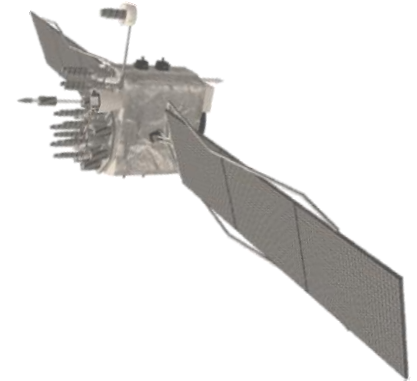




U.S. Space-Based Positioning, Navigation and Timing Policy and Augmentations Update

6th International Committee on GNSS

5 September 2011



*Ken Alexander
Senior Advisor, National Coordination Office*

United States of America

GNSS is Essential to Our Economies



Satellite Operations



Surveying & Mapping



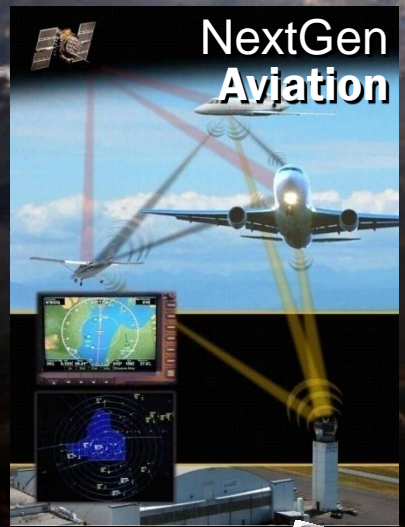
Power Grids



Precision Agriculture



Transit Operations



NextGen Aviation



Trucking & Shipping



Intelligent Vehicles



Telecom



Trucking & Shipping



Personal Navigation



Disease Control



Oil Exploration



Fishing & Boating²



U.S. Policy History

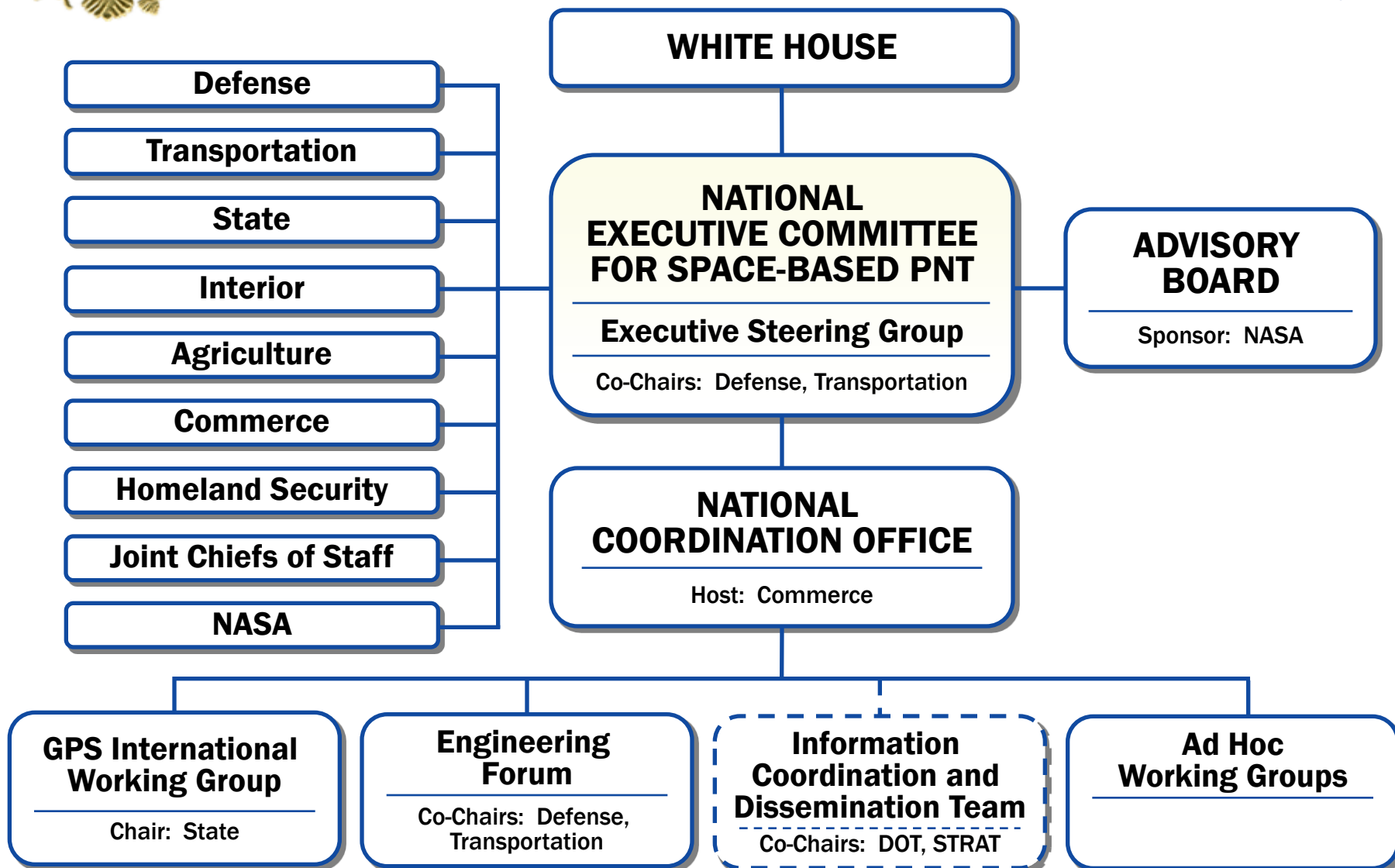


- 1983: President announces civilian access to GPS following loss of KAL 007
- 1991: U.S. offers free civil GPS service to the International Community
- 1996: First U.S. GPS Policy establishes joint civil/military management
- 1997: U.S. law provides civil GPS access free of direct user fees
- 2000: President ends use of *Selective Availability*
- 2004: President issues U.S. Policy on Space-Based PNT
- 2004: Agreement signed on GPS-Galileo Cooperation
- 2007: President announces *Selective Availability* eliminated from future GPS III satellites
