



SPACE-BASED POSITIONING
NAVIGATION & TIMING
NATIONAL COORDINATION OFFICE

The U.S. Space-Based PNT Policy Update

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Introduction

- During the past decade, GPS has grown into a **global utility** providing space-based positioning, navigation and timing (PNT)
 - Consistent, predictable, dependable policy and performance
 - Augmentations improve performance

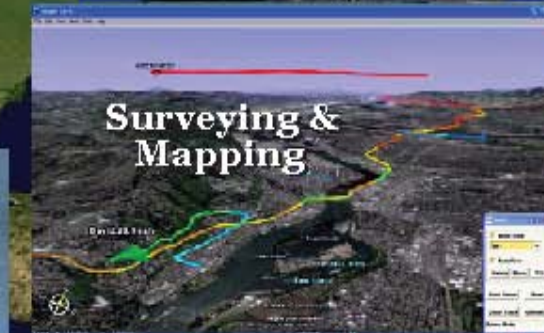


- Like the Internet, GPS is a **critical component of the global information infrastructure**
 - Scalable applications enabling broad new capabilities
 - Innovations in efficiency, safety, environmental protection, public security and science

GNSS Applications Support A Wide Range of Economic Activities



Communications Network Synchronization





GNSS is Key to Scientific Monitoring of the Earth



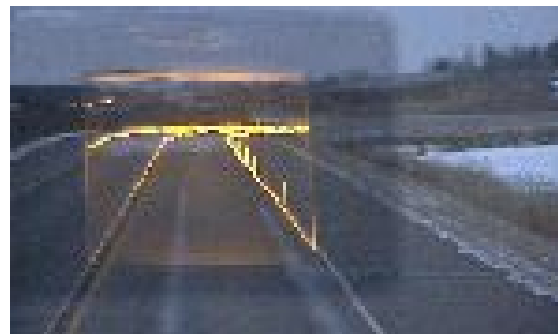
To better understand the changes and complex dynamic processes of our home planet



New Applications Are Evolving Every Day



- Wireless/mobile applications
- Child/pet tracking
- Spacecraft control
- Power grid management
- Open pit mining
- Automatic snowplow guidance



GPS Antennae



U.S. Policy History



- **1978: First GPS satellite launched**
- **1983: President offered free civilian GPS access to GPS**
- **1996: Established joint civil/military GPS management**
- **1997: Congress passes law providing civil GPS access free of direct user fees**
- **2000: President set Selective Availability to “Zero”**
- **2004: President issues U.S. Policy on Space-Based PNT**
- **2007: President announces Selective Availability eliminated from future GPS III satellites**



2004 U.S. Space-Based PNT Policy



- **No direct user fees** for civil GPS services
- **Open public signal structures** for all civil services
 - Promotes equal access for user equipment manufacture, applications development and value-added services
 - Encourages open market-driven competition
- Encourage use of **GPS time, geodesy and signal standards**
- Promote global **compatibility and interoperability** of GNSS systems with GPS
- Protect the **radionavigation spectrum** from disruption and interference
- Recognition of national and international **security issues** and protect against misuse



