

# **International Committee on Global Navigation Satellite Systems**

**Training Course on Global Navigation Satellite Systems**

**14 – 18 January 2019, Asian Institute of Technology, Bangkok, Thailand**

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Office for Outer Space Affairs**



UNITED NATIONS  
Office for Outer Space Affairs



## Space in the United Nations system

**UNOOSA** is the only United Nations office with a number of General Assembly mandates to bridge access to space technologies and space-based information for Member States and other United Nations 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

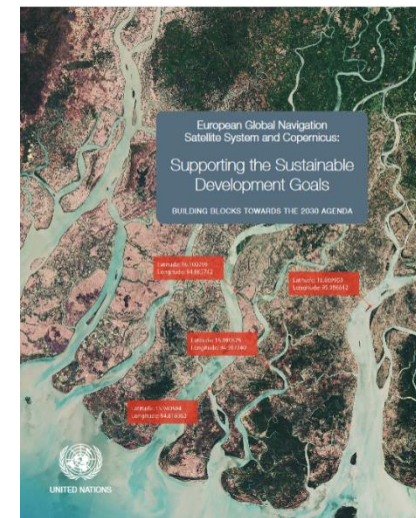
**Indirect** — as an integral part of the indicators for monitoring progress

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/st\\_space\\_71E.pdf](http://www.unoosa.org/res/oosadoc/data/documents/2018/stspace/stspace71_0.html/st_space_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



## 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
- ICG strives to encourage and facilitate compatibility, interoperability and transparency between all the satellite navigation systems, to promote and to protect use of their open services applications and thereby benefit the global community. Our vision is to ensure the best satellite based PNT for peaceful uses for everybody, anywhere, any time



## ICG: Background

- 2001 – 2004: Action Team on GNSS (Italy and the United States) – *in implementation of the recommendations of UNISPACE-III, 1999, Vienna*
  - An international framework to support operational coordination and exchange of information among system operators and national and international user communities would be important
  - 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



## ICG: Membership

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

*ICG participation is open to all countries and entities that are either GNSS providers or users of GNSS services, and are interested and willing to actively be engaged in ICG work*



## ICG: Annual meetings

- UNOOSA (2006), India (2007), United States (2008), Russian Federation (2009), Italy & European Union (2010), Japan (2011), China (2012), United Arab Emirates (2013), European Union (2014), United States (2015), Russian Federation (2016), Japan (2017), **China (2018), India (2019), Vienna (2020)**
- **2006:** Terms of Reference and Workplan
- **Systems, Signals and Services (United States & Russian Federation):** Focused discussion on compatibility and interoperability, encouraging development of complimentary systems; Exchange detailed information on systems and service provision plans
- **Enhancement of GNSS Performance, New Services and Capabilities (India, China and European Space Agency):** Focused discussion on system enhancements (multipath, integrity, interference, etc.) to meet future needs
- **Information Dissemination and Capacity Building (UNOOSA):** Focused on education and training programmes, promoting GNSS for scientific exploration (space weather specifically)
- **Reference Frames, Timing and Applications (IAG, IGS & FIG):** Focused on monitoring and reference station networks



## ICG: Providers' Forum

### ■ 2007: Establishment

- Members: Current and future global and regional satellite navigation systems and Satellite-based Augmentation Systems (SBAS) providers
- 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, 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"**

### ■ 2008: Terms of Reference and Workplan

- Agreement that all GNSS signals and services must be compatible and open signals and services should be interoperable to the maximum extent possible in order to maximize benefit to all GNSS users;
- 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

- **2019: 22<sup>nd</sup> Meeting, 10 June 2019, Vienna, Austria: *Open Service Information Dissemination, Open Service Performance, Spectrum Protection***





