Enabling GPS Information Sharing with Improved GPS OCX Security

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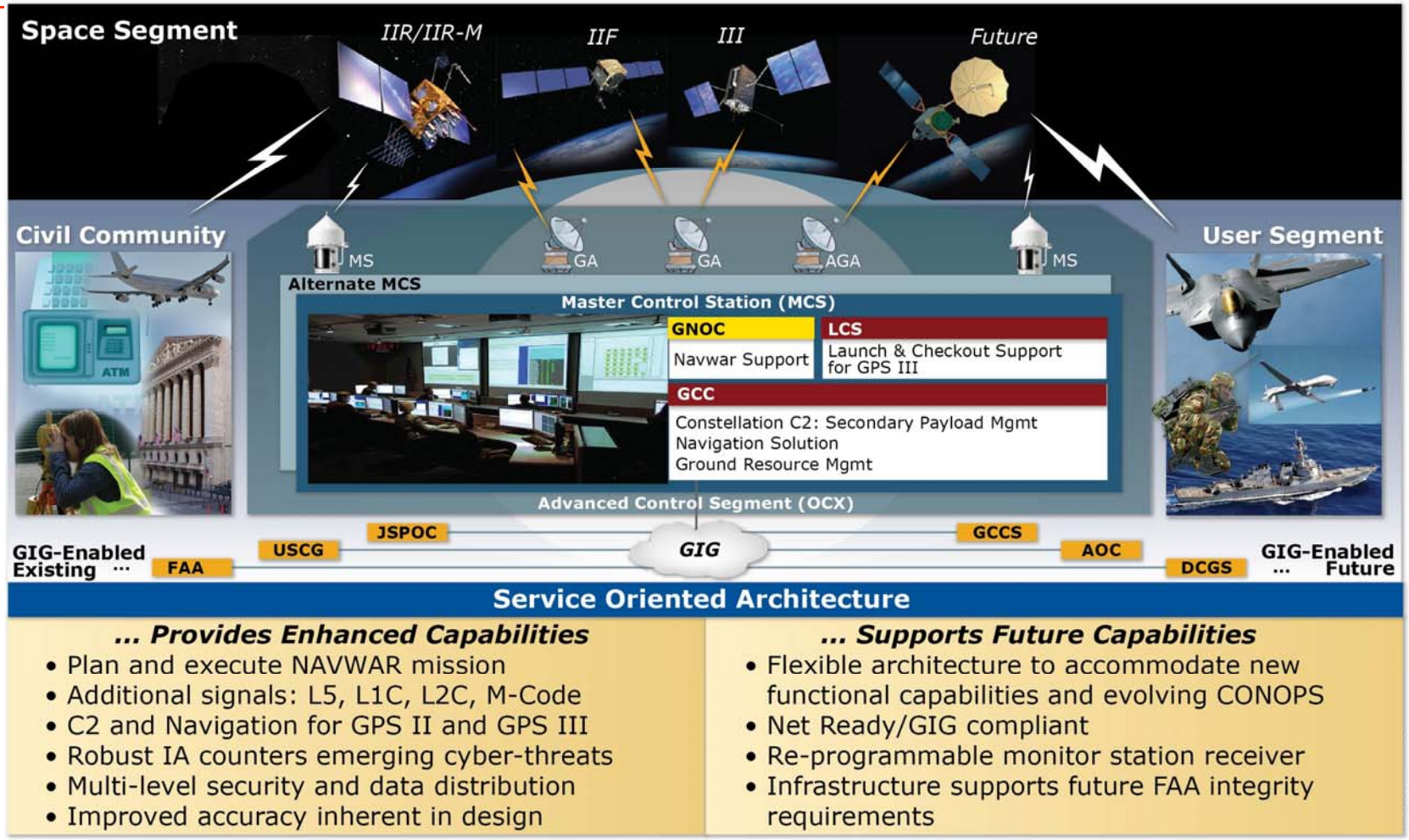
GPS OCX Overview



OCX Transforms GPS From Signals to Service-Based Capabilities

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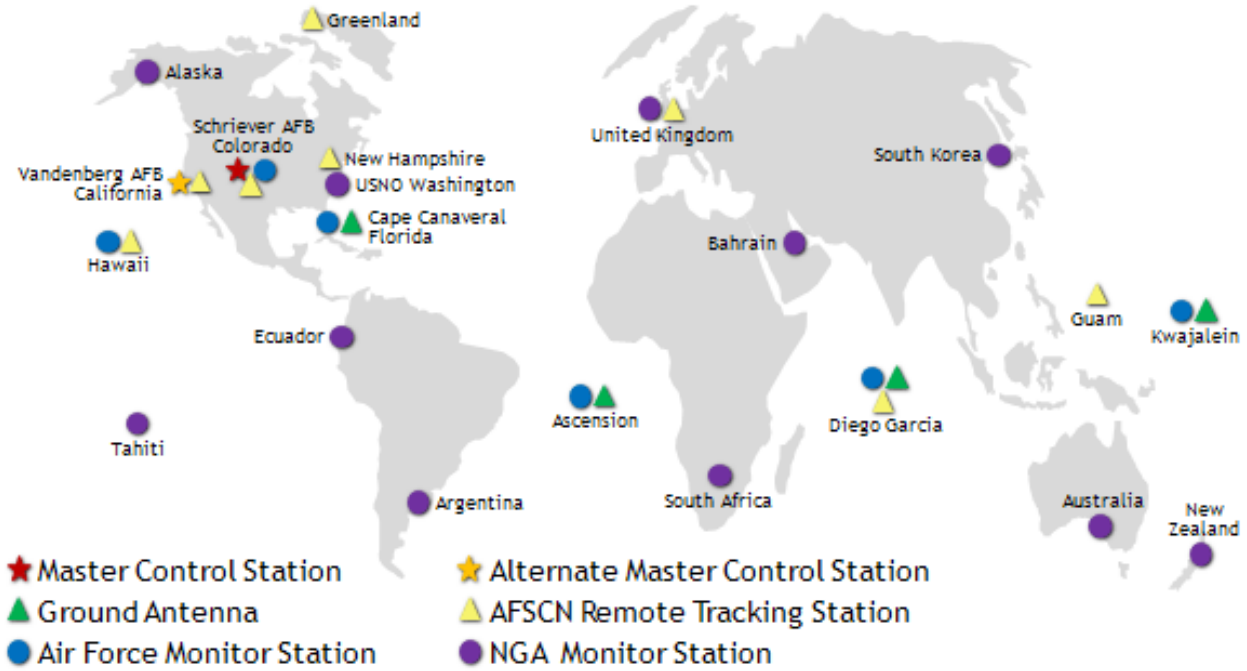
GPS OCX IA Challenges



