SPACE-BASED POSITIONING
NAVIGATION & TIMING
NATIONAL COORDINATION OFFICE

Global Positioning System Status

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Overview

- GPS Constellation Status
- GPS Performance
- GPS Modernization
- Summary

GNSS is Essential to Our Economies

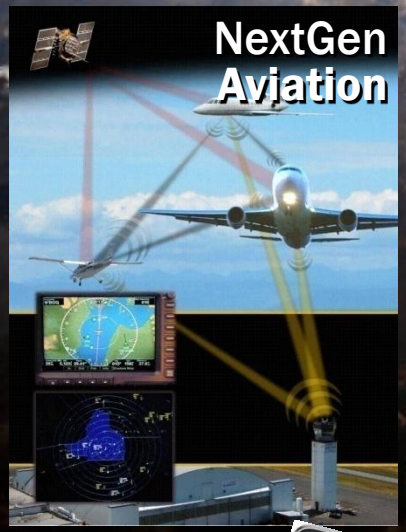
Satellite Operations

Surveying & Mapping

Power Grids

Precision Agriculture

Transit Operations



NextGen Aviation

Trucking & Shipping

Intelligent Vehicles

Telecom

Personal Navigation

Disease Control

Oil Exploration

Fishing & Boating

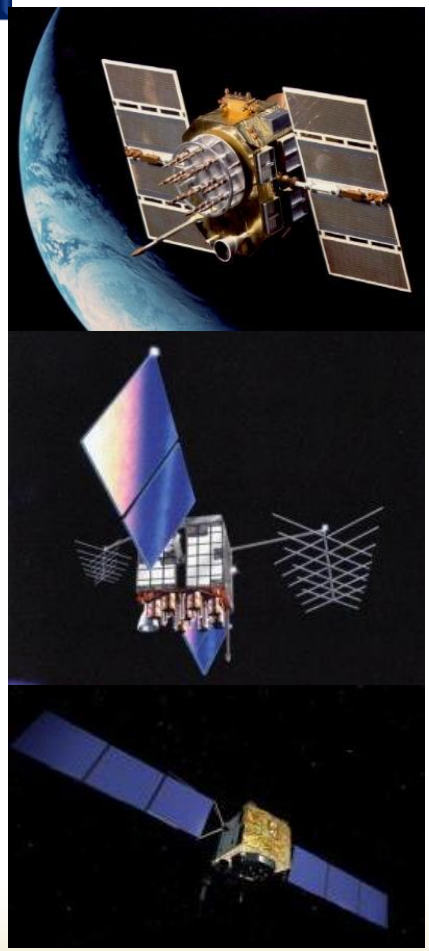
U.S. Policy Promotes Global Use of GPS Technology

