



ICAO

*International Civil Aviation Organization***Twenty Sixth Meeting of the Communications/
Navigation and Surveillance Sub-group (CNS SG/26) of
APANPIRG**

Video Tele-Conference, 5 – 9 September 2022

Agenda Item 6: Navigation

6.2 Review Report of the Fourth Meeting of GBAS/SBAS Implementation Task Force (GBAS/SBAS ITF/4)

**REVIEW REPORT OF THE FOURTH MEETING OF GBAS/SBAS IMPLEMENTATION
TASK FORCE (GBAS/SBAS ITF/4)**

(Presented by the Secretariat)

SUMMARY

This paper provides information on the outcomes of the GBAS/SBAS ITF/4 held through VTC from 11-12 May 2022 for the review by the meeting.

1. INTRODUCTION

1.1 The fourth Meeting of the ICAO Asia/Pacific GBAS/SBAS Implementation Task Force (GBAS/SBAS ITF/4) was held by Video Teleconference (VTC) on 11-12 May 2022. A total of 113 participants from Australia, China, Hong Kong China, Fiji, India, Japan, Mongolia, New Zealand, Pakistan, Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand, Vietnam, USA, IATA, IFALPA and ICAO were registered for the GBAS/SBAS ITF/4 VTC. A total of six (6) Information Papers (IPs) and twelve (12) Working Papers (WPs) were presented in the meeting. The relevant presentations and documents are available at following link: <https://www.icao.int/APAC/Meetings/Pages/2022-GBAS-SBAS-ITF4.aspx>

2. DISCUSSION

2.1 The meeting deliberated on the following main Agenda Items:

Agenda Item 2: Updates from States about GBAS/SBAS Implementation

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

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- Review and revise the GBAS and SBAS safety assessment guidance document related to anomalous ionospheric conditions, and to
- Draft a Guidance Document on Implementation Process for GBAS/SBAS.

Agenda Item 4: Review of Action Item List**2.2 Updates from the States about GBAS/SBAS Implementation**

2.2.1 In the GBAS/SBAS ITF/4, India, USA, Japan, Korea and Thailand updated the meeting the status of their GBAS/SBAS implementation and also shared with members their plan for GBAS/SBAS implementation in the future.

2.2.2 India presented status of Implementation of GAGAN based LPV approaches with emphasis on implementation at regional airports in India to improve access, regularity and efficiency of aircraft operations to provide reliable connectivity to relatively remote places in India. PBN OPS Approval process for LPV procedure was also explained and it was informed that one major Airline and AAI for its calibration aircraft were in the process of getting the OPS approval and another Airline had also submitted the documents for OPS approval.

2.2.3 The United States of America presented the current state of their GBAS activities. As GBAS is being implemented as a Non-federal system, the US currently has four active GBAS equipped aerodromes with another two planned for operations by 2024. Fifteen airlines, including several from APAC, have conducted GBAS approaches at these locations. The US continues Long Term Ionospheric Anomaly Monitoring (LTIAM) to refine and improve system availability and performance.

2.2.4 Japan presented the status of GBAS implementation in Japan, including installation and operational trial of CAT-I GBAS at Tokyo Haneda International Airport. GBAS R&D activities included CAT-I flight demonstration of RNP to GLS APCH with a portable GBAS system and DFMC GBAS concept study in southern Japan.

2.2.5 Japan shared updates on SBAS status that MSAS was currently served by QZS-3, the GEO of the Quasi-Zenith Satellite System. It was reported that LPV-250 would be provided on a trial basis in Hokkaido in 2022 using the current V2 ground equipment. In the future, Japan would aim to achieve LPV-200 using V3 with improved software and three GEOs. Japan had conducted LPV trials in southern part of Japan and expanded the trial to an airport in the northern part of Japan. Japan presented the MSAS performance analysis conducted at New Chitose Airport (i.e. in northern part of Japan) for about one month. The analysis was performed by MSAS V2 and some unavailability was observed. MSAS V3 is being developed to cope with LPC performance and it is expected to improve the availability.

2.2.6 The Republic of Korea is developing Korean SBAS called KASS (Korea Augmentation Satellite System). The KASS System Qualification Review (SQR) is planned for the

second half of 2023. Thereafter, the certification process would be completed by end 2023 for the provision of the Safety of Life (SoL) service across the designated coverage.

