



U.S. AIR FORCE

Global Positioning System Operations Status

CGSIC

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Who We Are

2d Space Operations Squadron Mission

To provide positioning, navigation, timing effects, nuclear detonation detection, and launch, anomaly resolution, disposal operations by operating and maintaining the Global Positioning System satellite constellation and dedicated ground network.

Motto

“On Time On Target”





Who We Are

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- **2d Space Operations Squadron (Active Duty)**
 - 117 Personnel
 - Operators, Engineers, Analysts, Maintainers, Cyber Professionals
- **19th Space Operations Squadron (Reserves)**
 - Surge for Launch and Disposal Operations
 - Modernization continuity and subject matter expertise
 - Maintain certified operators in all crew positions
- **5 Crews conducting GPS operations**
 - 7 Military & 1 Civilian
 - Navigation Warfare Officer (NWO)
- **AF Technical Application Center (AFTAC), Det 46**
- **GPS User Operations Center (GPSOC)**
 - User Engagement





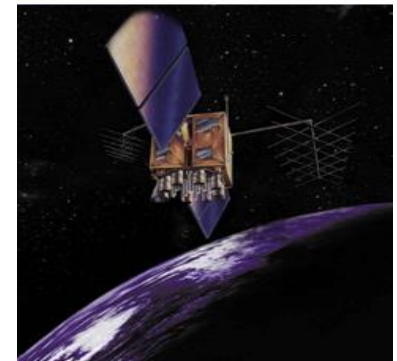
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Constellation Snapshot

39 Satellites
(Baseline Constellation: 24)

- 6 Block IIA satellites operational (6 in LADO)
- 12 Block IIR satellites operational
- 7 Block IIR-M satellites operational (1 in LADO)
- 7 Block IIF satellites operational

- U.S. Government continuously assessing constellation health to determine launch need
 - Newest satellites launched
 - IIF-6/SVN 67 – 17 May 2014
 - IIF-7/SVN 68 – 2 Aug 2014
 - IIF-8/SVN 69 launch scheduled for 31 Oct 2014





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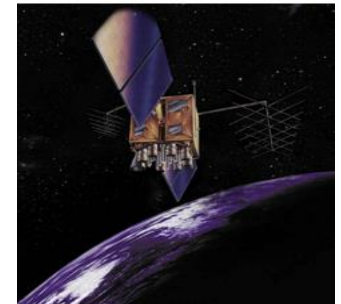
Space Segment

4 Generations of Operational Satellites

- **Block IIA - 6 Operational, 6 Residual**
 - 7.5 year design life (oldest operational satellite will be 24 yrs old in Nov)
 - Launched 1990-1997
- **Block IIR - 12 Operational**
 - 7.5 year design life
 - Launched 1997-2004
- **Block IIR-M - 7 Operational, 1 Residual**
 - 7.5 year design life
 - Launched 2005-2009
 - Added 2nd civil navigation signal (L2C)
- **Block IIF - 7 Operational**
 - 12 year design life
 - Launched 2010-present
 - Added 3rd civil navigation signal (L5)
- **Average age about 12 years**



