-by-step evaluations such as hazard and risk analysis in the early design stage, followed by detailed design reviews, manufacturing verification, on-site adjustment, and pre-operational assessments to ensure system safety and compliance.

In the final phase, flight inspections and data collection under near-operational conditions were carried out, with more than 300 flight trials conducted. The results confirmed both performance and safety, and pilots reported high confidence in the stability of GBAS approaches. These outcomes demonstrated the reliability of the system and supported its successful transition to operational use.

Singapore asked for more information on the required duration for flight trials and which criteria were used. Japan replied that a minimum of 200s flights were required first, and then it was decided to require 100 more flights. The goal was to verify the signal in space performance but also to ensure that the operators get familiarized with GBAS operations. The GLS procedures were published as temporary and the flights trials were conducted in VMC conditions from 11pm to 6am. Australia added that they had similar conditions too.

The Secretary asked the meeting how the safety assessment was conducted for the introduction of GLS procedure which was a change in local ATM environment and how the ANSP SMS was applied. Australia explained all the steps and documents to be provided to the CAA. Philippines asked for further details. The meeting was of the opinion that this subject of safety assessment of the GBAS/SBAS system and LPV/GLS procedure in ATM would require further discussion and analysis in the group.

5.2 SP/04 – Navigation Service Monitoring

This paper reviewed ICAO provisions related to navigation service monitoring in the context of the transition from conventional ground-based navigation aids to performance-based navigation supported by GNSS. It examined the information requirements for pilots and air traffic services when navigation performance was degraded or unavailable. ICAO documentation clearly distinguishes between conventional navigation aids, SBAS-supported PBN operations and GBAS operations. For SBAS-based

PBN approaches, real-time operational status monitoring by ATC is neither practical nor operationally required, with mitigations relying on prediction tools, NOTAMs and pilot reports. In contrast, GBAS is an airport-based system comparable to ILS, for which clear and timely status indications can and should be provided to ATC. The paper concluded that different navigation technologies required differentiated monitoring and information strategies consistent with ICAO guidance.

5.3 WP/03 – Discussion on the ITF Task List

The Secretary presented the list of open tasks of the ITF and all the tasks were reviewed by the meeting. The updated list is now available in Appendix D. Most of the tasks have been completed.

Agenda Item 6: Any Other Business

6.1 No topic was discussed.

Agenda Item 7: Discussion on the extension of the mandate of the Task Force

7.1 **WP/04** - Regional coordination on GNSS-related NSP Job Cards following the completion of the GBAS/SBAS ITF mandate

Singapore presented the status of GNSS-related NSP Job Cards and noted their continued relevance to the Asia/Pacific Region. The meeting recognized the value of sustained regional coordination to support global NSP activities, particularly in areas related to SBAS, GBAS, GNSS interference, C-PNT, and RON. The meeting discussed options for retaining expert engagement by establishing a successor mechanism to ensure continued regional contributions following the completion of the current ITF mandate.

7.2 **SP/05** - Discussion on the extension of the mandate of the Task Force

The presentation discusses whether to extend or conclude the mandate of the APAC GBAS/SBAS Implementation Task Force. The Task Force originated from the GBAS/SBAS Implementation Workshop held in Seoul in June 2019. Since its creation, the Task Force has conducted a series of meetings, mostly virtual, from 2020 to 2026. Face-to-face meetings were held in Tokyo, Bangkok, and Melbourne. In addition, a dedicated GBAS/SBAS workshop was held in Bengaluru in October 2025. The Task Force methodology focused on brainstorming, task identification, and collaborative knowledge sharing. It produced several technical and guidance-related deliverables. Most tasks listed in the ITF Action List have now been completed. Deliverables defined in the Task Force Terms of Reference have been substantially achieved.

The meeting had a long discussion on the different options to continue the work on GBAS and SBAS. While the PBNICG meeting is gathering operational people, the GBAS/SBAS ITF meeting is mainly composed of technical people. Merging both would not be suitable and we might lose the attendance of several technical experts. It was also added that the APAC region was at different stages of the deployment of GBAS and SBAS and close coordination in the region would be needed to ensure harmonized implementation and operations. NSP and IFPP panels are still working on standards like

DFMC and a regional group is needed to follow up, share details in the region and support implementation. Moreover, feedback from APAC to the two ICAO Panels would be valuable.

The group agreed with the following Draft decision to be submitted to the CNS Sub-Group in July 2026.