2.2.7 Thailand presented updates on the progress on the GBAS Proof-of-Concept (PoC) Project, which is under technical collaboration between Japan and Thailand. The GBAS PoC equipment construction and installation work had been done, with an IFM (Ionosphere Field Monitor) installed at the King Mongkut's Institute of Technology Ladkrabang (KMITL) campus to detect ionospheric disturbances. Thailand also updated members the progress of their ionospheric threat model development. The preliminary ionosphere characteristics from the year of 2012 and 2020, which represented high and low solar activities respectively, in Bangkok had been evaluated by AEROTHAI using the single-frequency carrier-based and code aided (SF-CBCA) method. The final ionospheric threat model used for this project is under finalization.

2.3 Progress on the work of Expert Groups

GBAS and SBAS Safety Assessment Guidance Document Related to Anomalous Ionospheric Conditions

2.3.1 Co-Chair (Mr. Susumu Saito) of the task force presented reports on the activities of the Expert Group 3-1 for revision of the GBAS and SBAS safety assessment guidance documents related to anomalous ionospheric conditions with timeline for the work of the Expert Group 3-1. Activities of the Expert Group 3-1 for revision of the GBAS and SBAS safety assessment guidance documents related to anomalous ionospheric conditions were reported. The group reviewed the GBAS and SBAS safety assessment guidance documents related to anomalous ionospheric conditions published in 2016, and identified points to be updated. The group targeted to deliver the first drafts of the guidance documents by fall 2022 and circulate the drafts to the Task Force members by December 2022. To achieve this, the group would have online meetings on a monthly basis.

2.3.2 As the lead of Expert Group 3-1, India presented outcomes from a review of SBAS Safety Assessment Guidance Document Related to Ionospheric Anomalies. The new proposed contents of the document were highlighted and the potential areas, where update of the SBAS Safety Assessment Guidance Document Related to Ionospheric Anomalies would be required, were briefly deliberated. Those are Ionospheric Characteristics, Definition of Nominal and Anomalous ionosphere, Ionospheric Monitoring and GAGAN Iono threat model. The existing document would be updated to account for new SBAS in the region and it would not go into details but remaining a high-level guidance as the current version.

Guidance Document on Implementation Process for GBAS/SBAS

2.3.3 Co-Chair (Mr George Wong), on behalf of Expert Group 3-2, tasked to draft a guidance reference document for implementation of GBAS/SBAS in the Asia/Pacific Region, presented the outcomes from the review and discussion under Expert group for this task. The guidance reference document would be prepared to present a holistic view of implementation from the initial phase for the analysis of operational needs to the phase for conducting post-implementation review. States' experience in implementation of GBAS/SBAS would also be incorporated in this guidance document to be prepared under Expert Group 3-2. The structure of guidance document on implementation process

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for GBAS/SBAS (i.e. given in **Appendix 1**) and the timeline for drafting this guidance document for the Region as well as the regular expert group review meetings (i.e. given in **Appendix 2**) proposed by Expert Group 3-2 were deliberated in the GBAS/SBAS ITF/4. In addition to taking reference to relevant materials from ICAO/ international organizations / States / Administrations, specific consideration(s), such as ionospheric impacts in low altitude region, only particularly applicable to the Asia/Pacific Region and States' experience in implementation of GBAS/SBAS would be incorporated in this guidance document to be prepared under the Expert Group. States' contributions were urged for sharing their internal guidelines/practice/experience in the implementation of GBAS/SBAS for Expert Group to prepare a comprehensive guidance document. The 1st draft of guidance reference document was planned for ready in March 2023. As per the discussion in the GBAS/SBAS ITF/4, an intermediate meeting was aimed for Dec 2022 to review the draft documents. Taking into consideration India's suggestion for getting one or two expert from regulators to join Expert Group 3-2 in order to enrich the regulatory perspective in the guidance document, all the States were urged to nominate corresponding expert(s) for the expert subgroup through email sent to APAC-RSO@icao.int.