Block IIA Satellite – Designed & Built by Rockwell International



Block IIR/IIR-M Satellite – Designed & Built by Lockheed Martin



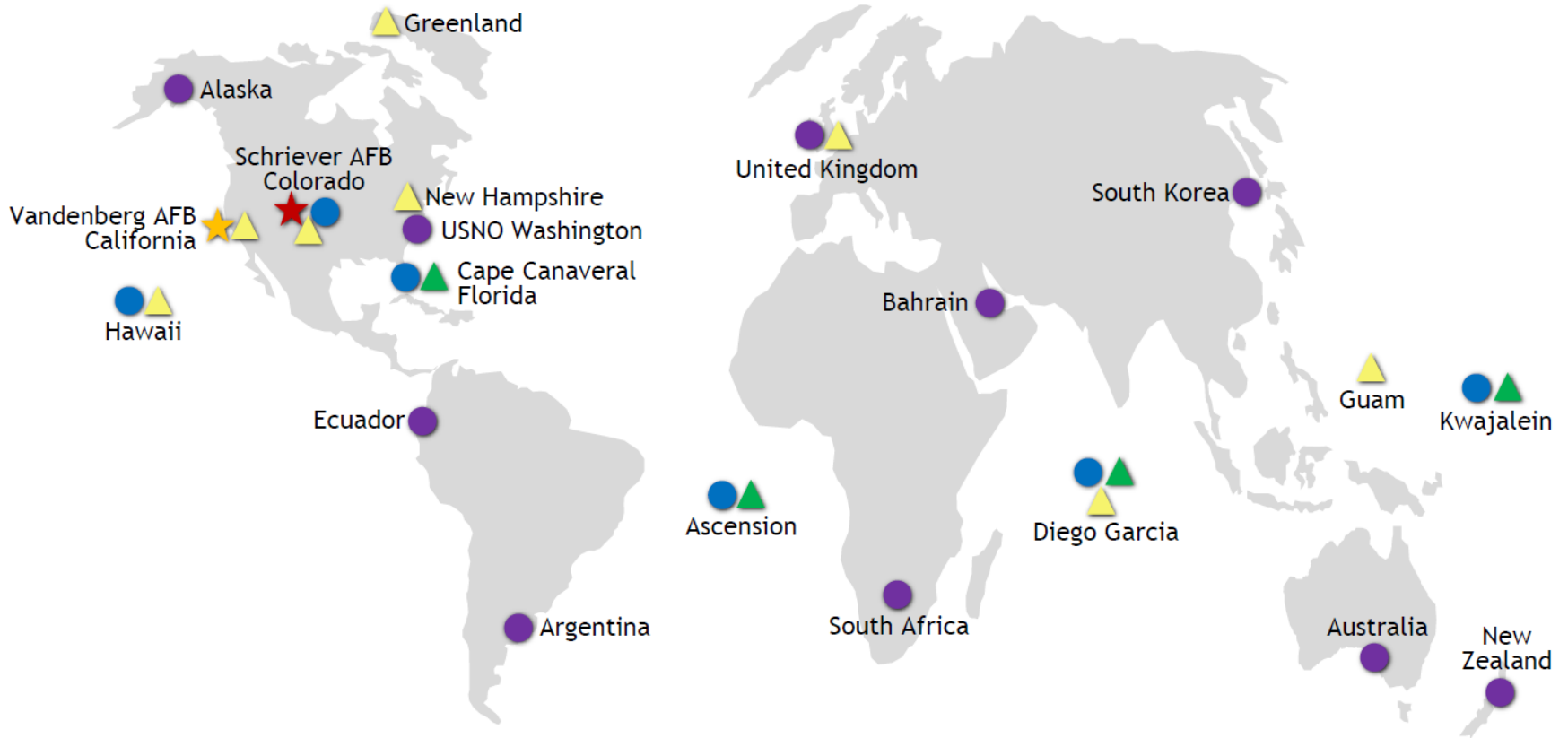
Block IIF Satellite – Designed & Built by Boeing

“Gold Standard” of Space-Based Navigation Systems Civil service performance commitment met continuously since 1993



Ground Segment

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★ Master Control Station

▲ Ground Antenna

● Air Force Monitor Station

★ Alternate Master Control Station

▲ AFSCN Remote Tracking Station

● NGA Monitor Station



- **Architecture Evolution Plan (AEP)**
 - Day-to-day command and control of up to 31 satellites
 - 4 dedicated Ground Antennas and AFSCN capability
 - 6 dedicated and 10 NGA Monitor Stations

