U.S. GPS/GNSS International Activities Update

Civil GPS Service Interface Committee Meeting

Miami, Florida

Office of Space and Advanced Technology
U.S. Department of State

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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

Global Perspective

- 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)
  - Korea – KPS (7)
- Satellite-Based Augmentations
  - **WAAS (3)**
  - MSAS (2)
  - EGNOS (3)
  - GAGAN (3)
  - SDCM (3)
  - BDSBAS (3)
  - KASS (2)
  - Australia SBAS (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

Japan

- Comprehensive Dialogue held in Washington, DC, July 2019
- Civil Space Dialogue held in Washington, May 2017
- Technical Working Group (TWG) discusses GPS and QZSS compatibility and interoperability
  - ITU coordination is ongoing

Europe

- GPS-Galileo Cooperation Agreement signed in 2004
- Working Group on Next Generation GPS/Galileo Civil Services meets twice per year – next meeting scheduled for October 2019
- EU waiver of FCC Part 25 rules discussed by Working Group on Trade & Civil Applications
- On-going PRS access negotiations

Bilateral Cooperation (continued)

China

- GNSS Plenary meeting held May 2018 in Harbin, China
- Three Working Groups Established
  - Meet as needed
- Public Joint Statement on Civil Signal Compatibility and Interoperability signed in November 2017

India

- U.S.–India Joint statement signed in 2007
- U.S.-India Civil Space Joint Working Group (CSJWG) met October 2017 in Washington
  - Agenda included GNSS discussions
- Next meeting scheduled to occur before the end of 2019

Additional Bilateral Dialogues

- ***Canada:*** Civil GNSS meeting held in Washington, D.C. – March 2019
- ***Australia:*** Joint Delegation Statement on Cooperation in the Civil Use of GPS in 2007
  - Regular discussions about Australia's plans for SBAS
  - U.S.-Australia Civil Space Dialogue held in November 2018
  - Australia became a member of the ICG at the 13th meeting
- ***Republic of Korea:*** Discussion about Korea's development of their SBAS and KPS
- ***Indonesia:*** *U.S. hosted* 1st Civil Space Dialogue in April 2019 – GNSS applications discussed
- ***Thailand:*** 2nd Civil Space Dialogue, August 2019 in Bangkok – Agenda item on GNSS collaboration

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
- ICG-12: Kyoto, Japan – December 2017
- ICG-13: Xi'an, China – November 2018

Future Meetings

- **ICG-14: Bangalore, India – 2019**
- ICG-15: UN Vienna, Austria - 2020

13th Meeting of the International Committee on GNSS (ICG)

Xi'an, China: 4-9 November 2018

- More than 200 participants
  - Representatives from 27 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
- New Membership approval: Australia

ICG International Committee on Global Navigation Satellite Systems

ICG Important Activities

GNSS Interference and Spectrum Protection

- Core Area of Focus of the ICG
- IDM Workshops have been held since 2012 – organized by the ICG
- Spectrum Protection Educational Seminars organized by ICG Experts – Focused on the importance of protecting GNSS spectrum
  - 4th Seminar held June 2019 in Fiji

Interoperability and Service Standards

- Interoperable Time
  - Timing Workshop held in June 2019 focused on GNSS Time Offsets
- Performance Standard Template
  - "Guidelines" document adopted as a template for Providers
  - Workshop in June 2019 – focused on additional PS parameters
- International GNSS Monitoring and Assessment (IGMA)
  - Trial Project with IGS is in progress
  - Workshop in June 2019 – focused on aligning of monitor parameters

Other Important ICG Activities

Space Service Volume

- United Nations booklet "The Interoperable GNSS SSV" – prepared by GNSS Providers through WG-B http://www.unoosa.org/res/oosadoc/data/documents/2018/stspace/stspace75_0_html/st_space_75E.pdf
- Outreach efforts continue on benefits of an interoperable space service volume and development of space-based user equipment

Search and Rescue

- Discussion about compatibility and interoperability of MEOSAR systems

Orbital Debris and Orbital De-confliction

- ICG working with IADC to review debris guidelines for MEO/IGSO satellites

Precise Point Positioning (PPP)

- Workshop held in June 2019 focused on multi-GNSS PPP based on plans by regional and global service providers

ICG-14: Bangalore, India

14th Meeting of the International Committee on Global Navigation Satellite Systems (ICG-14)

Welcome to ICG-14

9-13 December 2019

Other International Activities/Events

The U.S. participated in the following GNSS Related events in 2019:

- Munich Satellite Summit – March 2019
- Baska GNSS Conference in Baska, Croatia – May 2019
- China Satellite Navigation Conference in Beijing, China – May 2019
- United Nations/Fiji Workshop on the Applications of GNSS – June 2019
- ICG Providers' Forum, Workshops and Working Group Meetings in Vienna, Austria – June 2019
- Multi-GNSS Asia Workshop in Bangkok – August 2019
- ICG Working Group Meeting in Ispra, Italy – September 2019

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
  - U.S. priorities for ICG-14 include spectrum protection, system interoperability and information dissemination