



GPS Policy and International Update

**Civil GPS Service Interface Committee
(CGSIC) Regional Meeting**

Portland, Oregon

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

19 November 2015



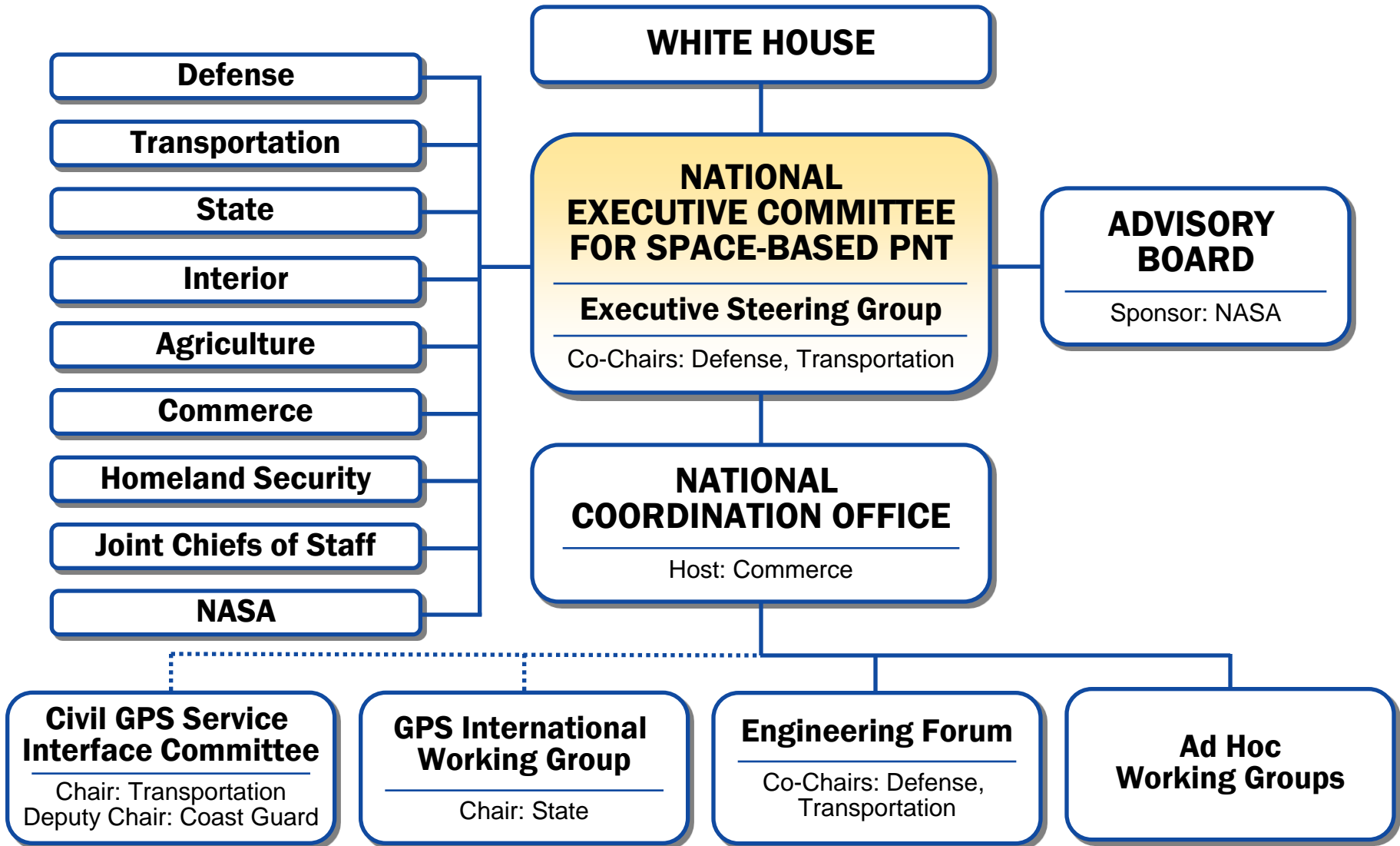
U.S. National Space Policy

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 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***



