International Committee on
Global Navigation Satellite Systems

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
  - Nine IDM Workshops held since 2012

9th ICG Workshop on IDM

- Workshop held virtually on 24 August 2021
- Agenda included:
  - Incorporating Resilience into IDM – Department of Homeland Security, United States
  - Implementation and Definition of Interference Protection Standards at Space Segment for the European Space Agency - European Space Agency
  - Environment-aware GNSS Position Estimation Process Realisation in Software-Defined Radio (SDR) - University of Rijeka, Croatia
  - Air-Ground coordinated RFI detection system in airport - China Research Institute of Radio-wave Propagation
  - Development of the European GNSS Interference Detection Network - European Union Agency for Space Programmes
  - Characterization of ADS-B Performance under GNSS Interference – Standford University, U.S.
  - Madrid Airport and TMA GNSS RFI Monitoring System (DYLEMA-Madrid) - Spanish Ministry of Transport
  - Interference scenario in S-band: NavIC experience - Indian Space Research Organisation

Recommendations Related to Interference and Spectrum Protection

Recent Recommendations Adopted by the ICG	
2014	Evaluate existing and emerging IDM capabilities and consider developing, testing and implementing these or similar capabilities
2014/2017	Crowdsourcing capabilities analysis for IDM
2015/2016/2017	UN regional workshops on GNSS spectrum protection and IDM
2015/2016	Campaign of Protection of RNSS operations – GNSS providers and GNSS user community member states promote spectrum protection
2015/2016	UN COPUOS multi-year agenda item focused on National Efforts to protect RNSS Spectrum, and develop IDM capability
2017	Encourage national regulators to use the protection criteria in relevant ITU-R Recommendations
2019	Produce a draft booklet on GNSS/RNSS spectrum Protection based on material used for the ongoing spectrum seminars

GNSS Jammers – National Legal Status (As Reported at ICG-9)

Jammers	US	RU	China	EU
manufacture	illegal	illegal	illegal	Nation-by-nation
sell	illegal	illegal	illegal	illegal
export	illegal	illegal	illegal	Nation-by-nation
purchase	Undefined (consumer import illegal)	illegal	illegal	illegal
own	legal	Undefined	Undefined	legal
use	illegal	illegal	illegal	illegal

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

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

Based on the success of four Spectrum/IDM sessions held in 2015-19, the Working Group on Systems, Signals and Services, and the ICG Secretariat, proposed pursuing additional sessions at upcoming UN Space Applications Program GNSS Workshops and/or events held by UN GNSS Regional Centers

OCTOBER 2021 SPECTRUM PROTECTION SEMINAR FOR MONGOLIA WORKSHOP!