Backgrounder

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Network and Space Systems

Overview

Headquartered in Arlington, Va., Network and Space Systems (N&SS) has nearly 23,000 employees located in 40 states and nine countries. As part of the Boeing's Integrated Defense Systems, 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, communications architectures, and space exploration. N&SS provides its customers -- government and commercial -- with an integrated set of capabilities and the most advanced technological systems in the world through the following six operating divisions:

Combat Systems

Combat Systems is creating the networked land force of the future, providing integrated, networked systems and solutions that allow U.S. and allied land forces to perform their missions more effectively and safely while reducing operating costs. Headquartered in St. Louis, Mo., the division consists of nearly 2,000 employees at eight major sites across the U.S. and a growing presence in the United Kingdom and Australia.

Combat Systems' flagship program is Future Combat Systems (FCS), the centerpiece of U.S. Army modernization. FCS is a networked, fully integrated system-of-systems that includes a new family of manned and unmanned ground and air vehicles and sensors. FCS will *enable* the U.S. Army modular force, providing Soldiers and military leaders with leading-edge technologies and capabilities that will afford them a significantly higher level of survivability and lethality in complex environments. Boeing, with partner Science Applications International Corporation (SAIC), function as the Lead Systems Integrator (LSI) for FCS, managing a best-of-industry team of more than 600 suppliers who are working together to deliver the first fully-equipped FCS Brigade Combat Team in 2015 and accelerate the delivery of selected FCS technologies to the U.S. Army's current force in the form of early capability "Spin Outs" starting in 2008.

With the FCS System of Systems Common Operating Environment (SOSCOE) and Advanced Collaborative Environment (ACE), Combat Systems is also a leader in Boeing's efforts to create the integrated battlespace, a network-centric system of assets operating within a common architecture to enable seamless sharing of information.

In addition, the division is leveraging its expertise in large-scale systems integration and land force modernization solutions in support of allied land forces around the globe. Combat Systems is supporting the United Kingdom's Future Rapid Effects System (FRES) program, which is intended to develop a new family of medium-weight, network-capable armored vehicles for the British Army. Combat Systems is also partnered with Boeing Australia Ltd. to support Land Warfare modernization requirements for the Australian Army as well as iRobot Corporation to develop a next-generation, small unmanned ground vehicle (SUGV), called the SUGV Early, which will provide military, civil and commercial users with unprecedented reconnaissance and secure, real-time intelligence capabilities.

Command, Control and Communications (C3) Networks

Command, Control, and Communications (C3) Networks, is headquartered in Huntington Beach, Calif. C3N, with approximately 4,500 employees in five states, Australia and South Korea, provides end-to-end solutions that enhance, net-enable, and integrate existing and future command and control systems for transformational communication networks, as well as legacy missile and submarine guidance systems.

Key programs include:

- **Network & Information Systems**
  - Joint Tactical Radio System – Boeing is building the Ground Mobile Radio (JTRS GMR), a joint services initiative to provide a family of software-programmable radios that will provide reliable multi-channel voice, data, imagery, and video communications for mobile military users that are interoperable between waveforms and service branches.
  - Family of Advanced Beyond line-of-sight Terminals (FAB-T) – Prime contractor and lead system integrator for development of a system that talks to different satellites, enabling information exchange between ground, air, and space platforms.
  - Combat Survivor Evader Locator (CSEL) – This lightweight radio is a critical component of a global communications system to assist in combat search-and-rescue missions. The system enables search-and-rescue forces to locate, authenticate and communicate with a downed or isolated solider, airman, or sailor anywhere in the world via satellite.

- **Intercontinental Ballistic Missile (ICBM) Systems** – Since 1958, Boeing has designed, developed and produced the guidance and control system for the Minuteman ICBM. The ICBM team is currently leading a team of contractors to

replace the aging guidance system electronics in the Minuteman III ICBM's. The new system will extend the life of the Minuteman III beyond the year 2020.

- **Integrated Shipboard Systems** – Since the late 1950's Boeing has been the leading supplier of navigators for the U.S. Navy's ballistic missile submarine fleet as well as British Royal Navy Trident submarines. The company provides systems for the Navy and is currently working to replace electro-statically supported gyroscopes as the inertial reference in submarine navigation systems.

