U.S. GPS/GNSS International Activities Update

Civil GPS Service Interface Committee Meeting

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

22 September 2020
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)
  - Australian 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 Space Dialogue hosted by Japan in August 2020
- Discussions underway for QZSS to host U.S. space situational awareness payloads
- Technical Working Group (TWG) discusses GPS and QZSS compatibility and interoperability

Europe

- GPS-Galileo Cooperation Agreement signed in 2004
- U.S.-EU Space Dialogue held June 2019 in Prague – Next Meeting later in 2020
- Working Group on Next Generation GPS/Galileo Civil Services meets twice per year – Last Meeting May 2020 (virtual)
- Working Groups on Compatibility and Interoperability, and Trade & Civil Applications meet as needed
Bilateral Cooperation (continued)

India

• U.S.–India Joint statement signed in 2007
• U.S.-India Civil Space Joint Working Group (CSJWG) met November 2019 in Bangalore
  – Agenda included GNSS discussions
• Technical Working Group established in 2019 to discuss compatibility and interoperability issues and coordination

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
Additional Bilateral Dialogues

- **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

- **Canada:** Civil GNSS bilateral meeting March 2020
  - Focused on resiliency and cross border issues

- **Republic of Korea:** Discussion about Korea’s development of KASS and KPS

- **UK:** Bilateral PNT discussions as needed
  - Focus on areas of mutual interest including PNT resiliency
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

More than 250 participants
- Representatives from 19 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: New Zealand

**Bangalore, India: 8-13 December 2019**

*ICG-15 Meeting Postponed to 2021 at UN Vienna*
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
• ICG-14: Bangalore, India – December 2019

Future Meetings

• ICG-15: UN Vienna, Austria - 2021
**ICG Important Activities**

**GNSS Interference and Spectrum Protection**
- Core Area of Focus of the ICG
- Closely monitoring ITU/WRC proposals and regulations related to RNSS spectrum
- 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
  - Recommendation adopted at ICG-14 to develop a booklet

**Interoperability and Service Standards**
- Interoperable Time
  - Timing Workshops focused on GNSS Time Offsets
- Performance Standard Template
  - “Guidelines” document developed as a template for Providers
- International GNSS Monitoring and Assessment (IGMA)
  - Trial Project with IGS is in progress
Other Important ICG Activities

Space Service Volume
- UN booklet “The Interoperable GNSS SSV” – prepared by GNSS Providers through WG-B – published in early 2018
- Technical discussions and outreach efforts continue – focused on benefits of an interoperable space service volume and development of space-based user equipment

Orbital Debris and Orbital De-confliction
- ICG working with IADC to review debris guidelines for MEO/IGSO satellites

Precise Point Positioning (PPP)
- ICG-14 recommendation adopted to form a Task Force on PPP interoperability – co-chaired by Australia, Japan and EU
- Virtual meeting scheduled for late September
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 within the ICG include spectrum protection, system interoperability and information dissemination
THANK YOU!

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