- 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

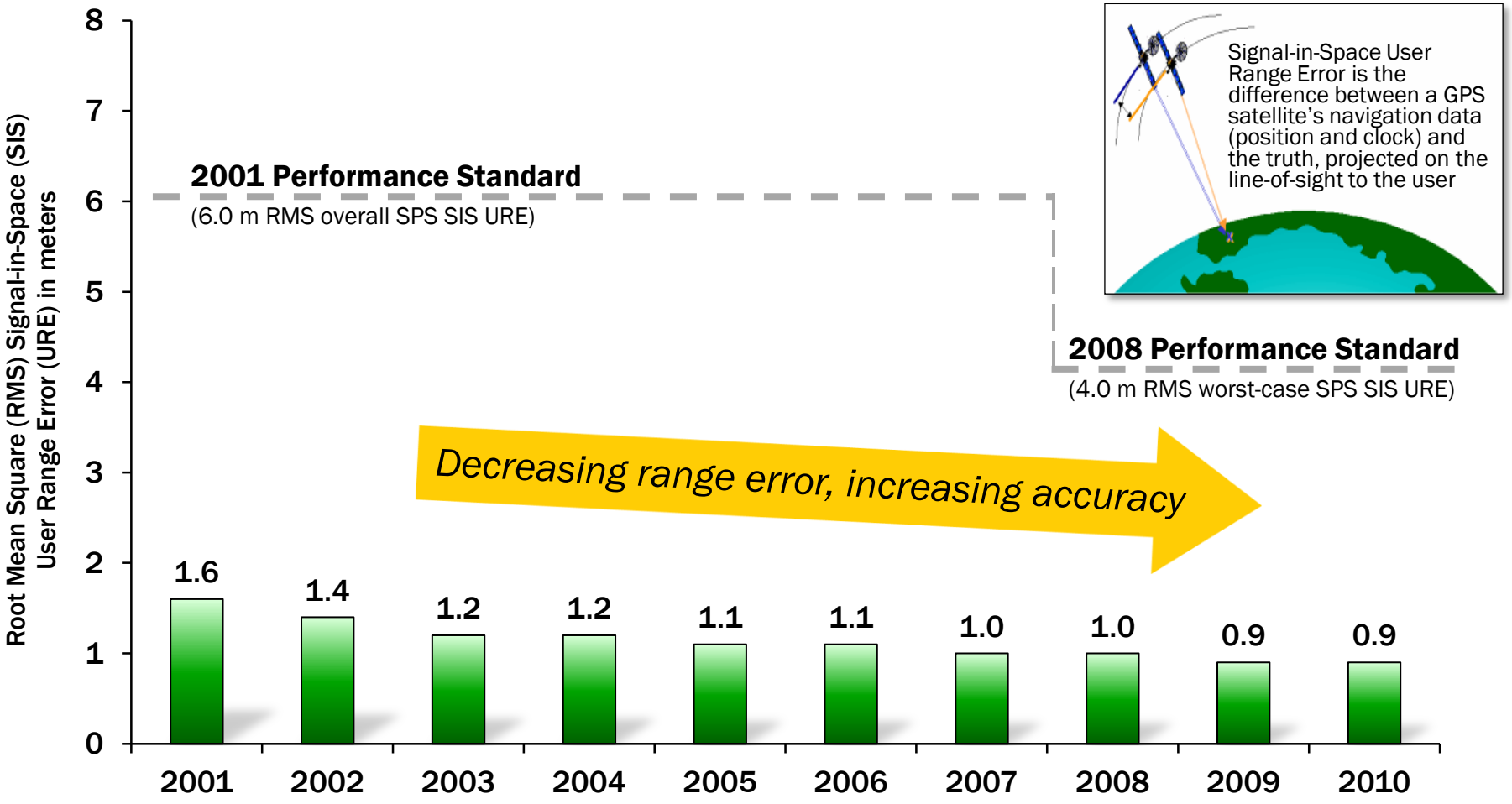
GPS Constellation Status

31 Healthy Satellites
Baseline Constellation: 24 + 3

- 10 Block IIA Satellites
- 12 Block IIR Satellites
- 7 Block IIR-M Satellites
- 2 Block IIF Satellites
  - *IIF-2 healthy as of October 16, 2011*
  - *Next IIF launch scheduled mid-2012*
- Global GPS civil service performance commitment met continuously since December 1993



Standard Positioning Service (SPS) Signal-in-Space Performance



System accuracy exceeds published standard

GPS Modernization Program

Increasing System Capabilities ◆ Increasing User Benefit

Block IIA/IIR

Basic GPS

- Standard Service
  - Single frequency (L1)
  - Coarse acquisition (C/A) code navigation
- Precise Service
  - Y-Code (L1Y & L2Y)
  - Y-Code navigation

Block IIR-M, IIF

IIR-M – Basic GPS capability plus

- 2nd civil signal (L2C)
- M-Code (L1M & L2M)

IIF – IIR-M capability plus

- 3rd civil signal (L5)
- 2 Rb + 1 Cs Clocks
- 12 year design life

Block III

- Backward compatibility
- 4th civil signal (L1C)
- Improved User Range Error
- Increased availability
- Increased integrity
- 15 year design life

U.S. Air Force Receives Award

- The International Astronautical Federation bestowed its 60th Anniversary Award to the U.S. GPS program at a ceremony held October 4, 2011 in Cape Town, South Africa

"…provided the greatest human benefit over the history of the space age"

Summary

- GPS continues to meet or exceed our performance commitments to worldwide users
  - *Performance is better than ever and will continue to improve with planned modernization*
- Modernization of all segments is on track