## ICG: Working Group Systems, Signals and Services (S)

### ▪ **Interference Detection and Mitigation (IDM)**

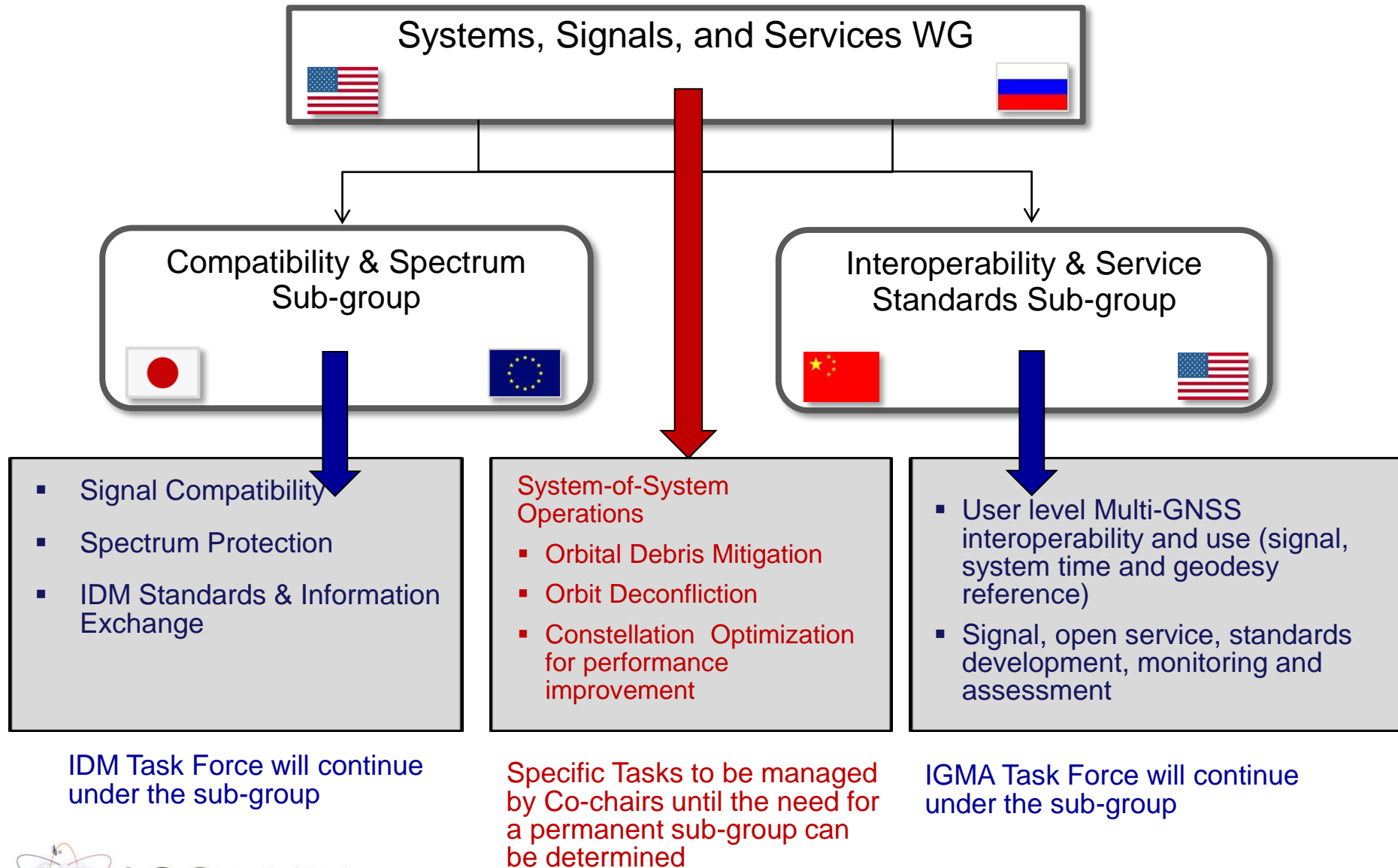
- To continue addressing the need for worldwide GNSS spectrum protection
- To establish a multi-year agenda item focused on national efforts to protect RNSS spectrum, and pursue GNSS IDM in member states

### ▪ **Request for voluntary reporting on national RNSS spectrum protection practices and GNSS IDM capabilities (A/AC.105/C.1/2017/CRP.18):**

*STSC agreed that, a general exchange of information should be included on issues related to GNSS IDM, with a view to raising awareness of efforts to achieve the overall goal of promoting effective use of GNSS open services by the global community.*

[http://www.unoosa.org/res/oosadoc/data/documents/2017/aac\\_105c\\_12017crp/aac\\_105c\\_12017crp\\_18\\_0\\_html/AC105\\_C1\\_2017\\_CRP18E.pdf](http://www.unoosa.org/res/oosadoc/data/documents/2017/aac_105c_12017crp/aac_105c_12017crp_18_0_html/AC105_C1_2017_CRP18E.pdf)

# Systems, Signals, and Services WG (WG-S)





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

The GNSS Space Service Volume (SSV) is the region of space extending to approximately the geostationary altitude or even beyond where terrestrial GNSS performance standards may not be applicable. The SSV defines GNSS system performance for space users by specifying at least three parameters:

