



U.S. GPS/GNSS International Activities Update

Civil GPS Service Interface Committee International Meeting

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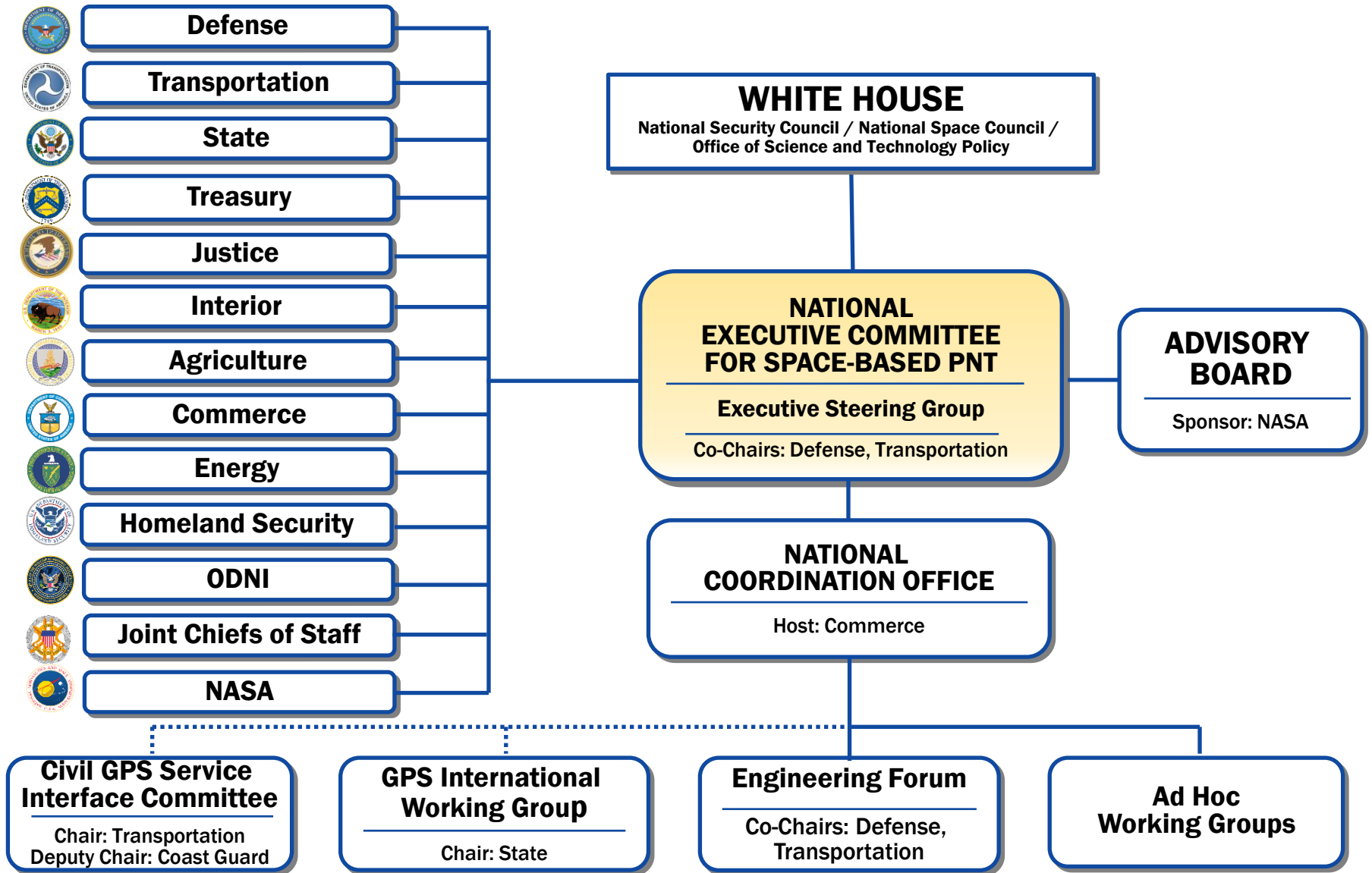
U.S. PNT Policy