U.S. Space-Based PNT Organization Structure





Planned Global and Regional Satellite Navigation 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 (2)
- SDCM (3)





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, compatibility and interoperability discussions, civil service provision and multilateral issues



Bilateral Cooperation: Europe

- GPS-Galileo Cooperation Agreement signed in 2004
 - Third Plenary meeting in Torrejon, Spain in June 2014
 - Four working groups established under the Agreement – continue to meet regularly as needed
- ITU compatibility coordination completed under Working Group A in July 2014
- Working Group B (Trade & Civil Applications) met June 2015 in Vienna, Austria
- Working Group C met October 2015 – Discussion focused on ARAIM and convergence toward compatible formats for both GPS and Galileo service performance commitments
- 8th U.S.-EU Space Dialogue scheduled for December 2015 in Washington, DC



Bilateral Cooperation: India

- U.S.–India Joint statement signed in 2007
- Discussions on emerging IRNSS and spectrum use
- ITU compatibility coordination completed between GPS and IRNSS
- U.S.-India Civil Space Joint Working Group (CSJWG)
 - 5th meeting held 23-24 September 2015 in Bangalore, India, produced positive results and calls for increased bilateral GNSS cooperation



Bilateral Cooperation: Japan

- Presidential/Prime Minister level Joint Statement signed in 1998
- U.S. continues to host QZSS monitoring stations in Hawaii and Guam
- ITU compatibility coordination between GPS and QZSS (four satellite configuration) completed in April 2015
- Sixth U.S.-Japan Civil Space Dialogue held September 10 in Tokyo
- Third U.S.-Japan Comprehensive Dialogue on Space held September 11 in Tokyo



Additional Bilateral Cooperation

- *Australia*: Joint Delegation Statement on Cooperation in the Civil Use of GPS in 2007
 - Last bilateral dialogue held in Oct. 2010
- *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 Civil Space Dialogue took place in Washington, D.C., July, 2014
 - Korea's interest in developing/deploying an SBAS and potential cooperation discussed
- *Vietnam*: 1st Civil Space Dialogue held December 18, 2014 in Washington, D.C.
 - GNSS applications discussed among other topics



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 Mission Statement

- Promote voluntary cooperation on matters of mutual interest related to civil satellite-based positioning, navigation, timing, and value-added services
- Contribute to the sustainable development of the world
- Encourage coordination among GNSS Providers to ensure greater **compatibility, interoperability, and transparency**
- Promote the introduction and utilization of GNSS services in developing countries, by assisting with the integration into their infrastructure
- Assist GNSS users with their development plans and applications, by encouraging coordination and serving as a focal point for international information exchange



ICG and the Providers' Forum

- Providers Forum Members include: U.S., EU, Russia, China, India, and Japan
 - Focused discussions on **compatibility and interoperability**, encouraging development of complimentary systems
 - Exchange detailed information on systems/service provision plans
- Consensus reached on Principles and general definition of ***compatibility, interoperability and transparency*** in civil service provision
 - Compatibility definition includes spectral separation between each system's authorized service signals (e.g. U.S. M-code) and other systems' signals
- ICG leading efforts to promote GNSS *radio-frequency interference detection and mitigation* efforts

Providers participate in, and are supported by, the ICG Working Group on Systems, Signals and Services



U.S. Hosted 10th ICG Meeting (ICG-10): 1-6 November 2015

- Meeting held in Boulder, Colorado at University Corporation for Atmospheric Research (UCAR)
- More than 200 participants
 - Representatives from 28 countries/organizations
 - Representation from all 6 GNSS Providers
- Panel of Experts Session
 - GNSS: Today and Preparing for the Future
- Applications and Experts Session
 - Observing Earth Processes using GNSS
- Local Tours Included:
 - National Space Weather Prediction Center
 - Time and Frequency Laboratory
 - UNAVCO (facilitates geoscience research and education using geodesy)



