

**INTERNATIONAL CIVIL AVIATION ORGANIZATION**



**REPORT OF THE THIRD MEETING OF THE  
ICAO ASIA/PACIFIC GBAS/SBAS IMPLEMENTATION TASK FORCE  
(GBAS/SBAS ITF/3)**

Video Teleconference, 27 – 28 September 2021

The views expressed in this Report should be taken as those of the Meeting  
and not the Organization

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

## **1. INTRODUCTION**

### **Meeting**

1.1 The third Meeting of the ICAO Asia/Pacific GBAS/SBAS Implementation Task Force (GBAS/SBAS ITF/3) was held by Video Teleconference (VTC) on 27-28 September 2021.

### **Attendance**

2.1 A total of 134 participants from Australia, Cambodia, China, Hong Kong China, India, Indonesia, Japan, Malaysia, Myanmar, New Zealand, Pakistan, Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand, Vietnam, USA, IATA, IFALPA and ICAO were registered for the GBAS/SBAS ITF/3 VTC. A list of participants is provided at Appendix A to this report.

### **Officers and Secretariat**

3.1 Mr. V. K. Mishra, Regional Officer, PBN, ICAO APAC was the Secretary of the meeting. He was supported by Yang Siqi, Program Assistant, ICAO APAC RSO.

### **Opening of Meeting**

4.1 On behalf of Mr. Tao Ma, Regional Director of ICAO Asia and Pacific Office, Mr. Raphael Guillet, Chief of ICAO APAC RSO welcomed all participants to the meeting. The meeting was conducted by Co-Chairs of the meeting Mr. Susumu Saito, ENRI Japan and Mr. George Wong, CAD, Hong Kong China.

### **Documentation and Working Language**

5.1 The working language of the VTC and all documentation were in English.

5.2 A total of six (6) Information Papers (IPs) and nine (9) Working Paper (WP) and one (1) flimsy were presented in the meeting. The list of papers and presentations is provided in Appendix B to this report. The papers are available on the webpage of the meeting;<https://www.icao.int/APAC/Meetings/Pages/2021%20Third-meeting-of-GBAS-SBAS-Implementation-Task-Force-GBAS-SBAS-ITF3.aspx>

### **List of Decisions and Draft Conclusions/Decisions**

#### **6.1 List of Draft Conclusions**

*Nil.*

#### **6.2 List of Draft Decisions**

*Nil.*

#### **6.3 List of Decisions**

<b>Decision GBAS/SBAS ITF/3-1: Review and revise the GBAS and SBAS safety assessment guidance document related to anomalous ionospheric conditions</b>	
<b>What:</b> That, GBAS/SBAS ITF will review and revise the GBAS and SBAS safety assessment guidance document related to anomalous ionospheric conditions in view of GAST-D to support Cat II/III and DFMC SBAS.	<b>Expected impact:</b> <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Ops/Technical
<b>Why:</b> To provide updated GBAS and SBAS safety assessment guidance related to anomalous ionospheric conditions	<b>Follow-up:</b> <input checked="" type="checkbox"/> Required from States
<b>When:</b> 28 September 2021	<b>Status:</b> Adopted by TF.
<b>Who:</b> <input type="checkbox"/> Sub groups <input type="checkbox"/> APAC States <input type="checkbox"/> ICAO APAC RO <input type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Other: GBAS/SBAS ITF	

<b>Decision GBAS/SBAS ITF/3-2: Guidance Document on Implementation Process for GBAS/SBAS</b>	
<b>What:</b> That, GBAS/SBAS ITF will draft a guidance reference document for implementation of GBAS/SBAS in the Asia/Pacific Region.	<b>Expected impact:</b> <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Ops/Technical
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## **REPORT ON AGENDA ITEMS**