- **Integrated Command and Control (IC2)** – Allows joint forces to gain and sustain an advantage across air, land, sea, and space with real-time information that improves command and control capabilities by allowing effects-based operations at home or abroad.

- **Integrated System Development – Boeing Australia Limited (ISD-BAL)** – Boeing is delivering several key programs to the Australian Defense Force that will provide the foundation for its national network centric warfare capability, including the Vigilare Ground-based Air Defense System; High Frequency Modernization Program (HFMP); as well as network management and support services for its Defense Wide Area Communications Network.

Intelligence and Security Systems

Based in Arlington, Va., Boeing Intelligence and Security Systems (I&SS) is dedicated to providing integrated capabilities to meet the needs of our nation's homeland security and intelligence agencies. With more than 2,000 employees, I&SS provides ground-based and other integrated intelligence and security solutions for a broad base of U.S. government customers. The following I&SS program areas are serve the homeland security and intelligence community:

Advanced Information Systems (AIS), based in Anaheim, Calif., focuses on advanced technology programs, information systems, marine systems, network systems, and tactical systems. AIS offers a broad range of capabilities from broadband information management to miniature, low-power communications, and autonomous unmanned systems for government and commercial customers. AIS is the Navy's lead systems integrator for its AN/BLQ-11 Long-term Mine Reconnaissance System. AIS also operates a commercial autonomous underwater vehicle, called the Echo Ranger.

Mission Systems, located in Springfield, Va., offers large-scale systems engineering and integration, mission infrastructure and operations, and intelligence and imagery analysis services. Mission Systems provides government and commercial clients with a range of information technology, systems engineering and software solutions. Capabilities include expertise in large-scale systems integration, mission operations, visualization and simulation, networks and communications

systems, high-assurance multi-level security solutions, information assurance services, data production, analysis and dissemination, and integrated intelligence management systems. Its largest customers are the National Geospatial-Intelligence Agency and the National Security Agency.

Security Solutions, which includes the SBI*net* program, is transforming our border control through the deployment of net-centric technologies and infrastructure. Boeing's SBI*net* program is responsible for acquiring, deploying and sustaining proven technology and tactical infrastructure in support of U.S. Customs and Border Protection's border security mission.

The transformational SBI*net* program aims to reduce the United States' vulnerability to terrorism and protect national interests by providing Border Patrol agents, along the U.S. land borders with Mexico and Canada, the tools needed to immediately detect an illegal entry; effectively respond to the entry, and bring the situation to the appropriate law enforcement resolution. Additionally, SBI*net* provides enhanced situational awareness through improved fixed and mobile communications systems and a Common Operating Picture, equipping agents with the advantage of real-time, up-to-date, integrated intelligence about illegal border activity, and interoperability with other federal, state, local and international law enforcement bodies.

Missile Defense Systems

Based in Arlington, Va., with operations across the country, Boeing Missile Defense Systems provides integrated missile defense solutions for all phases of ballistic missile threats -- boost, midcourse and terminal. Missile Defense Systems 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 3,500 people in nine major operating locations, Missile Defense Systems also develops directed energy systems to address multiple defense needs and customers.

Key Programs include:

- **Ground-based Midcourse Defense (GMD)** – Development, testing and deployment of a ground-based system to detect, track and destroy long-range ballistic missiles in their midcourse phase of flight.

- **Airborne Laser (ABL)** -- ABL is a precise, high-energy laser weapons system capable of destroying ballistic missiles in the boost phase.

- **Arrow** -- A joint American and Israel co-production of a ground-based, ballistic missile defense system designed to protect Israel against short- and medium-range missiles.

- **Directed Energy Systems (DES) –** DES includes the Advanced Tactical Laser (ATL), which will support missions on the battlefield and in urban operations by destroying, damaging or disabling ground targets.

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 Seal Beach, CA, has over 6,800 employees in five states and offers space-based Intelligence Systems, Experimental Systems, National Systems, Navigation and Communication Systems and Space Superiority Systems.