- 2010: New National Space Policy provides high-level PNT guidance





U.S. Space-Based PNT Organizational Structure





U.S. Policy Promotes Global Use of GPS Technology



- No direct user fees for civil GPS services
 - Provided on a continuous, worldwide basis
 - Including both current and future civil GPS services
- 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
- Service improvements for civil, commercial, and scientific users worldwide
- Protection of radionavigation spectrum from disruption and interference
- Global compatibility and interoperability with GPS



National Space Policy

June 2010



- Provide continuous worldwide access for peaceful uses, free of direct user charges
- Encourage compatibility and interoperability with foreign GNSS services
- Operate and maintain 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



Keys to Successful U.S. Program

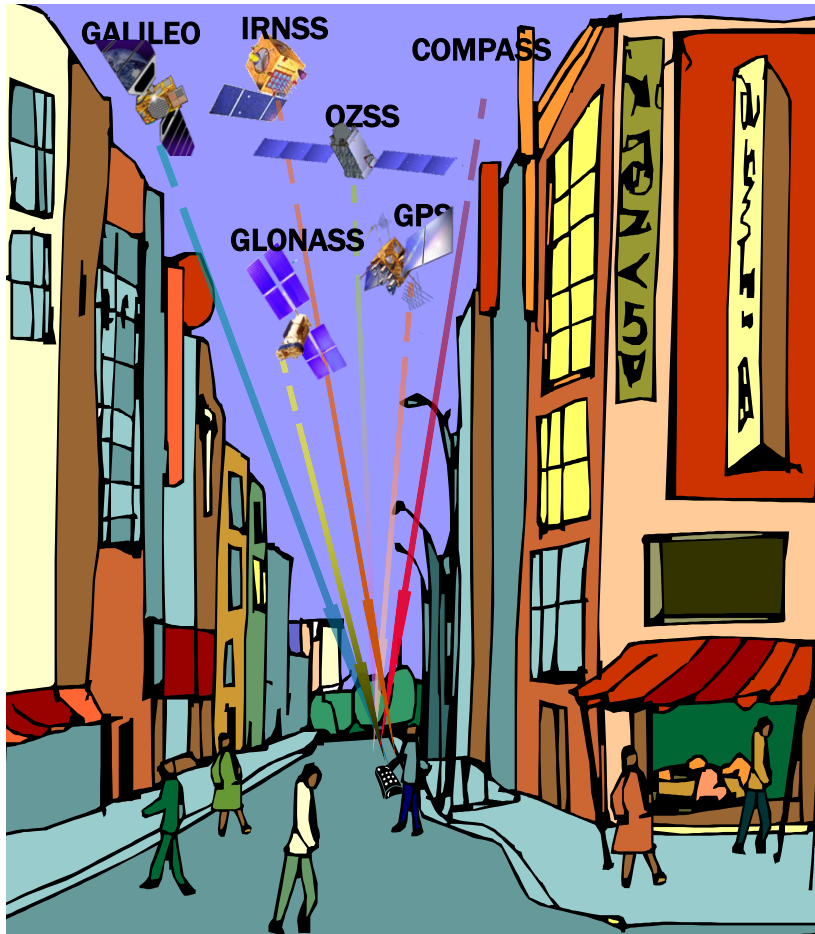


- Policy Stability
- Transparency
- Program Stability
- Sustained Performance and Credibility
- Continuous Improvement

Policy stability and transparency improve industry confidence and investment



The Goal of GNSS Civil Interoperability



- Compatibility
 - Do no harm
- 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