Draft Decision GBAS/SBAS ITF/8-01: Request for a GBAS/SBAS coordination group (GSCG) in the APAC region	
<p>Considering that :</p> <p>1) the implementation of GBAS and SBAS in APAC is at different stages and continues to evolve with several systems recently being commissioned or in development;</p> <p>2) the ICAO Navigation Systems Panel (NSP) and the Instrument Flight Procedures Panel (IFPP) are developing new standards related to GBAS and SBAS which will require long-term regional coordination for a consistent implementation by APAC States;</p> <p>That :</p> <p>The GBAS/SBAS ITF/8 meeting agreed that:</p> <p>a) the current Implementation Task Force (ITF) should transition to a formal Coordination Group (CG) structure to address evolving standards and to support continued regional coordination on GBAS and SBAS</p> <p>b) the Coordination Group should provide a sustained regional mechanism to support harmonized GBAS and SBAS implementation, interoperability coordination, operational information exchange, and stay abreast of global developments in the field</p> <p>c) the Coordination Group should foster an environment where States in the region which have implemented SBAS and GBAS, or are engaged in research, can offer support to States which are developing systems.</p> <p>d) the Coordination Group, in collaboration with the appropriate regional safety group, should develop guidance material on the process for conducting the safety assessment for implementation and operations of GBAS and SBAS</p> <p>e) the Coordination Group should develop material which summarises the benefits of GBAS and SBAS for communication with stakeholders.</p> <p>f) a) to e) above should form the basis of the terms of reference</p>	<p>Expected impact:</p> <p><input type="checkbox"/> Political / Global</p> <p><input type="checkbox"/> Inter-regional</p> <p><input type="checkbox"/> Economic</p> <p><input type="checkbox"/> Environmental</p> <p><input checked="" type="checkbox"/> Ops/Technical</p>

for the establishment of the GBAS/SBAS Coordination Group (GSCG) in the APAC region		
Why: Stronger regional coordination on implementation and knowledge sharing on GBAS and SBAS is required		Follow-up: <input type="checkbox"/> Required from States
When: 14 May 2026		Status: Draft to be adopted by CNS SG
Who: <input checked="" type="checkbox"/> CNS Sub group <input type="checkbox"/> APAC States <input type="checkbox"/> ICAO APAC RO <input type="checkbox"/> ICAO HQ <input type="checkbox"/> Other:		

The Co-Chairs will report the outcomes of the GBAS/SBAS ITF/8 to the forthcoming CNS SG meeting in early July 2026 and will present this Draft Decision for seeking CNS SG’s approval.

Agenda Item 8: Sharing experience with airlines on GBAS and SBAS implementation in Australia and New Zealand

8.1 **SP/11 - GLS Operational Experience**

The presentation on Qantas Group’s operational experience with GBAS/GLS reflected over 20 years of use and the conduct of hundreds of thousands of GLS approaches across multiple aircraft types and operational conditions, demonstrating the maturity and reliability of the system. Key benefits highlighted included smooth and stable approach paths, a consistent pilot interface, and the ability to provide precision approaches where ILS is not available, thereby improving safety, accessibility, and operational efficiency, while complementing advanced procedures such as RNP-AR. The presentation also identified in-service issues such as signal deviations, temporary dropouts, and GNSS interference effects, consistent with the meeting’s broader discussions on GNSS vulnerabilities, including radio frequency interference and ionospheric impacts. Mitigation measures implemented by the operator were noted as valuable inputs for States and industry, and future developments towards CAT II operations and expanded autoland capability were also highlighted.

8.2 **IP/06 - Australia's GBAS Implementation and Operational Experience**

This information paper presented Australia’s experience in implementing and operating Ground Based Augmentation System (GBAS) installations. Australia currently operates two GBAS installations located at Sydney and Melbourne airports. The Sydney GBAS was commissioned in 2014, followed by the Melbourne GBAS in 2017. Both installations support GBAS Landing System (GLS) approaches to Category I minima. Since the initial deployment, Australia has gained significant operational and maintenance experience with GBAS. The implementation has followed a phased approach, allowing progressive introduction of GBAS operations. The experience covers several areas, including engineering, maintenance, and system performance. It also includes operational aspects such as air traffic control procedures and flight procedure design. Operational experience has supported the safe use of GBAS for precision approach operations. The paper also highlighted aspects related to aircraft equipage rates for GBAS operations. Australia’s experience reflects a mature implementation of GBAS technology in routine operations. It demonstrates the feasibility of GBAS as a complement or alternative to conventional ILS systems. The presentation attached to the paper provides further detailed insights into technical and operational lessons learned. These lessons contribute to knowledge sharing within the international aviation community.

