U.S. Space-based Positioning, Navigation and Timing (PNT) Policy and International Cooperation

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Keys to the Global Success of GPS

- Program Stability and Performance
- Policy Stability and Transparency
- Private Sector Entrepreneurship and Investment

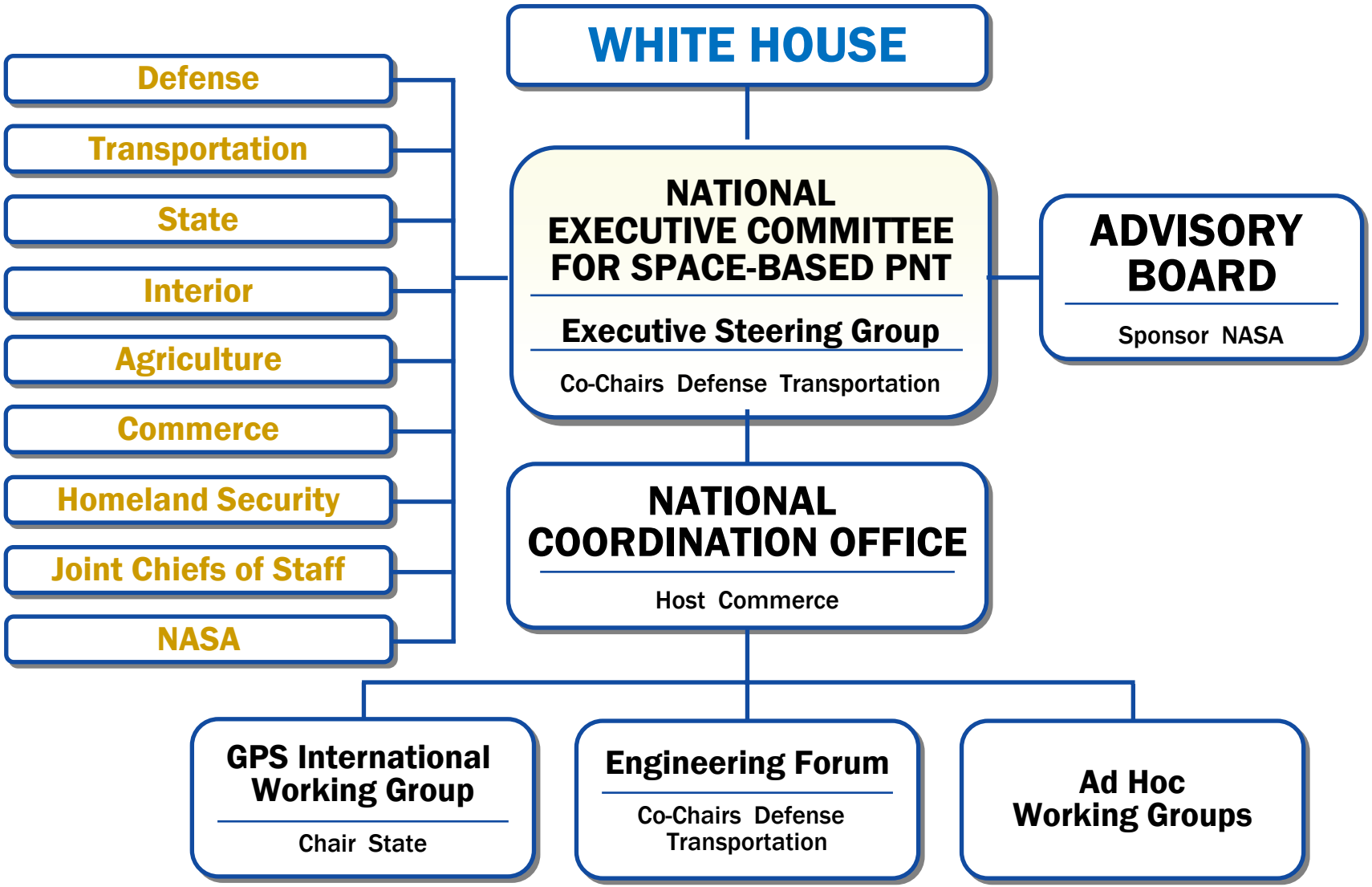
U.S. Space-based PNT Policy

- Provide GPS and augmentations free of direct user fees on a continuous, worldwide basis
- Provide open, free access to information needed to develop equipment
- Improve performance of GPS and augmentations
- Encourage international development of PNT systems based on GPS
- Seek to ensure international systems are interoperable with civil GPS and augmentations
- Address mutual security concerns with international providers to prevent hostile use

U.S. Policy Promotes Global Use of GPS/GNSS 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
- Service improvements for civil, commercial, and scientific users worldwide
- Global compatibility and interoperability with GPS