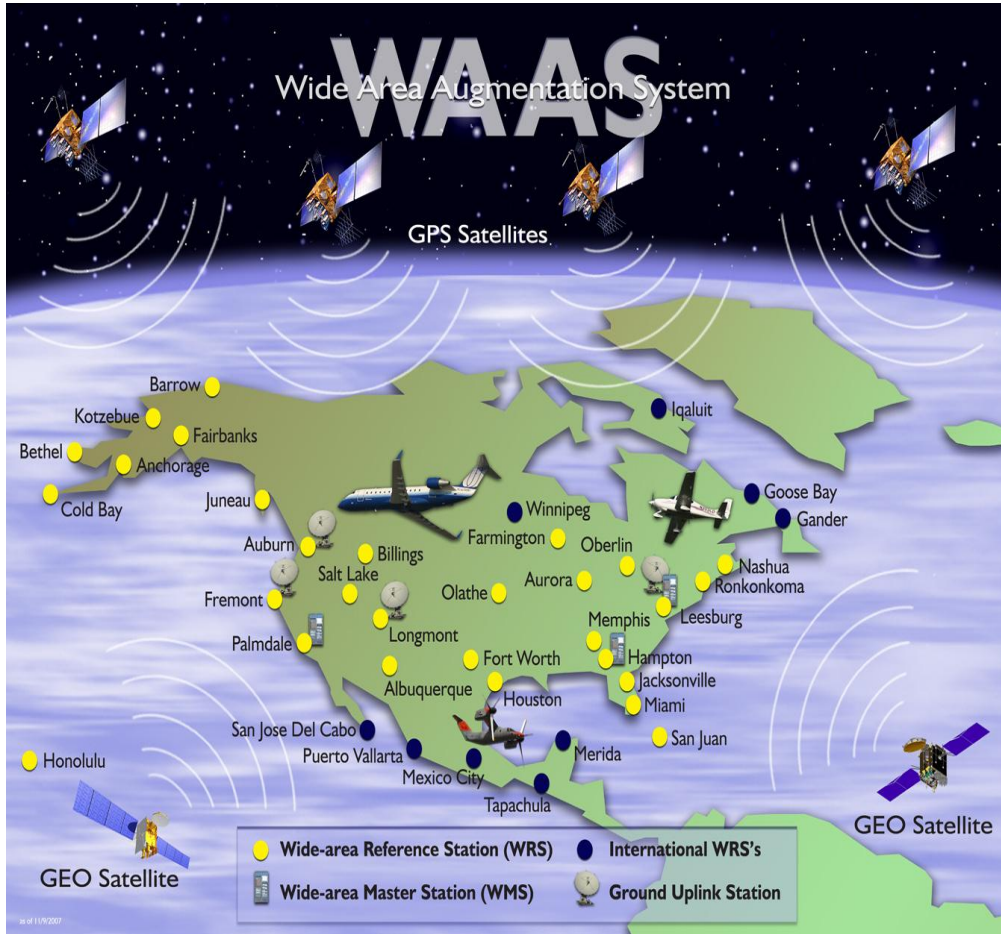


GPS Augmentation Systems

Ken Alexander



WAAS Architecture



38 Reference Stations

3 Master Stations

6 Ground Earth Stations

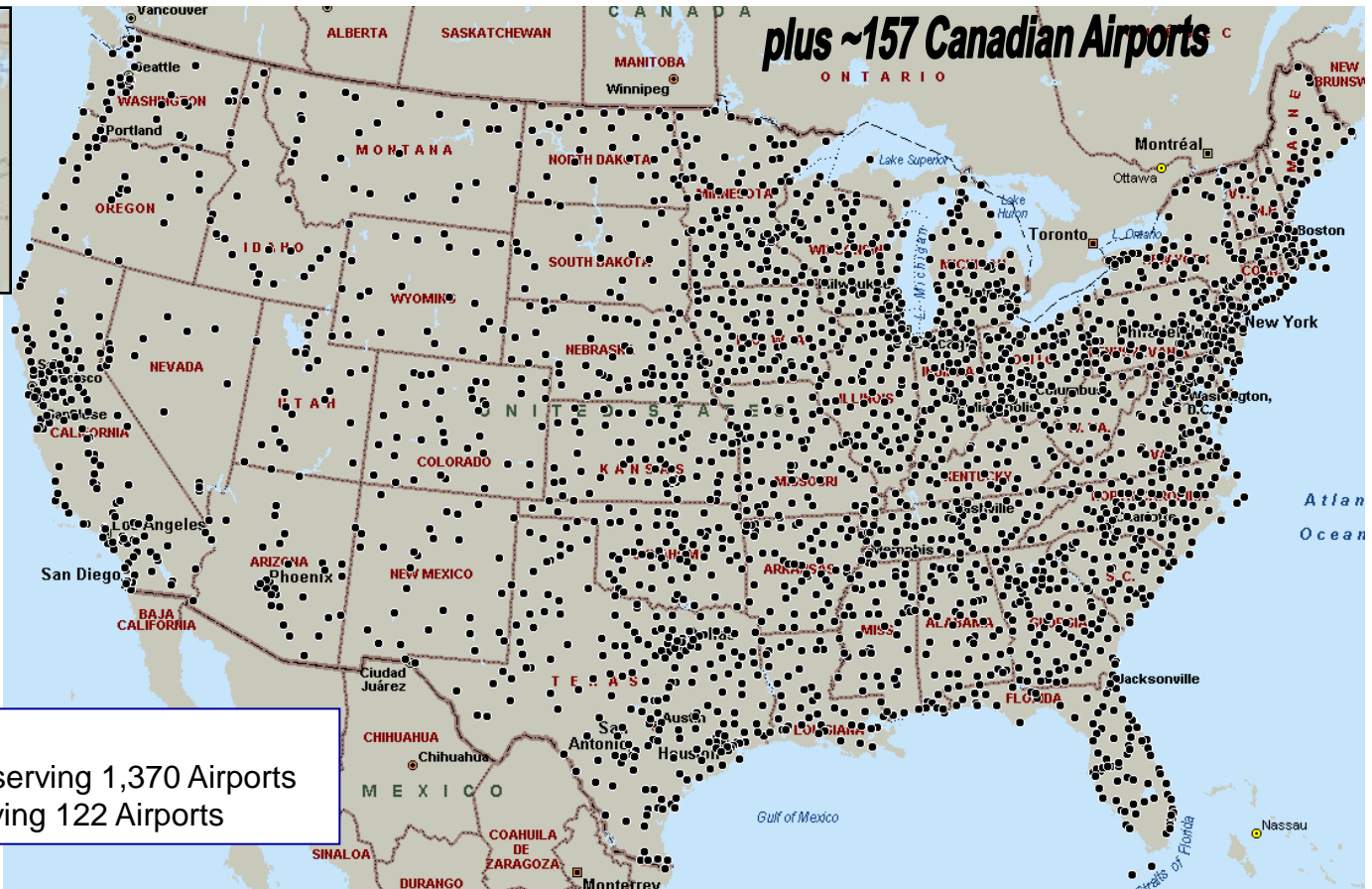


3 Geostationary Satellite Links

2 Operational Control Centers



