

Boeing Defense, Space & Security  
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## Network and Space Systems

### Overview

With headquarters in Arlington, Va., Network and Space Systems (N&SS) has approximately 15,000 employees located in 35 states and 12 countries. As part of Boeing Defense, Space & Security, the N&SS vision is to be our customer's preferred partner based on insight, innovation, performance and value by designing and building the future through network integration, intelligence, security and surveillance systems, information solutions, communications architectures and space exploration. N&SS provides its government and commercial customers with an integrated set of capabilities and the most advanced technological systems in the world through four operating divisions.



### Electronic & Information Solutions Systems

With headquarters in Fairfax, Va., the 4,800 employees of Electronic and Information Solutions (E&IS) focus on developing and providing advanced electronic systems, cyber security, command, control, communications, intelligence, surveillance and reconnaissance (ISR) solutions. The division is comprised of six business areas:

- **Advanced Technology Programs (ATP)** provides technical solutions to maritime ISR, maritime acoustics and proprietary programs. ATP specializes in small, lightweight low-power electronics; remote unattended sensors; network communications solutions; unmanned underwater systems; acoustics solutions; mission planning and field support; and operations support and sustainment.
- **C3 Solutions** provides ground Command and Control (C2), airborne Command, Control and Communications (C3), integrated networks and tactical systems, and advanced communications. Programs include the Family of Advanced Beyond Line-of-Sight Terminals (FAB-T) and the Combat Survivor Evader Locator (CSEL) radio.
- **Cyber and Security Solutions (C&SS)** provides network surveillance and data analytics, cyber training and simulation, security assessments, mission assurance, and information operations capabilities to the federal, commercial, and international markets as well as cybersecurity solutions and data analytics. C&SS manages the Cyber Engagement Center, a working operations facility that brings together cyber security experts from across Boeing to collaborate with customers, partners, and researchers.

- **Electronic and Sensor Solutions (E&SS)** is composed of two wholly owned subsidiaries, Argon ST and Digital Receiver Technology (DRT), specializing in ISR mission systems deployed in air, land and sea environments. The broad portfolio includes state-of-the-art signals intelligence (SIGINT) processing, system-of-systems and network-of-network solutions, electronic warfare capabilities and critical infrastructure protection systems. The business also develops and integrates reconnaissance, communications, navigation and geolocation systems. E&SS products include Ship's Signal Exploitation Equipment (SSEE), the Enhanced Medium Altitude Reconnaissance and Surveillance System (EMARSS), the Reconfigurable Airborne Multi-Intelligence System (RAMIS) and the Lighthouse Airborne COMINT and DRT collection systems.
- **The Intelligence Systems Group (ISG)** develops, integrates and deploys systems providing advanced capabilities to the U.S. defense and security communities and its allies. ISG has specific expertise and technologies that enable robust situational awareness through collection planning, Big Data management, advanced analytic processing and secure information sharing at the enterprise level. By incorporating the technologies of various Boeing acquisitions, including eXMeritus, SMSi and Kestrel, ISG provides deep vertical content and domain expertise to support customers' critical missions and offers an end-to-end capability framework. ISG is powered by the combination of best-of-breed technology, a heritage in solution delivery, and customer mission intimacy, allowing the best support to decision makers, analysts and operators.
- **Mission Operations** integrates, deploys, transitions, operates and sustains satellite ground systems supporting the intelligence community, the U.S. Department of Defense, and civil and commercial customers for mission success. Mission Operations provides extensive expertise in space command and control, and space situational awareness.

### **Space and Intelligence Systems**

Boeing Space and Intelligence Systems (S&IS) is the company's center for all space and experimental systems and government and commercial satellites. S&IS is based in El Segundo, Calif. and has about 5,400 employees. S&IS offers end-to-end intelligence space systems and specializes in large-scale systems integration; intelligence, surveillance and reconnaissance satellite systems; and navigation and communication satellite systems.

- **Commercial Satellites** – Commercial Satellite Systems oversees the design, integration and testing of communications satellites and payloads for commercial telecommunications, scientific and environmental applications. Since 1961, Boeing has developed and produced state-of-the-art space and communications systems for military, commercial and scientific uses. These systems supply communications and meteorological observation technology for domestic and international customers and meet many of the military and civil space system requirements of the U.S. government.

