

GPS OCX

Global Positioning System Advanced Control Segment



GPS OCX, the next generation Advanced Control Segment, will dramatically enhance GPS command, control and mission capabilities providing significant benefits to military and civilian users around the world.

Key Features and Benefits

- Control of GPS Block IIA, IIR, IIR-M, IIF, and IIIA satellites
- Improved availability of signals from space
- Increased accuracy using advanced predictive algorithms
- Extensible modern software architecture
- Timely clock and ephemeris updates
- Enhanced anti-jam and interference performance
- Increased capacity for satellite support
- Increased Situational Awareness for GPS operators
- On-going support of current and future on-orbit capabilities
- Assured Navigational Integrity and performance continuity

A Critical Asset

The Air Force's Global Positioning System (GPS) is a critical, national asset with increasing global dependence. The Precision Navigation and Timing (PNT) service, offered through GPS, is imperative to ensure the safety and success of our nation's warfighters as well as an integral component necessary for global and national telecommunication, commerce and transportation infrastructures. Reliance on the system is essential for both military and civil users.

The U.S. warfighter leverages GPS' Precise Positioning, Navigation and Timing services to support air, land, space and maritime mission operations, ranging from precision strike to

personnel recovery. Additionally, GPS is used by millions of people to provide enhancements to daily life activities such as personal GPS navigation tools; is required for business and industry needing precise timing technology and is essential to support safety-of-life assurance for air traffic control systems and other emergency personnel.

Existing performance limitations and the emergence of growing threats drive the need for GPS modernization and an Advanced Control Segment (OCX) to ensure continued access to vital legacy and new data.

The Next Generation

On Feb. 25, 2010, the U.S. Air Force selected Raytheon for an initial contract of \$886 million to develop a new element of the GPS to improve the accuracy and availability of GPS navigation signals. The contract represents the first two development blocks of the OCX, which will have a significant impact on GPS capabilities. The initial 73-month contract calls for development and installation of hardware and software at GPS control stations at Schriever Air Force Base in Colorado and Vandenberg AFB in California, deployment of advanced monitor stations at remote sites and initial contractor support with sustainment options for five years.

The new capabilities provided by OCX enable the revolutionizing of GPS Command and Control as well as enhanced mission data processing. OCX will shift the focus of GPS operations from primarily satellite command and control to transforming the signal data to user-oriented, effects-based operations. Therefore, allowing Air Force Space Command to enhance GPS' operational services to our nation's' deployed forces, civil partners and diverse civilian users worldwide.

The new generation OCX:

- provides command and control of the GPS IIA, IIR, IIR-M, IIF, and IIIA SVs
- replaces the OCX Master Control Station and Alternate Master Control Station
- upgrades the Air Force and National Geospatial-Intelligence Agency (NGA) Monitor Stations
- modifies the existing Ground Antennas
- provides monitoring of all current GPS signals and new L1C, L2C, L5, and M-Code signals
- upgrades support facilities.

Initially, OCX will focus on early

fielding of control segment support for the GPS modernization signals (L2C, L5, and M-code) and the first increment of new space segment development, GPS Block IIIA. OCX is built upon flexible service-oriented architecture that includes a robust infrastructure to meet requirements for new information assurance, integrity, and net centricity that are needed to support future capabilities. OCX will be developed in an incremental fashion that will deliver capabilities to the field and the required growth and flexibility to meet military and civil needs for the next 30 years.

Key Capabilities

The key capabilities for GPS OCX include:

- improved availability of military accuracy in a jammed environment,
- increased time transfer accuracy,
- increased position accuracy,
- enhanced system integrity,
- backward compatibility,
- survivability,
- L1 signal common with Galileo,
- interoperability with the global information grid.

Future OCX capabilities include enhanced space launch support, increased situational awareness for GPS operators, and support for future satellite blocks with advanced capabilities such as new signals, NAVWAR capabilities, high-speed cross-links and additional payloads.

OCX will provide easier access to more information all users. In addition, improved user situational awareness of GPS performance and coordination capability with other GNSS and space-based augmentation system providers will enable more precision capability for mission and user planning. Benefits to air traffic control include lower separation limits and higher traffic volume resulting in fewer air traffic delays.

The OCX net-centric services will provide the public with more in-depth knowledge of Control Segment plans, performance and operations, enabling better decision-making and tighter performance tolerances.

It Takes a Team

Raytheon selected an outstanding team of industry leaders with a unique balance of skills and experience to deliver GPS OCX.

Raytheon's Airspace Management and Homeland Security business area is prime contractor for the Federal Aviation Administration's GPS Wide Area Augmentation System and involved with implementation of India's GPS Aided GEO Augmented Navigation system. The two satellite-based systems are providing improved integrity and positioning accuracy. Raytheon's teammates include Boeing, ITT, Braxton Technologies, Infinity Systems Engineering and the Jet Propulsion Laboratory.

Raytheon's Commitment

As the need for GPS capabilities has become ever so vital to military and civilian operations, Raytheon is poised to ensure the nation's GPS system works around the clock - anywhere on and above the planet. Raytheon brings to OCX a solid history of successful time-certain delivery spanning more than four decades. This experience includes the deployment of over 110 unique high-availability satellite ground systems to key government, civil, and commercial customers.

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