Airports with WAAS Instrument Approaches

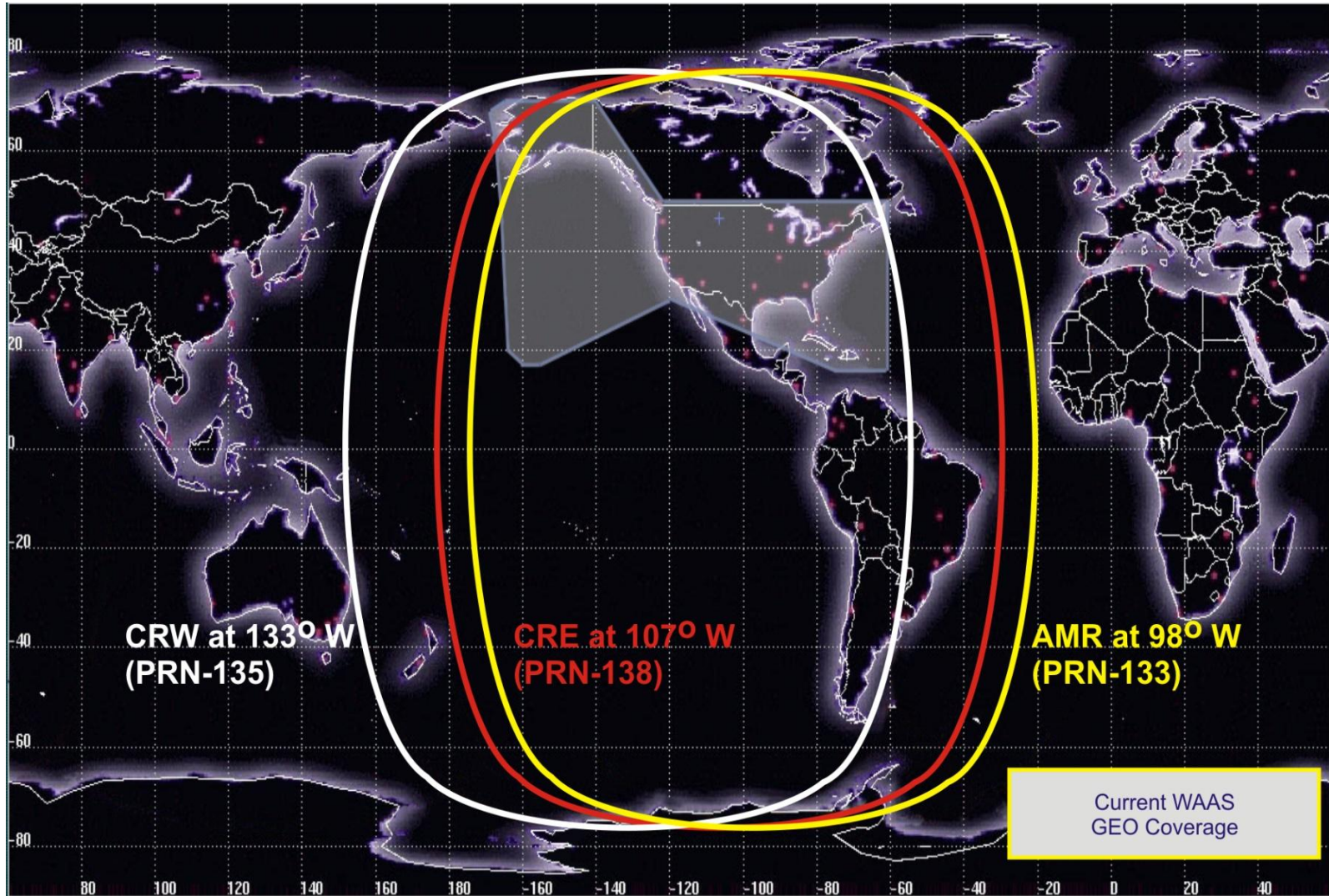


As of 25 August 2011
There are 2,677 LPVs serving 1,370 Airports
as well as 165 LPs serving 122 Airports

There are over twice as many WAAS procedures as there are Instrument Landing System (ILS) glide slopes in the United States

