SPACE-BASED POSITIONING
NAVIGATION & TIMING
NATIONAL COORDINATION OFFICE

U.S. Civil GNSS International Cooperation

Anita Eisenstadt
State Department Advisor

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Overview

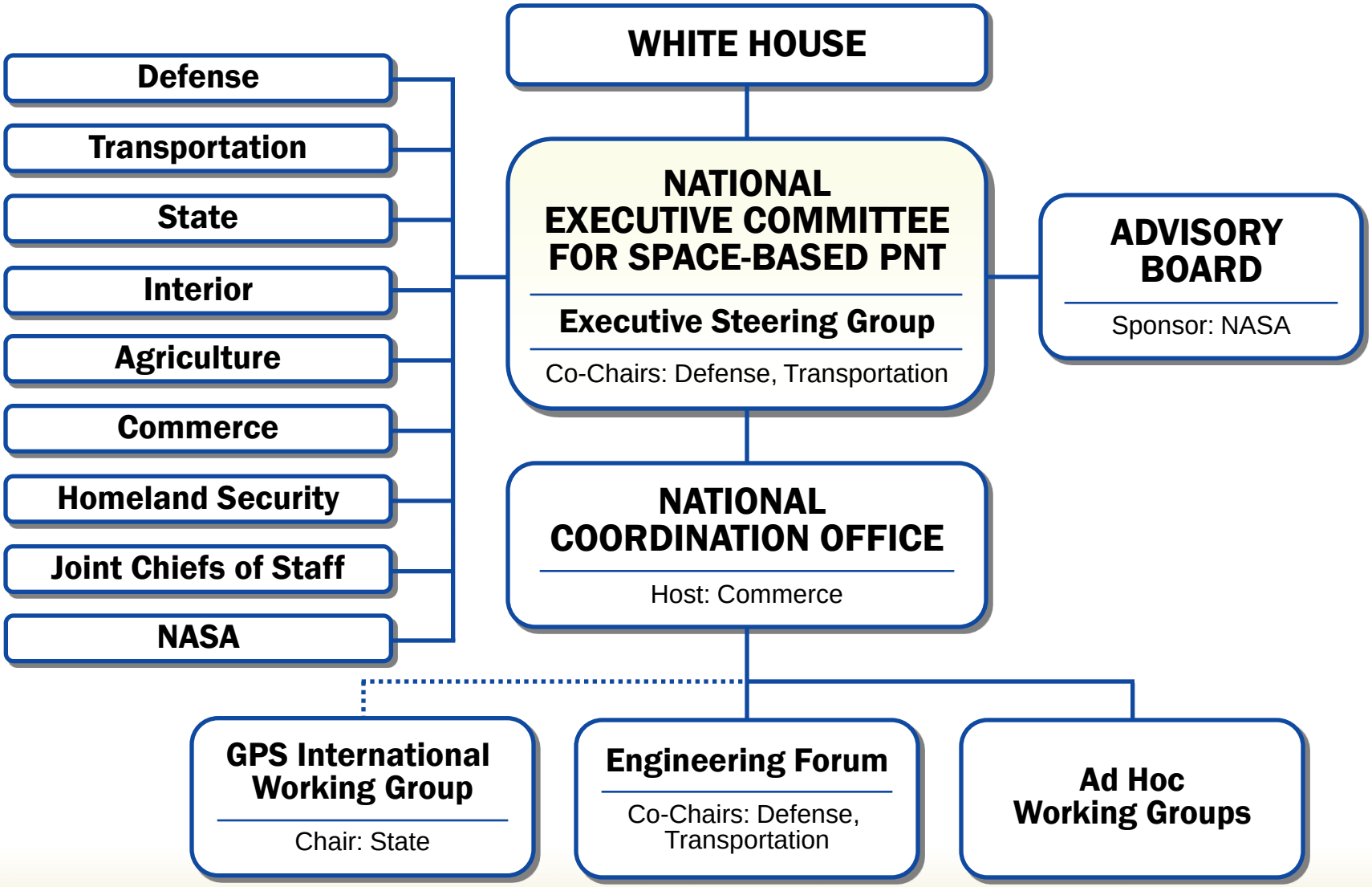
- **U.S. Policy**
- Bilateral Cooperation
- Multilateral Cooperation
- Summary

