



U.S. GPS/GNSS International Activities Update

Civil GPS Service Interface Committee Meeting

Portland, Oregon

Office of Space and Advanced Technology

U.S. Department of State

September 26, 2017



U.S. National Space Policy

Space-Based PNT Guideline: Maintain leadership in the service, provision, and use of GNSS

- Provide civil GPS services, free of direct user charges
 - Available on a continuous, worldwide basis
 - Maintain constellation consistent with published performance standards and interface specifications
 - Foreign PNT services may be used to augment and strengthen the resiliency of GPS
- Encourage global *compatibility* and *interoperability* with GPS
- Promote *transparency* in civil service provision
- Enable market access to industry
- Support international activities to detect and mitigate harmful interference



GNSS: A Global Navigation Satellite System of Systems

- Global Constellations

- **GPS (24+3)**
- GLONASS (24+)
- GALILEO (24+3)
- BDS/BEIDOU (27+3 IGSO + 5 GEO)



- Regional Constellations

- QZSS (4+3)
- IRNSS/NAVIC (7)

- Satellite-Based Augmentations

- **WAAS (3)**
- MSAS (2)
- EGNOS (3)
- GAGAN (3)
- SDCM (3)
- BDSBAS (3)
- KASS (2)



U.S. Objectives in Working with Other GNSS Service Providers

- Ensure **compatibility** — ability of U.S. and non-U.S. space-based PNT services to be used separately or together without interfering with each individual service or signal
 - Radio frequency compatibility
 - Spectral separation between M-code and other signals
- Achieve **interoperability** – ability of civil U.S. and non-U.S. space-based PNT services to be used together to provide the user better capabilities than would be achieved by relying solely on one service or signal
- Promote fair competition in the global marketplace

Pursue through Bilateral and Multilateral Cooperation



Bilateral Cooperation

China

- Most recent civil GNSS Plenary meeting held June 2015 in Washington, D.C.
- Working Group and Subgroups established – meet as needed
 - Sub-group on compatibility and interoperability met June 2017 in Los Angeles

India

- U.S.–India Joint statement signed in 2007
- U.S.-India Civil Space Joint Working Group (CSJWG) will meet October 2017 in Washington
 - Agenda includes GNSS discussions



Bilateral Cooperation (continued)

Europe

- GPS-Galileo Cooperation Agreement signed in 2004
- Working Group on Next Generation GPS/Galileo Civil Services meets twice per year – most recent meeting September 12-14, 2017 in Los Angeles
- EU request to waive FCC Part 25 rules discussed by Working Group on Trade & Civil Applications
- PRS access negotiations are under way

Japan

- Civil Space Dialogue held in Washington May 2017
- Technical Working Group and Plenary-level meetings discuss GPS and QZSS compatibility and interoperability



International Committee on Global Navigation Satellite Systems (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



<http://www.unoosa.org/oosa/en/ourwork/icg/icg.html>



ICG Meetings

Past ICG Meetings

- ICG-1: UN Vienna, Austria – November 2006
- ICG-2: Bangalore, India – September 2007
- [ICG-3: Pasadena, CA, USA – December 2008](#)
- ICG-4: St Petersburg, Russia – September 2009
- ICG-5: Turin, Italy – October 2010
- ICG-6: Tokyo, Japan – September 2011
- ICG-7: Beijing, China – November 2012
- ICG-8: Dubai, UAE – November 2013
- ICG-9: Prague, Czech Republic – November 2014
- [ICG-10: Boulder, CO, USA – November 2015](#)
- ICG-11: Sochi, Russia – November 2016

Future Meetings

- [ICG-12: Japan – December 2017](#)
- ICG-13: China – 2018
- ICG-14: India – 2019
- ICG-15: UN Vienna, Austria - 2020



11th Meeting of the International Committee on GNSS (ICG-11)



- More than 100 participants
 - Representatives from 21 countries/organizations
 - Representation from all 6 GNSS Providers
- Agenda included:
 - Meeting of the Providers' Forum
 - System Provider Updates
 - Applications and Experts Session
 - Meeting of all four Working Groups





ICG-11: Significant Accomplishments and Recommendations

- Interference Detection and Mitigation (IDM) & Spectrum Protection
 - Promotion of protection measures for GNSS operations around the world: **On-going with great interest in the U.S. ABC Study results**
 - National Reporting on Efforts to protect RNSS Spectrum and mitigate interference – **Conference Paper published at the 54th Session of the UN COPUOS Scientific and Technical Subcommittee – invites member states to report under the subcommittees GNSS agenda item**
 - 6th IDM workshop **was held May 9, 2017 in Baska, Krk Island, Croatia**
- International Multi-GNSS monitoring (IGMA): **Workshop was held in Shanghai, China, May 22, 2017**
- Interoperability – Timing: **Expert level timing workshop was held July 7, 2017 in conjunction with the annual IGS Workshop in Paris**