Maintain U.S. leadership in the service provision, and responsible use of GNSS, including GPS and foreign systems

- 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
- Encourage **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
- Promote **transparency** in civil service provision and enable **market access** for U.S. industry
- Promote and support the **responsible use of GPS** as the pre-eminent space-based PNT service
- Foreign space-based PNT services may be used to complement civil GPS service
 - Receiver manufacturers should continue to improve security, integrity, and resilience in the face of growing cyber threats
- Encourage foreign development of PNT services and systems based on GPS
- Support international activities to **detect, mitigate, and increase resilience** to harmful disruption or manipulation of GPS



National Space-Based PNT Organizations





Global Perspective

- Global Constellations

- **GPS (24+3)**
- GLONASS (24+)
- GALILEO (24+3)
- BDS/BEIDOU (27+3 IGSO + 5 GEO)

- Regional Constellations

- QZSS (4+3)
- IRNSS/NAVIC (7)
- KPS (7)

- Satellite-Based Augmentations

- **WAAS (3)**
- MSAS (2)
- EGNOS (3)
- GAGAN (3)
- SDCM (3)
- BDSBAS (3)
- KASS - Korea (2)
- SPAN – Australia/NZ (2)





Bilateral Cooperation

Europe

- GPS-Galileo Agreement (2004) guides cooperation
- U.S.-EU Space Dialogue
 - PNT a core element
 - Next meeting in 2025
- Working Group on Next Generation GPS/Galileo Civil Services
 - Subgroups and Plenary met in June 2024, next meeting in early 2025
- Working Group on Compatibility and Interoperability
 - Meeting in September 2024

China

- Joint Statement on GPS/Beidou Compatibility and Interoperability - 2017
- Working level discussions through working groups as needed



Bilateral Cooperation (continued)

Japan

- Comprehensive Space Dialogue – Co-chaired by NSpC/NSC
 - Last meeting August 2024
 - Included GNSS discussions
- Technical Working Group (TWG) established for working level collaboration/coordination
 - Met in February 2024
- QZSS monitor stations hosted by U.S.

India

- U.S.-India Civil Space Joint Working Group (CSJWG)
 - India to host next meeting in first half of 2025
- Technical Working Group established for working level collaboration/coordination



Bilateral Cooperation (continued)

Korea

- Civil Space Dialogue
 - Next meeting in 2025
- Joint Statement of Cooperation on KPS signed May 2021
- Technical Working Group (TWG) established for working level collaboration/coordination
 - Met in April 2024

Other Bilateral PNT Engagements

- Australia – Bilateral PNT meeting scheduled for October 2024
- Canada – Bilateral PNT discussions on cross border issues
- UK – Bilateral discussions on PNT, including resiliency



Multilateral Cooperation

International Committee on GNSS (ICG)

- Pursuing a Global Navigation Satellite System-of-Systems to provide civil GNSS services that benefit users worldwide
 - Promote the use of GNSS and its integration into infrastructures, particularly in developing countries
 - Encourage compatibility and interoperability among global and regional systems
- U.S. priorities include spectrum protection, system interoperability and information dissemination
- 17th Meeting held in Madrid, Spain in October 2023
- New Zealand will host the 18th Meeting in October 2024 in Wellington



ICG and GNSS Spectrum Protection

- ITU is responsible for international spectrum framework, including the protection of radio services
- Actual implementation of this framework is accomplished by national telecommunication administrations
- National telecommunication administrations work with relevant industries and stake holders
- ICG provides a forum that can facilitate and encourage the protection of GNSS spectrum by its members and participants in a voluntary, non-binding way



Addressing Spectrum Protection and IDM within ICG

- Establishment of Compatibility Subgroup in 2011
 - Focused on compatibility issues to include spectrum protection and IDM
- Establishment of Interference Detection and Mitigation Task Force in 2013
 - Objectives include:
 - 1) Develop a common set of information to be reported to GNSS civil service centers
 - 2) Establish routine communications among the (provider service) centers
 - 3) Develop guidelines for common capabilities to be considered in the development of future national IDM networks
 - Eleven (11) IDM Workshops held since 2012