- Boeing operates the largest satellite factory in the world in El Segundo, Calif., where the company designs and manufactures commercial communications satellites and space systems, satellites and payloads for national defense, science and environmental applications. Since 1961, Boeing has produced and launched more than 260 satellites that have provided a total of 2,500 years of satellite services on orbit. The world's first synchronous communications satellite, Syncom, was built by Boeing and launched in 1963. Recent satellites to enter service include DIRECTV 10, Spaceway (broadband Internet), Thuraya 3 (mobile phone service), GOES 13 (weather prediction), and the U.S. Air Force's Wideband Global SATCOM spacecraft (military communications).

- S&IS also manages the company’s Spectrolab subsidiary, the world's leading manufacturer of space solar cells and panels. Spectrolab's products include terrestrial concentrator solar cells and modules, solar simulators, compound semiconductors and high intensity lighting products. Spectrolab established its credibility in the space industry in 1958 with Pioneer 1, which carried the company's first body-mounted solar panels into space. That tradition continues today with NASA’s Mars rovers “Spirit” and “Opportunity,” which use Spectrolab’s triple junction solar cells for power as they explore the Red Planet.

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 spanning to Gemini, Apollo, Skylab and continuing with the space shuttle and International Space Station (ISS). Space Exploration, a division within Boeing Integrated Defense Systems’ Network and Space Systems business, employs nearly 4,000 people in Texas, Florida, California and Alabama.

Key programs include:

- **Space Shuttle** -- Boeing is the major subcontractor to NASA's space flight operations contractor, United Space Alliance. As the original developer and manufacturer of the Space Shuttle Orbiters, Boeing is responsible for Orbiter engineering, engineering support to operations, including launch, and overall Shuttle systems and payload integration services.

- **International Space Station (ISS)** -- As the prime contractor, Boeing is responsible for design, development, construction and integration of the ISS and assisting NASA in operating the orbital outpost. Boeing built all of the major U.S. elements. Space Exploration is also responsible for integrating the systems, procedures, and components of 16 participating countries in this worldwide enterprise. Today, Boeing performs much of the sustaining engineering for the ISS.

- **Checkout, Assembly and Payload Processing Services (CAPPS)** -- Boeing provides payload processing for the Space Shuttle, ISS, expendable launch vehicles and other programs at Kennedy Space Center, Fla. Boeing provides technical and engineering support to ensure payload readiness for launch.

- **Transformation and Integration** -- This office ensures the necessary skills, expertise, tools and processes are properly transitioned from Space Exploration legacy programs – Shuttle, ISS, CAPPS – to NASA Constellation projects..

- **Constellation** -- Boeing's Constellation program supports NASA's implementation of a sustained and affordable human and robotic exploration program. Boeing is working with NASA and industry to propose and study a wide variety of exploration concepts and approaches to meet the U.S. Global Exploration policy, which includes a return to the moon no earlier than 2020,

- **Exploration Launch Systems** -- Exploration Launch Systems supports NASA on strategy and policy on Space Exploration programs procured by the NASA Marshall Space Flight Center (MSFC) and leads the proposal capture and program execution teams for the Ares V cargo launch vehicle, the Earth Departure Stage (EDS) and the Altair lunar lander in Huntsville, Ala. The office also provides overall leadership and integration of programs and functions in Huntsville for Space Exploration. Boeing was awarded two NASA contracts in 2007: Ares I Upper Stage Production (USP) and Instrument Unit Avionics (IUA). Boeing is providing producibility engineering support to the NASA design team at MSFC in preparation for production of the upper stage components and final manufacturing at the NASA Michoud Assembly Facility (MAF) in New Orleans, La. Boeing will produce from two to six upper stages per year during regular production, depending on NASA requirements. Boeing will also produce three IUA flight test units and six production units, with an option to produce four additional units per year from 2014 to 2016. The IUA will also be assembled at MAF.

- **Launch Products and Services:** The Boeing Products and Services organization was part of Launch Systems, which ceased to exist when the new United Launch Alliance (ULA) was formed in 2006 and most of the Delta program moved to it. Boeing Launch Products and Services is responsible for two Boeing subsidiaries: Boeing Commercial Space Company (BCSC) and Boeing Launch Services. BCSC provides the payload accommodations and launch services to the Sea Launch Company, a multinational company in which Boeing is a 40 percent owner. The products and services markets and provides Delta launch services to the commercial community. Boeing procures these services from ULA.

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