U.S. National Space-based PNT Organization Structure



Planned Global Navigation Satellite Systems (GNSS)

- Global Constellations
  - GPS (24+)
  - GLONASS (30)
  - Galileo (27)
  - Compass (38)
- Regional Constellations
  - QZSS (3)
  - IRNSS (7)
- Satellite-Based Augmentations
  - WAAS (3)
  - MSAS (2)
  - EGNOS (3)
  - GAGAN (2)
  - SDCM (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
  - Primary focus on the common L1C and L5 signals
- Ensure a level playing field in the global marketplace

Pursue through Bi-lateral and Multi-lateral Cooperation

The Goal of RNSS Civil Interoperability

- Ideal interoperability allows navigation with one signal each from four or more systems with no additional receiver cost or complexity

Interoperable = Better Together than Separate

Private Sector Competition

- Encourage fair competition in the private sector in GNSS receiver and application markets
  - Leads to greater innovation, lower costs
- Fair competition means no preferential treatment for any particular company (s)
  - Equal (if not open) access to information and markets
- Freedom of choice desired for end users
  - Standards and other governmental measures should not effectively mandate use of one GNSS over another
- U.S. agreements with other GNSS providers include language on fair trade/open markets (non-discriminatory)

U.S. - Europe Cooperation

- 2004 U.S.-EU agreement provides foundation for cooperation
- Four working groups were set up under the agreement:
  - Technical, trade, future system, and security issues
- Improved new civil signal (MBOC) adopted in July 2007
- First Plenary Meeting successfully held in October 2008

Oct. 22, 2008 , EU - U.S. Plenary delegations meeting under the auspices of the GPS - Galileo Cooperation Agreement

Signing ceremony for GPS-Galileo Cooperation Joint Statement, Oct. 23, 2008
(Michel Bosco, European Commission; Kenneth Hodgkins, U.S. Department of State)

U.S. - Russian Federation Cooperation

- U.S.- Russia Joint Statement issued in December 2004
- Negotiations for a U.S.-Russia Agreement on satellite navigation cooperation have been underway since late 2005
- Several very productive technical working group meetings have been held:
  - Exchange of information regarding radio frequency compatibility and future civil signal designs
  - Next meeting of Working Group on Search and Rescue capabilities will be May 18-21 at St. Petersburg

Other U.S. Bilateral Cooperation

- U.S.-Japan Joint Statement on GPS Cooperation in 1998
  - Established foundation for stable policy leading to Japan as a global leader in commercial GPS/GNSS markets
  - Japan's Quasi Zenith Satellite System (QZSS) designed to be fully compatible and highly interoperable with GPS
  - U.S. working with Japan to set up QZSS monitoring stations in Hawaii and Guam in exchange for data access
- U.S.- India Joint Statement on GNSS Cooperation in 2007
  - Important topic is ionospheric distortion/solutions to this phenomena
  - Technical Meetings focused on GPS-IRNSS compatibility and interoperability held in 2008 and 2009
- U.S.-China
  - Several meetings under International Telecommunication Union auspices to coordinate signal interference issues

International Committee on Global Navigation Satellite Systems (ICG)

- ICG-3 held in December 2008 in Pasadena, California
- Began implementation of the ICG Work Plan within established working groups:
  - A. Interoperability and compatibility
  - B. Enhancement of performance of GNSS services
  - C. Information dissemination, education, outreach & coordination
  - D. Interaction with monitoring & reference station network organizations, e.g. Geodetic Reference Frames including AFREF
- Associated Providers Forum: includes U.S., Russia, EU, China, India, Japan
  - Updated definitions of interoperability and compatibility
- Russia will host the 4th ICG and Associated Providers Forum in St. Petersburg in September 14-18, 2009
- Italy will host the 5th ICG and Associated Providers Forum in December, 2010

APEC GIT Cooperation

- The Asia-Pacific Economic Cooperation (APEC) forum facilitates economic growth, cooperation, trade and investment in the Asia-Pacific region for its 21 member economies

- The APEC GNSS Implementation Team (GIT) has focused on air traffic control and aviation issues
  - The group now seeks to broaden its focus to the application of GNSS in all transportation sectors
  - Additional participation of GNSS government and industry experts is encouraged
  - Next GIT-13 meeting will be held in Singapore in conjunction with the Transportation Work Group

Summary

- **International cooperation** in the context of U.S. Space-based PNT Policy principles is a **top priority** for the U.S. Government
- Keys to GPS success include program stability and performance; policy stability and transparency; and private sector initiative and investment
- The U.S. is actively engaged in bi-lateral, multi-lateral and regional cooperation on satellite navigation issues
- Compatibility and civil interoperability are the keys to "success for all"

Contact Information

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