

International Committee on Global Navigation Satellite Systems

Programme on GNSS Applications

International Committee on GNSS (ICG)

- Promote voluntary cooperation on matters of mutual interest related to civil satellite-based positioning, navigation, timing, and value added services
- Contribute to the sustainable development of the world
- Encourage coordination among GNSS Providers to ensure greater **compatibility, interoperability, and transparency**
- Promote the introduction and utilization of GNSS services in developing countries, by assisting with the integration into their infrastructure
- Assist GNSS users with their development plans and applications, by encouraging coordination and serving as a focal point for international information exchange

Background

- Emerged from the recommendations of UNISPACE III, 1999, Vienna
- The assumption was that current and future system operators would soon move from a competitive to a collaborative mode where there is a shared interest in the universal use of GNSS services regardless of the system
- **2005: Establishment of the ICG** (*noted by UNGA 61/111 of 14 December 2006*)
 - Promote the use of GNSS and its integration into infrastructure, particularly in developing countries;
 - Encourage **compatibility and interoperability** among global and regional systems
- Main challenge is to provide assistance and information for those countries seeking to integrate GNSS into their basic infrastructure, including at governmental, scientific and commercial levels

Membership

- *Members:* Current and future core, regional or augmentation systems providers: China (BeiDou), EU (Galileo/EGNOS), Russia (GLONASS/SDCM), United States (GPS/WAAS), India (IRNSS/GAGAN), Japan (QZSS/MSAS), Nigeria (NIGCOMSAT)
- State Members of the United Nations with an active programme in implementing or promoting a wide range of GNSS services and applications: Italy, Malaysia, United Arab Emirates, *Australia (satellite based augmentation system)*
- *Associate Members and Observers:* 21 organizations, FIG and IAG – founding members

Annual meetings

UNOOSA (2006), India (2007), ... **China (2018)**

ICG-14 meeting, Bengaluru, INDIA, 8 – 13 December 2019

Vienna (2020), UAE (2021)

- **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) and its evolution; *examination of performance of atmospheric models, establish dialogue with space weather/RS community*
- **Information Dissemination and Capacity Building (*UNOOSA*):** Focused on education and training programmes, *promoting GNSS for scientific exploration (incl., space weather and its effects on GNSS)*
- **Reference Frames, Timing and Applications (*IAG, IGS & FIG*):** Focused on monitoring and reference station networks

Providers' Forum

- 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, and orbit de-confliction
- Scientific and Technical Subcommittee of UNCOPUOS (UN GA Res. 62/217 of 1 February 2008) started consideration of an agenda item “Recent developments in GNSS”
- **Providers' Forum: 22nd Meeting, 10 June 2019, Vienna, Austria:** *Open Service Information Dissemination, Open Service Performance, Spectrum Protection*

Working Group Systems, Signals and Services

▪ **The subgroup on compatibility and spectrum protection:**

- continued its campaign to promote adequate protection of GNSS spectrum through education and outreach;
- continued to investigate methods of implementing interference detection and mitigation capabilities through permanent network-based solutions and through crowdsourcing techniques;
- progress in encouraging national regulators to use relevant ITU protection criteria for GNSS was assessed, and the compatibility of search and rescue downlink broadcasts by GNSS in the L band was added to the scope of the subgroup's work, as cooperation with the International Satellite System for Search and Rescue (Cospas-Sarsat) programme was envisaged, and taking into account the role of ITU and national administrations.

Working Group Systems, Signals and Services

- **The subgroup on interoperability and service standards:**
 - focused on open service performance standards and international GNSS monitoring and assessment. A dedicated team of experts completed a document defining guidelines for developing open service performance standards, completing work that has been under way since 2012
- The international GNSS monitoring and assessment (IGMA) Task Force
 - *focused on the joint trial project activity with IGS to demonstrate a global GNSS Monitoring and Assessment capability for a limited set of GNSS parameters*
- System-of-systems operations discussed, with briefings on orbital debris mitigation for GNSS constellations and agreed to continue these discussions, working with experts from each GNSS provider. All Working Group activities will be addressed at one or more intersessional meetings

Working Group Enhancement of GNSS Performance, New Services and Capabilities

- All providers have agreed on the information presented in this booklet, and on several recommendations to continue development, support, and expansion of the multi-GNSS SSV concept.
- This publication, and the work of WGB, show the significant value of GNSS SSV for a much wider scope of future space exploration activities for countries all over the world.
- GNSS SSV and its potential augmentations can enable ambitious future missions and activities in the context of space exploration going beyond low-Earth orbit to the Moon, Mars and other celestial bodies.



http://www.unoosa.org/res/oosadoc/data/documents/2018/stspace/stspace75_0_html/st_space_75E.pdf

Working Group Enhancement of GNSS Performance, New Services and Capabilities

■ Space Weather

- encourages the open exchange of space weather data;
- agrees that dedicated mechanisms should be investigated to share space weather data among the international community, and
- additionally to disseminate it to potential users in all regimes (*Next Generation Broadcasting Service being one potential mechanism*)

Working Group Reference Frames, Timing and Applications

- Specific progress in the following areas:
 - the refinement of the alignment of GNSS reference frames to the International Terrestrial Reference Frame (ITRF); and
 - information on GNSS timing references and the inter-comparison of GNSS time offsets.
 - the templates on geodetic and timing references will be updated by the GNSS providers to reflect the changes.