8.3 SP/07 - Regulating SouthPAN

Australia and New Zealand are jointly implementing a satellite-based augmentation system called the Southern Position Augmentation Network (SouthPAN). Australia and New Zealand presented the methodology and joint effort in regulating the SouthPAN project to achieve the safety case approval. The meeting noted the challenges faced by the project in meeting Annex 10 requirements and User Differential Range Error Indicator (UDREI). It would be interesting if other SBAS providers could also share their experience or analysis on dealing with this issue.

The meeting of the GBAS/SBAS Coordination Group (GSCG) is planned for the period between March and May 2027. If a State wishes to host the next meeting, please inform the Secretary.

The Co-Chairs thanked all the participants of the task force for their engagement in the fruitful discussions and concluded the meeting.



International Civil Aviation Organization

THE EIGHTH MEETING OF THE ASIA/PACIFIC GBAS/SBAS IMPLEMENTATION TASK FORCE (GBAS/SBAS ITF/8)

(Melbourne, Australia, 12-14 May 2026)

LIST OF PAPERS

INFORMATION PAPERS

NO	AGENDA	TITLE	PRESENTED BY
IP01	1	Tentative Order of Discussion Rev.1	ICAO
IP02	2	Report of Navigation System Panel activities	Co-Chair
IP03	4	Continued Ionospheric Gradient Study for GBAS at Singapore Changi Airport	Singapore
IP04	2	Report of Instrument Flight Procedure Panel activities	ICAO
IP05	4	Updates on SBAS system and implementation status in Japan	Japan
IP06	8	Australia's GBAS Implementation and Operational Experience	Australia
IP07	4	KOREAN SBAS KASS Operations using 2nd GEO satellite	ROK
IP08	4	GBAS Status in Japan	Japan
IP09	5	GBAS Safety Assessment in Japan	Japan
IP10	4	Research activities related to GBAS and SBAS in Japan	Japan
IP11	4	Potential use of SBAS in Singapore	Singapore
IP12	4	GBAS Certification in China	China
IP13	4	PAK SBAS implementation status	Pakistan

WORKING PAPERS

NO	AGENDA	TITLE	PRESENTED BY
WP01	1	Provisional Agenda	ICAO
WP02	3	Update of the SBAS implementation guidance	Co-Chair
WP03	5	Discussion on the ITF Task List	ICAO
WP04	7	Regional coordination on GNSS related NSP Job Cards	Singapore

PRESENTATIONS

NO	AGENDA	TITLE	PRESENTED BY
SP01	2	Concept and Benefits of GBAS-SBAS & Summary and outcomes of the workshop in Bengaluru India	ICAO
SP02	2	Outcomes of SBAS IWG webinar series	ICAO
SP03	2	Outcomes from ICAO A42 ANC APANPIRG CNS SRWG	ICAO
SP04	5	Navigation service monitoring	ICAO
SP05	7	Discussion on the extension of the mandate of the Task Force	ICAO
SP06	4	GBAS-SBAS Procedure Design Training at APAC FPP	APAC FPP
SP07	8	Regulating SouthPAN	Australia-New Zealand (CAA NZ&CASA)
SP08	4	ADB's Technical Assistance on Advancing SBAS for ASEAN	ADB
SP09	4	Research activities of advanced operations utilizing GBAS in Japan Ver.1	Japan
SP10	4	SouthPAN programme update	Australia
SP11	8	GLS Operational Experience	Qantas

— END —



International Civil Aviation Organization

**The Eighth Meeting of the Asia/Pacific GBAS/SBAS Implementation Task Force
(Melbourne, Australia, 12 – 14 May 2026) (APAC GBAS/SBAS ITF/8)**

List of Participants

No	Name	Title/Organization	Onsite/Online
Australia (11)			
1.	Mr. David Cook	Team Leader Air Navigation Projects & System Civil Aviation Safety Authority (CASA)	Online
2.	Mr. Kojo Owusu-Akyeampong	Senior Standards Officer (CNS) Civil Aviation Safety Authority (CASA)	Onsite
3.	Mr. Stuart Cameron	Strategic and International Officer Civil Aviation Safety Authority (CASA)	Onsite
4.	Ms. Brenda Cattle	Regulatory Specialist Flight Standards Branch Civil Aviation Safety Authority (CASA)	Onsite
5.	Ms. Teja Sethi	Senior Aviation Safety Inspector Civil Aviation Safety Authority (CASA)	Onsite
6.	Mr. Ritesh Kapoor	Senior Engineering Specialist Airservices Australia	Onsite
7.	Mr. Vincent Rooke	Director of SouthPAN Geoscience Australia	Onsite
8.	Ms. Anna Rynne	SouthPAN Aviation Implementation Manager Geoscience Australia	Onsite
9.	Mr. Shamila Shirt	System Engineer Geoscience Australia	Onsite
10.	Mr. Christopher Marshall	Navigation Engineer Geoscience Australia	Onsite
11.	Mr. Alex Passerini	Chief Technical Pilot Qantas	Onsite
China (3)			
12.	Mr. Tong Wei	Professor level senior engineer Southwest ATMB, CAAC	Onsite
13.	Ms. Tiantian Yang	Engineer ATMB, CAAC	Onsite
14.	Mr. Longhao Ren	Senior Engineer Middle South ATMB OF CAAC	Onsite