### **Agenda Item 1: Adoption of Agenda**

1.1 The following proposed agenda was adopted by the meeting.

**Agenda Item 1:** Adoption of Agenda

**Agenda Item 2:** GBAS/SBAS Information Sharing Platform

**Agenda Item 3:** Updates from States about GBAS/SBAS Implementation

**Agenda Item 4:** Technical Updates related to GBAS/SBAS

**Agenda Item 5:** Guidance Reference on Implementation Process for GBAS/SBAS

**Agenda Item 6:** GBAS/SBAS Flight Procedure Design Overview

**Agenda Item 7:** Review of Action Item List

**Agenda Item 8:** Any Other Business

**Agenda Item 9:** Date and Venue of Next Meeting

### **Agenda Item 2: GBAS/SBAS Information Sharing Platform**

#### **WP-01- GBAS-SBAS Information Sharing Platform (Secretariat)**

2.1 The Secretariat presented WP-02 on GBAS-SBAS Information Sharing Platform created on the APAC website for benefit of all the States. This page contains all those reference documents required for implementation of GBAS-SBAS listed there with applicable links. The information is available on the following link: [Applicable and Reference Documents - All Documents \(icao.int\)](#). This will help the States in the implementation of GBAS-SBAS. The States were encouraged to go through the contents and suggest for any amendment in the contents, as well as updating the information about Focal points and GBAS-SBAS implementation status in their respective States at least every six month.

### **Agenda Item 3: Updates from the States about GBAS/SBAS Implementation**

#### **WP-02- Cross Border Application of SBAS to Support Terminal Approach Procedures (USA)**

The US presented a historical context of the U.S. SBAS, Wide Area Augmentation System (WAAS), and its expansion of service volume to cover the remainder of North America. The US delivers neighboring CAAs a low cost SBAS option to support cross border implementation of SBAS and associated RNP, LPV, and LP instrument procedures. The US publishes system performance and design data on its public website

allowing aviation regulators and users opportunity to understand system design and limitations to conduct risk assessments. The US recommended Asia/Pacific States to consider similar arrangements for current or planned SBAS serving the region and offered its expertise and lessons learned to interested States.

On a query from ICAO, USA informed that they had MOU with the neighboring States on WAAS service. In response to query from Pakistan, Co-Chair and ICAO clarified that Ionospheric disturbance depended on latitude of the place. Pakistan also enquired about categories higher than LPV-200. USA informed that CAT I was adequate for those airports, where there was no such procedure before. ICAO supplemented that as per standard, WAAS (SBAS) could provide only up to CAT I service.

### **WP-03- Aircservices GBAS Certification Journey (Australia)**

Australia presented about the journey for implementation of GBAS in Australia with detailed steps involved in each stage of implementation. Secretariat enquired about the extent of utilization of GLS procedures as against the ILS and any plan to replace some of the ILSs with GLS. Australia informed that around 35% in Melbourne and 28% in Sydney of all landings were GLS capable.

Upon a query from India, Australia clarified that they did not use ionosphere field monitors to mitigate iono impact due to its location in mid latitude. Australia further informed that GBAS in Australia was operational on 24x7 basis as they did not face much ionospheric disturbances.

Hong Kong China enquired about criterion applied in order to determine the operation testing being sufficient and satisfactory and the duration taken for that operation testing. Australia informed that they initially use the number of completed GLS precision approach landing as the criteria. However, the operation testing continued after this criteria was fulfilled and the operation testing actually ended up going for about a year whilst they worked on updating their safety case to reflect a CAT I operation.

In response to India's query, Australia informed the meeting that they used Block 2 software at both Sydney and Melbourne airports. Australia also informed that they used the flight inspection aircraft to validate the GBAS coverage.

### **WP-04- MSAS Status and Future Plan (Japan)**

Japan presented that the use of MSAS v2 (one GEO), LPV-250 approach would be introduced in step-by-step manner from 2021. After 2023, the use of MSAS v3 (three GEOs), MSAS LPV-200 had been scheduled to commence for operation at all airports designed for IFR approach, excluding 2 military control airports.