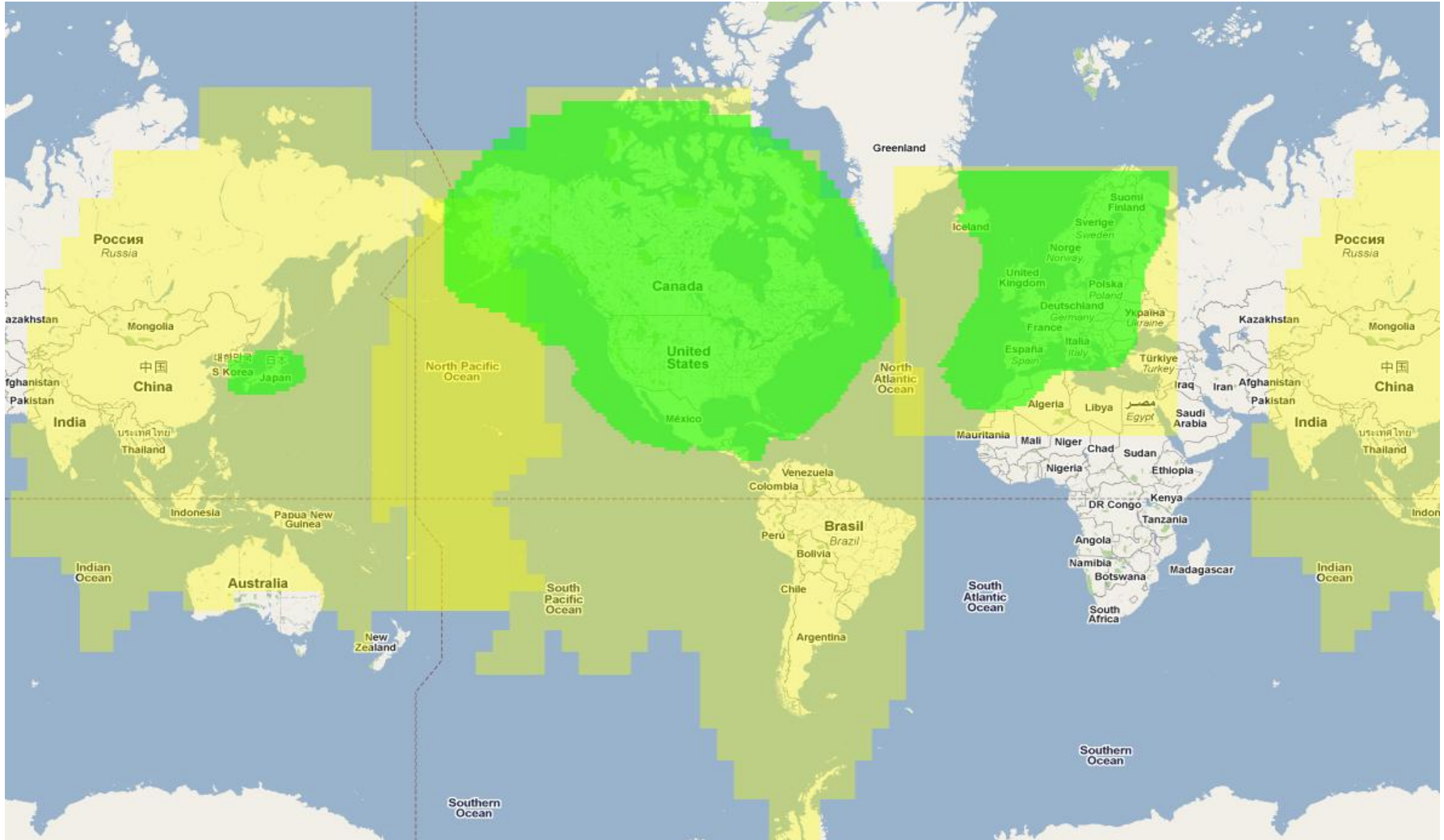


Current WAAS GEOs



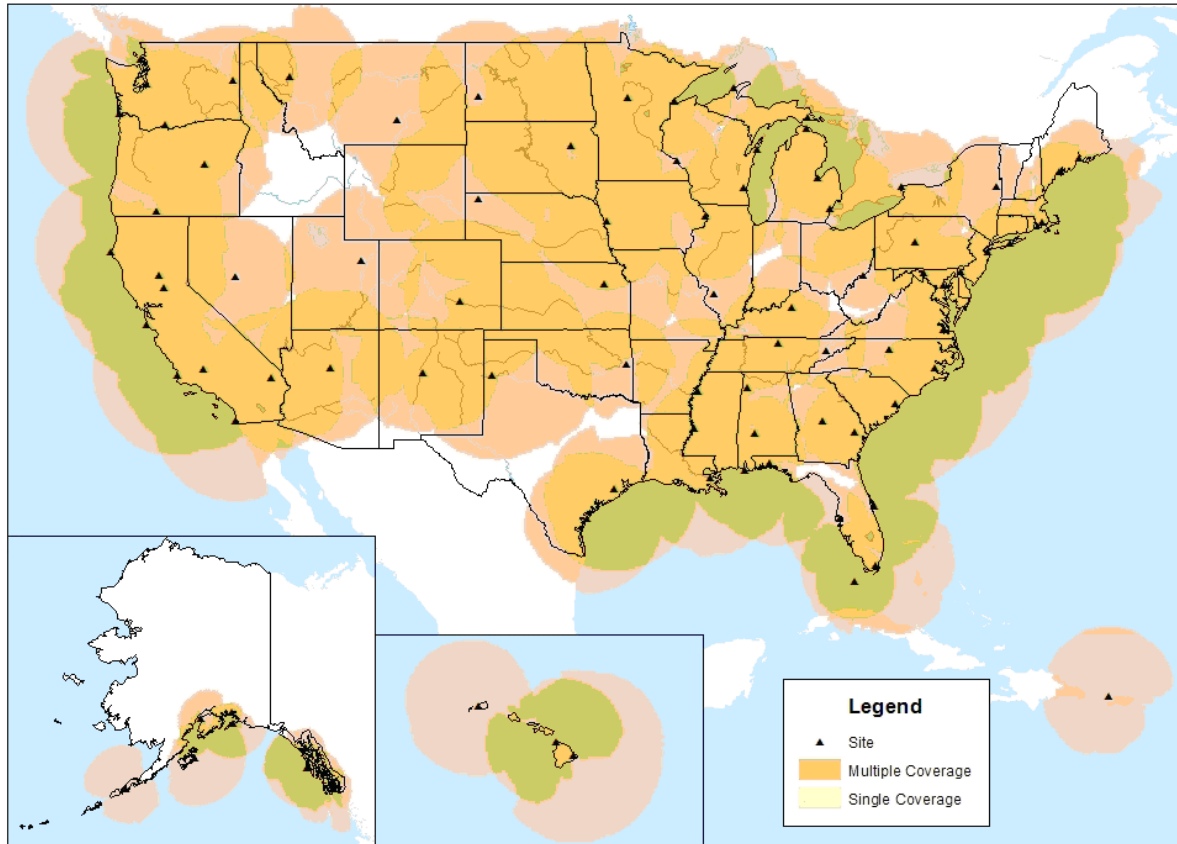


Combined SBAS Snapshot





Nationwide Differential GPS



