



U.S. GPS International Activities and Engagement

**13th National Space-Based Positioning,
Navigation and Timing (PNT)
Advisory Board**

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Overview

- **U.S. Space-Based PNT Policy**
- International Cooperation Activities
- Summary



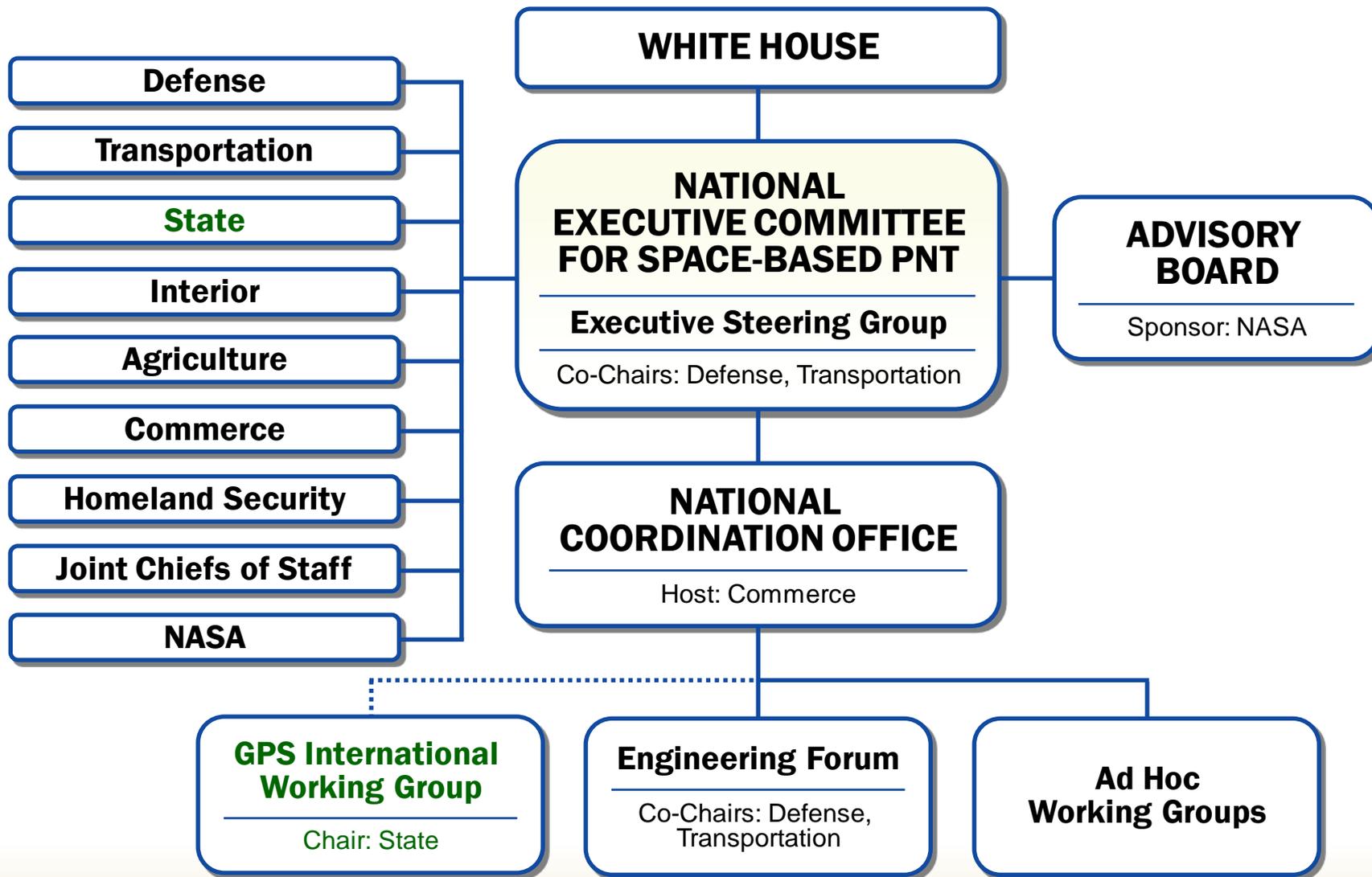
U.S. National Space Policy

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



U.S. Space-Based PNT Organization Structure





U.S. Policy Promotes Global Use of GPS Technology

- No direct user fees for civil GPS services
 - Provided on a continuous, worldwide basis
- Open, public signal structures for all civil services
 - Promotes equal access for user equipment manufacturing, applications development, and value-added services
 - Encourages open, market-driven competition
- Global compatibility and interoperability with GPS
- Service improvements for civil, commercial, and scientific users worldwide
- Protection of radionavigation spectrum from disruption and interference