Current contracts include the MEXSAT satellite communications system, which

includes three satellites; four Inmarsat-5 satellites; eight satellites for Intelsat; four small platform satellites for Asia Broadcast Satellite and Satelites Mexicanos; one for SES, and one for ViaSat. Boeing spacecraft routinely relay digital communications, telephone calls, video conferences, television news reports, facsimiles, television programming, mobile communications, Internet connectivity and direct-to-home entertainment.

- **Boeing Commercial Satellite Services** – Boeing Commercial Satellite Services (BCSS) develops innovative solutions for satellite customers by marketing commercial satellite telecommunications services to the U.S. government and other satellite users. The initial target market for BCSS is the U.S. government; future plans include teaming with commercial satellite operators to provide other types of customized communications capacity, including services to foreign governments.
- **Global Positioning System IIF (GPS)** – Boeing is under contract to build 12 GPS IIF satellites for the U.S. military's satellite-based radio navigation system that permits land, sea and airborne users to instantaneously and precisely determine their three-dimensional position, velocity and time 24 hours a day, under all weather conditions, anywhere in the world.
- **Tracking and Data Relay Satellites (TDRS)** – Boeing is building three satellites in the TDRS series: TDRS-K, -L, and -M. The first was launched in 2013. The satellites incorporate a modern design based on flight-proven performance. The three previous TDRS satellites were based on Boeing 702HP-class electronics, which are still the standard for the newest spacecraft Boeing is building today. Boeing also has upgraded NASA's TDRS system ground terminals.
- **Wideband Global SATCOM (WGS)** – WGS offers greatly increased communications capacity, coverage and operational flexibility for the warfighter. The WGS constellation, comprised of 12 high-capacity communications satellites, is alleviating severe bandwidth shortfalls and reducing reliance on costly commercial SATCOM.
- **X-37B Orbital Test Vehicle (OTV)** – The X-37B OTV is an unmanned space vehicle that will be used by the U.S. Air Force to explore reusable space vehicle technologies in support of long-term space objectives. Objectives of the X-37B program include space experimentation, risk reduction, and concept of operations development. Boeing's involvement in the program dates back to 1999.

## Space Exploration

Boeing Space Exploration division, based in Houston, is the leading global supplier of reusable and human space systems and services. Since the beginning of the Space Age, Boeing has designed, developed, built, and operated human and robotic space vehicles as well as supporting hardware. The organization's legacy began with the X-15 – the first winged aircraft to enter space – and Mercury, spanning to Gemini, Apollo, Skylab, Space Shuttle and the International Space Station (ISS). Space Exploration employs more than 2,000 people in Alabama, California, Florida, Louisiana, Ohio, Washington and Texas.

Key programs include:

- **Space Launch System** – Essential to NASA’s deep space exploration endeavors, the Space Launch System (SLS) will be the largest, most capable rocket ever built, carrying humans and cargo beyond Earth. Boeing is responsible for the design, development, manufacture and assembly of the SLS core stages and avionics, working with NASA’s SLS program office at Marshall Space Flight Center (MSFC) in Huntsville, Ala. Boeing is manufacturing the core stage, which will tower more than 200 feet tall, at the NASA Michoud Assembly Facility (MAF) in New Orleans, La. First launch of the rocket is scheduled for 2017.
- **Launch Products and Services** – Boeing Launch Products and Services is responsible for two Boeing subsidiaries: Boeing Commercial Space Company (BCSC) and Boeing Launch Services. BCSC provides payload accommodations and related services to Sea Launch, a commercial launch provider of communications satellites, which Boeing developed with the current owner, RSC Energia. Boeing Launch Services markets and provides Delta launch services to the commercial community. Boeing procures these services from United Launch Alliance.
- **Boeing CST-100** – The Boeing Crew Space Transportation-100, or CST-100, vehicle was developed as part of NASA’s Commercial Crew Program. The CST-100 can accommodate up to seven passengers or a mix of crew and cargo and will transport astronauts to the International Space Station and other low-Earth-orbit destinations, like the planned Bigelow space station. Featuring an innovative weldless design and a pressurized vessel that can be reused up to 10 times, the CST-100 capsule features Boeing’s LED “Sky Lighting” and tablet technology for crew interfaces. The first CST-100 test flight will launch in late 2016, with the first manned mission planned for 2017.
- **International Space Station (ISS)** – The ISS is the largest, most complex international scientific project in history and our largest adventure into space to date. The ISS’s National Lab is a unique test bed for research in the areas of biology, biotechnology, physical and materials sciences as well as Earth and space sciences. ISS research has resulted in major scientific breakthroughs and real benefits on Earth. Boeing is the prime contractor to NASA for the ISS. In addition to designing and building all the major U.S. elements, Boeing is responsible for ensuring the successful integration of new hardware and software – including components from international partners – as well as providing sustaining engineering work.