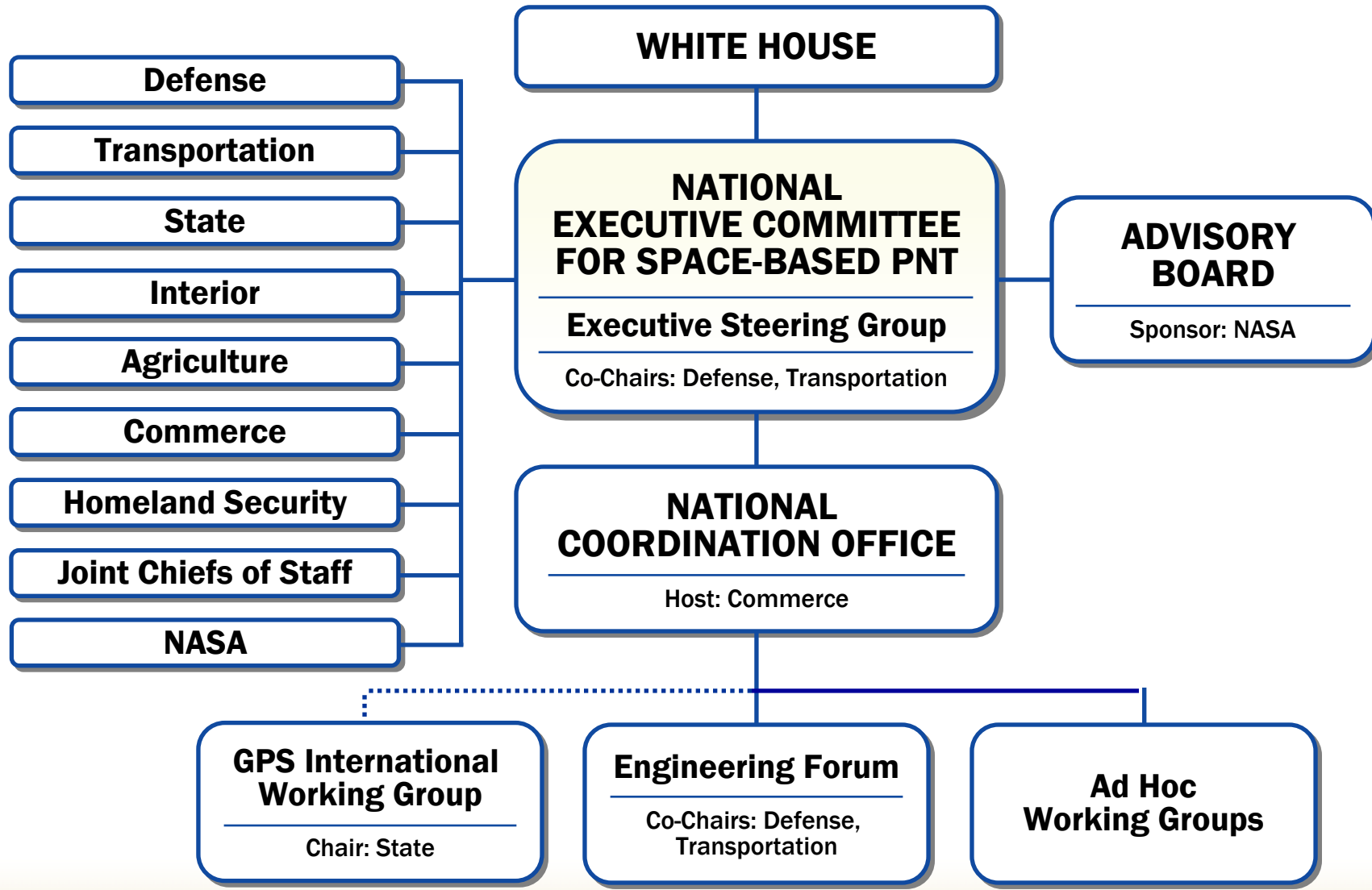
2004 U.S. Space-Based PNT Policy



- Recognizes the **changing international scene**
 - Other nations are implementing space-based systems that provide PNT services
- **National Executive Committee** for Space-Based PNT
 - Chaired by Deputy Secretaries of Defense and Transportation
 - Membership includes: State, Interior, Agriculture, Commerce, Homeland Security, Joint Chiefs of Staff and NASA
- Established **National Coordination Office** with staff from each member agency