2.4 Review of the Action list*ATC Perspective in GBAS Implementation*

2.4.1 Australia shared their experience on their GBAS implementation and considerations from an Air Traffic Control (ATC) perspective (including ATC training). Australia developed a Concept of Operations, which involved replicating the existing Category I ILS practices. With a defined Concept of Operations, an assessment was performed on the scope of change to ATC with the introduction of GBAS which then induced the ATC Training Needs Analysis. Given the similarities to existing practices, ATC training primarily involved internal briefings on the technology and key differences to the ILS (including differences in phraseology). Australia noted the implementation of a Constellation Alerting capability to predict potential GLS service outages due to changes in the GPS satellite constellation. Australia presented key lessons learnt with the introduction of the GBAS including the limitations associated with the initial GBAS Maximum Use Distance (Dmax) setting of 23 NM on ATC operations (which was subsequently increased to 50 NM post the change to the definition of Dmax in ICAO Annex 10, Volume 1, Amendment 91) and the need for an independent constellation alerting capability to meet Continuity of Service requirements.

VDB Frequency Assignment and Coordination

2.4.2 Co-chair (Mr. Saito) presented a report on the recent ICAO updates of frequency coordination related to GBAS VDB. To facilitate frequency assignment for GBAS VDB, the frequency coordination criteria for VHF were considered necessary. The ICAO Navigation Systems Panel (NSP), as well as the Frequency Spectrum Management Panel (FMSP), had discussed the technical details of frequency coordination criteria. Frequency coordination criteria related to GBAS VDB discussed in the ICAO NSP and recent update on GBAS VDB frequency coordination criteria discussed at ICAO were reported in the GBAS/SBAS ITF/4. The airport-to-airport compatibility assessment methodology, which would be incorporated in the next update of the Handbook, on Radio Frequency Spectrum

Requirements for Civil Aviation (Doc 9718) Vol. II was explained. The frequency compatibility assessment for GBAS was demonstrated with the case at Tokyo Haneda International Airport.

2.4.3 IATA presented a preliminary analysis of airline responses to the GNSS Augmentations section of IATA's Aircraft Equipage and Capability Survey for Asia-Pacific and North Asia conducted in Quarter 1 of 2022, showing GBAS and SBAS equipage of the aircraft in the APAC region.

SBAS Training and Safety Assessment

2.4.4 Japan shared the information about the summary of contents of SBAS training for ATSEP being conducted in Network Performance Assessment Center (NPAC).

2.4.5 India presented the information regarding steps taken by India for SBAS Safety Assessment relating to anomalous ionosphere as part of post-adoption activities of GAGAN.

Revision of Action List

2.4.6 The Action List of the task force is a collection of technical matters identified during the first meeting of the task force, incorporating description, relevance, ownership and priority to be assessed in meetings of GBAS/SBAS ITF. Taking into account outcomes from the Task Force, a review on the current status of action items was conducted and deliberated in GBAS/SBAS ITF/4. A certain number of action items had been considered closed as the corresponding actions had been completed. For the rest of action items, new target dates were assigned per the discussion in the GBAS/SBAS ITF/4. The revised Action List is attached as **Appendix 3** for reference.

2.5 Japan shared in the GBAS/SBAS ITF/4 the event of GPS signal degradation occurred on 23 September 2021. TOPS (ATC oceanic Control System in Japan) detected that the FOM level, which is a navigation performance index used in ADS-C application, had declined on the oceanic airways in the southeastern offshore of Hokkaido region. At the same time, aircrafts reported that EICAS Advisory Message "ADS-B OUT" also occurred. NPAC researched this event and issued NOTAM.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) Review the Summary Report on the outcome of the GBAS/SBAS ITF/4 Meeting;
- b) Urge States/Administrations to share relevant materials with Expert Group for preparing the draft guidance document on Implementation Process for GBAS/SBAS and note the timeline given in Appendix 2 for it;

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- c) Urge States/Administrations to nominate experts from regulators to join Expert Group for preparing the draft guidance document on Implementation Process for GBAS/SBAS; and
- d) Discuss any relevant matters as appropriate.

