



# ***U.S. International GNSS Activities Update***

## **National Space-Based Positioning Navigation and Timing (PNT) Advisory Board: 20th Meeting**

Redondo Beach, CA

***Office of Space and Advanced Technology  
U.S. Department of State***

***November 15, 2017***



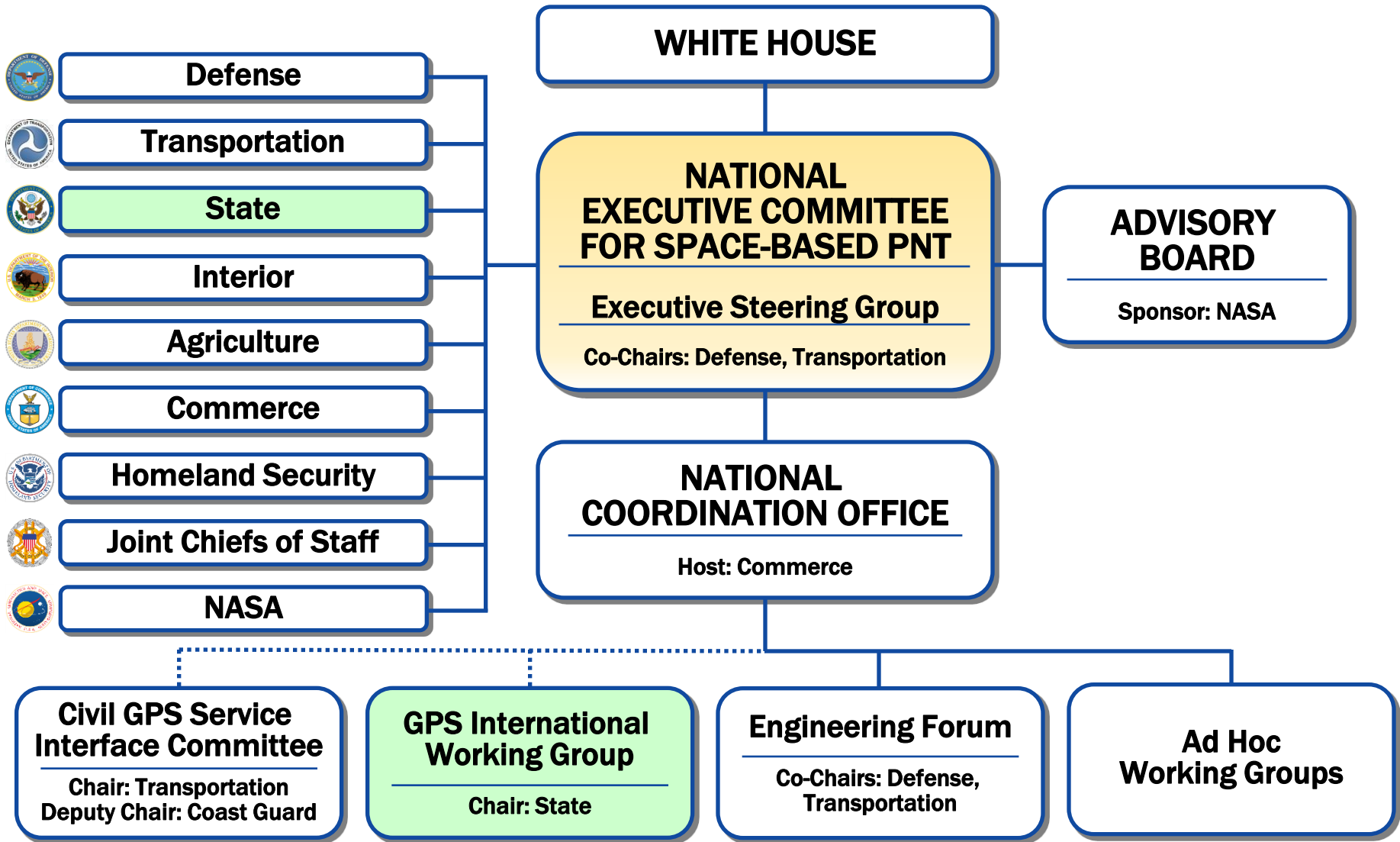
# ***U.S. National Space Policy***

## ***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



# National Space-Based PNT Organization





# ***GNSS: A Global Navigation Satellite System of Systems***

- 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)

