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2nd Space Operations Squadron

Mission
Provide combat-ready space warfighters delivering position, navigation, and timing to optimize the full range of Air Force, Joint Force and civilian operations, across all domains

Vision
The dominant Global Navigation System provider innovating and accelerating positioning, navigation, and timing through modernization and integration
Largest DoD satellite system
- 36 satellites, 30 operational
- Robust satellite system – IIA, IIR/IIR-M, IIF, III

Total Force Integration
- 2nd Space Operations Squadron (Active Duty)
- 19th Space Operations Squadron (Reserve)

Master Control Station (MCS) utilizing dedicated ground segment:
- Dedicated Ground Antennas and Monitoring sites
- Air Force Satellite Control Network (AFSCN)
- National Geospatial Intelligence Agency (NGA)
**GPS Constellation**

**IIR/R-M**
- **IIR**
  - 9 Operational
  - 1 Experimental
  - 2 Residual
- **IIR-M**
  - 7 Operational/1 in Test

Manufacturer: Lockheed
First Launch: July 1997 (IIR), September 2005 (IIR-M)
# of SVs: 20 satellites
Designed Life: 7.5 years
Dimension: 37 feet wide
Weight: 4,480 lbs at launch

Signals Added: L2C, L1M/L2M (M-Code)

**IIF**
- 12 Operational

Manufacturer: Boeing
First Launch: May 2010
# of SVs: 12 satellites
Designed Life: 12 years
Dimension: 57½ feet wide
Weight: 3,400 lbs at launch

Signals Added: L5 Safety of Life, M-Code

**III**
- 2 Operational

Manufacturer: Lockheed
First Launch: December 2018
# of SVs: 10 satellites (planned)
Designed Life: 15 years
Dimension: 17¼ feet wide
Weight: 4,000 lbs at launch

Signals Added: L1C GNSS Compatible, Spot Beam M-Code Capable
Where We are Going

**WARFIGHTER DEVELOPMENT**
- Space Mission Force
- Culture & Trust
- Tactician…Ops + W&T
- Technician…Ops + Analyst
- PTF Relocation ETC: TBD $6M
- GIN Simulator ETC: TBD $9M

**WARFIGHTER COLLABORATION**
- GWCC/User Operations
- Global Exercises
- Integrated Warfighting (JNWC, CCMDs, Coalition SpOCs)
- SAASM Taskings
- NAVWAR
- GPS Collaboration Node Certification

**Innovation**
- Navigation Uploads ETC: TBD
- NDS Data Dumps ETC: TBD
- ✔️ Vehicle Health Checks ETC: Dec 20 $2M
- ✔️ Scheduling - CTR filled $300K/yr
- ✔️ FLEXPOWER ETC: TBD $690K
- ✔️ SAASM TBD

**AUTOMATION**
- Mission Transfers
- New Generation Vehicles
- New Capabilities
- New C2 Architecture
- Cyber Security

**MODERNIZATION**
AFSPC/CC directed Jan 2017
GPS Squadron Accomplishments

- BLUF – Busiest modernization period in GPS history and significant change in culture toward warfighting
Warfighter Collaboration - GWCC

- DoD’s focal point for near real-time products to authorized users
- 24/7 Support
- Short-term tasking requests

**Products Delivered**

- 451 Space Support Requests (SSR) for US and Coalition Forces
- 190 Requests for Anomaly Analysis (RAA) worldwide to civil and government users
- 206 Requests for Information (RFI) requiring technical GPS analysis

**Organizations Supported**

- 35 Military Organizations
- 4 Main Civil Organizations

2019 – 2020: 128,000+ products created for users
GPS Standard Positioning Service (SPS) Performance Standard

- Updated levels of performance made available to users of the GPS Standard Positioning Service (April 2020)

New Geographic Longitude of the Ascending Node (GLAN) tuning formula optimizes global GPS coverage

- The new formula now accounts for satellite inclination as well as RAAN drift to define a moving slot center for each GPS vehicle

\[ \Delta \text{GLAN} = 0.713 \times \Delta \text{RAAN} \]

- Significant improvements in Position Dilution Of Precision (PDOP) seen worldwide
GPS Way Ahead

- GPS III-04
  - SV04 Scheduled to Launch Sept 2020
  - Operational Oct 2020
- AEP Contingency Operations
  - Currently Operating in 2020
- OCX
  - Modernized Master Control System
  - L1C for Civilian Use

- 3X better Accuracy … 8X better Anti-Jam
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