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List of Participants

No	Name	Title/Organization	Onsite/Online
Hong Kong China (3)			
15.	Mr. Tak Yuen George Wong	Chief Electronics Engineer HKSAR / Civil Aviation Department Hong Kong, China	Onsite
16.	Ms. Yan Yin, Jenny LEE	Senior Operations Officer (Procedures Design) Civil Aviation Department Hong Kong, China	Onsite
17.	Mr. Timothy Yuk Lun Law	Operation Officer Civil Aviation Department Hong Kong, China	Onsite
India (2)			
18.	Mr. Ravinder Singh Jamwal	Director (Operations) Airspace and Air Navigation services standards DGCA India	Online
19.	Mr. Akash Kumar	Assistant Director (Operations) Airspace and Air Navigation Services Standards DGCA India	Online
Japan (7)			
20.	Mr. Shingo Maeda	Special Assistant to the Director Air Navigation Services Department Japan Civil Aviation Bureau	Online
21.	Mr. Makoto Fukuda	Special Assistant to the Director Air Navigation Services Department Japan Civil Aviation Bureau	Online
22.	Mr. Masashi Giho	Special Assistant to the Director Japan Civil Aviation Bureau	Online
23.	Mr. Kenji Ichinose	Chief, Air Navigation Services Department Japan Civil Aviation Bureau	Onsite
24.	Mr. Ryuhei Kaikura	Chief, CNS planning office Japan Civil Aviation Bureau	Onsite
25.	Mr. Susumu Saito	Principal Researcher Electronic Navigation Research Institute, National Institute of Maritime, Port and Aviation Technology	Onsite



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List of Participants

No	Name	Title/Organization	Onsite/Online
26.	Mr. Takayuki Yoshihara	Principal Researcher Electronic Navigation Research Institute, National Institute of Maritime, Port and Aviation Technology	Onsite
New Zealand (6)			
27.	Mr. Myles Brown	Senior Technical Specialist Civil Aviation Authority of New Zealand	Onsite
28.	Mr. Edmund Heng	Senior Technical Specialist Aeronautical Services Civil Aviation Authority of New Zealand	Onsite
29.	Ms. Thiaza Thasthakeer	Communication, Navigation and Surveillance Systems Engineer Airways NZ	Onsite
30.	Mr. Matt Amos	Leader SouthPAN Land Information New Zealand	Online
31.	Mr. David Selby	Certification Engineer Land Information New Zealand	Online
32.	Anja Boehme	SouthPAN Project Manager – Safety Project Land Information New Zealand	Online
Pakistan (6)			
33.	Mr. Faisal Anwar Awan	Sr. Joint Director (FPD) Pakistan Airports Authority	Online
34.	Muhammad Imran	Sr. Joint Director Ops (ATS) Pakistan Airports Authority	Online
35.	Ch Muhammad Razi	Joint Director (FDP) Pakistan Airports Authority	Online
36.	Mr. Aamir Mughal	Joint Director Ops (ATM) Pakistan Airports Authority	Online
37.	Mr. Syed Mohsin Raza	Sr. Joint Director FIU Pakistan Airports Authority	Online
38.	Mr. Bilal Athar Jawed	Deputy Director NavAids Pakistan Airports Authority	Online