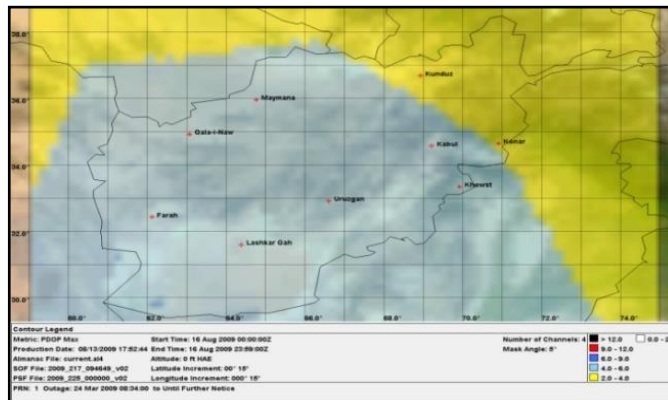
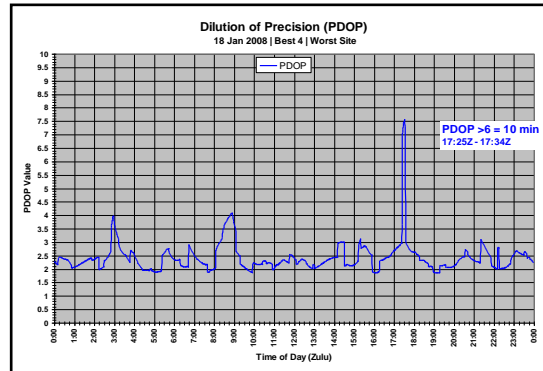
- **Launch, Anomaly Resolution, and Disposal Operations (LADO)**
 - Day-to-day command and control residual satellites using AFSCN
 - State-of-health monitoring
 - Leverage for some vehicle emergencies
 - Launch prep and initial post-launch operations
 - Satellite end of life disposal operations



User Segment: GPSOC

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- DoD's focal point for military GPS user issues
 - Supports warfighter mission planning
 - Supports FAA/NAVCEN user issue resolution



Military applications

- Force location
- Navigation
- Force employment
- Weapon guidance
- Satellite positioning
- Comm network timing
- Plus Many Others

Civilian applications

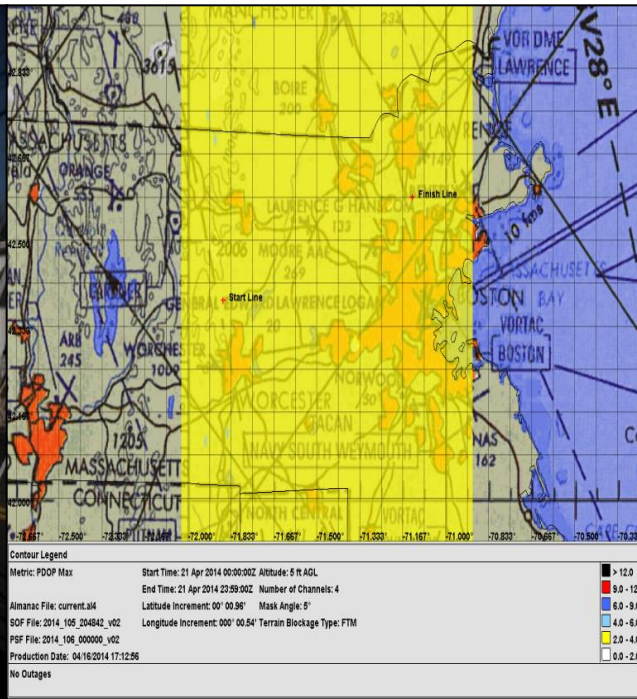
- Aviation / Civil Navigation
- Space Shuttle
- Search and Rescue
- Geodetic Measurements
- Drilling / Mining / Agriculture
- Commercial
- Plus Many Others



Support for the 2014 Boston Marathon

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- The Department of Homeland Security asked 2 SOPS/GPSOC to provide GPS accuracy prediction support for the 26.2 mile route at this year's Boston Marathon.
- Increased security presence this year:
 - Between 3,500-4,000 government agents (Double 2013 presence)
 - Doubled security force included approx 500 plainclothes officers and 750 uniformed military personnel, surveillance cameras, and security checkpoints.
- PDOP, CEP/SEP, and Vis charts were used by DHS to enhance security at the event.