1. Pseudorange Accuracy
2. Received Power and
3. Signal Availability

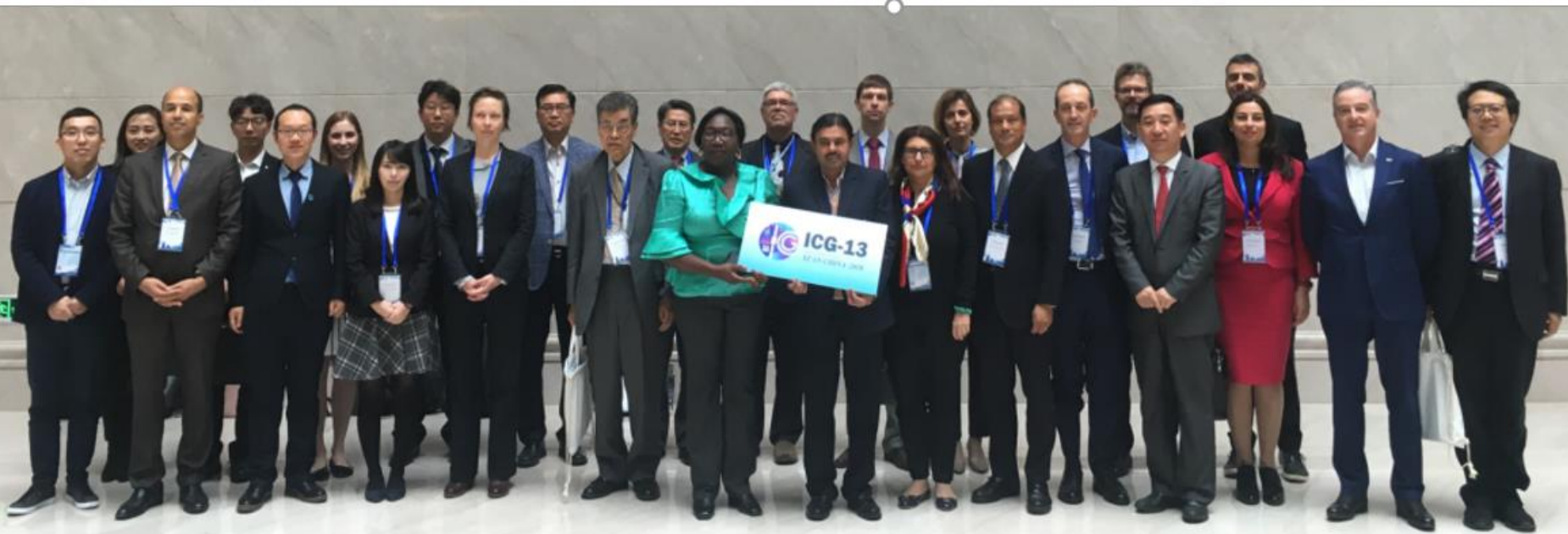


[http://www.unoosa.org/res/oosadoc/data/documents/2018/stspace/stspace75\\_0\\_html/stspace\\_75E.pdf](http://www.unoosa.org/res/oosadoc/data/documents/2018/stspace/stspace75_0_html/stspace_75E.pdf)



## ICG: Information Dissemination and Capacity Building (C)

- 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





## ICG: Working Group Reference Frames, Timing and Applications (D)

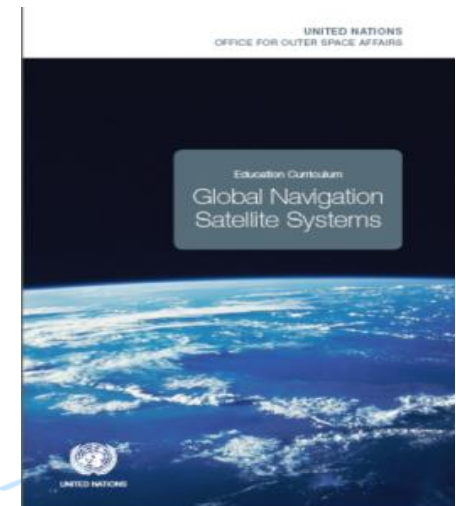
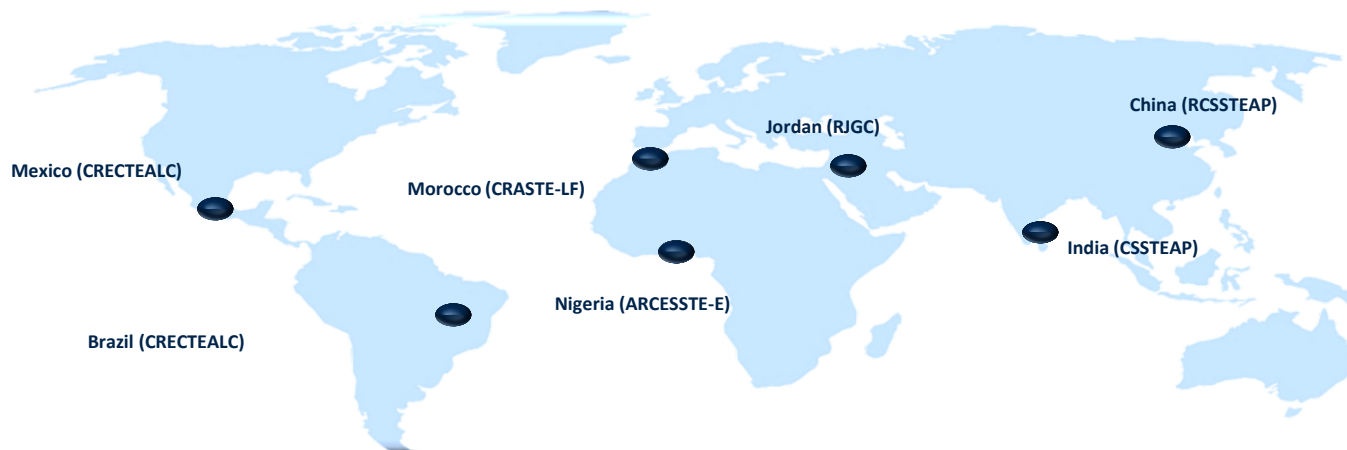
- Significant progress on geodetic and timing references by GNSS providers: the recent establishment of the subcommittee on geodesy by the Committee of Experts on Global Geospatial Information Management as part of the work under the United Nations Initiative on Global Geospatial Information Management (UN-GGIM)
- **Precise Point Positioning (PPP)** allows a single GNSS receiver user to determine position at the decimetre / centimetre error level in kinematic / static mode using precise satellite orbits and clocks.