India enquired whether the MSAS performance analysis shown in the presentation was taken under calm ionosphere or disturbed Iono conditions. Japan responded that the data was taken under calm ionosphere condition in Aug 2021. However, in the early phase of MSAS implementation, some studies were conducted for disturbed iono conditions.

In response to a query from India, Japan clarified that they surveyed RF interference and RF level in the airport before implementation of the LPV procedures. On a query from Hong Kong China whether there was any plan to extend the MSAS services to neighboring states, Japan informed that they intended to extend the service to other States. However, it would require software upgrade.

### **IP-01- GAGAN Coverage Extension to Neighboring States (India)**

India presented the current status of Indian SBAS - GAGAN (GPS Aided GEO Augmented Navigation) and its expansion plan in the Asia-Pacific region. The meeting recognized the benefits accruable through Satellite-based Augmentation System (SBAS) implementation and India's efforts towards implementation of SBAS based PBN operations, as well as the actions taken by India to extend the GAGAN services beyond Indian Flight Information Regions (FIR).

Secretariat enquired whether mandate about SBAS equipage was just to have the SBAS receiver or to have the LPV capability. India informed that the intent was to have LPV capability. In response to a query from Pakistan about the procedure, time and cost to join GAGAN, India informed that upon receipt of expression of interest, it could be worked out.

### **IP-02- GBAS Status (Japan)**

JCAB decided CAT I GBAS implementation at Tokyo international airport (Haneda:HND) and Haneda GBAS ground system was installed by 2019. Haneda GLS flight procedures had been published through AIP SUP for operational trial since July 2020.

On query from ICAO, Japan informed that Haneda GBAS trial was open to all airlines, and flight procedures was published in AIP Supplement. In response to a query from Pakistan, Japan clarified that, for GLS approach, necessary information was provided through VHF Data Broadcast (VDB) installed as a part of a GBAS system.

### **IP-03- Certification Overview (Japan)**

Japan presented about the certification framework for SBAS and GBAS implementation.

### **IP-04- Concept of Operations for GNSS Event Reporting (Singapore)**

This paper highlighted potential vulnerabilities to Global Navigation Satellite System (GNSS) disruptions, mitigations, and a resultant Concept of Operations (CONOPS) for the successful mitigation of a GNSS Outage in a State. It makes recommendations on the GNSS Outage Responses and Reporting, based on Air Traffic Control (ATC) and airline operators' feedback. This paper focuses on detection of the GNSS outage events and a proposed response paradigm that addresses the need for the dissemination of critical information. Key objectives of this CONOPS paper are to describe:

- a) How to identify and declare GNSS events.
- b) What information should be collected?
- c) How to disseminate information and to whom it should be communicated.

On a query from Pakistan about records of GNSS events, Singapore informed the meeting that they did have some records even though these events were rare. USA enquired about number of times for multiple aircraft reported outages, Singapore advised that they did not have the data.

#### **IP-05- GBAS Proof-of-Concept Project (Thailand)**

Thailand presented an overview of the GBAS Proof-of-Concept (PoC) Project between Japan and Thailand focusing on the installation of a GBAS PoC equipment at Suvarnabhumi International Airport in Bangkok, Thailand. The main objective of this collaboration project is to install GBAS PoC equipment at Suvarnabhumi International Airport and conduct an experiment for the deployment of GBAS at low geomagnetic latitude area, of which the performance is affected by the ionospheric irregularities. In response to a query from ICAO, Thailand informed that the project was slightly delayed due to COVID-19 restrictions.

#### **IP-06- Korean SBAS Implementation Status (Republic of Korea)**

The Republic of Korea is developing Korean SBAS called KASS (Korea Augmentation Satellite System). This paper presented the SBAS implementation status in the Republic of Korea. The KASS System Qualification Review (SQR) is planned by the second half of 2023. Thereafter, the certification process will be completed by the end of 2023 for the provision of the Safety of Life (SoL) service across the designated coverage. In response to ICAO's enquiry about the target service volume of KASS, ROK informed that it was for Incheon FIR.

