International Committee on Global Navigation Satellite Systems (ICG) and its activities

59th Meeting of the Civil GPS Service Interface Committee (CGSIC)
Miami, Florida, United States, 16 – 17 September 2019

Sharafat Gadimova
United Nations Office for Outer Space Affairs

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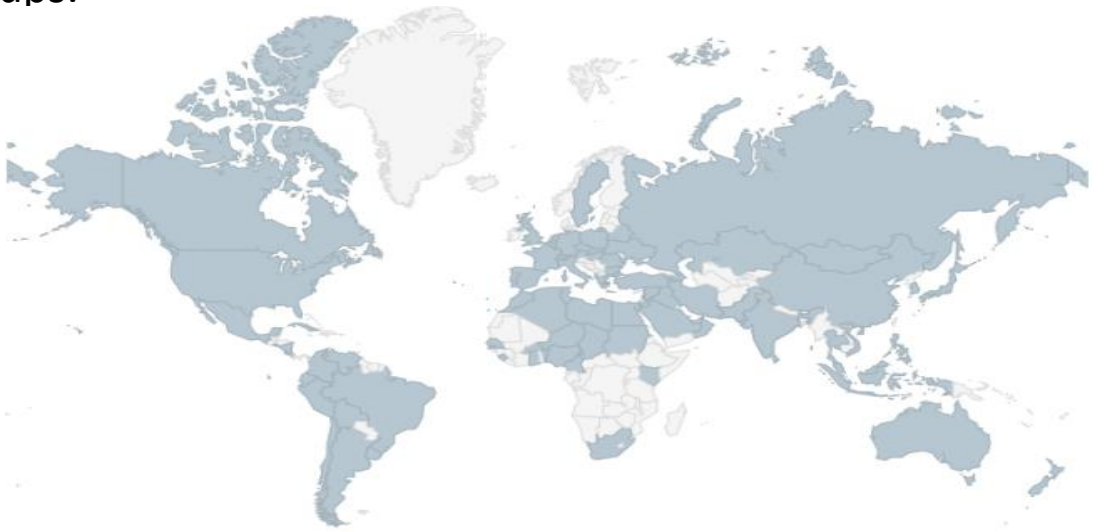
CAPACITY-BUILDER: UNOOSA brings the benefits of space to humankind by building space capacity of non-space-faring countries

GLOBAL FACILITATOR: UNOOSA plays a leading and facilitating role in the promotion of the peaceful uses of outer space

GATEWAY TO SPACE: UNOOSA is the main UN office on space matters and facilitates the coordination of UN activities using space-related technology to improve the human condition globally.

Committee on the Peaceful Uses of Outer Space

UNOOSA supports **the Committee on the Peaceful Uses of Outer Space (COPUOS**), its Scientific and Technical Subcommittee, Legal Subcommittee, and related working groups.



COPUOS was established by the General Assembly in 1959 with 24 members. Since then, the Committee's membership has continued to expand (currently 92 members), though the Office serves all 193 Member States of the UN.

STSC and LSC

The **Legal Subcommittee (LSC)** discuss **legal matters** related to the exploration and use of outer space. Topics include the status and application of the **five United Nations treaties on outer space**, the definition and delimitation of outer space, national space legislation, legal mechanisms relating to **space debris mitigation**, and **international mechanisms for cooperation** in the peaceful exploration and use of outer space

The **Scientific and Technical Subcommittee (STSC)** discuss matters related to the scientific and technical aspects of space activities. Topics for discussion include **space weather**, **near-Earth objects**, the use of **space technology for socioeconomic development**, or for **disaster management support**, **global navigation satellite systems**, and the **long-term sustainability** of outer space activities.

Space in the UN System

UNOOSA is the only UN office with a number of General Assembly mandates to bridge access to space technologies and space-based information for Member States and other UN agencies and to build capacity in the use of such technologies.

UN-Space

The annual interagency meeting (est. 1975) - since 2014 = *UN-Space.*

For the attainment of all 17 SDGs and 169 targets space tools carry significant relevance:

Direct — as enablers and drivers for sustainable development

Indirect — as an integral part of the indicators for monitoring progress

The importance of synergies

- The combination of the two (Copernicus and EGNSS) will allow both the **monitoring** and the **achievement** of some of the targets that are associated with the Goals:
  - **Monitoring** – enhancing the quality of data collected to help monitor the status of SDGs implementation;
  - **Achievement**, which envisages direct support from *EGNSS* and *Copernicus* in achieving specific SDGs.