UCAR Center Green Facility



ICG-10: Significant Accomplishments and Recommendations

- **Interference Detection and Mitigation (IDM)**
 - Recommendation for Providers to promote the implementation of protection measures of GNSS operations around the world
 - Recommendation for ICG presentation to UN Committee on the Peaceful Uses of Outer Space (COPUOS) - Focused on National Efforts to protect RNSS Spectrum, and pursue Interference Detection and Mitigation in Member States
- **Interoperability**
 - Discussion about GNSS system time and signals, based on 5 system provider workshops held between 2013 and 2015
- **International Multi-GNSS monitoring (IGMA)**
 - Existing civil service centers working to establish a link to a new ICG web portal allowing users to easily find GNSS monitoring information and products
 - Recommendation to initiate a trial project between the ICG and IGS to demonstrate a global GNSS Monitoring and Assessment capability



ICG-10: Significant Accomplishments and Recommendations (continued)

- Space Service Volume (SSV)
 - Progress on developing definitions and assumptions for an interoperable SSV
 - Providers to report on new Spaceborne GNSS receiver developments within their region
- Space Weather
 - Presentation/discussion on new U.S. Space Weather Strategy (includes section on international cooperation)
- Orbital Debris Mitigation
 - U.S. presentation on orbital debris strategies in Medium Earth Orbit (MEO)
- Service Center Cooperation
 - Recommendation to develop a template for cooperation between GNSS provider user information centers



UN Workshops on the Use and Applications of GNSS

- Office for Outer Space Affairs (OOSA), through its Program on GNSS Applications:
 - Organizes regional workshops, training courses and international meetings focusing on capacity-building in the use of GNSS-related technologies;
 - Has developed an in-depth GNSS education curriculum for the training programs at all UN-affiliated Regional Centres for Space Science and Technology Education, also acting as the ICG information centres.
- These activities bring together a large number of experts, including those from developing countries, to discuss and act on issues that are also of high relevance to the ICG
- ICG Experts Meeting: December 2015, Vienna, Austria
 - Includes Seminar on Spectrum Protection and IDM



Summary

- U.S. policy encourages worldwide GPS/GNSS use
- International cooperation to ensure compatibility, interoperability, and transparency is a priority
 - Includes bilateral cooperation with PNT providers and expanded discussions with important allies
- The U.S. is actively involved in the ICG as a multilateral forum for multi-GNSS Cooperation
 - Good progress made during the 10th meeting hosted by the U.S. in 2015
- The work of ICG and UN OOSA through its Program on GNSS Applications, are important vehicles for helping build a multi-GNSS world



For Additional Information...

www.gps.gov/internationals/

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GPS.GOV

Official U.S. Government information about the Global Positioning System (GPS) and related topics

Home What's New Systems Applications Governance Multimedia Support

For General Public

For News Media

For Congress

For Internationals

For Professionals

For Students



The United States was pleased to host the 10th meeting of the UN-affiliated International Committee on GNSS (ICG) in Boulder, Colorado.

VISIT ICG-10 WEBSITE →

Multilingual Content

To improve global understanding about GPS, we are pleased to offer key portions of this website in multiple languages. Please note that some pages link back to English content.

Español

- Página Principal
- El Sistema de Posicionamiento Global
- Ampliaciones al GPS
- Aplicaciones del GPS

Français

- Accueil
- Le Système de Positionnement Mondial
- Compléments GPS
- Applications du GPS

中文

- 首页
- 全球定位系统
- GPS的增强系统
- GPS的应用

عربي

- الصفحة الرئيسية
- نظام التموضع العالمي
- إضافات إلى نظام التموضع العالمي
- تطبيقات النظام

International GPS Cooperation →

- Australia
- China
- Europe
- India
- Japan
- Russia
- United Kingdom
- International Committee on GNSS
- Other International Organizations

GPS Presentations from International Events →

www.gps.gov