



ICG Activities and its Role in Spectrum Protection and Interference Detection and Mitigation

What is the ICG?

- Emerged from 3rd UN Conference on the Exploration and Peaceful Uses of Outer Space July 1999
 - Promote the use of GNSS and its integration into infrastructures, particularly in developing countries
 - Encourage compatibility and interoperability among global and regional systems
- Members include:
 - GNSS Providers: (U.S., EU, Russia, China, India, Japan)
 - Other Member States of the United Nations
 - International organizations/associations

ICG Working Groups

- Systems, Signals and Services (Co-Chairs: U.S. & Russia)
 - Focus on compatibility and interoperability, encouraging development of complimentary systems
 - Exchange information on systems and service provision plans
 - Includes **spectrum protection** and **IDM**
- Enhancement of GNSS Performance, New Services and Capabilities (Co-Chairs: India, European Space Agency, China)
 - Focus on system enhancements (multipath, integrity, interference, etc.) to meet future needs
- Capacity Building, Education and Outreach (Chair: UN Office for Outer Space Affairs)
 - Focus on training/workshops, promoting scientific applications, space weather
- Reference Frames, Timing and Applications (Co-Chairs: IAG, IGS & FIG)
 - Focus on timing, monitoring and reference station networks



ICG and GNSS Spectrum Protection

- ITU is responsible for international spectrum framework, including the protection of radio services
- Actual implementation of this framework is accomplished by national telecommunication administrations
- National telecommunication administrations work with relevant industries and stake holders
- ICG provides a forum that can facilitate and encourage the protection of GNSS spectrum by its members and participants in a voluntary, non-binding way



ICG Work Plan: Working Group on Systems, Signals and Services (1 of 2)

- Pursue the protection of radionavigation satellite service (RNSS) spectrum through appropriate domestic and international regulation
- Facilitate Provider discussions on their individual views and actions related to RNSS spectrum issues under consideration by the ITU and its Working Parties
- Develop a strategy for ICG support of mechanisms to detect and mitigate sources of electromagnetic interference, taking existing regulatory mechanisms into consideration



ICG Work Plan: Working Group on Systems, Signals and Services (2 of 2)

- Considering the principle of compatibility and its definition, the working group will:
 - Review existing ITU regulations and recommendations related to the avoidance of harmful interference;
 - Seek common understanding on appropriate methods to determine compatibility among all GNSS; and,
 - If necessary, propose new questions or studies for ITU consideration, through appropriate mechanisms, to further protect the noise floor impacting all GNSS, and to define methodology used between GNSS providers to ensure compatibility.



Addressing Spectrum Protection and Interference Detection and Mitigation within ICG

- Establishment of Compatibility Subgroup in 2011
 - Focused on compatibility issues to include spectrum protection and IDM
- Establishment of Interference Detection and Mitigation Task Force in 2013
 - Objectives include:
 - 1) Develop a common set of information to be reported to GNSS civil service centers
 - 2) Establish routine communications among the (provider service) centers
 - 3) Develop guidelines for common capabilities to be considered in the development of future national IDM networks
 - Five IDM Workshops held since 2012



ICG Recent Recommendations: Spectrum Protection

- The ICG recommends that GNSS providers and GNSS user community member states promote the implementation of the protection measures of GNSS operations in their nations and/or regions as well as other parts of the world
- UN COPUOS, should establish a multi-year agenda item focused on National Efforts to protect GNSS Spectrum, and pursue GNSS Interference Detection and Mitigation in member states
 - Develop a communication from the ICG Secretariat
 - Material would be circulated to select COPUOS Member States before the end 2016, with a view to them presenting their answers at the February 2017 UN COPUOS STSC and other Spectrum Protection & IDM activities



ICG Recent Recommendations: IDM

- GNSS providers and user community member states encouraged to evaluate existing and emerging interference detection, localization, and characterization capabilities and consider developing, testing and implementing these or similar capabilities in their nations or regions of the world
- System providers and user community member states are encouraged to work with industry groups to determine if standards for crowd sourcing interference detection and localization techniques should be developed and cost-effectively implemented by mobile telecommunication service providers



Other Related Topics Discussed in ICG

- Adjacent Band Compatibility
- Unintentional Interference
 - Electromagnetic emissions limits from non-licensed transmitters
- Interference Detection and Geo-Location Capabilities
- Critical Infrastructure



GNSS as Critical Infrastructure (as reported at ICG-9)

US	RU	China	EU
There is official Critical Infrastructure definition	There is no official Critical Infrastructure definition	There is no official Critical Infrastructure definition	There is official Critical Infrastructure definition
GPS is not a critical infrastructure	Navigation is a critical technology	BeiDou is Essential Space Infrastructure	Galileo will be designated as critical infrastructure
GPS integrated in most of all critical infrastructures	GLONASS is integrated in most of all priority development directions of science and technique	Beidou is integrated in most of all economy branches	Galileo service is critical to Energy and Transport critical infrastructure sectors



6th ICG Workshop on IDM

- Croatia will host the next IDM Workshop in Baska
- To be held in conjunction with the Baska GNSS Conference in May 2017
- Focus will be on member state capabilities (site and network-based IDM) and receiver-based implementation (crowd sourcing)
- ICG Members, Observers, and invited participants with an interest are encouraged to attend



ICG Proposal for Workshop/Seminar on GNSS Spectrum Protection and IDM

Based on the success of the Spectrum/IDM session in December 2015, the Working Group on Systems, Signals and Services, and the ICG Secretariat, will pursue additional sessions at upcoming UN Space Applications Program GNSS Workshops and/or events held by UN GNSS Regional Centers

**DECEMBER 2016 SPECTRUM PROTECTION
SEMINAR IN KATHMANDU**

