



U.S. Civil GNSS International Cooperation

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Overview

- **U.S. Space-Based Positioning, Navigation and Timing (PNT) Policy**
- Bilateral Civil GNSS Cooperation Activities
- Multilateral Civil GNSS Cooperation Activities
- Summary

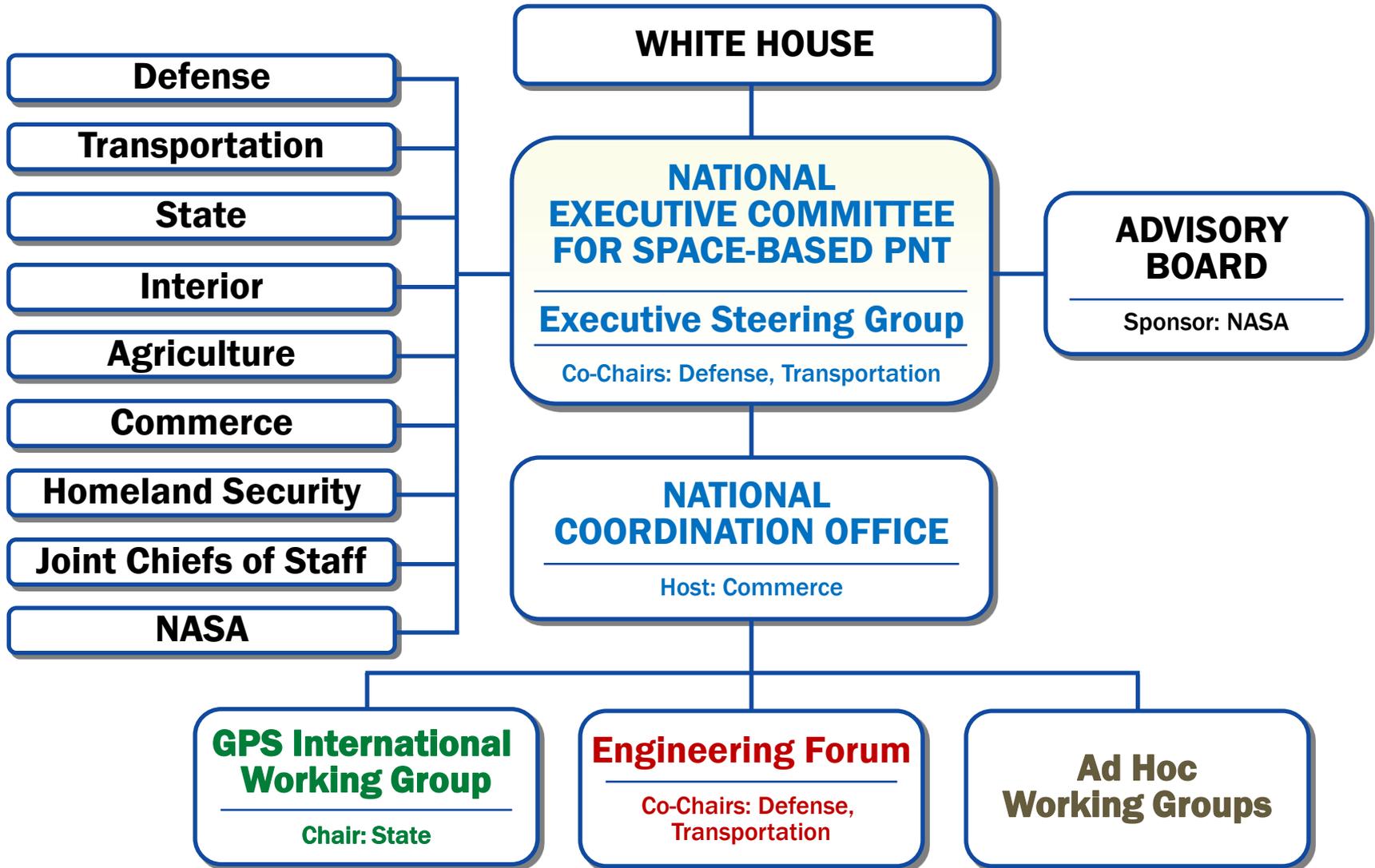


U.S. National Space Policy

- 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. National Space-Based PNT Organization Structure





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U.S. Objectives in Working with Other GNSS 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
 - Primary focus on the common L1C and L5 signals
- Promote fair competition in the global marketplace

Pursue through Bilateral and Multilateral Cooperation



Bilateral Consultations - Europe

- GPS-Galileo Agreement signed in 2004, ratified by EU in December 2011
 - Four working groups established under the Agreement
- Plenary and WG A, B, and C meetings held in June 2012 in Washington, D.C.
 - Work towards shared U.S.-EU vision on IDM that would support future multilateral efforts on IDM
 - Working Group A is finalizing coordination between GPS and the EU's EGNOS augmentation system under ITU auspices.
 - Working Group C is characterizing performance and benefits from joint GPS-Galileo receivers.



