



# **International Committee on GNSS (ICG): Recent developments**

**Sharafat Gadimova**  
**ICG Executive Secretariat**  
**United Nations Office for Outer Space  
Affairs**





**CONVENER**



**GATEWAY**



**CAPACITY  
BUILDER**

**Facilitate global cooperation  
among UN Member States**



**To develop new space policy  
through COPUOS - the  
Committee on the Peaceful  
Uses of Outer Space**

**The sole UN agency  
dedicated entirely to Space**



**A gateway between  
technology & Member  
States to support their  
needs & the SDGs**

**Access to space-data  
& information & training**



**Empowering States to use  
space solutions to address  
national priorities**



# Key themes impacting our work





- ❑ 2025: ICG represents a unique combination of GNSS service providers and major user groups that seek to encourage **interoperability and compatibility** among the various satellite systems
- ❑ 2007: PF provides ways and means of promoting communication among system providers on key technical issues and operational concepts such as the **GNSS spectrum protection, orbital debris**
  - Consensus reached on **Principle of Transparency** - every GNSS provider should publish documentation that describes the signal and system information, the policies of provision and the minimum levels of performance offered for its open services
- ❑ 2008: Scientific and Technical Subcommittee of UNCOPUOS (UN GA Res. 62/217) started consideration of an agenda item "Recent developments in GNSS"
- ❑ ICG is an **important vehicle** in the multi-lateral arena, as satellite-based PNT becomes more and more a **genuine multinational cooperative venture** (*15 Members and 22 Int'l Org*)
  - United Nations Global Geodetic Centre of Excellence (Observer, 2025)

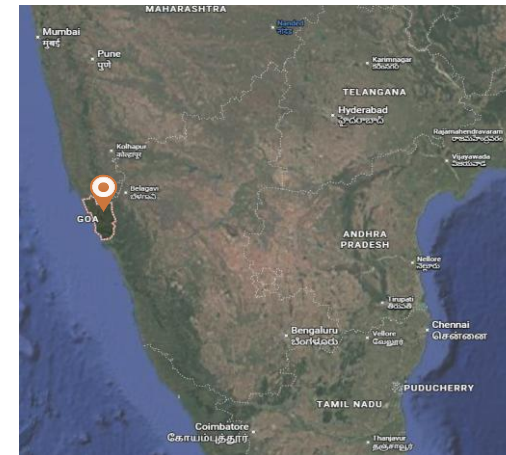


ICG is holding annual meetings to review and discuss developments on GNSS, including GNSS science and innovative technology applications and future commercial applications



- 19th meeting of ICG, 19 - 24 October 2025, Busan, Republic of Korea

- 20th meeting of ICG, 25 - 30 October 2026, Goa, India



**ICG Information Portal:** <https://www.unoosa.org/oosa/en/ourwork/icg/icg.html>



- ❑ **Systems, Signals and Services** (*United States & Russian Federation*): Compatibility and spectrum protection; interoperability and service standards; system-of-system operations
- ❑ **Enhancement of GNSS Performance, New Services and Capabilities** (*India, China & ESA*): Future & novel integrity solutions; *implementation of interoperable GNSS Space Service Volume (SSV)* examination of performance of atmospheric models, *establish dialogue with space weather/RS communities and its evolution*
- ❑ **Information Dissemination and Capacity Building** (*UNOOSA*): Focused on education and training programmes, promoting GNSS for scientific exploration
- ❑ **Reference Frames, Timing and Applications** (*IAG, IGS & FIG*): Focused on monitoring and reference station networks
- ❑ **Lunar Positioning, Navigation and Timing (PNT)** (*China, Japan, United States and ESA*): provide guidance to providers and users to ensure that the lunar PNT systems are available, compatible, and interoperable for peaceful purposes for all. The work is to be coordinated with BIPM, IAG, IAU, IOAG, ISECG, SFCG, ATLAC



- ❑ **GNSS Monitoring:** ICG encourages member states to consider use of national and/or global interference monitoring to timely inform users where interference may cause GNSS/RNSS to be unavailable (jammed) or errant (spoofed)
  
- ❑ **LEO PNT Performance Standards Guidelines:** Engage with LEO PNT providers to maintain the standards for compatibility and spectrum protection that exist among GNSS and augmentations
  
- ❑ **LEO-PNT Compatibility and Interoperability Task Force** (*China, ESA/EC and United States*):
  - *Prepare technical presentations on topics related to LEO-PNT compatibility and Interoperability, to be coordinated with the “Compatibility and Spectrum” and “Interoperability and Service Standards” Subgroups as well as WGD*
  - *Organize annual LEO PNT Workshops to be held during the intersession time (June 2026, Vienna)*
  - *Complete the effort to develop a document within the WGS (“LEO-PNT Systems Compatibility and Interoperability Document”), including, engaging in exchanges with other ICG WGs as needed (WGD on time and reference frames)*



## □ Workshop on ionospheric monitoring and warning and international collaboration for GNSS

- *Monitoring of the GNSS performance is a fundamental activity within the ICG. Given that the ionosphere exerts global impact, collaborative efforts among countries would help to monitor the global ionospheric impacts and potentially provide alerts*
- *ICG will complement activities performed by other organizations*

ICG/REC/2025

### Recommendation for Committee Decision

**Prepared by:** Working Group B

**Date of Submission:** 22 October 2025

**Issue Title:** The workshop on ionospheric monitoring and warning and international collaboration for global navigation satellite systems (GNSS)