- **Global Network of Monitor Stations and Ground Antennas**
- **NIPRNET, SIPRNET and Internet Connectivity**
- **GPS supports Mission Critical Military and Civil functions**
- **Escalating Cyber Threat**

OCX is a Global Network Controlling a Critical National Asset

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The Threat

2007 - Landsat-7 and Terra AM-1 Satellite Systems Attacked

September 2012 – White House confirms breaching Military Office for nuclear commands

March 2011

RSA Hacked; data used to attack Lockheed-Martin, Northrop, and L-3 Communications.

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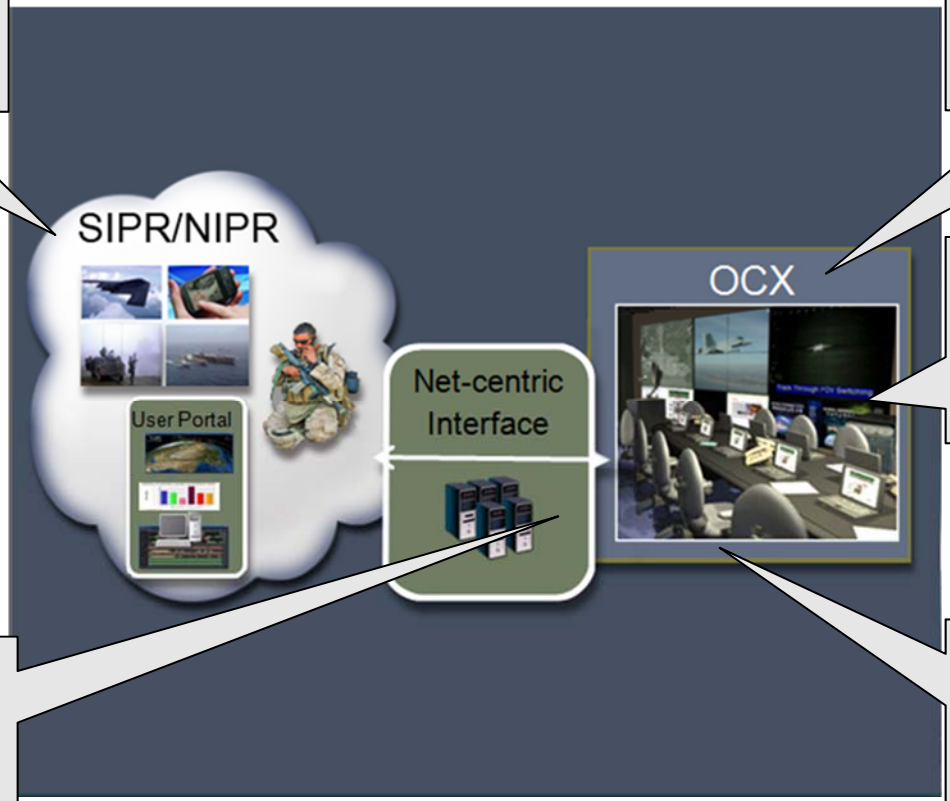
GPS OCX IA Features

Feature	Approach	Benefit
"De-Militarized Zone" for all external Connections	Multiple IA Controls (including Encryption, Firewall, IDS, and Application Security)	• Separation between Communications network and constellation C2 systems • Scalable Net-Centric Interfaces maximizes interoperability
Hardened COTS Architecture	Segmented Network with multiple Policy Enforcement Points OS/Database/Apps hardened to DoD guidelines	• Capability to operate in a through attack • "Crumple Zones" between critical subsystems • Reduced attack surface
Hardened Software	Refactoring ~ 2 million LOC (lines of code) of the reuse baseline to remove any vulnerabilities	• Significant improvement in application security
Multi-Level Security	UCDMO certified Cross-Domain Guard (Raytheon High Speed Guard)	• SOA architecture that provides products to multiple security levels

GPS OCX IA Architecture Features

Encrypted, Authenticated Links for all customers

All applications run on a tested, hardened COTS architecture



All Custom Applications designed securely

DMZ buffers outside communications from C2 Systems

Active IA monitoring throughout the system

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GPS OCX IA Lessons Learned

Significant IA utility can be gained with inexpensive fixes:

- **Firewalls at WAN links**
- **Proactive patching of COTS**
- **Minimize admin privileges**
- **Application Whitelisting (Configuration Control)**
- **Hardened Operating Systems**

Older Application Code is largely insecure

- **C++ is particularly problematic**
- **Java is better, but not perfect**

“Trust No One”

- **Look to protect yourself from your neighbors security problems**
- **Monitor your system to guard against insider threat**
- **Look to constantly improve**