



GNSS International Activities Update: Multilateral and Bilateral Issues

National Space-Based Positioning Navigation and Timing (PNT) Advisory Board: 15th Meeting

*Office of Space and Advanced Technology
Bureau of Oceans, and International Environmental & Scientific Affairs
U.S. Department of State*

11-12 June, 2015



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 complement services from 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*



Planned Space-Based PNT Systems

- Global Constellations

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

- Regional Constellations

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

- Satellite-Based Augmentations

- WAAS (3)
- MSAS (2)
- EGNOS (3)
- GAGAN (3)
- SDCM (3)





ICG-9 Meeting in Prague - Nov 9-14, 2014

- Interference Detection and Mitigation (IDM)
 - Nations should evaluate & implement existing/emerging **IDM capabilities** and work with the telecom industry on standards for crowd sourcing IDM techniques
 - The ICG Secretariat and IDM taskforce will organize UN-sponsored workshops on **RNSS spectrum protection** and IDM for user community member nations
 - IDM Task Force initiated a discussion on **GNSS as critical infrastructure**
- International Multi-GNSS monitoring (IGMA)
 - Existing civil service centers should establish a link to a new ICG web portal allowing users to easily find GNSS monitoring information and products
 - Conduct a workshop in 2015 focused on **multi-GNSS open service monitoring**, parameters to be monitored, and an organizational approach
- Interoperability Task Force and System Providers should continue to assess industry feedback received at four **interoperability** workshops
- Providers should develop a booklet defining the characteristics of a fully **interoperable space service volume**
- Providers will continue discussing the topic of **fair "Market Access"**



ICG-10 - November 1-6, 2015

- **U.S. will host in Boulder, Colorado**
 - 45 km from Denver
- Meeting Venue: University Corporation for Atmospheric Research (UCAR)
 - Consortium of more than 100 member colleges and universities focused on atmospheric research and Earth system sciences
 - UCAR manages the National Center for Atmospheric Research (NCAR) on behalf of the National Science Foundation
- **Tour Sites confirmed**
 - National Oceanic and Atmospheric Administration, [National Space Weather Prediction Center](#)
 - UNAVCO: University-governed consortium, which facilitates geoscience research and education using geodesy
 - National Institute of Standards and Technology, Time and Frequency Laboratory



UCAR Center Green Facility



Bilateral Cooperation: Europe

- GPS-Galileo Cooperation Agreement signed in 2004
- Third Plenary meeting in Torrejon, Spain in June 2014
 - Working Group A on compatibility and interoperability completed ITU coordination on updated GPS and Galileo reference assumptions documents in July 2014
 - GPS-Galileo Time Offset (GGTO), broadcast since April 2014, will be further refined at June 2015 meeting in Europe
 - Working Group C Milestone II Report entitled “EU-U.S. Cooperation on Satellites Navigation, Working Group C – ARAIM Technical Subgroup, Milestone II Report, February 11, 2015,” approved by the Plenary co-chairs March 20, 2015
 - Next WG C meeting June 16-18 will advance work on ARAIM and convergence toward compatible formats for both GPS and Galileo service performance commitments



Bilateral Cooperation: China

- First bilateral space-based PNT related meeting on civil cooperation topics held 19 May 2014 in Beijing
 - Topics included: interoperability, service monitoring, interference detection, spectrum protection, and civil aviation applications
 - Agreement to establish a civil satellite navigation cooperation working group for additional discussions
- Second bilateral space-based PNT meeting held 4-5 June 2015 in Washington, D.C.
 - Topics included: Aviation applications, spectrum compatibility and interoperability review, civil service performance standards and multilateral issues



Bilateral Cooperation: Japan

- Presidential/Prime Minister level Joint Statement signed in 1998
- Cooperation focuses on compatibility and interoperability between GPS and Japan's Quasi-Zenith Satellite System (QZSS)
- U.S. continues to host QZSS monitoring stations in Hawaii and Guam
- U.S. and Japan completed ITU compatibility coordination between GPS and the future QZSS four satellite configuration in April 2015
- Third U.S.-Japan Comprehensive Dialogue on Space to be held in Tokyo, September 11, 2015



Additional Bilateral Cooperation (1) Vietnam and India

- Vietnam: First U.S.-Vietnam Civil Space Dialogue held December 18, 2014 in Washington, D.C.
 - Topics included: Capacity building programs, use of space technologies to manage the Mekong Delta, exchange of Earth observation data, orbital debris mitigation, maritime domain awareness, and Vietnam's accession to the United Nation's Outer Space Treaties
- India: U.S.–India Joint statement signed in 2007
 - Expanded effort to ensure interoperability between GPS/WAAS and India's regional GAGAN system
 - ITU compatibility coordination – Meeting in early 2013
 - U.S.-India Civil Space Joint Working Group (CSJWG) held in Washington, D.C. in March 2013



Additional Bilateral Cooperation (2)

- *Canada* – Civil GNSS meeting held May 6, 2015 in Ottawa
 - Agreed to expand cooperation on interference detection and mitigation, jammer enforcement, and geodetic network ground station coverage in Canada
- *Republic of Korea* – 1st bilateral Civil Space Dialogue took place in July, 2014
 - Korea’s interest in developing/deploying an SBAS and potential cooperation discussed
- *Australia* – Joint Delegation Statement on Cooperation in the Civil Use of GPS in 2007
 - Last bilateral dialogue held in Oct. 2010
- *Russia* – GPS-GLONASS discussions since 1996, Joint Statement issued December 2004: talks currently on hold
 - Technical working groups on GNSS compatibility/interoperability and MEOSAR capabilities



Summary

- U.S. policy encourages the worldwide use of GPS/GNSS
- In ICG, U.S. works to promote greater international cooperation on interference detection and mitigation, civil signal monitoring, and consideration of GNSS as an enabler of critical infrastructure
- Coordination with PNT providers and expanded contacts with important GNSS users are priorities
- Compatibility, interoperability, and transparency in civil service provision are continuing policy goals