## Information Centres for ICG

- The Programme of Space Applications established regional centres (**also acting as the ICG information centres**) in each region covered by the United Nations Economic Commissions: Africa, Asia and the Pacific, Latin America and the Caribbean, and Western Asia
  - **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





## COPUOS: Space Weather

- **2004:** Session of the Committee on the Peaceful Uses of Outer Space (COPUOS) called for addressing solar-terrestrial interaction: global climate, **space weather**, Sun-Earth-heliosphere-system
- **2005 - 2009:** Workshops and Follow-up projects: low-cost, ground-based world-wide instrument arrays, GNSS on board of instrument arrays (IHY: Instrument Array, Data, Teaching)
- **2010 - 2012:** STSC agenda item “International Space Weather Initiative” & ISWI Workshops (Egypt, Nigeria, Ecuador)
- **2013:** STSC agenda item “Space Weather”





# ICG Information Portal



- About Us ▾
- Our Work ▾
- Benefits of Space ▾
- Information for... ▾
- Events ▾
- Space Object Register ▾
- Documents ▾
- COPUOS 2015 ▾

Our Work ▾ ICG

## International Committee on Global Navigation Satellite Systems (ICG)

### MISSION STATEMENT

The International Committee on Global Navigation Satellite Systems (ICG), established in 2005 under the umbrella of the United Nations, promotes voluntary cooperation on matters of mutual interest related to civil satellite-based positioning, navigation, timing, and value-added services. The ICG contributes to the sustainable development of the world. Among the core missions of the ICG are to encourage coordination among providers of global navigation satellite systems (GNSS), regional systems, and augmentations in order to ensure greater compatibility, interoperability, and transparency, and to promote the introduction and utilization of these services and their future enhancements, including in developing countries, through assistance, if necessary, with the integration into their infrastructures. The ICG also serves to assist GNSS users with their development plans and applications, by encouraging coordination and serving as a focal point for information exchange.



International Committee on  
Global Navigation Satellite Systems

### VISION STATEMENT

The International Committee on Global Navigation Satellite Systems (ICG) strives to encourage and facilitate compatibility, interoperability and transparency between all the satellite navigation systems, to promote and protect the use of their open service applications and thereby benefit the global community. Our vision is to ensure the best satellite based positioning, navigation and timing for peaceful uses for everybody, anywhere, any time.

At the "United Nations International Meeting for the Establishment of the International Committee on Global Navigation Satellite Systems (ICG)" held on 1-2 December 2005 in Vienna, Austria, the ICG was established on a voluntary basis as an informal body for the purpose of promoting cooperation, as appropriate, on matters of mutual interest related to civil satellite-based positioning, navigation, timing, and value-added services, as well as compatibility and interoperability among the GNSS systems, while increasing their use to support sustainable development, particularly in the developing countries. The participants in the meeting agreed on an establishment of the ICG information portal, to be hosted by UNOOSA, as a portal for users of GNSS services.

### Our Work

- Secretariat of COPUOS
- Programme on Space Applications

### UN-SPIDER

#### ICG

- Members
- Providers' Forum
- Working Groups
- ICG Annual Meetings
- ICG Programme on GNSS Applications
- Resources
- ICG Documents
- Space Weather & GNSS
- Other Events
- ICG Timeline

### UN-Space

- Space Law
- Topics
- Photo Gallery

[WWW.UNOOSA.ORG](http://WWW.UNOOSA.ORG)

[WWW.UNOOSA.ORG/OOSA/EN/OURWORK/ICG/ICG.HTML](http://WWW.UNOOSA.ORG/OOSA/EN/OURWORK/ICG/ICG.HTML)



# THANK YOU



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