Programme on GNSS applications

- Disseminating information through the information centres hosted by the regional centres for space science and technology education, affiliated to the United Nations;
- Promoting the use of GNSS as tools for scientific applications; and
- Building the capacity of developing countries in using GNSS technology for sustainable development

Information Centres

United Nations-affiliated Regional Centres for Space Science and Technology Education

Africa: Morocco and Nigeria

Latin America and the Caribbean: Brazil/Mexico

Asia and the Pacific: India and China

Western Asia: Jordan

- **The Technical Level:** explore the benefits of GNSS technologies for regions and to spread their applications; exchange information and knowledge
- **The Cooperative level:** facilitate collaboration with the GNSS providers (seminars/trainings and educational material), as well as communication and outreach to the wider community through the ICG information portal

Promoting the use of GNSS technologies as tools for scientific applications

- **Reference frames and timing (WGD)** – To benefit operational geodesists or surveyors involved in positioning and measurement and potentially dealing with sea level changes. It is open to government, private sector, academic or graduate students in surveying or a related discipline (IAG, FIG, IGS)
 - **Technical Seminars on Reference Frames in Practice, FIG Working Week 2019, 20 – 21 April, Hanoi, Vietnam**
- **AfricaArray** is an educational initiative to support postgraduate studies and promote research into the structural detail of the Earth's crust and mantle. It has produced a number of master's and doctorate degrees in seismology, and one of its goals is to expand seismic networks in Africa

Promoting the use of GNSS technologies as tools for scientific applications

- **Training Course on GNSS (WGC)** – To create awareness on GNSS and its applications in Asia and the Pacific region (Asian Institute of Technology and the Centre for Spatial Information Science of the University of Tokyo)
 - General overview of signal processing in receiver, receiver performances, field survey using low-cost receiver for high-accuracy positioning: [Training on GNSS, January 2020, Bangkok, Thailand](#)
- **Space Weather and GNSS (WGC)** – Promotes the use of GNSS for scientific applications and space weather in developing countries (International Centre for Theoretical Physics (ICTP), Boston Colleague)
 - Increased number of students and young scientists studying and using GNSS, including increasing participation by women, and many opportunities for research (improved imaging of the ionosphere over the equatorial region, ionospheric effects on augmentation systems...)

[Workshop on Ionospheric Forecasting for GNSS Operations in Developing Countries: Findings and Challenges, 27 -31 May 2019, Trieste, Italy \(ICTP, Boston College\)](#)

Regional Workshops

United Nations Regional Workshops/training courses on the use and applications of GNSS

- Building the capacity of developing countries in using GNSS technology for sustainable development: [Workshop on GNSS applications, 24 – 28 June 2019, Suva, Fiji](#)
- **WGS:** Seminar on GNSS Spectrum Protection and Interference Detection and Mitigation: The purpose of the seminar is to educate participants on the importance of GNSS spectrum protection at the national level and explain how to reap the benefits of GNSS
- **A joint meeting with WG B, S and D** to discuss “*Interoperability of GNSS precise point positioning services*”

United Nations/Italy Long-term Fellowship Programme, Politecnico di Torino, Turin

- The Master in Navigation and Related Applications (MNA) Programme provides extensive background knowledge in navigation/localization systems as well as a detailed analysis on NAV/COM integration and environmental monitoring applications

Information Portal



The screenshot shows the United Nations Office for Outer Space Affairs (UNOOSA) website. The main navigation bar includes links for 'About Us', 'Our Work', 'Benefits of Space', 'Information for...', 'Events', 'Space Object Register', 'Documents', and 'COPUOS 2015'. The 'Our Work' menu is expanded to show the 'International Committee on Global Navigation Satellite Systems (ICG)'. The page content includes the ICG logo and text describing its mission and vision. A sidebar on the right lists various resources under 'Our Work', including 'Secretariat of COPUOS', 'Programme on Space Applications', 'UN-SPIDER', and 'ICG' resources like 'Members', 'Providers' Forum', 'Working Groups', 'ICG Annual Meetings', 'ICG Programme on GNSS Applications', 'Resources', 'ICG Documents', 'Space Weather & GNSS', 'Other Events', and 'ICG Timeline'. Other sidebar links include 'UN-Space', 'Space Law', 'Topics', and 'Photo Gallery'.

WWW.UNOOSA.ORG

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Publications