Appendix 1 – Structure and Content List of Guidance Reference Document for Implementation of GBAS/SBAS in the Asia/Pacific Region

1. *Objectives and Scope of the Guidance Document*
2. *Executive Summary*
3. *Roles and Responsibilities of Stakeholders*
4. *Performance Indicators*
5. *Implementation Process for GBAS*
 - a. *Overview*
 - b. *Framework, Phases and Elements of GBAS Implementation Process*
 - i. *Operational Need Analysis*
 - ii. *Cost-benefit Assessment*
 - iii. *Technical Feasibility Assessment*
 - *Siting Study*
 - *GPS Data Collection and Analysis*
 - *Ionospheric Impact Study*
 - *Site Constraint Study*
 - ***VDB Coverage Assessment****
 - iv. *Concept of Operations (CONOPS) Development*
 - v. *VDB Frequency Application and Assignment*
 - vi. *GBAS Solution Selection*
 - vii. *Site Deployment*
 - viii. *Airport Height Restriction Plan Amendment*
 - ix. *GLS Flight Procedure Development*
 - x. *Flight Check*
 - xi. *Safety Assessment*
 - xii. *System Certification*
 - xiii. *Development of Regulations Related to GBAS for Aviation*
 - xiv. *Training*
 - xv. *Operation Certification*
 - xvi. *Post-implementation Review*
6. *Implementation Process for SBAS*
 - a. *Overview*
 - b. *Framework, Phases and Elements of SBAS Implementation Process*
 - i. *Operational Need Analysis*
 - ii. *Cost-benefit Assessment*
 - *Full SBAS implementation (Implementation Type A)*
 - *Participating in existing SBAS (Implementation Type B)*
 - *Utilizing existing SBAS service (Implementation Type C)*
 - iii. *Technical Feasibility Assessment*
 - *Full SBAS implementation (Type A)*
 - *Satellite (transponder) deployment*
 - *SBAS PRN coordination*
 - *SBAS ID coordination*
 - *Coverage and service volume*
 - *Service level*

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- *Ground monitoring station siting*
 - *Uplink station siting*
 - *Ionospheric impact study*
 - *Participating in existing SBAS (Type B)*
 - *Ground monitoring station siting*
 - *Coordination with the SBAS provider*
 - *Review of existing SBAS services*
 - *Coverage and service volume*
 - *Service level*
 - *Ionospheric impact study*
 - *Utilizing existing SBAS service (Type C)*
 - *Coverage and service volume*
 - *Service level*
 - *Available services*
 - *Coordination with the SBAS provider*
- iv. *Concept of Operations (CONOPS) Development*
- v. *SBAS Solution Selection*
- vi. *System Deployment (For Implementation Type A and B)*
- vii. *SBAS Flight Procedure Development*
- viii. *Flight Check*
- ix. *Safety Assessment*
- x. *System Certification*
- xi. *Development of Regulations Related to SBAS for Aviation*
- xii. *Training*
- xiii. *Operation Certification*
- xiv. *Post-implementation Review*
- 7. *Post-implementation Activities*
 - a. *Operation and Maintenance Activities*
 - b. *Performance Indicators*
- 8. *Appendix*
 - Appendix 1 - Terminologies and Definition*
 - Appendix 2 – Reference*
 - Appendix 3 – Experience shared by States/Administrations*

Notes:

** New element was added after Expert Group's review*

Appendix 2 – Proposed Timeline for Preparing Guidance Reference Document for Implementation of GBAS/SBAS in the Asia/Pacific Region

Period	Activities	Outcomes
May – October 2022	States sharing with Expert Group their internal guidelines/practice/experience in the implementation of GBAS/SBAS <i>(Action: States/Administrations)</i>	States’ relevant contribution for their internal guidelines/practice/experience in the implementation of GBAS/SBAS
May – June 2022	Sub-team working meetings and writing up draft of guidance document <i>(Action: Expert Group Members and Leads/Co-Lead)</i>	Sections of draft write-up
End June 2022	Expert Group Leads/Co-lead Meeting with Chair <i>(Action: Leads/Co-Lead and Chair)</i>	Milestone dates for completing draft write-up of individual section and progress reporting on draft write-up
July – September 2022	Sub-team working meetings and writing up draft of guidance document <i>(Action: Expert Group Members and Leads/Co-Lead)</i>	Sections of draft write-up
End September 2022	Expert Group Leads/Co-lead Meeting with Chair <i>(Action: Leads/Co-Lead and Chair)</i>	Progress reporting on draft write-up
October – December 2022	Sub-team working meetings and writing up draft of guidance document <i>(Action: Expert Group Members and Leads/Co-Lead)</i>	Sections of draft write-up
End December 2022	Expert Group Leads/Co-lead Meeting with Chair <i>(Action: Leads/Co-Lead and Chair)</i>	Progress reporting on draft write-up
January – March 2023	Sub-team working meetings and writing up draft of guidance document <i>(Action: Expert Group Members and Leads/Co-Lead)</i>	1 st draft write-up for all sections
End March 2023	Expert Group Leads/Co-lead Meeting with Chair <i>(Action: Leads/Co-Lead and Chair)</i>	Progress reporting on draft write-up and review on the 1 st draft write-up for all sections
APAC GBAS/SBAS ITF/5	Presenting the 1 st draft of guidance reference document for implementation of GBAS/SBAS in the Asia/Pacific Region <i>(Action: Expert Group)</i>	Comments consolidated from APAC GBAS/SBAS ITF for fine tuning the draft guidance document
Beyond APAC GBAS/SBAS ITF/5 and up to APAC GBAS/SBAS ITF/6	Fine tuning the draft guidance document to address comments collected in APAC GBAS/SBAS ITF/5 <i>(Action: Expert Group Members, Leads/Co-Lead and Chair)</i>	Final draft of guidance reference document for implementation of GBAS/SBAS in the Asia/Pacific Region