UNOOSA and the European GNSS Agency **(ST/SPACE/71):**

European Global Navigation Satellite Systems and Copernicus: Supporting the Sustainable Development Goals

http://www.unoosa.org/res/oosadoc/data/documents/2018/stspace/stspace71_0_html/st_space_71E.pdf

EGNSS and Copernicus supporting SDG 14

Targets	EGNSS	Copernicus	Synergies
14.1	◑●	●●	●●
14.2	●●	●●	●●
14.3	◑◑	◑◑	◑◑
14.4	●●	●●	●●
14.5	●●	●●	●●
14.7	◑◑	◑●	◑●
14.c	◑◑	●●	◑●

Level of contribution in monitoring/achieving part of a target/indicator

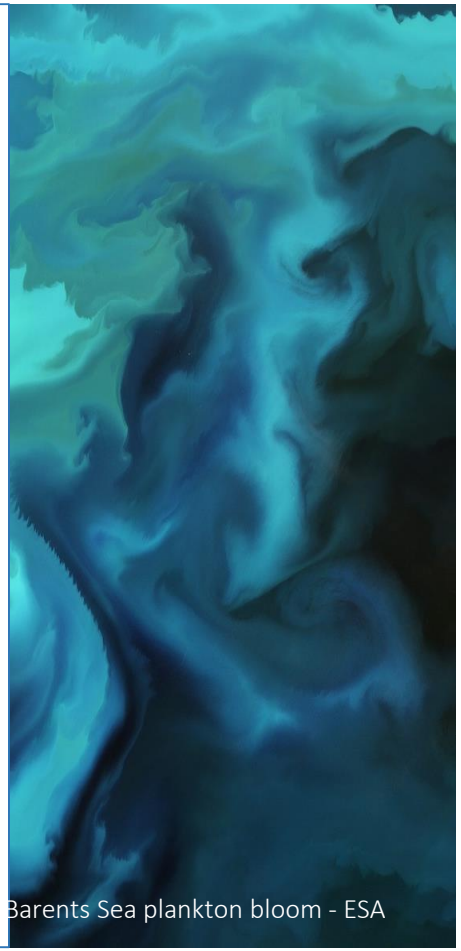
◑◑ Limited contribution ●● Significant contribution

United Nations publication: ST/SPACE/71

SDG 14: Life below water

"Conserve and sustainably use the oceans, seas and marine resources for sustainable development"

- Supports the conservation and protection of oceans and their resources;
- Considers the sustainable use of submarine resources and their respective habitats, as well as the increase of economic benefits to Small Island developing States and least developed countries from such use;
- Champions the promotion of scientific knowledge and the adoption of new technologies to deliver results towards the achievement of the global agendas.
- GNSS are commonly used to monitor marine traffic and prevent accidents at sea, particularly ship collisions.



Barents Sea plankton bloom - ESA

International Committee on GNSS (ICG)

- UNOOSA serves as the executive secretariat of ICG
- The ICG promotes **voluntary cooperation** related to civil satellite-based positioning, navigation, timing, and value added services
- Encourages **coordination** among GNSS providers
- **Promotes** the introduction and utilization of GNSS services in developing countries
- **Assists** GNSS users with their development plans and applications
- Contributes to the **sustainable development** of the world

- Assure GNSS **interoperability and compatibility** among providers and users globally for enhanced services and applications

ICG: Membership and Annual Meetings

- *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
- *Annual Meetings*: UNOOSA (2006), India (2007), … **China (2018), India (2019),** Vienna (2020), UAE (2021)
- **Providers' Forum: 22nd Meeting, 10 June 2019, Vienna, Austria:** *Open Service Information Dissemination, Open Service Performance, Spectrum Protection*
  - ***ICG-14 meeting, Bengaluru, INDIA, 8 – 13 December 2019***

Working Group Systems, Signals and Services (S)