U.S. Space-Based PNT Structure





Key Executive Committee Activities

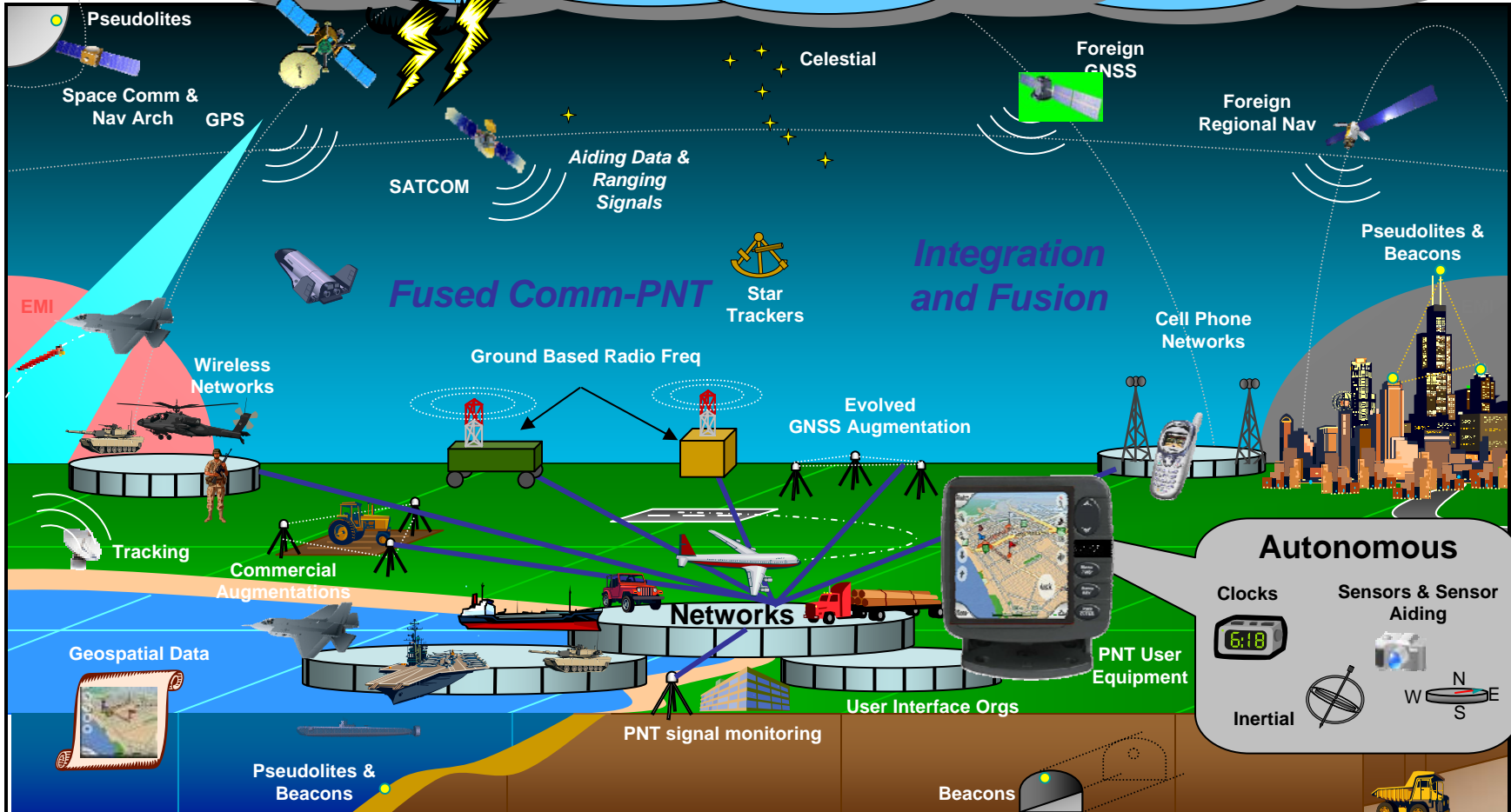
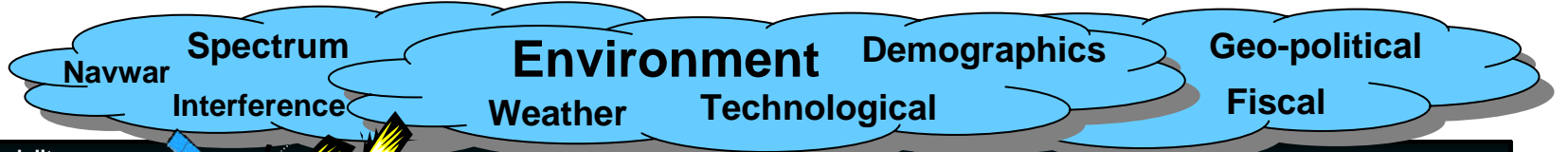