- Satellite-Based Augmentations

- **WAAS (3)**
- MSAS (2)
- EGNOS (3)
- GAGAN (3)
- SDCM (3)
- BDSBAS (3)
- KASS (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
- Promote fair competition in the global marketplace

***Pursue through Bilateral and Multilateral Cooperation***



# *Bilateral Cooperation*

## China

- Most recent civil GNSS Plenary meeting held June 2015 in Washington, D.C. – next meeting tentatively scheduled for early 2018
- Working Group and Subgroups established – meet as needed
  - Sub-group on compatibility and interoperability met June 2017 in Los Angeles

## India

- U.S.–India Joint statement signed in 2007
- U.S.-India Civil Space Joint Working Group (CSJWG) met October 2017 in Washington
  - Agenda included GNSS discussions



# *Bilateral Cooperation (continued)*

## Europe

- GPS-Galileo Cooperation Agreement signed in 2004
- Working Group on Next Generation GPS/Galileo Civil Services meets twice per year – most recent meeting September 2017 in Los Angeles
- EU request to waive FCC Part 25 rules discussed by Working Group on Trade & Civil Applications
- PRS access negotiations are under way

## Japan

- Civil Space Dialogue held in Washington May 2017
- Technical Working Group (TWG) and Plenary-level meetings discuss GPS and QZSS compatibility and interoperability
  - TWG met most recently in September 2017 to discuss compatibility coordination



# *Additional Bilateral Dialogues*

- *Canada:* Civil GNSS meeting held in Ottawa – November 2017
  - Also included meeting on space weather
- *Republic of Korea:* 2nd bilateral Civil Space Dialogue held in Seoul – April 2016
  - Discussion about Korea's development of their SBAS
- *Australia:* Joint Delegation Statement on Cooperation in the Civil Use of GPS in 2007
  - Last formal space bilateral meeting held in Oct. 2010
- *Other bilateral civil space dialogues:* Vietnam; United Arab Emirates; Ukraine





# *U.S. Federal Communications Commission (FCC) Part 25 Rules*

- FCC rules require licensing of receive-only Earth stations (receivers) operating with Non-U.S. Licensed Space Stations [47 CFR § 25,131(j)(1), 25.137]
  - Established in 1997 when opened market for non-U.S. licensed satellites under WTO Basic Telecom commitments [IB Docket No. 96-11, 12 FCC Rcd 24094 (1997) (*DISCO II Order*)]
  - Applies to non-Federal users only
- NTIA (on behalf of Executive Branch) has outlined criteria it will apply in recommending waiver of these rules (2011)
  - Process for considering waiver request from foreign government initiated through consultation with U.S. Department of State
  - FCC could also consider non-gov't requests through established licensing/waiver procedures

***No FCC licensing or waiver of Part 25 rules to date for use of multi-GNSS receivers in the U.S.***



# ***FCC Part 25 Rule Evaluation Criteria & EU Galileo Waiver Request***

- Considerations (criteria):
  1. Grant of a waiver is in the public interest
  2. System complies with United Nations Space Debris Mitigation guidelines
  3. Grant of a waiver is consistent with U.S. international trade and other treaty obligations
  4. Waiver request is limited to receive-only RNSS (which includes positioning) and standard time and frequency satellite services
  5. Operation of the RNSS signals offered by the foreign RNSS system has been found compatible with U.S. government systems operating in the specified RNSS frequency bands
- EU Waiver Request Submitted to State **in 2013**
  - NTIA submitted the EC's request to the FCC, on behalf of the Executive Branch, **in 2015** and recommended granting the request
  - FCC issued a public notice on **06 January 2017** inviting interested parties to comment on the waiver request
    - 13 Comments - closed 21 February
    - 4 Reply Comments - closed 23 March



# *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



<http://www.unoosa.org/oosa/en/ourwork/icg/icg.html>



# *ICG Meetings*

## **Past ICG Meetings**

- ICG-1: UN Vienna, Austria – November 2006
- ICG-2: Bangalore, India – September 2007
- [ICG-3: Pasadena, CA, USA – December 2008](#)
- ICG-4: St Petersburg, Russia – September 2009
- ICG-5: Turin, Italy – October 2010
- ICG-6: Tokyo, Japan – September 2011
- ICG-7: Beijing, China – November 2012
- ICG-8: Dubai, UAE – November 2013
- ICG-9: Prague, Czech Republic – November 2014
- [ICG-10: Boulder, CO, USA – November 2015](#)
- ICG-11: Sochi, Russia – November 2016