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Planned GNSS

Global Constellations

- GPS (24+)**
- GLONASS (30)
- Galileo (27+3)
- 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)



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:** Joint statement signed in 1998; cooperation focuses on compatibility and interoperability between GPS and Japan's Quasi-Zenith Satellite System (QZSS)
- **European Union:** GPS-Galileo Agreement signed in 2004, ratified by EU in December 2011; working groups formed under the agreement continue to meet
- **India:** Joint statement on GNSS cooperation signed 2007; continuing discussions under the Joint Civil Space Cooperation Working Group
- **Russia:** GPS-GLONASS discussions ongoing since 1996; Joint Statement issued Dec. 2004; May 2012 request to consider hosting SDCM sites within U.S. territory to monitor GLONASS civil signals is still under review within the U.S. government



U.S. Cooperation with China

- Operator-to-operator coordination under ITU auspices for GPS & Beidou was completed in September 2010
- Following CSNC 2011:
 - Workshop on GNSS conducted by the Chinese Academy of Engineering and U.S. National Academy of Engineering
 - Meeting between the CAAC (中国民用航空局) and U.S. FAA focused on aviation satellite navigation issues
- On going cooperation with China Satellite Navigation Office (CSNO) and China National Administration of GNSS and Applications (CNAGA), on the margins of the International Committee on GNSS (ICG)
- Delegations from both nations just met on May 19 in Beijing to discuss civil cooperation topics such as interoperability, service monitoring, interference detection, spectrum protection, and civil aviation applications



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





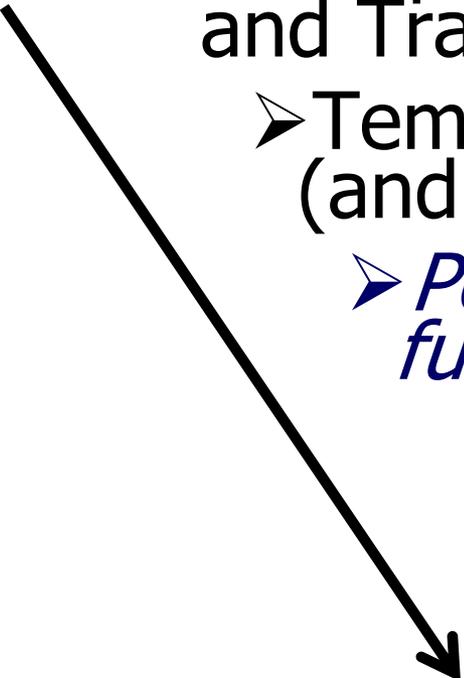
ICG-8 Meeting in Dubai: Nov 10-14, 2013

- Interference Detection and Mitigation (IDM) Task Force established
 - Focus on developing a common set of information to be reported to GNSS civil service centers
 - Third IDM Workshop to be held in 2014 (ITU will host)
- Interoperability Task Force established
 - Focus on analyzing the results of the April 2013 U.S. hosted Interoperability Workshop
 - Additional System Provider-hosted Interoperability Workshops to be held in 2014
- Multi-GNSS monitoring: International GNSS Monitoring and Assessment (IGMA) Task Force to focus on:
 - Identifying what service parameters should be monitored
 - Defining the level and methods for carrying out the monitoring
- Consensus that achieving a fully interoperable GNSS space service volume would provide significant performance benefits that no single system could provide on its own

ICG-9 will be hosted by the EU in Prague, November 2014



Progress at ICG in GNSS Civil Service Provision

- ✓ Providers Forum
 - ✓ Providers Forum System Report
 - ✓ Principles of Compatibility, Interoperability, and Transparency
 - Template for Performance Standards (and ICDs)
 - *Postulated Performance Standards for future services*
 - Service Assurances or Commitments
 - *Monitoring of service performance*
 - *Interference monitoring*
- 



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Summary

- U.S. policy encourages worldwide GPS use
 - International cooperation to ensure compatibility, interoperability, and transparency is a priority
- GPS and augmentations continue to provide improved service and modernized capabilities while maintaining backward compatibility for all users
- Policy stability, service transparency, and continuous improvement are the keys to success in GNSS Programs



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U.S. and UK Reach Understanding on GPS Patents

The United States and United Kingdom successfully reached an understanding on intellectual property rights that will ensure GPS civil signals remain free and openly available for users worldwide.

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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.

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