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List of Participants

No	Name	Title/Organization	Onsite/Online
Papua New Guinea (2)			
39.	Mr. Garneth Otizo	CNS Inspector Civil Aviation Safety Authority of Papua New Guinea	Onsite
40.	Mr. Caleb Sagati	Airways Surveyor (PANS-OPS) Design / Aero- Charts – Inspector Aviation Facilities (ANS) Civil Aviation Safety Authority of Papua New Guinea	Onsite
Philippines (3)			
41.	Mr. Ray R. Arbotante	Chief, AANSOO Civil Aviation Authority of the Philippines	Onsite
42.	Mr. Michael Rizada	Division Chief, Project Implementation Civil Aviation Authority of the Philippines	Onsite
43.	Mr. Edmund Lexter Eclarinal	ATMO V, Civil Aviation Training Center Civil Aviation Authority of the Philippines	Onsite
Republic of Korea (4)			
44.	Mr. BYUNGHUN LEE	Assistant director Ministry of Land, Infrastructure and Transport of the Republic of Korea (MOLIT)	Online
45.	Mr. GeonHwan PARK	Researcher Korea Aerospace Research Institute (KARI)	Online
46.	Mr. Young Min Yoon	Principal Researcher Korea Aerospace Research Institute (KARI)	Online
47.	Ms. SORA PARK	Researcher Korea Aerospace Research Institute (KARI)	Online
Singapore (2)			
48.	Mr. Shu Gao	Head (Navigation and Meteorology) Civil Aviation Authority of Singapore (CAAS)	Onsite
49.	Mr. Wee Jui Chua	Senior Chief (Operations Technology) Civil Aviation Authority of Singapore (CAAS)	Onsite
South Africa (1)			



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(Melbourne, Australia, 12 – 14 May 2026) (APAC GBAS/SBAS ITF/8)**

List of Participants

No	Name	Title/Organization	Onsite/Online
50.	Mr. Takalani Tshikalaha	Senior Engineer: RD&I Air Traffic and Navigation Services (ATNS)	Onsite
United States of America (1)			
51.	Mr. Shayne Campbell	Senior International Air Traffic Representative Asia Pacific United States Federal Aviation Administration (FAA)	Onsite
IFALPA (2)			
52.	Mr. Tsuyoshi Yamaguchi	ALPA Japan Age Committee Chairman IFALPA	Onsite
53.	Mr. Yuji USHIKUSA	ALPA JAPAN ADO COMMITTEE Member IFALPA	Online
ADB (1)			
54.	Mr. Masato Nakane	Economist Asian Development Bank (ADB)	Online
ICAO (3)			
55.	Mr. Raphael Guillet	Chief ICAO Asia and Pacific Regional Sub-Office <u>BEIJING</u>	Onsite
56.	Ms. Ying Liu	Coordinator ICAO Asia and Pacific FPP Office <u>BEIJING</u>	Onsite
57.	Ms. Chen Yanru	Programme Assistant ICAO Asia and Pacific Regional Sub-Office <u>BEIJING</u>	Onsite



Focal Point list for the National GBAS SBAS Programmes

(last update May 2026)

List of Focal Points

No	Name	Title/Organization
Australia (1)		
1.	Mr. Ritesh. Kapoor	Senior Engineering Specialist – GBAS & SBAS primary Airservices Australia
China (3)		
2.	Mr. Liu Zhengzhong	Engineer, CNS Division ATMB, CAAC
3.	Mr. Jia Yu	Senior Engineer, Technical Centre ATMB, CAAC
4.	Ms. Yang Tiantian	Engineer, Technical Centre ATMB, CAAC
DPRK (1)		
5.	Mr. Kim Kun Ju	Chief of NavAid, ATMD, GACA Democratic People's Republic of Korea
Fiji (3)		
6.	Mr. Jeremaia Lewaravu	Air Navigation Inspector - AIS-AIM/Pans Ops and Charting Civil Aviation Authority of Fiji
7.	Ms. Samanunu Cagi	Controller – AIS ANSP - Fiji Airports
8.	Mr. Ilisoni Raravula	AIS Officer ANSP - Fiji Airports
Hong Kong, China (1)		
9.	Mr. Leung Cheuk Kit, Fernando	Acting Senior Electronics Engineer, Air Traffic Engineering Services Division Civil Aviation Department Hong Kong SAR, China
India (2)		
10.	Shri Gaurav Raghuvanshi	Deputy General manager (ATM-FPD) (Focal point for planned and published procedures) Airport Authority of India (AAI)
11.	Mr. A.K.Tiwari	DGM CNS-P Development of GBAS/SBAS Programmes and technical matters Airports Authority of India