- **The subgroup on compatibility and spectrum protection:**
  - continued its campaign to promote adequate protection of GNSS spectrum through education and outreach;

    http://www.unoosa.org/oosa/en/ourwork/icg/working-groups/s/IDMIndex.html
  - 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.
- **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

Working Group Enhancement of GNSS Performance, New Services and Capabilities (B)

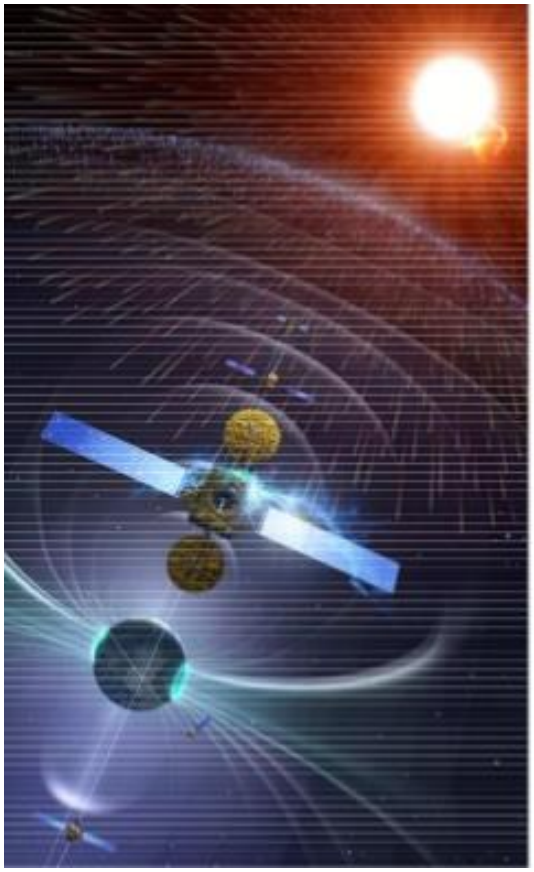
- All providers have agreed on the information presented in this booklet, and on several recommendations to continue development, support, and expansion of the multi-GNSS SSV concept.
- This publication, and the work of WGB, show the significant value of GNSS SSV for a much wider scope of future space 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 (B)

- The importance of exploiting the multitude of signals broadcast by GNSS enabling better monitoring of space weather phenomena and progressing the understanding of the ionosphere is continued to be addressed

  - Examine the performance of atmospheric models to correct single frequency measurements and recommend models for implementation to Service Providers;
  - Establish a dialogue with Space Weather/Remote Sensing community in order to identify how GNSS can better support the advancement of Space Weather/Remote Sensing products and vice versa.



Working Group Reference Frames, Timing and Applications (D)

- 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.
- A joint meeting with WG B & S to discuss "*Interoperability of GNSS precise point positioning services*"

http://www.unoosa.org/oosa/en/ourwork/psa/schedule/2019/2019-workshop-on-global-navigation-satellite-systems_-presentations.html

ICG: Programme on GNSS applications

- **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

- *2019:* Workshop on the applications of GNSS, 24 – 28 June, 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
  - **WGD&B&S**: Special technical session on Interoperability of GNSS PPP services
    - Access to high accuracy positioning services provided by GNSS and regional navigation satellite systems would serve as an enabler for emerging mass-market high accuracy positioning applications, such as in autonomous systems in transportation, construction, agriculture and location-based service applications.

- ***2020:*** 20 – 24 April, Ulaanbaatar, Mongolia

ICG: Programme on GNSS 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
    - Objective: Vertical and geometric reference frames with a focus on examples for the Asia-Pacific region
  - International Workshop on the Implementation of the Global Geodetic Reference Frame (GGRF) in Latin America, 16 – 20 September 2019, Buenos Aires, Argentina
    - Objective: Dissemination of knowledge, data and information on geoscience topics