#### **Agenda Item 4: Technical Updates related to GBAS/SBAS**

##### **WP-05- Proposed Amendment to Annex 10 - DFMC, BDS & Galileo (Secretariat)**

The Secretariat presented a summary of Amendment to Annex 10 - Vol-I to include DFMC GNSS & SBASs, Galileo & BDS Standards to be applicable from 2 Nov 2023. This is an important amendment as SARPs for new frequencies (DFMC) being introduced for existing constellation and SBASs and introduction of SARPs for new Constellations, such as BeiDou (BDS) from China and European Union's Galileo. This will help the States to plan their implementation of GBAS-SBAS. This amendment will also allow some flexibility in location of GBAS system on an Airport so as to provide GLS procedures on all the runways.

Pakistan enquired about the regulatory aspect of the amendment in terms of avionics compatibility and certification. ICAO clarified that, based on the amendment, States should amend their national regulations. Co-Chair supplemented that industry would come up with necessary changes in the avionics.

##### **WP-06- Review of Guidance Documents Related to Ionospheric Anomalies (Co-Chairs)**

The Co-Chairs of the task force presented this paper regarding the review of the GBAS safety assessment guidance documents related to anomalous ionospheric conditions and identified items to be updated. The States were requested to nominate members to constitute an expert group to update this document.

On a query from Pakistan about the domain expert for the group, ICAO and Co-chairs clarified that the expert should have technical background and familiar with SMS.

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#### **WP-07- VDB Frequency Assignment and Coordination (Hong Kong China)**

Hong Kong, China presented a paper to share their strategy and experience in VDB frequency assignment for GBAS as VDB frequency would use the same radio frequency band as other types of ground-based navigational systems, such as VHF Omni-directional Range (VOR) and Instrument Landing System (ILS), but with large (around 1MHz) channel space required from existing DVOR/ILS frequencies already in use. Hong Kong China drew States' attention to the need for the coordination with other State/Administration for the use of navigational facilities frequency, through collaboration with ICAO Spectrum Review Working Group (SRWG) and assistance from ICAO APAC Office, in the implementation of GBAS.

#### **Flimsy01- Sharing on Safety and Risk Assessment Process in GBAS Trial of HKIA (Hong Kong China)**

Hong Kong, China presented about safety and risk Assessment process, covering both engineering and operation aspect, applied for GBAS Trial at HKIA. In response to Pakistan's enquiry about the post implementation procedures of safety assessment, Hong Kong China informed that post-implementation review would be conducted for assessing the performance of the system and identifying any further improvement needed in a certain period after the implementation. However, this trial would help in future GBAS deployment because it was treated as a technical assessment for GBAS serving as proof of concept.

**Action 3/1-** To review and revise the GBAS and SBAS safety assessment guidance document related to anomalous ionospheric conditions available on APAC website in view of GAST-D to support Cat II/III and DFMC SBAS. A draft document is targeted for ready by the forth GBAS/SBAS ITF meeting. Two co-chairs will lead the task force expert group and States are urged to nominate experts to the group by 31 Oct 2021.

**Agenda Item 5: Guidance Reference on Implementation Process for GBAS/SBAS**

**WP-08- Framework of Guidance Reference on Implementation Process for GBAS/SBAS (Co-Chairs)**

A guidance reference for implementation of GBAS/SBAS developed by the Co-Chairs was presented. The paper presented a high level framework of guidance reference document on implementation process for GBAS/SBAS. The framework will be taken as a reference for the task force expert group to draft the guidance document for the Region. The task force was requested to

- a) Review the materials presented in the WP;
- b) Establish an expert group to prepare the draft of guidance document;
- c) Set up a timeline for the preparation work; and
- d) Urge States/Administrations to nominate subject matter expert(s) for the expert group.

India expressed the opinion that, for nomination of expert, ICAO should issue a State letter, which was agreed after discussion.