No	Name	Title/Organization
Japan (3)		
12.	Mr. Masahiro NAKAKUBO	Special Assistant to the Director JCAB
13.	Mr. Makoto FUKUDA	Special Assistant to the Director JCAB
14.	Mr. Koji NAKAITANI	Special Assistant to the Director JCAB
Lao PDR (1)		
15.	Mr. Moukphamay Thammavongsa	Air Navigation Standards Division Department of Civil Aviation of Lao PDR
Malaysia (2)		
16.	Mr. Mohd Syahril Azmir Bin Remli	Senior Assistant Director (PANS-OPS) Civil Aviation Authority of Malaysia (CAAM)
17.	Mr. Mohd Shahrul Azree Bin Remly	Senior Assistant Director (ANSA) Civil Aviation Authority of Malaysia (CAAM)
New Zealand (3)		
18.	Mr. Edmund Heng	Senior Technical Specialist Aeronautical Services Civil Aviation Authority of New Zealand
19.	Mr. Myles Brown	Senior Technical Specialist Aeronautical Services Civil Aviation Authority of New Zealand
20.	Dr. Thiaza Thasthakeer	Communication, Navigation and Surveillance Systems Engineer Airways New Zealand
Pakistan (2)		
21.	Mr. Junaid Akhtar	Additional Director CNS (Nav-Aids) Pakistan Civil Aviation Authority
22.	Mr. Zulfiqar Ali Soomro	Additional Director CNS (RADAR) Pakistan Civil Aviation Authority
Philippines (2)		
23.	Mr. Michael Rizada	Division Chief III CNS/MET Division, Air Navigation Service (ANS) Civil Aviation Authority of the Philippines
24.	Mr. Ray R. Arbotante	Division Chief CNS Safety Inspectorate Division Aerodrome and Air Navigation Safety Oversight Office (AANSOO) Civil Aviation Authority of the Philippines
ROK (2)		
25.	Mr. Sang-hyun, Park	Deputy Director, Air Navigation Facilities Division

No	Name	Title/Organization
		Republic of Korea / MOLIT
26.	Mr. Byunghun, Lee	Assistant Director Korea Air Satellite Navigation Center (kansc) / MOLIT
Singapore (2)		
27.	Mr. Joe Chua	Senior Chief (Operations Technology) / Chief (Information Management & Flight Procedure Design) Air Traffic Services Division (ATS) Civil Aviation Authority of Singapore
28.	Mr. Gao Shu	Head (Navigation & Specialised Systems) Air Navigation Services (Engineering) Division (ANSE) Civil Aviation Authority of Singapore
Thailand (2)		
29.	Mr. Takdanai Wuthisen	Senior Air Navigation Services Officer The Civil Aviation Authority of Thailand
30.	Mr. Punyawee Phatthanakitworarak	Air Traffic Systems Engineer Aeronautical Radio of Thailand Ltd.
United States of America (1)		
31.	Mr. Shayne A. Campbell	Senior International Air Traffic Technical Representative, Asia Pacific FAA - Air Traffic Organization
IATA (1)		
32.	Mr. John Moore	Assistant Director, Safety and Flight Operations IATA
IFALPA (2)		
33.	Mr. Tsuyoshi Yamaguchi	ADO Chairman, ALPA Japan IFALPA
34.	Mr. Yuji Ushikusa	ADO Member, ALPA Japan IFALPA

ACTION List

GBAS SBAS Implementation TF

Last Updated: 3/4/2026

NUMB	ACTION ITEM	PRIORITY	OWNER	DUE	STATUS ITF	NOTES (ICAO Document ref)
1	Develop awareness and information sharing					
1.1	Organize a workshop with airspace users of the APAC region (expected benefits, comparison with ILS and Baro VNAV, operational concept, coverage of SBAS and GBAS, programmes in the region, fleet readiness, cockpit interface, business case, retrofit, mandates, inviting air operators already using SBAS or GBAS procedures)	HIGH	ICAO/IATA		Closed	Thanks to AAI for hosting the workshop in Bengaluru India 14-16 Oct 2025. All presentations are available here https://www.icao.int/APAC/meetingdocs?fid=572
1.2	Organize a specific meeting with APAC regulators interested in GBAS SBAS (update of regulation, certification of provider, certify pilot training and standard operating procedures., approval of procedures,...)	HIGH	ICAO and some States to conduct a survey first		Closed	The TF has invited the regulators to the different meetings and workshop. Should be done at national level. ICAO could organize a regional meeting of regulators upon request.
1.3	Create a brochure to summarize main aspects of GBAS and SBAS systems	HIGH	1) ICAO to collect information already available and put on the website 2)See whether we do need a brochure		Closed	Information on ICAO APAC webpage : https://www.icao.int/APAC/GBAS-SBAS And also the GBAS and SBAS implementation guidance documents