ICG: Programme on GNSS applications

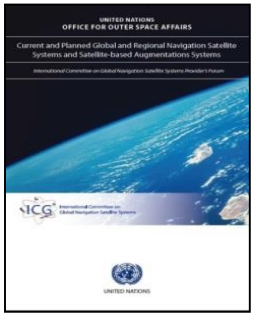
- **Space Weather and GNSS (WGC)**
  - Promotes the use of GNSS for scientific applications and space weather in developing countries
  - Increased number of students and young scientists studying and using GNSS, including increasing participation by women, and many opportunities for research (improved imaging of the ionosphere over the equatorial region, ionospheric effects on augmentation systems…)
- *In cooperation with the Institute for Scientific Research at Boston College, the United States, and the Abdus Salam International Centre for Theoretical Physics, Italy:* A series of outreach workshops on space weather effects on GNSS operations
- 2019: Workshop on Ionospheric Forecasting for Global Navigation Satellite Systems Operations in Developing Countries: Findings and Challenges, 27 - 31 May, Trieste, Italy
- 2020: CRASTE-LF, Rabat, Morocco, 5 – 16 October
  - To provide updated knowledge to use GNSS for ionospheric and space weather research in developing countries

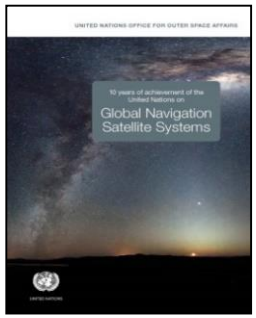
ICG Information Portal

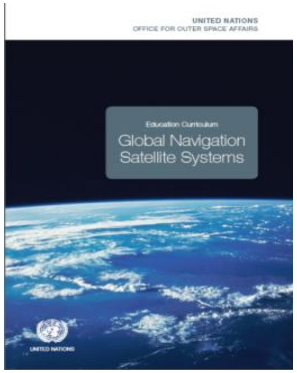
WWW.UNOOSA.ORG

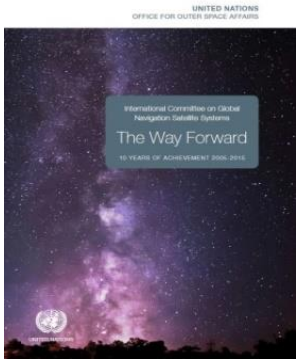
WWW.UNOOSA.ORG/OOSA/EN/OURWORK/ICG/ICG.HTML

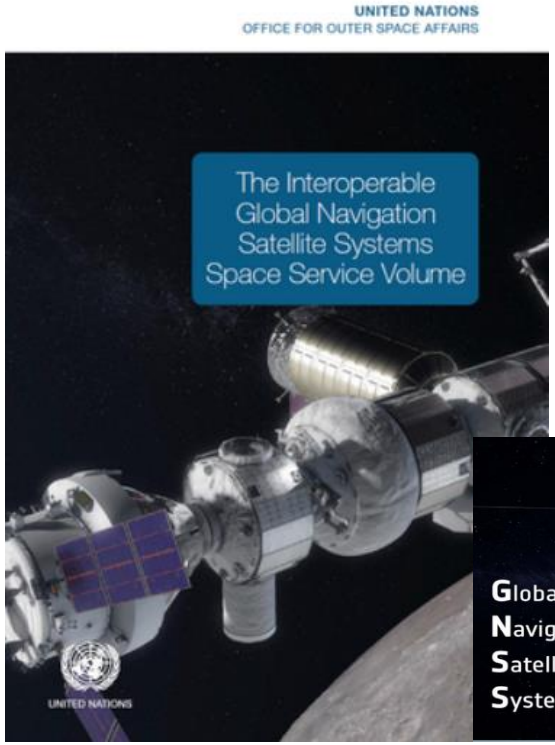
UNOOSA Publications

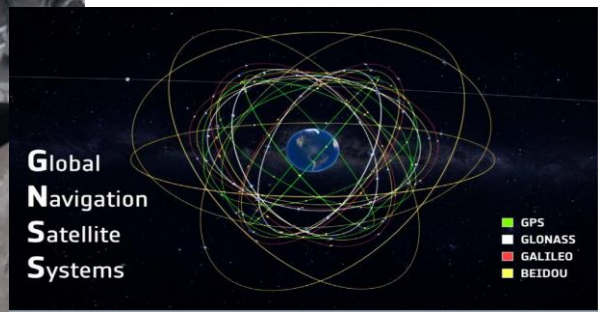












http://www.unoosa.org/oosa/en/ourwork/icg/documents/publications.html

THANK YOU

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