



BOB FERGUSON PHOTO

Spacecraft engineers at the Satellite Development Center in El Segundo, Calif., prepare a Boeing-built 601 spacecraft for testing in a thermal vacuum chamber designed to replicate the harsh extremes of the space environment. Every Boeing satellite is tested at extremes ranging from -250 to 320 degrees Fahrenheit.

A look at SDC's activity

Even a cursory look inside the million-square-foot Satellite Development Center in El Segundo, Calif., is impressive, if not overwhelming.

Straight ahead, you glimpse a coterie of smock-clad technicians tending to some of the most complex satellites ever built. Once deployed to Earth orbit, many of these spacecraft will enable millions of people around the world to exchange voice, data and images with ease.

A glance down the cavernous high bay captures another satellite being readied for thermal-vacuum testing, which simulates the spacecraft's harsh operating environment 22,300 miles (35,900 kilometers) above Earth. And not far away, 157-foot-long solar panels (48 meters), built by Boeing subsidiary Spectrolab Inc., stand poised to convert sunlight into energy for still another spacecraft.

These scenes are found nowhere else at Boeing; the 5,400-employee SDC is the company's primary satellite manufacturing facility.

Instantaneous global communication service, direct-to-home television, vital military links, life-saving weather monitoring—the SDC, anchored by 43 years of experience in designing and building space-based assets, enables all these capabilities.

—Joel R. Nelson

Aiming High

Industry recovery, new pacts and technology improvements spur optimism for Boeing's satellite biz

By JOEL R. NELSON

Recent contract wins. Program successes. Ongoing technical innovation.

These achievements of Boeing's Satellite Development Center—of IDS Space & Intelligence Systems—fuel strong optimism the center will continue to be an aggressive competitor in the recovering satellite industry. The buzz of activity that permeates the

factory in El Segundo, Calif., reflects this sense of confidence.

The S&IS team is executing 10 satellite orders for nine customers, including the U.S. Air Force, New Skies Satellites of The Netherlands, and the Malaysian concern MEASAT (Malaysia–East Asia Satellite system). S&IS also helps design and build space-based systems for several U.S. national security customers.

“We’ve stabilized our performance, we’re focused on making money with good business practices, and we see tremendous opportunities across all our markets,” said Charles Toups, S&IS vice president of Engineering.

EARLY TRACTION IN 2006

S&IS got off to a fast start this year. In January, it recorded its largest contract in nine years: an agreement to build three satellites that will form the backbone of Mobile Satellite Ventures’ North American mobile communications system. In February, Boeing received authorization to begin work on the fourth spacecraft in the Wideband Gap-filler Satellite system, a multispacecraft fleet that will provide next-generation communications to U.S. and allied warfighters.

Then in May, a Boeing Delta IV rocket launched into Earth orbit the first of three next-generation U.S. weather satellites (GOES-N) built at the Satellite Development Center (see Page 29 of the July 2006 *Boeing Frontiers*). And in June, the Air Force ordered another three Global Positioning System satellites.

CONTRIBUTING ACROSS BOEING

Along with serving its own wide-ranging customer base, S&IS delivers vital support to programs across the company. “A lot of people across the company have helped us, so we’re eager to give back by leveraging our expertise and best practices into their work,” Toups said. This work includes

- Helping define the Transformational Satellite Communications System, which will provide high-capacity, Internet-like connectivity to military forces.
- Assuming responsibility for delivering 12 satellites for the Global Positioning System IIF constellation, continuing a Boeing GPS heritage that dates to 1974.
- Providing support to NASA’s Orion spacecraft, the successor to the Space Shuttle, for which Boeing is part of a team performing developmental studies. S&IS digital technology experts invented a flexible processor that controls nine spacecraft subsystems, including navigation, proximity detection and communications.
- Developing radio frequency converters and electronics for the Family of Advanced Beyond Line-of-Sight Terminals initiative, which will provide protected communications for the U.S. military.

LEAN+ DRIVING IMPROVEMENTS

Buoyed by this momentum, S&IS is aggressively seeking to expand its satellite business.

The enterprise is applying Lean+ and Critical Chain Project Management—a method for efficiently managing equipment, personnel, and other program resources—across its Engineering and support functions as well as on the factory floor.

“Lean and CCPM were huge factors in engaging our employees in improving our operations and making us competitive for the Mobile Satellite Ventures contract,” Toups said. “We expect them to drive even more improvements that will position us well for future opportunities.”

Lean+ and CCPM have paid off in improved program execution. For example, the cost of rework, repair and scrap has declined by two-thirds since 2002. Cycle times for building a number of key spacecraft components have shown steady improvement, and the



JEFF LOFTIN PHOTO

Boeing 702 satellites, like the one pictured here inside Boeing’s 60-foot High Bay in El Segundo, Calif., undergo final processing during this last stage of assembly and test. Once launched, these satellites will operate from geostationary orbit 22,300 miles above the equator.

delivery schedule for a satellite that will expand high-definition television service across the United States was significantly shortened this year.

“Several commercial and government customers have commented on how well we’re doing,” Toups said. Also validating its improvement efforts: The Satellite Development Center has delivered improved financial results over the past several quarters.

NETWORK SOLUTIONS

Those efficiencies allow the center to fulfill its mission of providing networked solutions.

“Our customers look to us to create total systems solutions—a network-enabled approach in which satellites interact with a variety of other assets—that deliver critical information, in real time, to a variety of commercial, military and civil environments,” Toups said.

The Satellite Development Center draws upon some unique capabilities in carrying out this mission. One of them is digital signal processing technology, which allows satellites to route multiple signals quickly and efficiently. The facility has been developing and improving this technology since the late 1970s; it’s one of S&IS’ core competencies in government and commercial markets.

“S&IS is the world leader in building very-large-scale digital signal processors for satellites,” said Brian Clebowicz of the S&IS Digital Electronics organization. “No one else makes as many digital signal processors or as many that are highly complex.” ■

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