Eight meetings since 2006

- **Five-Year National Space-Based PNT Plan**
 - Summarizes EXCOM agency planning for development, acquisition, sustainment and modernization of U.S. space-based PNT systems
- **Interference Detection and Mitigation Plan**
 - Department of Homeland Security coordinating U.S. capabilities to detect and mitigate sources of interference to GPS and its augmentations
- **National PNT Architecture**
 - Provides national PNT framework/investment strategy to help guide future PNT system-of-systems investment – 2025 timeframe
- **International Cooperation and Consultation**
 - Compatibility and interoperability with other foreign systems



Should-Be PNT Architecture (2025)



Standards	Reference Frames	Cryptography	Science & Technology	USNO	NIST	NGA	NGS
Star Catalogs	Launch	ENABLERS & INFRASTRUCTURE		NSA	Industrial Base		
Electro Optical Info.	Modeling	Mapping/Charting/Geodesy	Laser Ranging Network		Policies	Testing	



Existing and Future GNSS



- **Global Constellations**
 - GPS (US)
 - GLONASS (Russia)
 - Galileo (EU)
 - Compass (China)
- **Regional Constellations**
 - QZSS (Japan)
 - IRNSS (India)
- **Satellite-Based Augmentations**
 - WAAS (US)
 - EGNOS (EU)
 - MSAS (Japan)
 - GAGAN (India)



2004 U.S. Space-Based PNT Policy

International Relations



Goals:

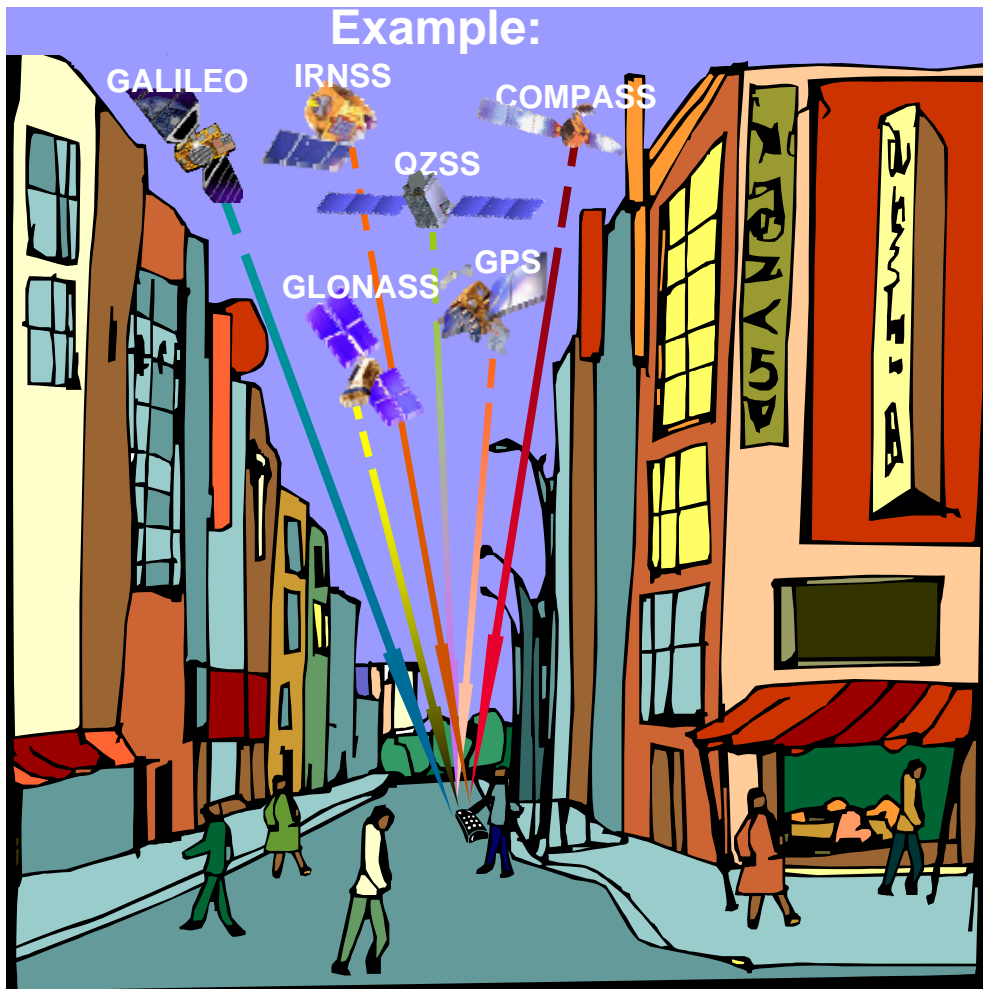
- U.S. space-based PNT systems and services remain essential components of internationally accepted services
- Promote U.S. technological leadership in applications involving space-based PNT services