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Period	Activities	Outcomes
APAC GBAS/SBAS ITF/6	Presenting the final draft of guidance reference document for implementation of GBAS/SBAS in the Asia/Pacific Region in APAC GBAS/SBAS ITF/6 for endorsement <i>(Action: Expert Group)</i>	Finalized the 1 st issue of guidance reference document for implementation of GBAS /SBAS in the Asia/Pacific Region

ACTION PLAN							
GBAS SBAS Implementation TF		Last Updated:		12/5/2022			
NL	ACTION ITEM	PRIORITY	OWNER	DUE	STATUS	NOTES (ICAO Document ref)	Decision by the meeting
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	Early 2023		ICAO and IATA as main organizers, with the host State. First choice would be to have a face-to-face workshop , in India for example, as Gagan has been put in place. Second choice is to organize a small webinar. To be decided in Dec 2020.	Wait until COVID-19 situation to allow international travel.
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			Australia is supporting	To wait for dec meeting in Dec2022
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	S1 2021	Closed	With input from other actions, may be combined with 1.4 Brochure in a second stage	Already available on Information Sharing Platform, TF members are encouraged to see and suggest for any changes
1.4	Make reference to existing information about benefits of GBAS and SBAS vs ILS and APV Baro	MEDIUM	ICAO	12/31/2020	Closed	What is already available from ICAO or from other regions ? From FAA : https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/navservices/gnss/ https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/navservices/gnss/library/factsheets/media/RNAV_QFacts_final_06122012.pdf From ICAO EUR/NAT 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	Already available on Information Sharing Platform, TF members are encouraged to see and suggest for any amendments.
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	9/30/2020- for dispatch of SL	Closed	Information to be put on the website	Already available on Information Sharing Platform, TF members are encouraged to see and suggest for any changes
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	12/31/2020	Closed	Reuse the format of the information presented at the workshop in Republic of Korea in 2019	Already available on Information Sharing Platform, TF members are encouraged to see and suggest for any changes
1.7	Develop a synthetic list of GBAS and SBAS fleet readiness	MEDIUM	ICAO/IATA/Eurocontrol	End of Q1 2021	Closed	Public information from IGWG and aircraft manufacturers. (https://ext.eurocontrol.int/analytics/saw.dll?Dashboard) The IGWG information is available at the EUROCONTROL's One Sky Team website (registration required).	Can be accessed through One Sky Team website and Airbus and Boeings presentation in ICAO APAC GBAS-SBAS workshop contents.

