



U.S. AIR FORCE

2D SPACE OPERATIONS SQUADRON CONSTELLATION UPDATE

CGSIC

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- **Who We Are**
- **Constellation Snapshot**
- **Milestone Events**
 - **Significant Awards/Recognition**
 - **IIF**
 - **New Signals**
 - **GPSOC**
 - **New Initiatives**
 - **Modernization Efforts**
- **Continuing to Deliver the Best Spaced Based PNT**



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Who We Are

2d Space Operations Squadron Mission

Provide Positioning, Navigation, Timing Effects, Nuclear Detonation Detection, and Launch, Anomaly Resolution, Disposal Operations (LADO) by operating and maintaining the GPS satellite constellation and a dedicated ground network.

Motto

“On Time On Target”

Committed to responsible stewardship of GPS as a global utility



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Who We Are

- **2d Space Operations Squadron**
 - 113 Personnel
- **5 Crews conducting GPS operations**
 - 7 Military
 - 1 Civilian
 - Navigation Warfare Officer (NWO) on-call
- **GPS User Operations Center (GPSOC)**
- **AF Technical Application Center (AFTAC) Det 46**
- **19 SOPS reserve squadron partner with 2 SOPS**
 - Fully integrated into 2 SOPS mission
 - Maintain certified operators in all crew positions
 - Modernization efforts (GPS IIF, Next Generation Operational Control System (formerly OCX), and GPS III)
 - Launch





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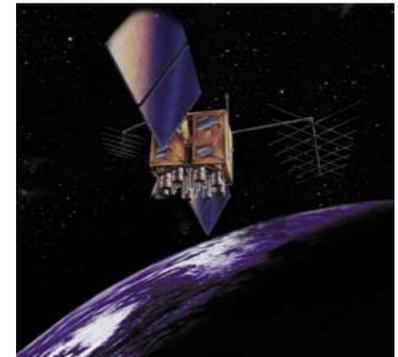


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Constellation Snapshot

31 Operational Satellites
(Baseline Constellation: 24)

- 10 Block IIA satellites operational
- 12 Block IIR satellites operational
- 7 Block IIR-M satellites operational
- 2 Block IIF satellites operational
- U.S. Government continuously assessing constellation health to determine launch need
 - Newest satellites launched
 - IIR-21 (M)/SVN 50 – 17 August 2009
 - IIF-1/SVN 62 – 27 May 2010
 - IIF-2/SVN 63 – 16 July 2011
 - IIF-3 launch scheduled for Oct 2012
- Global GPS civil service performance commitment met continuously since 1993





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Significant Awards/Recognition

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- **GPS Program recognized by the International Astronautical Federation in Oct 2011**
 - One-time 60th Anniversary Award
 - Recognized GPS as a singular/successful project in the field of Space Applications, Space Science and Exploration, which demonstrates measurable benefit to humanity

 - **2011 Air Force Chief of Staff Team Excellence Award**
 - GPS IIF-1 Total Force (2/19 SOPS, SMC/GP, Aerospace Corp) Satellite Launch and Early Orbit Team
 - Recognized for 22% increase in manpower efficiency and 60-day redux in launch-to-operational-handover timeline
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IIF Satellites On-Orbit

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- **IIF satellites launched under SMC/GP Satellite Control Authority (SCA)**
 - Agreement signed between 50 SW/CC and SMC/GP defining roles and responsibilities during the On-Orbit Checkout (OOC) period
 - SMC/GP retained SCA during OOC with 2/19 SOPS operators
 - 50 SW/CC obtained SCA after OOC completion
 - L5, L2C, M-Code

 - **IIF SV-1 (SVN 62) launched 27 May 10 – available to users on 26 Aug 10**
 - 90-day On-orbit Test period
 - SCA transferred to 50 SW/2 SOPS on 25 Aug 10

 - **IIF SV-2 (SVN 63) launched 16 July 11 – available to users on 14 Oct 11**
 - 30-day On-orbit checkout period
 - SCA transferred to 50 SW/2 SOPS on 19 Aug 11

 - **IIF SV-3 (SVN 65) scheduled to launch NET Oct 12**
 - On-Orbit Checkout projected to last 30 days
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L2C and L5 Signals

■ **Second civil signal “L2C”**

- Designed to meet commercial needs
- Provides dual-frequency users with a more robust, coded signal to aid in ionospheric correction
- All IIR (M) satellites and IIF-1 are broadcasting a developmental L2C signal now



■ **Third civil signal “L5”**

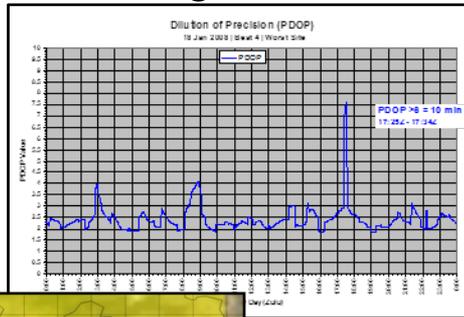
- Designed to meet demanding requirements for transportation safety-of-life and is available to all users
- Uses highly protected Aeronautical Radio Navigation Service (ARNS) band
- SVN 62/SVN 63 broadcasting a developmental L5 signal





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- **DoD's focal point for operational issues concerning military use of GPS**
 - Constellation Ops
 - User Ops
- **DoD's 24/7 interface to military and civil community**
 - 911 for DoD GPS user emergencies
 - Supports FAA/NAVCEN in resolving civil user issues



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



New Initiatives

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■ **Satellite Operations Plans**

- Developed concise plans for all activities from pre-launch activities to making satellite available to users
- Increased efficiency will bring future satellites on-air to users with less risk

■ **Satellite Contingency Plans**

- Developing contingency plans for every satellite currently on-orbit
 - Most likely failure modes explored with plans to take off the shelf in case of failures
 - Deliberate forward planning BEFORE an on-orbit emergency happens
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■ **AEP v5.8**

- Routine sustainment software upgrade
- No changes to GPS signal in space – transparent to civilian and military users
- Provides C2 of protected receiver capabilities to the JSpOC
- Extensive testing conducted – verified no harm to users

■ **OCX Buildout**

- Construction of Next Generation GPS Control Segment began in Mar 12
 - Scheduled completion of construction NLT July 12
 - OCX scheduled to be operational 4th quarter 2015
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Delivering the Best Space-based PNT

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- ***Sustaining*** capabilities for civil and military users worldwide
 - Maintain ground systems/on-orbit satellites, launch new satellites
 - Fielding GPS enhancements
- ***Modernizing*** constellation with new signals and capabilities
 - New civil and military GPS signals and control capabilities
 - Continuing work with international GNSS community
 - Maintains Backward Compatibility
- ***Managing*** GPS systems and supporting stakeholders

Estimated US annual economic benefits of 3.5M jobs and \$96B for FREE