To achieve these goals, the U.S. shall:

- Encourage foreign development of PNT services/systems based on GPS
 - Seek to ensure foreign space-based PNT systems are **interoperable** with civil GPS and augmentations
 - At a minimum ensure **compatibility**
- Promote use of GPS and its augmentations, civil services and standards with foreign gov'ts and other int'l organizations



Goal of Civil Interoperability



- **Ideal interoperability** provides users a PNT solution using signals from different GNSS systems:
 - No additional receiver cost or complexity
 - No degradation in performance

Interoperable = Better Together Than Separate



International Committee on GNSS (ICG) and Providers Forum



- **ICG was established November 2006**
 - Promote the use of GNSS and its integration into infrastructures, particularly in developing countries and encourage compatibility and interoperability among global and regional systems
 - Members include: GNSS providers (U.S., EU, Russia, China, India, Japan), international organizations and associations
 - U.S. to host ICG-3 in Pasadena, Dec 2008
- **Providers Forum established at ICG-2, Sep 2007**
 - Six providers listed above are members
 - Enables focused discussions on compatibility and interoperability
 - Consensus reached on the general definitions of compatibility and interoperability - including spectral separation between each system's authorized service signals and other systems' signals



Summary



U.S. Space-based PNT effort progressing well in policy, programs and international outreach

- **Implementation of 2004 U.S. Policy proceeding well**
- **U.S. space-based PNT system performance continue to improve into the future**
- **International cooperation is a top U.S. priority**
 - **Actively engaged in multi-lateral/bi-lateral consultations**
- **New GNSS applications emerging**

As new space-based GNSSs emerge, compatibility and interoperability is the key to “success for all”



Web-based Information



- **PNT.gov** established to provide a source for information about U.S. Space Based PNT Program including:
 - U.S. policy, Executive Committee membership, Advisory Board and frequently asked questions
 - Announcements about Selective Availability and offer letter to International Civil Aviation Organization
 - Recent public presentations
- **GPS.gov** established for public information about GPS applications
 - Available in English, French, Spanish, Arabic and Chinese
 - Brochures also available in hardcopy upon request
 - Links to various other Web sites



Contact Information



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This presentation and other GPS information:
www.pnt.gov