## **Future Meetings**

- [ICG-12: Japan – December 2017](#)
- ICG-13: China – 2018
- ICG-14: India – 2019
- ICG-15: UN Vienna, Austria - 2020



# *11<sup>th</sup> Meeting of the International Committee on GNSS (ICG-11)*



- More than 100 participants
  - Representatives from 21 countries/organizations
  - Representation from all 6 GNSS Providers
- Agenda included:
  - Meeting of the Providers' Forum
  - System Provider Updates
  - Applications and Experts Session
  - Meeting of all four Working Groups







# *PNT Advisory Board Participation in ICG*

- Dr. Parkinson made a Plenary presentation on Advisory Board activities at ICG-11 in 2016
  - Dr. Rashad also participated representing the Arab Institute of Navigation
- Dr. Betz will participate in ICG-12 and provide an update on Advisory Board Activities

The screenshot shows the homepage for the 12th Meeting of the International Committee on Global Navigation Satellite Systems (ICG-12) in Kyoto, Japan, December 2017. The header features logos for the United Nations, ICG, and the 12th ICG meeting. The main title is "12th Meeting of the International Committee on Global Navigation Satellite Systems". A navigation menu includes: HOME, REGISTRATION, AGENDA, TRANSPORT, VENUE, LODGING, VISA, ABOUT KYOTO, and CONTACT US. The main content area has a "HOME" heading and a "Welcome to ICG-12" message. Below this, it states: "ICG-12 will be held in Kyoto, Japan from 2nd to 7th December, 2017. Japan will host the twelfth Meeting of the International Committee on Global Navigation Satellite Systems (ICG-12) 2-7 December, 2017. The meeting will be co-organized by the Cabinet Office, Government Of Japan and the Ministry of Foreign Affairs of Japan. The details of the meeting including venue, program, accommodation, etc. will be posted on this website in due course." A video player is embedded with the title "KyotoMICE\_Web.mp4" and a play button. At the bottom, there are logos for the ICG, Japan's "Endless Discovery" campaign, and the "KYOTO" logo with the text "THE EXPERIENCE WILL CHANGE YOU." and "WE'RE OFFICIAL WEBSITE."

**Advisory Board Member participation at ICG Meetings is welcome and helps to underscore the importance of the advisory board concept!**



# *The ICG and GNSS Interference and Spectrum Protection*

- ICG Core Area of Focus since its inception
  - *"Develop a strategy for support by the International Committee of mechanisms to detect and mitigate sources of electromagnetic interference, taking existing regulatory mechanisms into consideration"*
  - Primarily discussed within the Working Group on Systems, Signals and Services (WG-S)
  - Subgroup on Compatibility & Spectrum Protection formed in 2010
  - Interference Detection and Mitigation (IDM) Task Force formed in 2013
- Recent Activities
  - Two Seminars on Spectrum Protection (2015 and 2016) – **Outreach and Education**
  - Reporting by COPUOS Member States on Spectrum Protection and IDM – **National-level Action and Accountability**
  - Six IDM Workshops – **Discussion on tools and techniques**



# ***Achieving Interoperability Through the ICG***

- Interoperability Subgroup under the Working Group on Systems, Signals and Services (WG-S)
- Performance Standards
  - Working on defining common parameters to monitor
- Monitoring and Assessment
  - International monitoring trial project underway with IGS
- Timing discussions
  - Workshop held in July 2017
- Space Service Volume (SSV)
  - Discussion and outreach on achieving an interoperable SSV in the Working Group on Enhancement of GNSS Performance
- Search and Rescue (SAR)
  - Recognition by providers of the importance of having interoperable SAR services





# *Summary*

- U.S. policy encourages the worldwide use of civil GPS services and cooperation with other GNSS providers
  - **Compatibility, interoperability, and transparency in civil service provision** are priorities
  - Pursued through bilateral and multilateral dialogues
- The ICG, with strong U.S. participation, serves as a good mechanism for collaboration on spectrum protection, interference detection and mitigation, and interoperability