11th ICG Workshop on IDM

- Workshop held on 15 April 2024, hosted by U.S. (Honolulu)
- Agenda included:
 - 1) PNT from Low Earth Orbit** – *Mr. Bryan Chan, Co-Founder, XONA Space Systems*
 - 2) GNSS Interference Detection from Low Earth Orbit** – *Mr. Iain Goodridge, Federal Space Systems, SPIRE*
 - 3) Data Exploitation and Enhanced Processing (DEEP)** – *Dr. Steve Lewis, DEEP Chief Engineer, Aerospace Corp*
 - 4) USDOT IDM Update** – *Mr. James Aviles, Senior RF Engineer, Office of Research and Technology, U.S. Department of Transportation*
 - 5) EASA/IATA PNT Resiliency Workshop, 25 Jan, Cologne Germany** – *Ms. Christina Clausnitzer, U.S. Federal Aviation Administration*
 - 6) ICAO EUR/MID Radio Navigation Symposium, Antalya, Turkey** – *Mr. Ken Alexander, Chief Scientist, U.S. Federal Aviation Administration*
 - 7) Ambient-Aware PNT** – *Professor Dr Renato Filjar, FRIN, Faculty of Engineering, University of Rijeka, Rijeka, Croatia*



ICG Recommendations Related to IDM and Spectrum Protection

Recent Recommendations Adopted by the ICG

2014/2017	Crowdsourcing capabilities analysis for IDM
2015/2016/2017	UN regional workshops on GNSS spectrum protection and IDM
2015/2016	Campaign of Protection of RNSS operations – GNSS providers and GNSS user community member states promote spectrum protection
2015/2016	UN COPUOS multi-year agenda item focused on National Efforts to protect RNSS Spectrum, and develop IDM capability
2017	Encourage national regulators to use the protection criteria in relevant ITU-R Recommendations
2019	Produce a draft booklet on GNSS/RNSS spectrum Protection based on material used for the ongoing spectrum seminars
2022	Incorporating Resilience into GNSS Interference Detection and Mitigation



Other Important ICG Activities

Interoperability and Service Standards

- Performance Standard Template
 - "Guidelines" document developed as a template for Providers
- International GNSS Monitoring and Assessment (IGMA)
 - Trial Project with IGS continues, Workshop held in January 2024
- Interoperable Time – Focus on System Time Offsets
 - Working with industry to get views and perspective

Space Service Volume and Lunar PNT

- UN booklet "The Interoperable GNSS SSV" 2nd edition published by the ICG
- Technical discussions and outreach efforts continue under U.S. leadership

Geodetic Reference Frames

- Focus on improving interoperability through alignment of reference frames



LEO PNT Workshop (ICG)

June 26-27 in Vienna, Austria

- Briefings from emerging LEO-PNT initiatives
- Compatibility and interoperability with GNSS and among LEO-PNT providers
 - How to apply compatibility and interoperability between LEO systems and GNSS
 - ITU coordination mechanisms to ensure compatibility
- Discussion on future ways to involve commercial/emerging LEO PNT providers in ICG work



18th Meeting of the International Committee on GNSS (ICG)



- **Mix of Government and Academic Participants**
 - Expecting more than 200 people will participate in hybrid format
 - All 6 GNSS Providers expected, as well as other members and observers
- **Agenda includes:**
 - Meeting of the Providers' Forum
 - System Provider Updates
 - Applications and Experts Session
 - Meeting of all four Working Groups



Summary

- U.S. Policy continues to focus on maintaining **leadership in the service provision**
 - **Compatibility, interoperability, and transparency** remain priorities
 - Pursued through bilateral and multilateral dialogues
- Bilateral cooperation forms the basis for carrying out U.S. policy
- U.S. support for the ICG continues with a focus on civil GNSS services that benefit users worldwide
 - U.S. priorities include **spectrum protection, system interoperability and information dissemination**



THANK YOU!

*Office of Space Affairs
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