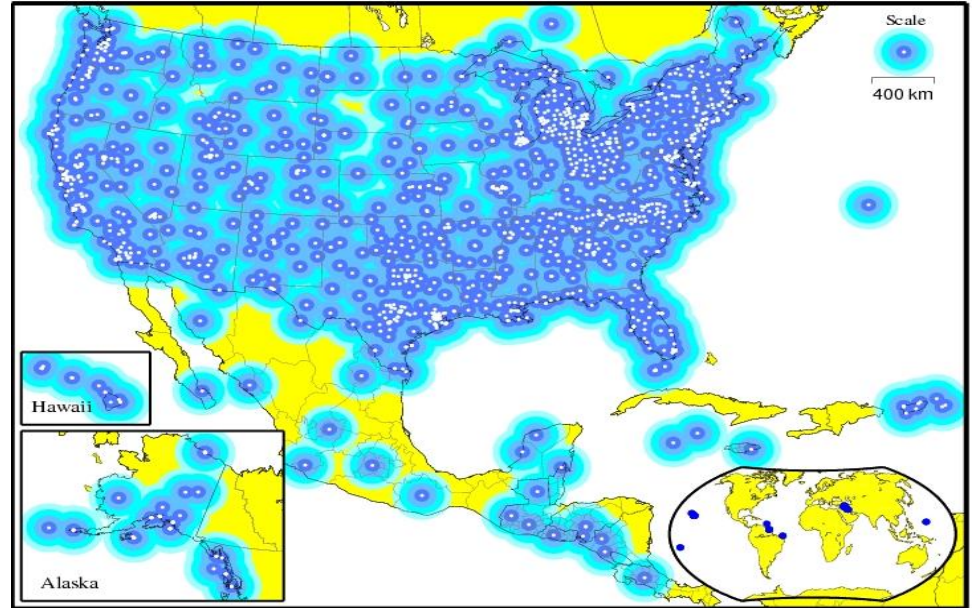
- Expansion of maritime differential GPS (DGPS) network to cover terrestrial United States
- Built to international standard adopted in 50+ countries



