High Level Forum: Preparatory Meeting,
19 November 2015, Vienna

ICG: Future Perspectives and International Aspects

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UNITED NATIONS
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ICG
International Committee on
Global Navigation Satellite Systems

International Committee on GNSS (ICG): Mission Statement

- 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-8 Meeting, 2013, Dubai, United Arab Emirates

Background

- 2001 – 2004: Action Team on GNSS (Italy and the United States) – *in implementation of the recommendations of UNISPACE-III*
- 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

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), 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

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 activities

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)
- 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 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

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
- **2015: Fifteenth meeting, 1 – 6 November, Boulder, Colorado, United States**
- Open Service Information Dissemination, Open Service Performance, Spectrum Protection (interference detection and mitigation)

Working Groups: Recommendations/Observations

- **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
- **International GNSS Monitoring and Assessment (IGMA)**
  - To initiate a joint trial project with the International GNSS Service (IGS) to demonstrate a global GNSS monitoring and assessment capability
- **Interoperable GNSS Service Volume (SSV)**
  - Providers will develop a booklet defining the characteristics of a fully **interoperable space service volume**

ICG Working Groups: Recommendations/Observations

- **Utilization of GNSS satellites in Eccentric Non-Nominal MEO Orbits**
  - To report to the Working Group on their experience utilizing satellites that are in eccentric, non-nominal MEO orbits in order to build a survey of these satellites for scientific research and Position, Velocity and Time (PVT) applications
- **Geodetic and Timing References for GNSS**
  - The alignments of GNSS associated reference frames to the realization of the International Terrestrial Reference Frame (ITRF2008)
  - Timing References in relation to Rapid Coordinated Universal Time (UTCr)

ICG Information Portal: http://www.unoosa.org/oosa/en/ourwork/icg/working-groups.html

Programme on GNSS applications

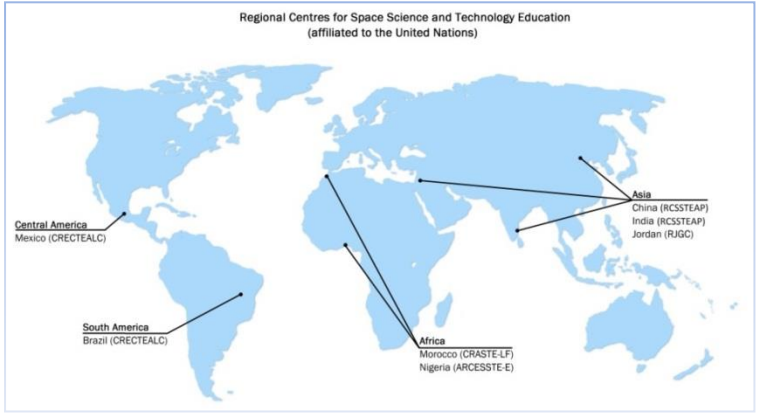
- **United Nations Regional Workshops/training courses on the use and applications of GNSS**
  - These activities increase awareness among decision and policy makers of the benefits of GNSS, and develop regional and national pilot projects on GNSS applications
  - These activities bring together a large number of experts, including those from developing countries, to discuss and act on issues that are also of high relevance to the ICG
  - United Nations/Russian Federation Workshop, May 2015, Krasnoyarsk
- **ICG Experts Meeting: GNSS Services, 14 – 18 December 2015, Vienna**
  - To focus on identifying the needs of users with respect to the compatibility and interoperability of global and regional systems, and space-based augmentations providing and planning to provide GNSS service
  - To incorporate useful user and application sector views and inputs into the Working Groups work plans
  - Seminar on GNSS Spectrum Protection and IDM

Information Portal: http://www.unoosa.org/oosa/en/ourwork/icg/activities.html

Programme on GNSS applications

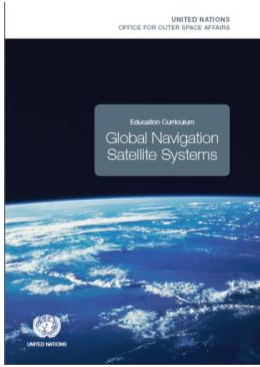
- **Promoting the use of GNSS technologies as tools for scientific applications**
  - These activities are to provide technical knowledge on the operational and practical aspects and issues relating to reference frames, in particular to facilitate a regional forum for geodetic agencies, improve data sharing (GNSS leveling, tide gauge, gravity)
  - Technical Seminars on Reference Frames in Practice, FIG Working Week 2016, Christchurch, New Zealand
  - AfricaArray Workshop, the University of the Witwatersrand, Johannesburg, South Africa,
- **Space Weather and its effects on GNSS**
  - ICTP and Boston College: Workshops on Ionospheric Effects on SBAS and GBAS Applications at Low Latitudes
- **United Nations/Italy Long-term Fellowship Programme: Master in Navigation and Related Applications (MNA), Politecnico di Torino, Turin, Italy**
  - The curriculum is structured to meet effectively work market demands for high-level technicians endowed with a broad vision of the navigation/localization sate-of-the-art

Information Centres for ICG



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

ICG Information Portal

2010: Report on planned and existing global navigation satellite systems and their policies and procedures

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

Conclusion

- Significant progress continues to be made through ICG, and the results of this work not only promote the capabilities of GNSS to support sustainable development, but also promote new partnerships among members of ICG and institutions of the broader user community, particularly in developing nations
- The activities and opportunities provided through the ICG result in the development and growth of capacities that will enable each country to enhance its knowledge, understanding and practical experience in those aspects of GNSS technology that have the potential for a greater impact on its economic and social development, including the preservation of its environment
- 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

Thank you

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