#### Background/Brief Description of the Issue:

The ionosphere is one of the key factors affecting the performance of all navigation satellite systems. Currently, the 25<sup>th</sup> solar activity cycle is ongoing. During this period, the occurrence and intensity of ionospheric anomalies such as scintillation, disturbances, and storms will increase significantly. The influence of the ionosphere is similar for all navigation satellite systems and ionospheric anomalies can have a significant global impact. Aligned with the recommendation Working Group B in 2024 from the eighteenth meeting of ICG, the ICG Multilateral Ionospheric Workshop on "Ionospheric Impacts on GNSS and International Collaboration to Meet Current and Future Solar Activity Period Challenges" was held on 25 – 26 June 2025. The workshop identified many areas of potential work.

#### Discussion/Analyses:

Monitoring of the GNSS performance is a fundamental activity within the ICG. Given that the ionosphere exerts global impacts on different countries, collaborative efforts among worldwide countries would be helpful to monitor the global ionospheric impacts and potentially provide alerts. Currently, other organizations (for example the International Civil Aviation Organization (ICAO)) are also working on the ionospheric monitoring and warning. ICG should precisely identify which contribution could be done, in complement to activities performed by other organizations.

To meet this goal, it is necessary to hold a dedicated workshop involving ICG members and representatives from other international organizations. The workshop will discuss what could be the most appropriate format to organize the work and the required actions under the ICG Working Group B.

#### Recommendation of Committee Action:

*ICG encourages ICG members and international organizations to work together by conducting a workshop of ionospheric monitoring and warning for GNSS aimed at identifying which contribution could be done by ICG.*

*The ICG Working Group B will identify the most appropriate format to organize the activities contributing to the collaborative effort.*

Members Consensus Reached \_\_\_\_\_ ; No Consensus Reached \_\_\_\_\_

Chairperson Signature: \_\_\_\_\_ Date: \_\_\_\_\_



- ❑ Cooperation ICG & The University of Tokyo, Japan: *To focus on GNSS data types, GNSS errors, coordinate systems and applications, and low-cost receiver system data*
- ❑ Cooperation ICG, ICTP, Italy and Boston College, US: *To enhance capacity building on GNSS for Space Weather monitoring*
- ❑ Cooperation ICG, FIG, IAG and IGS: *To focus on reference frames in general with a specific focus on UN initiatives, global and regional frames as well selected national case studies*
- ❑ Low-cost GNSS receiver system for space weather: *To focus on low-cost GNSS receiver systems for high-accuracy PNT and associated applications*
  - A directory of education opportunities in GNSS technology and its applications is to be added to the ICG information portal to include information on educational programmes, fellowship opportunities and opportunities for international cooperation, as well as reference to educational material



- ❑ **Publication of a Statement on the Critical Role of the Global Geodesy Supply Chain:** The proposed Statement provides a unifying narrative and authoritative reference for MS, international organizations, and private-sector stakeholders to align policy, funding, and technical initiatives aimed at reinforcing the resilience of the GGSC.
- ❑ **Continuous GNSS Time Transfer across Day Boundaries using IGS Products:**
  - *The IGS considers to encourage its Analysis Centers to implement and distribute daily clock products that maintain temporal continuity across day boundaries, avoiding discontinuities in the clock and phase bias solutions, or provide the necessary information to recover such continuity*
  - *ICG members who operate an IGS Analysis Center to also consider adopting a similar strategy for their precise products*
- ❑ **Information on the work related to the proposed redefinition of UTC (revised of Recommendation 16-B, 2016)**
  - *ICG monitors the ongoing development of the proposed redefinition of UTC*
  - *GNSS/RNSS providers anticipate the consequences of the increased tolerance between UT1 and UTC*
  - *GNSS RNSS providers promote research on the impact of a possible negative leap second*



- ❑ **Coordinated Development of Lunar PNT Systems:** Providers of Lunar PNT services coordinate via the ICG
  - *to ensure compatibility with each other and with other radio-based systems, including GNSS*
  - *to maximize interoperability for the benefit of users; and*
  - *to offer a sufficient level of transparency necessary for effective coordination*
  
- ❑ **Organization of Annual Multilateral Cislunar PNT Workshop:** The ICG work with appropriate international organizations to organize a multilateral cislunar PNT workshop on an annual basis to foster open and timely dissemination of information related to cislunar PNT services (February 2026, Vienna)
  - *Compatibility and interoperability among GNSS, lunar PNT systems, and related lunar surface assets are the focal point of the workshop, including the discussion on the lunar spectrum, lunar reference frames, and lunar time systems*



- ❑ to scale up the capacities in the regions for pursuing the application of GNSS solutions
- ❑ to provide updated knowledge of how GNSS operate and their applications
- ❑ to describe the science of SW, and
- ❑ how to perform ionospheric and SW research with GNSS data

- *Workshop on Machine Learning applied to SW and GNSS, 16 - 20 February, San Jose*
- *United Nations/Republic of Korea Workshop on ISWI: AI-Enabled Space Weather Forecasting for Global Cooperation and Capacity Building, 7 - 11 September, Seoul*
- *United Nations/Vietnam Workshop on the applications of GNSS, 7 - 11 December, Hanoi*

Workshops: <https://www.unoosa.org/oosa/en/ourwork/psa/gnss/workshops.html>