U.S. GPS International Activities and Engagement

12th National Space-Based Positioning, Navigation and Timing (PNT) Advisory Board

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Overview

- **U.S. Space-Based PNT Policy**
- International Cooperation Activities
- 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 complement services from 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. Policy Promotes Global Use of GPS 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
- Global compatibility and interoperability with GPS
- Service improvements for civil, commercial, and scientific users worldwide
- Protection of radionavigation spectrum from disruption and interference

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Planned Global and Regional Space-based PNT Services and Augmentations

- Global Constellations
  - **GPS (24+)**
  - GLONASS (24+)
  - Galileo (27+3)
  - Compass (27+3 IGSO + 5 GEO)

- Regional Constellations
  - QZSS (4+3)
  - IRNSS (7)
- Satellite-Based Augmentations
  - **WAAS (3)**
  - MSAS (2)
  - EGNOS (3)
  - GAGAN (2)
  - SDCM (3)

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

Russia: Update on GLONASS Civil Signal Monitoring Discussions

- The Government of the Russian Federation made a formal proposal to the United States in May 2012 to consider hosting SDCM sites within U.S. territory that would monitor GLONASS civil signals
  - The FAA and NASA initially expressed interest in acting as hosts
- Subsequently, U.S. officials have requested more information through discussions led by State in coordination with Executive Branch Departments and Agencies
  - Based on the on-going discussions, the original Russian proposal has evolved and is currently under review within the U.S. government
- No final decisions have been made
- All GNSS discussions, including those with Russia, take into account a broad spectrum of U.S. economic, national security, and foreign policy considerations

Other Bilateral Cooperation Update

- **China**:
  - Informal discussions with China Satellite Navigation Office (CSNO) and China National Administration of GNSS and Applications (CNAGA), on the margins of multilateral international meetings in 2012 and 2013
  - China has agreed to a more formal bilateral GNSS discussion to be held in China, possibly in May 2014. Agenda topics could include: signal compatibility, interoperability, and aviation applications
- **European Union**:
  - Working Group C met in September in Washington and made progress on a draft report on advanced aviation applications of GPS and Galileo signals
  - Ongoing coordination under ITU rules on GPS III
  - EU seeking waiver of FCC rules requiring licensing of all Galileo capable receive-only earth stations operating with a non-U.S. licensed space station (Galileo system)

Other Bilateral Cooperation Update

- **India**:
  - U.S. – India Joint statement signed in 2007
    - Cooperation on GPS and GPS augmentations
    - Expanded effort to ensure interoperability between GPS and GAGAN
  - ITU Coordination in progress – Meeting in early 2013
  - U.S.-India Civil Space Joint Working Group (CSJWG) bilateral meeting held in Washington, DC in March 2013
- **Japan**:
  - Joint statement signed in 1998
  - Annual plenary meeting held in Tokyo July 2013
    - Both sides reaffirmed close cooperation on GNSS issues, no major outstanding problems or issues
    - GPS-QZSS Technical Working Group met to discuss compatibility coordination under the ITU auspices for planned expanded regional QZSS

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)
  - ICG also includes 22 Other Member States of the United Nations and International organizations/associations representing the user community

http://www.icgsecretariat.org

Progress at ICG in GNSS Civil 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*

ICG-8 Meeting in Dubai: Nov 10-14, 2013

- Interference detection and mitigation (IDM) Task Force established
  - Focus on developing a common set of information to be reported to GNSS civil service centers
  - Third IDM Workshop to be held in 2014 (China likely host)
- Interoperability Task Force established
  - Focus on analyzing the results of the April 2013 U.S. hosted Interoperability Workshop
  - Additional Interoperability Workshops to be held in 2014 (hosted by different GNSS Providers)
- Multi-GNSS monitoring: International GNSS Monitoring and Assessment (IGMA) Task Force to focus on:
  - Identifying what service parameters should be monitored
  - Defining the level and methods for carrying out the monitoring
- Consensus that achieving a fully interoperable GNSS space service volume would provide significant performance benefits that no single system could provide on its own

ICG-9 will be hosted by the EU in Prague, November 2014

Summary

- U.S. policy encourages worldwide GPS use
  - International cooperation is a priority
  - Bilateral and Multilateral cooperation is ongoing
- GLONASS civil monitoring cooperation under careful review – more information needed – no decision has been made
- ICG-8 created three task forces to further work on IDM, interoperability and multi-GNSS monitoring

For Additional Information…

www.gps.gov