



International Committee on Global Navigation Satellite Systems

Reference Frames in Practice Seminar

4 - 5 May 2018, Istanbul, Turkey

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Office for Outer Space Affairs



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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.

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

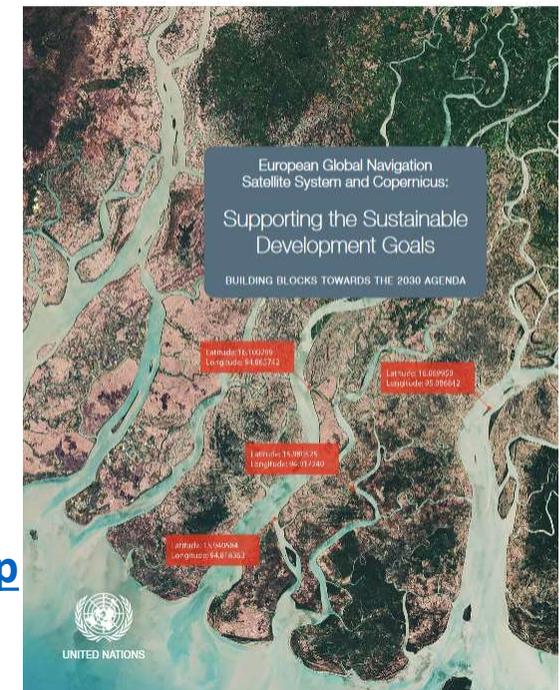
UNOOSA and the European GNSS Agency (**ST/SPACE/71**):

**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/stspace_71E.pdf



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Committee on the Peaceful Uses of Outer Space

Space and climate change

Disaster Management

Space debris mitigation

National space legislation

International mechanisms for cooperation

Long-term sustainability of outer space activities

Definition and delimitation of outer space

Space applications for socioeconomic development

Near-Earth objects

Global Navigation Satellite Systems

Space Weather

GGE-report and TCBM's

Establishment

- **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

- **Members:** 9 nations and the European Union
Current and future core, regional or augmentation systems providers: China (BeiDou), EU (Galileo/EGNOS), Russia (GLONASS/SDCM), United States (GPS/WAAS), India (IRNSS/GAGAN), and Japan (QZSS/MSAS)

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

- **Associate Members and Observers:** 21 organizations
*International & regional organizations and associations dealing with GNSS services and applications: UN system entities, IGOs, NGOs – **FIG and IAG***



Annual Meetings

- UNOOSA (2006) - Japan (2017), China (2018), India (2019), Vienna (2020), UAE (2021)

- **2007: Establishment of the 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*

- **2017: 19th Meeting of the Providers' Forum, Kyoto, Japan, 2 – 7 December**

- **Adjacent Band Compatibility:** The providers emphasized that it was necessary to protect the use of GNSS, which had been one of the goals pursued by ICG; the adjacent-band issue could arise not only in the L1 frequency band, as there were concerns about potential deployments of wireless microphone applications in the band below 1,164 MHz, which could impact the L5 frequency band. Therefore, the providers agreed that it was important to follow these issues closely.
- **Space Service Volume (SSV):** The providers agreed that ICG should stay relevant to the wider space sector by ensuring the future contribution of GNSS to SSV. One possible way to do so was to improve GNSS system interoperability by transmitting intersystem timing offsets.
- **2018: 20th Meeting, 18 June 2018, Vienna, Austria:** Open Service Information Dissemination, Open Service Performance, Spectrum Protection



Working Groups

WGS: Systems, Signals and Services (USA and RF)

- Protection criteria for GNSS from non-RNSS interference sources, including unwanted emissions;
- 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.

WGB: Enhancement of GNSS Performance, New Services and Capabilities (India, China and ESA)

- Search-and-rescue services are implemented by Galileo and GLONASS and will be implemented by GPS and BDS in accordance with the standards COSPAS-SARSAT. Matters of signal-level compatibility of search-and-rescue downlink signals will be followed up by the compatibility and spectrum subgroup of WG S;

Working Groups

WGC: Information Dissemination and Capacity-Building (UNOOSA)

- Strengthening and delivering targeted capacity-building and technical advisory activities with the goal of sharing ideas and expertise regarding GNSS technology and its applications, particularly encouraging the participation of women and young professionals;

WGD: Reference Frames, Timing and Applications (IAG, IGS and FIG)

- Significant progress on geodetic and timing references by GNSS providers: the recent establishment of the subcommittee on geodesy by the Committee of Experts on Global Geospatial Information Management as part of the work under the United Nations Initiative on Global Geospatial Information Management (UN-GGIM).

<http://www.unoosa.org/oosa/en/ourwork/icg/meetings/icg-12/d.html>



Working Group D

- The evaluation of the quality of the new release of the International Terrestrial Reference Frame (ITRF2014) and the significant contribution of GNSS data;
- The refinement of the alignments of GNSS reference frames to the ITRF;
- The information on the GNSS timing references and the inter comparisons of GNSS time offsets.
- **Guidelines on Selection and Prioritizing Laser Ranging to GNSS Satellites by the International Laser Ranging Service (ILRS):** *ILRS coordinates a global network of approximately 40 laser tracking stations.*
- ICG work with the ILRS to develop guidelines on how to select and prioritize GNSS satellite laser tracking to ensure the best utilization of the ILRS resources.



Working Group D

- **Reference Frame Competency Questionnaire**
- **The UN-GGIM Subcommittee on Geodesy** is working towards developing an accurate and sustainable Global Geodetic Reference Frame (GGRF). The Subcommittee's **Focus Group on Education, Training, and Capacity Building** is tasked with assisting UN Member States build their capacity and expertise for the worldwide development of the GGRF. By assessing the current and future competency requirements of each Member State, Focus Group will be able to focus on helping build targeted training and developing competency that will benefit each Member State, as well as filling critical needs for the GGRF.

<http://www.unoosa.org/oosa/en/ourwork/icg/resources/Regl-ref.html>



Programme on GNSS Applications

United Nations Regional Workshops/training courses on the use and applications of GNSS: [United Nations/Argentina Workshop on GNSS, 19 – 23 March 2018, Falda Del Carmen](#)

- **WGS:** Seminar on GNSS Spectrum Protection and Interference Detection and Mitigation

Promoting the use of GNSS technologies as tools for scientific applications (WGD): -

[Technical Seminars on Reference Frames in Practice, FIG Working Week 2018, 4 – 5 May, Istanbul, Turkey](#)

[13th AfricaArray Workshop, 24 – 27 June 2018, Johannesburg, South Africa](#)

Space Weather (WGC): [Workshop on Space Weather Effects on GNSS Operations at Low Latitudes, 23 April - 4 May 2018, Trieste, Italy](#)

United Nations/Italy Long-term Fellowship Programme, Politecnico di Torino, Turin:
[Workshop on Natural and Artificial Threats to GNSS, 7 - 9 May 2018, Turin, Italy](#)



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13th Meeting of ICG
Xi'an, China, 2018

4 - 9 November

The ICG is an important vehicle in the multi-lateral arena, as satellite-based positioning, navigation and timing becomes more and more a genuine multinational cooperative venture

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