National Continuously Operating Reference Stations (CORS)



- Enables highly accurate, 3-D positioning
 - Centimeter-level accuracy
 - Tied to National Spatial Reference System
- 1,300+ sites operated by 200+ public, private, academic organizations
- NOAA's Online Positioning User Service (OPUS) automatically processes coordinates submitted via the web from around the world
- OPUS-RS (Rapid Static) declared operational in 2007
- NOAA considering support for real-time networks

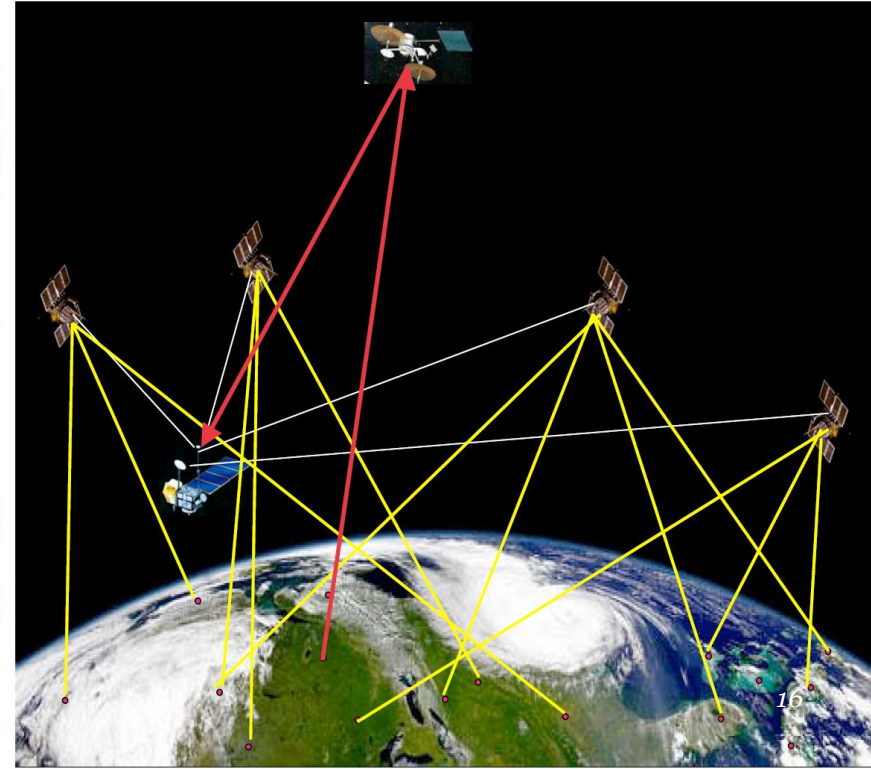
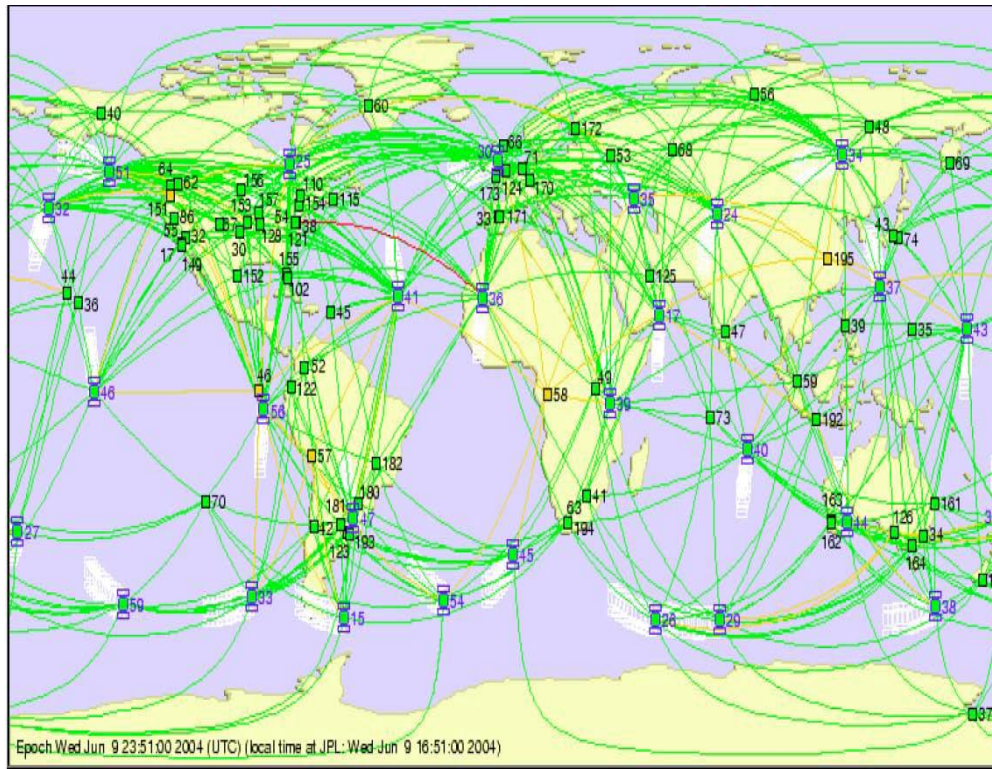