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 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



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
- Promote fair competition in the global marketplace

Pursue through Bilateral and Multilateral Cooperation

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Japan

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

Russia

- GPS-GLONASS discussions ongoing since 1996
- 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 Oct-Nov 2011 to discuss joint search and rescue capabilities
- Joint statement signed in Sept 2011 reaffirming intent to continue cooperation

Europe

- GPS-Galileo Agreement signed in 2004, ratified by EU in December 2011
- GPS-Galileo issues discussed at U.S.-EU Space Policy Dialogue in Brussels, June 2011
- ITU coordination meetings held in Sept and Dec 2011
  - Focused on GPS III, WAAS, EGNOS
- Trade working group met in Oct 2011 to discuss commercial issues, including potential LightSquared impacts to GNSS
- Annual plenary meeting scheduled for June 2012

China

- U.S. and China concluded ITU operator-to-operator coordination on GPS-COMPASS signal compatibility in Sept 2010
- Discussions on broader cooperation issues take place during meetings of the International Committee on GNSS
- Officials from both nations participated in bilateral GNSS workshop in Shanghai organized by U.S. and Chinese engineering academies, May 2011

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 Global Navigation Satellite Systems (ICG)

- Emerged from UNISPACE III (1999)
  - Promote the use of GNSS and its integration into infrastructures, particularly in developing countries
  - Encourage compatibility and interoperability among global and regional systems
  - Met annually since 2006
- Members include:
  - GNSS providers: China, EU, India, Japan, Russia, **United States**
  - Other interested UN Member States
  - International organizations/associations

U.S. Contributions to ICG-6

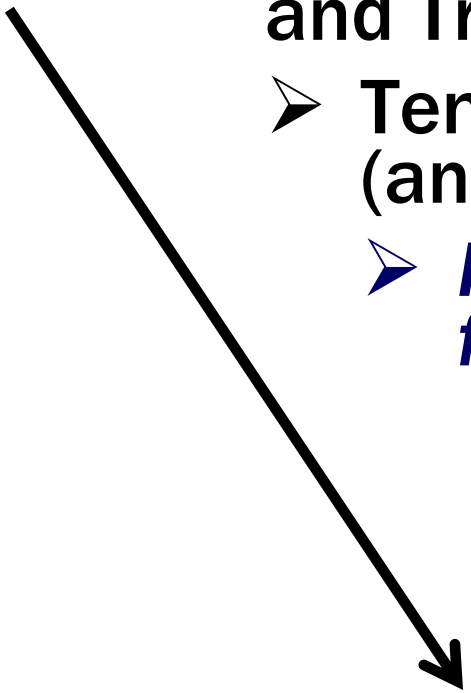
- 6th ICG meeting held in Tokyo, Sept 2011
- U.S. Presentations:
  - U.S. system and policy update, including information on LightSquared situation
  - GNSS for disaster management
  - FAA update
- U.S. Proposals:
  - Potential improvements to ICG website
  - Joint Japan-U.S. recommendation for Interference Detection and Mitigation (IDM) Workshop
  - Recommendation for GNSS service providers to define the Space Service Volume

ICG-6 Outcomes

- Approved IDM Workshop
- Development of multi-GNSS monitoring networks was major topic of discussion
  - ICG endorsed IGS Multi-GNSS Experiment
  - A subgroup will collectively investigate international GNSS monitoring and assessment
- Compatibility subgroup will initiate collaboration on Open Service GNSS performance parameters
- Completed templates describing geodetic and timing references for all systems

Progress in GNSS 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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- 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

Contact Information

Anita Eisenstadt

State Department Representative to the
National Coordination Office for
Spaced-Based Positioning, Navigation, and Timing

+1-202-482-5809

anita.eisenstadt@pnt.gov

www.gps.gov