GNSS Interference and Spectrum Protection: A Multilateral Effort

- ICG Core Area of Focus since its inception
 - *"Develop a strategy for support by the International Committee of mechanisms to detect and mitigate sources of electromagnetic interference, taking existing regulatory mechanisms into consideration"*
 - Primarily discussed within the Working Group on Systems, Signals and Services (WG-S)
 - Subgroup on Compatibility & Spectrum Protection - 2010
 - Interference Detection and Mitigation (IDM) Task Force - 2013
- Recent Activities
 - Two Seminars on Spectrum Protection (2015 and 2016) – **Outreach and Education**
 - Reporting by COPUOS Member States on Spectrum Protection and IDM – **National-level Action and Accountability**
 - IDM Workshops – **Discussion on tools and techniques**



Status of GNSS ICDs and Open Service Performance Standards

	GPS	GLONASS	BDS	Galileo	IRNSS	QZSS
Interface Control Documents/ Specifications	✓	✓	✓	✓	✓	✓
	IS GPS 200-H, 705D, 800D	ICD 5.1 for L1 & L5	ICD 2.0	ICD 1.2	ICD 1.0	ICD 1.6
Open Service Performance Standards	✓	Draft under review	✓	✓		
	SPS PS 4 th edition (L1-only)	Provided to WG-S	OS PS 1.0	OS SDD v1.0		
Web Access	GPS.gov		en.beidou.gov.cn/	https://www.gsc-europa.eu/system/files/galileo_documents/Galileo-OS-SDD.pdf	irnss.isro.gov.in/	qz-vision.jaxa.jp/USE/is-qzss/index_e.html

Each System Provider has identified a POC for the ICG Subgroup on Compatibility and Performance Standards



Additional ICG-11 Accomplishments and Recommendations

- **Signal Patents**
 - Recommendation for nations to ensure that open signal structure patents are discouraged and not used for the collection of royalties
- **Space Service Volume (SSV)**
 - SSV Booklet released in 2017 – results of completed simulations used to develop definitions and assumptions for an interoperable SSV
 - Outreach activities in 2017 to highlight the importance of the ICG work taking place and the benefits of an interoperable SSV
- **Search and Rescue (SAR)**
 - Presentations from 3 GNSS providers on SAR implementation status – recognition by providers of the importance of having interoperable SAR services
- **Space Weather**
 - Discussion about ionospheric models – will be discussed further at future ICG meetings



KYOTO, JAPAN
DECEMBER 2017

12th Meeting of the International Committee on Global Navigation Satellite Systems

HOME

REGISTRATION

AGENDA

TRANSPORT

VENUE

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Welcome to ICG-12

ICG-12 will be held in Kyoto, Japan from 2nd to 7th December, 2017.

Japan will host the twelfth Meeting of the International Committee on Global Navigation Satellite Systems (ICG-12) 2-7 December, 2017.

The meeting will be co-organized by the Cabinet Office, Government Of Japan and the Ministry of Foreign Affairs of Japan.

The details of the meeting including venue, program, accommodation, etc. will be posted on this website in due course.

KyotoMICE_Web.mp4





Other International Activities/Events

The U.S. participated in the following GNSS Related events in 2017:

- Munich Satellite Summit – March 2017
- APEC GNSS Implementation Team Meeting in Taiwan – April 2017
- Royal Institute of Navigation Vulnerabilities Conference in Baska, Croatia – May 2017
- China Satellite Navigation Conference and ICG IGMA Workshop in Shanghai, China – May 2017
- International Committee on GNSS (ICG) Providers' Forum Meeting and ICG WG-B Meeting, Vienna, Austria – June 2017
- International GNSS Service (IGS) Meeting and ICG Intersessional Working Group Meeting, Paris, France – July 2017



Summary

- U.S. policy encourages the worldwide use of civil GPS services and cooperation with other GNSS providers
 - **Compatibility, interoperability, and transparency in civil service provision** are priorities
 - Pursued through bilateral and multilateral dialogues
- The ICG, with strong U.S. participation, continues to pursue a **Global Navigation Satellite System-of-Systems** to provide civil GNSS services that benefit users worldwide
 - Priorities for the U.S. at ICG-12 will include continued focus on Civil Service Protection, Definition, and Information Dissemination