### **Strategic Missile & Defense Systems**

Based in Huntsville, Ala., with operations across the country, Boeing Strategic Missile & Defense Systems (SM&DS) provides integrated missile defense solutions for all phases of ballistic missile threats – boost, midcourse and terminal. SM&DS is currently involved in the development of several key advanced missile defense technologies and systems and continues to provide established products and services to its customers. Comprised of more than 2,200 employees nationwide, SM&DS also develops directed energy systems to address multiple defense needs and customers. Key programs include:

- **Arrow** – Boeing and Israel Aerospace Industries (IAI) have teamed to co-produce the Arrow Weapon System (AWS), the first operational national missile defense system for the Israel Ministry of Defense. The AWS program demonstrates Boeing’s commitment to developing international missile defense partnerships around the globe.
- **Avenger** – Avenger has been the U.S. Army’s premier line-of-sight, mobile, shoot-on-the-move, short-range air defense system. Boeing has expanded Avenger capabilities by developing derivatives that provide adaptive force protection solutions, and developed an open architecture based on a universal weapons interface concept that enables integration of a variety of weapons – missiles, rockets, guns, and future weapons – on a single platform.
- **Directed Energy Systems (DES)** – Boeing is leading the industry in the field of directed energy, demonstrating the capability to provide counter rocket, artillery and mortar (C-RAM) and unmanned aerial vehicle (C-UAV) and counter Information surveillance and reconnaissance (C-ISR) threat defense using high energy lasers. Key programs include the High Energy Laser Mobile Demonstrator (HEL MD), Navy Solid State Laser Technology Maturation program, the Mk 38 Tactical Laser Weapon System and the Air Force Research Laboratory Space Surveillance System. Boeing is funding additional efforts that will provide innovative and effective directed energy solutions for force protection defense and security applications.
- **Ground-based Midcourse Defense (GMD)** – Boeing is the prime contractor for GMD, the United States' only operational defense against long-range ballistic missiles, and holds the Development and Sustainment Contract for the system. Boeing oversees development, testing, deployment, operations and sustainment of the ground-based system to detect, track and destroy long-range ballistic missiles in their midcourse phase of flight.
- **Patriot Advanced Capability-3 Missile (PAC-3)** – The PAC-3 Missile uses hit-to-kill technology to intercept and destroy tactical ballistic missiles, cruise missiles and hostile aircraft. The Boeing-built PAC-3 seeker acts as the missile’s “eyes.” By providing active guidance data to the missile, PAC-3 can acquire the target and ensure a kill through direct body-to-body impact.
- **Strategic Missile Systems** – Boeing has been a key contractor for the Air Force in land-based Intercontinental Ballistic Missile (ICBM) systems for more than 50 years. Areas of expertise include full life-cycle support, repair and sustaining engineering, systems engineering, strategic guidance systems, ground systems, trainers, secure codes, field deployment, missile integration and systems testing. Boeing remains engaged in numerous modification and sustainment programs for the Minuteman III system that are critical to extending Minuteman’s deterrent capability through 2030, and is conducting studies for the Ground Based Strategic Deterrent (ICBM system beyond 2030). Boeing is also maturing concepts and technologies for a Conventional Prompt Global Strike capability that draws on the company’s extensive missile system background and knowledge.

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