



IDS Business Support,  
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## Network & Space Systems Space & Intelligence Systems

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### Wideband Global SATCOM Backgrounder

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#### **Description & Purpose:**

The mission of the Wideband Global SATCOM (WGS) system is to provide vital communications capacity for the warfighter. The WGS constellation will be a key element of a high-capacity SATCOM system providing a quantum leap in communications capability.



Boeing's investments in phased array antennas and digital signal processing, combined with innovations in the commercial satellite market, have resulted in a flexible WGS system that will deliver the capacity, coverage, connectivity and control required by the most demanding operational scenarios.

#### **Customer**

Air Force MILSATCOM Systems Wing at Los Angeles Air Force Base is the WGS customer. Boeing is under contract to build the first three satellites for the WGS system known as WGS Block I. They will be launched in 2007 and 2008. Two Block II satellites, with an RF Bypass enhancement to support high data rate Airborne Intelligence, Surveillance and Reconnaissance (AISR) missions, are also currently in production.

#### **Characteristics**

WGS is designed for Coverage, Capacity and Connectivity, and can route 2.1 to 3.6 Gbps of data – more than 10 times that of the previous system. Operating at both X-band and Ka-band, the system will enable networks for tactical Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR).

WGS will provide coverage to the most important theaters of operation around the world. WGS supports communication links throughout the allocated 500 MHz of X-band and 1 GHz of Ka-band spectrum. Through frequency reuse and digital channelization, each WGS payload can exploit more than 4.8 GHz of usable communications bandwidth, providing throughput in excess of 2.1 Gbps per satellite.

The WGS design includes 19 independent coverage areas – 10 Ka-band and 8 X-band spot beams can be positioned anywhere in the field of view of each satellite. Full-Earth coverage in X-band is also provided. Use of phased array technology allows the eight X-

band beams to be steered and shaped to apply gain and power exactly where it's needed.

Communications between users is enhanced using the digital channelizer, which allows for very efficient use of a satellite's bandwidth. It divides the uplink bandwidth into nearly 1,900 independently routable sub channels, providing the connection from any uplink coverage area to any downlink coverage area.

### **Miscellaneous**

The WGS communications payload is controlled from four Wideband Satellite Operations Centers, using ground-based control elements provided by Boeing, ITT Industries, and Raytheon. Platform control is conducted from Schriever AFB using mission-unique software designed specifically for this program by Boeing in concert with the Command and Control System-Consolidated (CCS-C) products furnished under a separate contract by Integral Systems, Inc.

WGS leverages a wealth of government and commercial experience and technology, including the proven Boeing 702 satellite platform – the industry leader in capacity, performance, and cost-efficiency. Enabling technologies of the 702 platform include xenon-ion propulsion system (XIPS), highly efficient triple-junction gallium arsenide solar cells, and deployable radiators with flexible heat pipes.

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