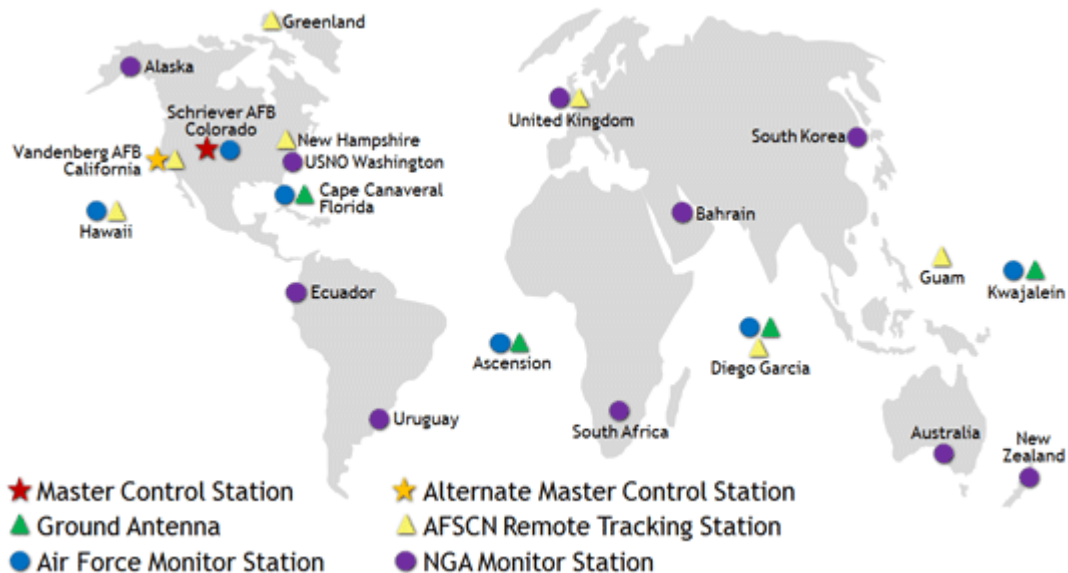


Control Segment

The GPS control segment consists of a global network of ground facilities that track the GPS satellites, monitor their transmissions, perform analyses, and send commands and data to the constellation.



The control segment (CS) tracks and maintains the satellites in space. The CS monitors satellite health and signal integrity and maintains the orbital configuration of the satellites. Furthermore, the CS updates the satellite clock corrections.

The current Operational Control Segment (OCS) includes:

1. a master control station,
2. an alternate master control station,
3. 11 command and control antennas,
4. 16 monitoring sites.

The locations of these facilities are shown in the map above.

Master Control Station

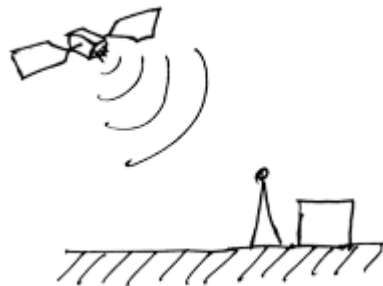
- Provides command and control of the GPS constellation

- Uses global monitor station data to compute the precise locations of the satellites
- Generates navigation messages for upload to the satellites
- Monitors satellite broadcasts and system integrity to ensure constellation health and accuracy
- Performs satellite maintenance and anomaly resolution, including repositioning satellites to maintain optimal constellation
- Currently uses separate systems ([AEP](#) & [LADO](#)) to control operational and non-operational satellites
- Backed up by a fully operational alternate master control station

The Launch/Early Orbit, Anomaly Resolution, and Disposal Operations [LADO](#) system serves three primary functions:

- Telemetry, tracking, and control;
- Planning and execution of satellite movements; and
- Simulation of different telemetry tasks for GPS payloads and subsystems.

The Architecture Evolution Plan [AEP](#) system improved the flexibility and responsiveness of GPS operations and paved the way forward for the next generation of GPS space and control capabilities.



Monitor Stations

- Track GPS satellites as they pass overhead
- Collect navigation signals, range/carrier measurements, and atmospheric data
- Feed observations to the master control station
- Utilize sophisticated GPS receivers

- Provide global coverage via 16 sites: 6 from the Air Force plus 10 from The National Geospatial-Intelligence Agency (NGA)



Ground Antennas

- Send commands, navigation data uploads, and processor program loads to the satellites
- Collect telemetry
- Communicate via S-band and perform S-band ranging to provide anomaly resolution and early orbit support
- Consist of 4 dedicated GPS ground antennas plus 7 Air Force Satellite Control Network (AFSCN) remote tracking stations