<b>Decision GBAS/SBAS ITF/3-2: Guidance Document on Implementation Process for GBAS/SBAS</b>	
<b>What:</b> That, GBAS/SBAS ITF will draft a guidance reference document for implementation of GBAS/SBAS in the Asia/Pacific Region.	<b>Expected impact:</b> <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Ops/Technical
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**Action 3/2-** To draft a guidance reference for implementation of GBAS/SBAS in the region. A draft document was planned for ready by the fourth GBAS/SBAS ITF meeting. Two Co-chairs would lead the group and States were urged to nominate experts to the task force expert group by 31 Oct 2021.

## **Agenda Item 6: GBAS/SBAS Flight Procedure Design Overview**

### **WP-09- GBAS-SBAS Procedure Design Overview (Secretariat)**

The Secretariat presented about GBAS/SBAS Flight Procedure Design Overview to describe the differences of these procedures vis-a-vis conventional procedures. It was emphasized that FAS DB was one of the main difference of GBAS-SBAS procedures as compared to conventional procedures. It was further clarified that FAS DB for SBAS and GBAS procedures were slightly different and States should be careful in using the tools to generate FAS DBs.

India enquired whether SBAS based procedure could be called precision approach. ICAO clarified that SBAS could provide APV-1 and CAT I precision approaches.

New Zealand asked whether it was possible that CAT I would achieve a better minima than APV I but still be above 250ft. ICAO answered that it might be possible as Minima (DH) depends on the terrain and obstacle environment.

### **Agenda Item 7: Review of the Action list**

The Action List of the task force was discussed, with description, relevance and priority being assessed by the meeting. Some of the action items have been closed as those actions have been completed and for others new target dates have been assigned. The amended Action list is attached as **Appendix C**.

### **Agenda Item 8: Any Other Business**

Secretariat introduced the two webinars that they would conduct this year:

- 27-28 October 2021 :Safety Culture Workshop
- 24 November 2021: CDO/CCO Implementation

The online link is: [APAC Webinars - Workshops and Seminars \(icao.int\)](https://www.icao.int/APAC-Webinars-Workshops-and-Seminars)

The Co-chairs proposed to conduct the 4<sup>th</sup> task force meeting in due course. The States were requested to send the nomination to expert group, by end Oct 2021, to review Ionospheric model and to develop Guidance material for GBAS-SBAS Implementation in the region.

Mr. Raphael GUILLET thanked all participants for their fruitful contributions and closed the meeting.



*International Civil Aviation Organization*

**The Third Meeting of the Asia/Pacific GBAS/SBAS Implementation Task Force (APAC GBAS/SBAS ITF/3)**

(Video Conference, 27 – 28 September 2021)

**List of Participants**

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## **List of Papers**

### **Information Papers**

- IP-01- GAGAN Coverage Extension to Neighboring States (India)
- IP-02- GBAS Status (Japan)
- IP-03- Certification Overview (Japan)
- IP-04- Concept of Operations for GNSS Event Reporting (Singapore)
- IP-05- GBAS Proof-of-Concept Project (Thailand)
- IP-06- Korean SBAS Implementation Status (Republic of Korea)

### **Working Papers**

- WP-01- GBAS-SBAS Information Sharing Platform (Secretariat)
- WP-02- Cross Border Application of SBAS to Support Terminal Approach Procedures (USA)
- WP-03- Airservices GBAS Certification Journey (Australia)
- WP-04- MSAS Status and Future Plan (Japan)
- WP-05- Proposed Amendment to Annex 10 - DFMC, BDS & Galileo (Secretariat)
- WP-06- Review of Guidance Documents Related to Ionospheric Anomalies (Co-Chairs)
- WP-07- VDB Frequency Assignment and Coordination (Hong Kong China)
- WP-08- Framework of Guidance Reference on Implementation Process for GBAS/SBAS (Co-Chairs)
- WP-09- GBAS-SBAS Procedure Design Overview (Secretariat)