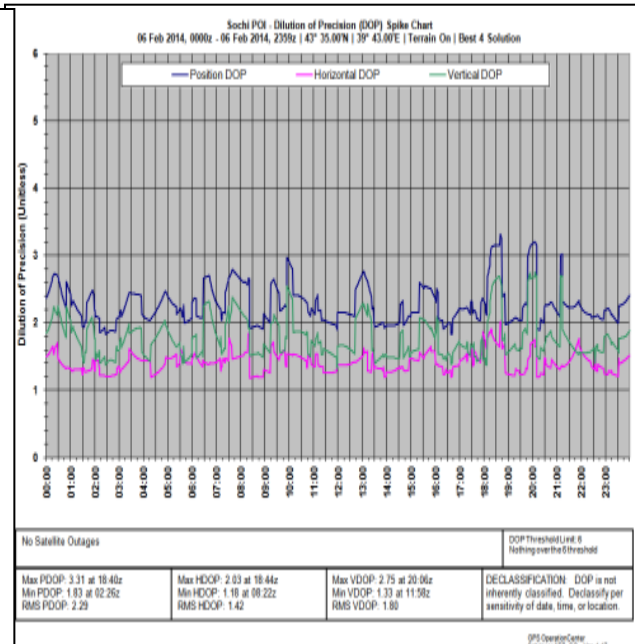
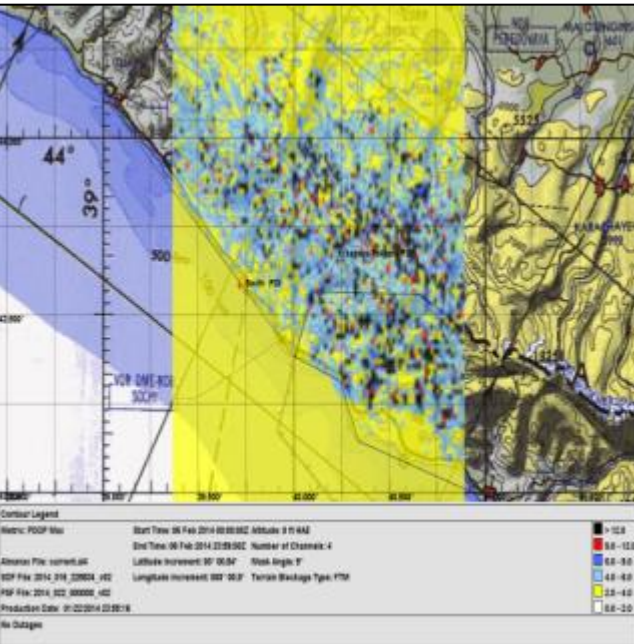




Support for Sochi Winter Olympics

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- DHS requested GPS DOP predictions and satellite visibility charts to support the US security detail in Sochi & Krasnaya Polyana, Russia
- GPSOC provided DOP contour & 24 hour accuracy “spike” charts and Visibility Charts for 31 Jan and 06 Feb 14
- DHS shared these GPS accuracy prediction products with the FBI Joint Task Force in Russia





Delivering the Best Space-Based PNT

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- ***Operating*** the gold standard in position, navigation & timing
- ***Sustaining*** capabilities for civil and military users worldwide
 - Maintain on-orbit satellites, ground systems
- ***Modernizing*** constellation with new signals and capabilities
 - New civil and military GPS signals and control capabilities
 - 4 new launches this year
- ***Leading*** the way for **GPS systems & supporting stakeholders**



Committed to Responsible Stewardship of GPS





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Questions?

2d Space Operations Squadron
"On Time, On Target"