For Additional Information…

www.GPS.gov

Contact Information

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BACKUPS

U.S. Policy History

- 1983: President announces civilian access to GPS
- 1994: U.S. offers free civil GPS service to International Civil Aviation
- 1996: First U.S. GPS Policy establishes joint civil/military management
- 1997: Civil GPS access free of direct user fees codified in U.S. statute
- 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 includes specific PNT guidance

Civil Capability Improvements

Second civil signal "L2C"

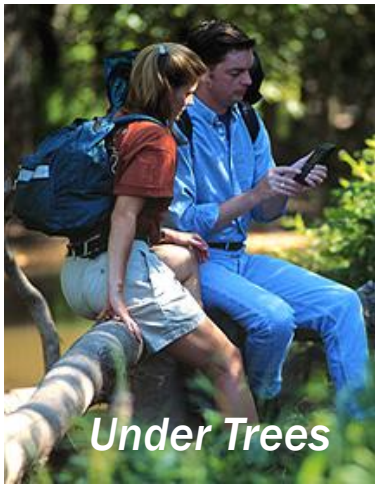
- Designed to meet commercial needs
- Higher accuracy through ionospheric correction
- Available since 2005 without data message
  - Currently, 7 IIR-Ms transmitting L2C
- Full capability: 24 satellites ~2016

Third civil signal "L5"

- Designed to meet demanding requirements for transportation safety
- Uses highly protected Aeronautical Radio Navigation Service (ARNS) band
- Operational on 2 GPS IIF satellites
- Full capability: 24 satellites ~2018

After 2020, with L2C and L5 online, the USG will no longer support semi-codeless access to military GPS signals

Civil Capability Improvements



Fourth civil signal "L1C"

- Designed with international partners for interoperability
- Modernized civil signal at L1 frequency
  - More robust navigation across a broad range of user applications
  - Improved performance in challenged tracking environments
  - Original signal retained for backward compatibility
- Specification developed in cooperation with industry recently completed
- Launches with GPS III in 2014
- On 24 satellites by ~2021

GPS IIR/IIR-M Status

- All GPS IIR and IIR-M satellites are on orbit
  - Current backbone of the GPS constellation
- Excellent on-orbit performance
  - SIS URE of .50 meters
    (1 yr performance Jul 11)
- Excellent life expectancy
  - Solar array capacity far exceeds specification
  - No clock failures to date

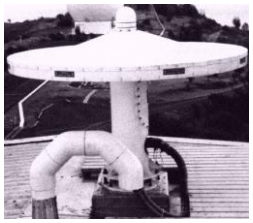
GPS IIF Status

- Excellent on-orbit performance for IIF-1
  - SIS URE of .30 meters (1 yr performance Jul 11)
- Launched GPS IIF-2 on 15 Jul 11
  - SVN 63, PRN 1
  - Set healthy 14 October 2011
  - Second operational L5
  - Increases the enhanced GPS clock performance coverage
- 10 more IIFs in the pipeline
  - SVs 3-8 are in Assembly, Integration & Test
- IIF-3 Initial Launch Capability in Feb 12

GPS III Status

- Newest block of GPS satellites
  - First GPS satellite to broadcast L1C signal
  - Multiple civil and military signals; L1 C/A, L1 P(Y), L1M, L1C, L2C, L2 P(Y), L2M, L5
  - Three Rubidium clocks
- Completed Critical Design Review
- Prototype and engineering unit build/test underway
  - Completed 57 of 59 Manufacturing Readiness Reviews
  - Completed 43 of 59 Test Readiness Reviews
- GPS Nonflight Satellite Testbed (GNST) integration underway
- Initiated Capability Insertion Program for SV-9+

Control Segment Status



Monitor Station

Master Control Stations at Schriever AFB, Colorado

Ground Antenna

- Operational Control Segment (OCS)
  - Now flying Block IIA/IIR/IIR-M/IIF constellation
  - Added the capability for anomaly resolution and disposal ops for IIF
- Next Generation Operational Control System (OCX)
  - Preliminary Design Review concluded August 2011
  - OCX Block I deployment planned for August 2015
  - New Launch and Checkout System will control first GPS III satellites prior to OCX Block I