Global Differential GPS (GDGPS) and TDRSS Augmentation Service for Satellites (TASS)

Sponsor: NASA

- GDGPS: More than 100 real-time tracking sites providing real-time positioning, timing, and orbit determination
- TASS: Future plans include dissemination of GDGPS differential corrections, integrity and space weather alerts





Summary



- U.S. policy encourages worldwide use of civil GPS and its augmentations
 - Permits U.S use of foreign PNT to increase resiliency
- GPS continues to meet or exceed our performance commitments to worldwide users
- GPS and its augmentations remain critical components of the global infrastructure
- The U.S. supports free access to civilian GNSS signals with public domain documentation to develop user equipment
- U.S. policy promotes open competition and market growth for commercial GNSS

*International cooperation is a priority —
Compatibility and interoperability are critical*



For Additional Information...



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Official U.S. Government information about the Global Positioning System (GPS) and related topics

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For News Media

For Congress

For Internationalists

For Professionals

GPS Map Errors Explained!



Does your GPS device show your house in the wrong place? Does it suggest inappropriate routes? Don't blame the GPS satellites... contact the map makers! We'll tell you how.

[READ MORE...](#)

Previous Feature Stories

- Did You Know? GPS Jamming Is Illegal

Looking for LightSquared Information?

If you are seeking official U.S. government information related to the planned LightSquared 4G wireless network and its potential interference to GPS users, you'll find it at our sister site, www.PNT.gov. [GO THERE...](#)

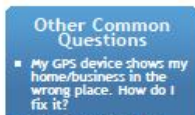
Hello, Canada! GPS Adventures Is Migrating North



The traveling GPS Adventures exhibit will close down at the Adventure Science Center in Nashville, Tennessee, on September 5 and reopen at the Ontario Science Centre in Toronto on September 30.

GPS Adventures is an immersive experience designed to teach kids and adults about GPS technology. Visitors navigate their way through an interactive maze while simulating the popular, GPS-based activity known as geocaching. [LEARN MORE...](#)

Also on the move: GPS Adventures Arkansas will close at the Discovery Place Children's Museum on September 18 and reopen at the University of Arkansas Discovery Zone in October. This smaller, localized version of GPS Adventures focuses on geocaching in the state parks of



- My GPS device shows my home/business in the wrong place. How do I fix it?
- How do I report GPS service problems?
- How does GPS work?
- How accurate is GPS?
- Has the United States ever turned off GPS for military purposes?
- How vulnerable is GPS to malicious jamming?

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National Executive Committee for Space-Based Positioning, Navigation, and Timing



SPACE-BASED POSITIONING NAVIGATION & TIMING

NATIONAL EXECUTIVE COMMITTEE

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Information About LightSquared Interference to GPS Users

The National Executive Committee for Space-Based Positioning, Navigation, and Timing (PNT) is a U.S. Government organization established by Presidential directive to advise and coordinate federal departments and agencies on matters concerning the Global Positioning System (GPS) and related systems.

The National Executive Committee is chaired jointly by the Deputy Secretaries of Defense and Transportation. Its membership includes equivalent-level officials from the Departments of State, the Interior, Agriculture, Commerce, and Homeland Security, as well as the Joint Chiefs of Staff and NASA. Components of the Executive Office of the President participate as observers to the National Executive Committee, and the FCC Chairman participates as a liaison.

A National Coordination Office located in Washington, D.C., provides day-to-day staff support to the National Executive Committee. It consists of an interagency staff headed by Director Anthony Russo. The National Coordination Office is a point of contact for inquiries regarding PNT policy.

An Advisory Board provides independent advice to the National Executive Committee through its sponsor agency, NASA.



Several working groups support the National Executive Committee through staff-level, interagency

Get GPS status info and other user support at the U.S. Coast Guard Navigation Center

Learn more about space-based PNT systems and applications at

GPS.gov

FY 2012 Program Funding & Other Info for Hill Staff
UPDATED JUL 29

What's New

- Meeting
- News Release: Executive Branch Position on LightSquared Issue
- NTIA Letter to FCC on LightSquared Interference Concerns
- NPEF Report on LightSquared Interference to GPS
- Request for Public Comments on LightSquared Issue
- Final Report of LightSquared Working Group
- Congressional Testimony on LightSquared Interference Issue

More Releases...



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**This presentation and other information
available at: www.pnt.gov**

New GPS Website: <http://www.gps.gov>