NUME	ACTION ITEM	PRIORITY	OWNER	DUE	STATUS ITF	NOTES (ICAO Document ref)
1.4	Make reference to existing information about benefits of GBAS and SBAS vs ILS and APV Baro	MEDIUM	ICAO		Closed	<p>What is already available from ICAO or from other regions ?</p> <p>From FAA :</p> <p>https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/navservices/gnss/</p> <p>https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/navservices/gnss/library/factsheets/media/RNAV_QFacts_final_06122012.pdf</p> <p>From ICAO EUR/NAT</p> <p>https://www.icao.int/EURNAT/EUR%20and%20NAT%20Documents/EUR%20Documents/EUR%20Documents/025%20-%20EUR%20RNP%20APCH%20Guidance%20Material/EUD%20Doc%20025%20RNP%20APCH.pdf</p>
1.5	Develop a list of GBAS and/or SBAS focal points in each APAC State	HIGH	ICAO / Action of the GBAS SBAS ITF/2 for ICAO RO to send a State Letter		Closed	<p>https://www.icao.int/sites/default/files/APAC/GBAS-SBAS/Focal-Point-list-for-the-national-GBAS-SBAS-programmes-APAC-States.pdf</p>
1.6	Develop a synthetic list of the on going development of GBAS SBAS systems in the APAC region (coverage, date of entry into service)	HIGH	ICAO / Information to put on the website / Action Focal point to provide GBAS SBAS programme information to ICAO		Closed	<p>https://www.icao.int/APAC/GBAS-SBAS</p> <p>More could be done to present each programme The two GBAS and SBAS Implementation guidance documents are available in E-documents on ICAO APAC website</p>
1.7	Develop a synthetic list of GBAS and SBAS fleet readiness	MEDIUM	ICAO/IATA/Eurocontrol		Closed	<p>Information available from the last workshop in Bangaluru in Oct 2025 :</p> <p>https://www.icao.int/APAC/meetingdocs?fid=572</p> <p>Synthetic view could be added on the ICAO webpage for GBAS SBAS</p>

NUMB	ACTION ITEM	PRIORITY	OWNER	DUE	STATUS ITR	NOTES (ICAO Document ref)
1.8	Develop a list/map of published GBAS and SBAS procedures in the APAC region	MEDIUM	ICAO with input from focal points		Closed	https://www.icao.int/APAC/GBAS-SBAS-MAP The website (Airbus/Eurocontrol) lists the GBAS stations worldwide : https://pbnportal.eu/epbn/main/PBN-Tools/FlyGLS.html SBAS : FAA LPV approaches: https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/navservices/gnss/approaches/media/LPVs.xlsx EGNOS LPV https://egnos-user-support.essp-sas.eu/new_egnos_ops/resources-tools/lpv-procedures-map Europe through Eurocontrol access https://www.eurocontrol.int/platform/performance-based-navigation-map-tool
1.9	Develop a list of APAC States' mandates (existing and planned) related to GBAS and SBAS	MEDIUM	ICAO with input from focal points		Closed	Information from India : - NATIONAL CIVIL AVIATION POLICY 2016 https://www.civilaviation.gov.in/sites/default/files/2025-10/national-civil-aviation-policy-2016_1.pdf - Amendment to National Civil Aviation Policy 2016_0.pdf https://www.civilaviation.gov.in/sites/default/files/2023-07/Amendment%20to%20National%20Civil%20Aviation%20Policy%202016_0.pdf Focal points will inform about any mandate when published
2	Experience sharing					
2.1	Organize a discussion and a visit if possible of States/Airports who have already implemented Gbas or Sbas systems (all subjects including siting, performance demonstration, safety assessment..)	HIGH	ICAO / When possible		Closed	Visit of GBAS site at Tokyo Haneda airport Visit of GAGAN in Bangaluru during the workshop
3	Technical issues					

