SPACE-BASED POSITIONING NAVIGATION & TIMING

NATIONAL COORDINATION OFFICE

Policy Update

PNT Advisory Board

15 November 2017

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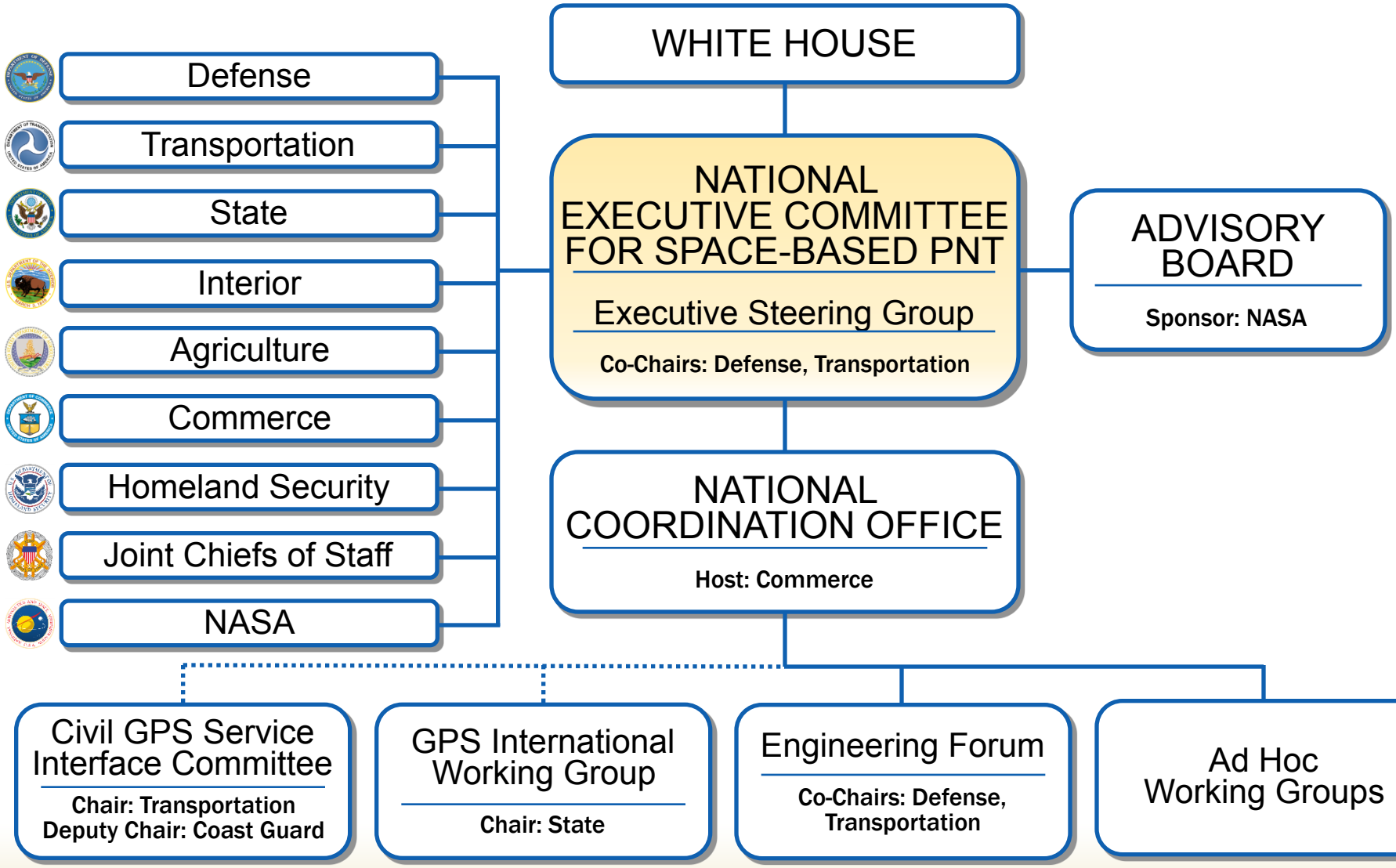
Washington D.C.