Russia

- GPS-GLONASS discussions ongoing since 1996
- Joint Statement issued December 2004
- Working Group 1 met in June 2011 to discuss Russian augmentation system (SDCM), assignment of PRN codes, and GLONASS CDMA signal plans
- Working Group 2 met October 2011 to discuss joint search and rescue capabilities
- Joint statements signed in September 2011 and June 2012 reaffirming intent to continue cooperation



Japan

- Joint statement signed in 1998
- Cooperation focuses on compatibility and interoperability between GPS and Japan's Quasi-Zenith Satellite System (QZSS)
- Bilateral agreements for QZSS monitoring stations in Hawaii and Guam
- Annual plenary meeting held in January 2012
 - Both sides reaffirmed close cooperation on GNSS issues, no major outstanding problems or issues
 - GPS-QZSS Technical Working Group completed, released its report



China

- U.S. and China concluded ITU operator-to-operator coordination on GPS-COMPASS signal compatibility in September 2010
- Successful bilateral GNSS workshop organized by U.S. and Chinese engineering academies, May 2011 in Shanghai
- Bilateral meeting focused on aviation satellite navigation issues took place following the China Satellite Navigation Conference in May 2011
- On going discussions with China Satellite Navigation Office on the margins of multilateral international meetings



India

- Joint statement on GNSS cooperation signed 2007
- Third U.S.-India Joint Working Group on Civil Space Cooperation held July 2011
- Parties agreed to resume work on interoperability between GPS and India's GPS Aided Geo Augmented Navigation (GAGAN) system and Indian Regional Navigational Satellite System (IRNSS)



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International Committee on GNSS (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.icgsecretariat.org>



ICG Providers Forum

- Six space segment providers listed previously are members
- Purpose:
 - Focused discussions on **compatibility and interoperability**, encouraging development of complimentary systems
 - Exchange detailed information on systems & service provision plans
 - Exchange views on ICG work plan and activities
- Providers have agreed that all GNSS signals and services must be compatible and open signals and services should also be interoperable to the maximum extent possible
- **Principle of Transparency**: every GNSS provider should publish documentation that describes the signal and system information, the policies of provision and the minimum levels of performance offered for its open services



ICG-6 Outcomes

- 6th ICG meeting held in Tokyo, Sept 2011
- The development of **multi-GNSS monitoring** networks was a major topic of discussion
 - The Committee endorsed the IGS Multi-GNSS Experiment
 - A Subgroup of the Working Group A has been formed to collectively investigate international GNSS monitoring and assessment
- Ongoing discussions on **future framework for ICG**

China will host ICG-7 in November 2012



IDM Workshop Conclusions

- **Interference Detection and Mitigation (IDM) Workshop held 7-8 June 2012**

- **Workshop Conclusions:**
 - ICG Should Develop Educational Materials
 - RNSS Spectrum Management
 - Exchange information and develop best practices for GNSS interface reporting
 - Identify a GNSS monitoring site or center to be recognized by ITU as part of international interference monitoring network.
 - ICG Should Consider Process for Developing Guidelines for Mobile GNSS Device Manufacturers Interested in Contributing Interference Detection Information to National Reporting Authorities
 - Identify Experts to Participate in Next IDM Workshop



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Summary

- U.S. policy encourages **worldwide use of civil GPS and augmentations**
- **International cooperation** at all levels is a priority
- **Compatibility, interoperability, and transparency** in open service provision are critical

The screenshot shows the GPS.gov website homepage. At the top, there are language options: English, Español, Français, 中文, and عربي. The main header features the GPS.gov logo and the text "Official U.S. Government information about the Global Positioning System (GPS) and related topics". Below the header is a navigation menu with links for HOME, WHAT'S NEW, SYSTEMS, APPLICATIONS, POLICY & FUNDING, MULTIMEDIA, and SUPPORT. A central banner displays "Bienvenidos Welcome أهلا وسهلا Bienvenue" with a globe and stick figures. To the right of the banner, there is a text box stating: "To improve global understanding about GPS, we are pleased to offer key portions of this website in multiple languages. Please note that some pages may link back to English-language content." Below the banner, there is a "Multilingual Content" section with links for Español, Français, 中文, and عربي. The Español section includes links for "Página Principal", "El Sistema de Posicionamiento Global", "Ampliaciones al SPG", and "Aplicaciones del SPG". The Français section includes links for "Accueil", "Le Système de Positionnement Mondial", "Compléments GPS", and "Applications du GPS". The 中文 section includes links for "首页", "全球定位系统", "GPS的增强系统", and "GPS的应用". The عربي section includes links for "الصفحة الرئيسية", "نظام التموضع العالمي", "إضافات إلى نظام التموضع العالمي", and "تطبيقات النظام". To the right of the multilingual content, there is a "GPS Cooperation with Other Nations" section with links for Australia, China, Europe, India, Japan, Russia, International Committee on GNSS, and Other International Organizations. Below this, there is a "GPS Outreach Handouts" section with a link to "The Global Standard". At the bottom, there is an "International GPS User Support" section with a link to "U.S. Policy on Global GPS Access" and a text box stating: "The U.S. Coast Guard Navigation Center (NAVCEN) is the designated point of contact within the U.S. government for GPS user support to civilians outside the United States, including international civil aviation users. Through their website and email list, NAVCEN disseminates information to".

<http://www.gps.gov/>



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