NUME	ACTION ITEM	PRIORITY	OWNER	DUE	STATUS ITF8	NOTES (ICAO Document ref)
3.1	Review of the previous ionosphere studies published in 2016 (also look at how to use SBAS coverage for GBAS)	HIGH	Expert Subgroup 3-1		Closed	Coordination/harmonization with the ad hoc group of ICAO NSP GWG (GBAS Working Group) working on iono guidance for GBAS in low latitude regions.
3.2	Management of SBAS Channel	MEDIUM	ICAO APAC office		Closed	Handled by ICAO HQ SL 2019/87 from ICAO to States to nominate contact point and then can access the ICAO tool ICAO HQ is organizing internal meetings in Q2 2026 with Regional Offices for the management of the SBAS Channel Numbers. To be handled by APAC.
3.3	VDB frequency assignment and coordination in APAC	HIGH	Hong Kong China to coordinate with other States and ICAO		Closed	Already an existing mechanism to check the availability of frequency for use. Please refer to ICAO Doc 9718 Vol.II (Second Edition, 2022) includes VDB frequency compatibility criteria.
3.4	ATC interface and NOTAM matters (both for GBAS and SBAS) (Ref essential navigation means in Annex 10 ??)	MEDIUM	ICAO/ WP and discussion for a future meeting	ITF/8	Closed	Presentation by ICAO at ITF8 in May 2026 EUROCAE ED-114B Change 1 includes requirements for status monitoring and control of GBAS by ATC.
3.5	SBAS coverage extension to neighboring States (simulation, adding ground station and associated costs, certification,Service Level Agreement)	HIGH	States operating SBAS should present WP		Closed	Continuous discussion among interested parties Was discussed at the workshop in Bengaluru
3.6	GBAS and SBAS safety assessment	HIGH	States to share their experience		Open	Presented by Australia on GBAS in ITF/3; by Japan and China on GBAS in ITF8. May need more discussion on the process for the introduction of GLS or LPV operations into local ATM environment under SMS.
3.7	GBAS SBAS performance demonstration (acc,int,avail,cont,time to alarm, data collection, simulation,...)	HIGH	States to share their experience		Closed	Presentations by States through WPs in different ITF meetings and at workshops

NUMB	ACTION ITEM	PRIORITY	OWNER	DUE	STATUS ITF	NOTES (ICAO Document ref)
3.8	GNSS signal monitoring (legal recording,...)	MEDIUM	States to share their experience		Closed	Ref ICAO GNSS Manual
3.9	GBAS siting criteria	MEDIUM			Closed	EUROCAE ED114B and FAA Order 6884.1 (http://www.faa.gov/documentLibrary/media/Order/6884_1.pdf) Some information is available in the GBAS Implementation Guidance document
3.10-	Information to be provided in the flight plan and information into AIP	MEDIUM			Closed	ICAO DOC 4444
3.11	Final Approach Segment Data Block : 1) Tool to elaborate the FAS DB ; 2) How to validate FAS DB during the ground and flight inspection	MEDIUM	States to share their experience		Closed	Adressed in several papers in ITF and by APAC FPP too Ref Eurocontrol tool to create FAS DB : EUROCAE ED114B for GBAS
3.12	Phraseology	LOW			Closed	ICAO DOC 4444
3.13	Lack of PRN numbers for SBAS Geo Satellites	MEDIUM	Mainly for new SBAS providers		Closed	Annex 10 / NSP and receiver standards RTCA DO229F
3.14	Interference management (but this is not only specific to GBAS SBAS)	MEDIUM	States to share their experience		Closed	GNSS RFI has be discussed in many ICAO meetings and forum. A regional ad hoc group will work on this.
4	Quick guides and references					
4.1	ICAO and others document review (Top Down)	HIGH	ICAO / Website		Closed	Source : ICAO presentation given at the first workshop in ROK in 2019
4.2	Develop High Level guide on Implementation Process for GBAS and SBAS	HIGH	Expert Sub group 3-2		Closed	Documents approved by CNS SG and published on ICAO APAC website E-document : - GBAS Implementation Guidance (Weblink) - SBAS Implementation Guidance (weblink)

NUME	ACTION ITEM	PRIORITY	OWNER	DUE	STATUS ITF8	NOTES (ICAO Document ref)
4.3	Technical support for system certification and operation certification	TBD			Closed	Already adressed in task 3.6
4.4	Complement the "PBN in a page"	LOW	ICAO to assess what could be done		Closed	https://www.icao.int/APAC/Documents/edocs/PBN-in-a-page%20V2.pdf and discussed in WP02 at ITF8 and as Appendix of the SBAS guidance implementation document GBAS is not part of PBN but rather comparable with ILS
5	Training					
5.1	To share syllabus for ATCOs	MEDIUM	States		Closed	Refer to IP06 by Australia in ITF8
5.2	Develop one day/two day training workshop for ATCOs (Use of GBAS/SBAS for approach and landing : mixity of traffic, ATC interface, Notam,...)	MEDIUM	States		Closed	No need
5.3	Deliver a training module on GBAS and SBAS instrument flight procedure design	MEDIUM	ICAO CDI APAC Flight Procedure Programme (FPP)		Closed	At national level and At regional level : Courses provided by APAC Flight Procedure Programme : PBN Procedure Design course and Procedure Design Refresher Course. https://www.icao.int/APAC/APAC-FPP/default