U.S. National Space Policy

Space-Based PNT Guideline: Maintain leadership in the service, provision, and use of GNSS

- **Provide continuous worldwide access to GPS for peaceful uses, free of direct user charges**
- **Engage with foreign GNSS providers on compatibility, interoperability, transparency, and market access**
- **Operate and maintain GPS constellation to satisfy civil and national security needs**
  - **Foreign PNT may be used to strengthen resiliency**
- **Invest in domestic capabilities and support international activities to detect, mitigate, and increase resiliency to harmful interference**

National Space-Based PNT Organization



EXCOM Strategic Focus Areas

- **GPS Sustainment and Modernization**
- **International Cooperation**
- **Spectrum Management**
- **Critical Infrastructure**
- **PNT Resilience**
- **Outreach**

National Space Council

- On June 30, 2017, President signed an executive order which revived the National Space Council (NSpC)
  - Advise and assist on National Space Policy and Strategy
  - Chaired by Vice President

- October 5, 2017, first NSpC meeting
  - Testimony from:
    - Civil Space
    - Commercial Space
    - National Security space Industry

The Airwaves Are Not Safe

- Computers and the Internet: Once Upon a Time…
  - A GPS receiver is more computer than radio…
- GPS relies on spectrum – no longer a safe haven
- GPS receivers lack cyber resilience
- Policy directs PNT resiliency (NSPD-39, PPD-4, PPD-21)
- Jan 6, 2017 - DHS released Best Practices document now available on GPS.gov:

  "Improving the Operation and Development of Global Positioning System (GPS) Equipment Used by Critical Infrastructure"

Protect GPS and America's Critical Infrastructure that Relies on GPS

GPS Cyber Challenges

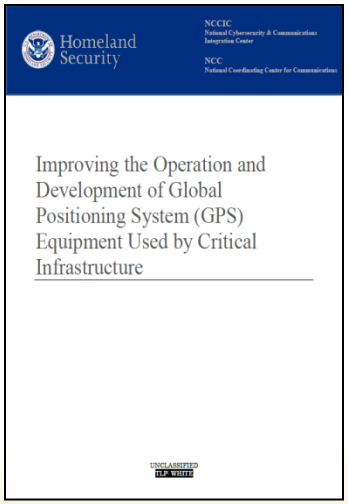
- GPS receivers across the U.S. Critical Infrastructure require greater cyber resilience
- Interference, jamming, and spoofing challenge competence of GPS receivers and associated PNT equipment and supported systems
  - Measurement spoofing: introduces RF waveforms that cause the target receiver to produce incorrect measurements of time of arrival or frequency of arrival or their rates of change.
  - Data spoofing: introduces incorrect digital data to the target receiver for its use in processing of signals and the calculation of PNT.
- Awareness regarding security and robustness of GPS and other PNT technologies needs improvement
- Mission critical systems and applications may be affected by the loss or manipulation of civil GPS signals

What You Can Do Now

- Incorporate GPS-related requirements as part of your Cyber Security Plan
- Demand ICD-compliant technologies:
  - Ahead of Tech refresh, update GPS equipment requirements
  - Adopt recommended Interface Control Document specifications
- Prioritize systems for upgrades

IS-GPS-200
IS-GPS-705
IS-GPS-800
www.gps.gov/technical/icwg

- Implement Best Practices:
  - Latest version Jan 17: *"Improving the Operation and Development of Global Positioning System (GPS) Equipment used by Critical Infrastructure"* (www.gps.gov)
  - Consider antenna mods
  - Install firewall between antenna and receiver
- Participate in standards development
  - Receivers must implement IS-GPS-200 changes
  - Incorporate "head room" for software updates
  - Apply good cyber hygiene



FY17 National Defense Authorization Act

- **On December 23, 2016, the National Defense Authorization Act (NDAA) for Fiscal Year 2017, included policy and funding guidance for the GPS program**
  - **Technology options to backup and complement GPS PNT information for National Security and Critical Infrastructure**
  - **Viability of a public-private partnership to establish a complementary PNT system**
  - **Viability of service level agreements to operate a complementary PNT system**
  - **Plan to meet the PNT requirements to include: costs, schedule, technical considerations, user equipment, and integration considerations**
  - **ID appropriate resourcing**
  - **Each Department appoint a Single Designated Official**

Thank You

www.GPS.gov provides detailed information on legislation pertinent to GPS, such as:

- Program Funding, specifically information on Defense and Transportation appropriations, as well as Defense Authorization (NDAA). The website has archival information going back to Fiscal Year 2009.
- You may also find information on legislation related to Geolocation, Privacy, and previous Enacted Laws.
- Subscribe to the GPS Bulletin

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