NL	ACTION ITEM	PRIORITY	OWNER	DUE	STATUS	NOTES (ICAO Document ref)	Decision by the meeting
1.8	Develop a list/map of published GBAS and SBAS procedures in the APAC region	MEDIUM	ICAO with input from focal points	Next meeting	Closed	The flygls.net website (Airbus/Eurocontrol) lists the GBAS stations worldwide 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	Already available on Information Sharing Platform, TF members are encouraged to see and suggest for any changes
1.9	Develop a list of APAC States' mandates (existing and planned) related to GBAS and SBAS	MEDIUM	ICAO with input from focal points	On going			Remind focal points to respond.
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	To be discussed in the next meetings		Could be done in : - Australia as Melbourne and Sydney have published procedures on GBAS stations. - Japan : a GBAS operational trial procedure has been published at Tokyo Haneda and is applicable from 16 July 2020.	Wait until COVID-19 situation to allow international travel.
3 Technical issues							
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	2022/12/1		Coordination/harmonization with the ad hoc group of ICAO NSP GWG (GBAS Working Group) working on iono guidance for GBAS in low latitude regions.	At least GBAS guidance needs update to include GAST-D. ICAO NSP GWG is working on developing a manual on GBAS including iono mitigation. SBAS guidance should be reviewed, maybe to add some on DFMC SBAS.
3.2	Management of SBAS Channel	MEDIUM	States to contact ICAO to get the SBAS channel numbers as per SL 2019/87		Closed	Handled by ICAO HQ SL 2019/87 from ICAO to States to nominate contact point and then can access the ICAO tool	Already available on Information Sharing Platform
3.3	VDB frequency assignment and coordination in APAC	HIGH	Hong Kong China to coordinate with other States and ICAO	Next meeting	Closed	ICAO Doc 9718 is under revision to include VDB frequency compatibility criteria. To coordinate with Spectrum Review WG and Navigation System Panel (NSP). Mr Susumu Saito offered to help in coordination with NSP.	WP07 from HK in ITF/3 and WP09 from Cochair in ITF/4
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	Next meetings in Dec2022		Based from ICAO provision and experience of other regions	
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	Next meetings	Closed	India / USA are willing to contribute to this WP	India and USA presented in ITF/3. Completed
3.6	GBAS and SBAS safety assessment	HIGH	States to share their experience	Next meetings		Presented by Australia on GBAS in ITF/3	GBAS Completed, SBAS Safety Assessment presented by India in ITF/4(IP06)
3.7	GBAS SBAS performance demonstration (acc,int,avail,cont,time to alarm, data collection, simulation,...)	HIGH	States to share their experience	Next meetings		Also addressed in IGWG	States to respond
3.8	GNSS signal monitoring (legal recording,...)	MEDIUM	States to share their experience	Next meetings	Closed	Ref ICAO GNSS Manual	Already available on Information Sharing Platform
3.9	GBAS siting criteria	MEDIUM			Closed	EUROCAE ED114B and FAA Order 6884.1 (http://www.faa.gov/documentLibrary/media/Order/6884_1.pdf)	Already available on Information Sharing Platform

NL	ACTION ITEM	PRIORITY	OWNER	DUE	STATUS	NOTES (ICAO Document ref)	Decision by the meeting
3.1 0-	Information to be provided in the flight plan and information into AIP	MEDIUM			Closed	ICAO DOC 4444	Already available on Information Sharing Platform
3.1	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	Next meetings	Closed	Same for SBAS and GBAS? Ref Eurocontrol tool to create FAS DB : EUROCAE ED114B for GBAS	Completed
3.1	Phraseology	LOW			Closed	ICAO DOC 4444	Already available on Information Sharing Platform
3.1	Lack of PRN numbers for SBAS Geo Satellites	MEDIUM	Mainly for new SBAS providers		Closed	Annex 10 / NSP and receiver standards RTCA DO229F	Already available on Information Sharing Platform
3.1	Interference management (but this is not only specific to GBAS SBAS)	MEDIUM	States to share their experience		Closed		Refer to GNSS manual (Doc9849) on website
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	Already available on Information Sharing Platform
4.2	Develop High Level guide on Implementation Process for GBAS and SBAS	HIGH	Expert Sub group 3-2	1st draft to be presented at the next meeting in March 2023		What is already available from ICAO or from other regions ? Ref- GBAS Guide- ICAO SAM Region	Expert Sub Group 3-2 working on this
4.3	Technical support for system certification and operation certification	TBD		Next meeting in Dec2022		To be decided after meeting with regulators Linked with 1.2 and 3.6 above.	SBAS to be covered
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 GBAS is not part of PBN but rather comparable with ILS	Already available on APAC website
5 Training							
5.1	Develop syllabus for ATCOs	MEDIUM	To be confirmed	Next meeting			
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	To be confirmed				WP08-ATC perspective from Australia in ITF/4, IP05-ATSEP training for SBAS by JAPAN in ITF/4;WP04-USA on GBAS in ITF/4
5.3	Deliver a training module on GBAS and SBAS instrument flight procedure design	MEDIUM	ICAO TCB Flight Procedure Programme (FPP)			Training conducted by FPP on 13-17 July 2020	Report to the next meeting (if conducted)