### **Flimsy**

- Flimsy01- Sharing on Safety and Risk Assessment Process in GBAS Trial of HKIA (Hong Kong China)

**ACTION PLAN**

GBAS SBAS Implementation TF

Last Updated: 28/9/2021

NU	ACTION ITEM	PRIORITY	OWNER	DUE	STATUS	NOTES ( ICAO Document ref)	To do
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 2021		ICAO and IATA as main organizers, with the host State. First choice would be to have a <b>face-to-face workshop</b> , 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	To be discussed at the 3rd TF meeting	Before ITF/4 Meeting	Australia is supporting	Develop a survey plan, then circulate to States- Secretariat in onsultation with Co- Chairs - Before 4th Meeting
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, <b>may be</b> 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 : <a href="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/</a> <a href="https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/navservices/gnss/library/factsheets/media/RNAV_QFacts_final_06122012.pdf">https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/navservices/gnss/library/factsheets/media/RNAV_QFacts_final_06122012.pdf</a> From ICAO EUR/NAT <a href="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">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</a>	Already available on Information Sharing Platform, TF members are encouraged to see and suggest for any changes
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. ( <a href="https://ext.eurocontrol.int/analytics/saw.dll?Dashboard">https://ext.eurocontrol.int/analytics/saw.dll?Dashboard</a> ) <b>The IGWG information is available at the EUROCONTROL's One Sky Team website (registration required).</b>	Can be accessed through One Sky Team website and Airbus and Boeings presentation in ICAO APAC GBAS-SBAS workshop contents.

NU	ACTION ITEM	PRIORITY	OWNER	DUE	STATUS	NOTES ( ICAO Document ref)	To do
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: <a href="https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/navservices/gnss/approaches/media/LPVs.xlsx">https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/navservices/gnss/approaches/media/LPVs.xlsx</a> EGNOS LPV <a href="https://egnos-user-support.essp-sas.eu/new_egnos_ops/resources-tools/lpv-procedures-map">https://egnos-user-support.essp-sas.eu/new_egnos_ops/resources-tools/lpv-procedures-map</a> Europe through Eurocontrol access <a href="https://www.eurocontrol.int/platform/performance-based-navigation-map-tool">https://www.eurocontrol.int/platform/performance-based-navigation-map-tool</a>	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	Next meeting			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	Japan / Ad hoc group under GBAS SBAS ITF ICAO to send an email to get volunteers with Mr Susumu as coordinator	Next meeting		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 assignement and coordination in APAC	HIGH	Hong Kong China to coordinate with other States and ICAO	Next meeting		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.	Outcome of NSP to be reported to the next meeting.
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		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	Completed
3.6	GBAS and SBAS safety assessment	HIGH	States to share their experience	Next meetings			States to respond
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

NU	ACTION ITEM	PRIORITY	OWNER	DUE	STATUS	NOTES ( ICAO Document ref)	To do
3.9	GBAS siting criteria	MEDIUM			Closed	EUROCAE ED114B and FAA Order 6884.1 ( <a href="http://www.faa.gov/documentLibrary/media/Order/6884_1.pdf">http://www.faa.gov/documentLibrary/media/Order/6884_1.pdf</a> )	Already available on Information Sharing Platform
3.10-	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	Co-chairs	WP/ Skeleton to be presented at the next meeting		What is already available from ICAO or from other regions ? Ref AIDC and ADSB High Level Guide	Skelton presented , needs to developed with constitution of an expert group, States to nominate members and Co-chairs to work on it.
4.3	Technical support for system certification and operation certification	TBD				To be decided after meeting with regulators Linked with 1.2 and 3.6 above.	
4.4	Complement the "PBN in a page"	LOW	ICAO to assess what could be done		Closed	<a href="https://www.icao.int/APAC/Documents/edocs/PBN-in-a-page%20V2.pdf">https://www.icao.int/APAC/Documents/edocs/PBN-in-a-page%20V2.pdf</a> 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				
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				
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)