Space: The cluttered frontier

Boeing-led team developed satellite that tracks orbiting spacecraft and 'junk'

By Diana Eastman

It's crowded up there.

Fifty years ago, when Russia and the United States began sending satellites into orbit, it was a pretty empty place. Not today.

About 1,000 active spacecraft are circling the earth, and at least 20 times as many pieces of "space junk" are flying around. Satellite builders and operators are increasingly worried about collisions that could disable or destroy their satellites and disrupt the vital services they provide, from battlefield communications to banking transactions.

In September, a government and industry team led by Boeing Space and Intelligence Systems helped the U.S. Air Force take a significant step in its ability to watch, predict and react to what's going on in space. The launch of the first Space Based Space Surveillance (SBSS) System satellite will give the military a sky-high perch from which it can see and assess orbiting objects.

What was once tracked only from the earth can now be tracked from space.

"This satellite is going to revolutionize the way we track objects in space by not being constrained by the weather, the atmosphere or the time of day," said Col. J.R. Jordan, vice commander, Space Superiority Systems Wing, U.S. Air Force Space and Missile Systems Center, who retired in November.

Data collected around the clock by the new satellite will be correlated against information from ground- and ship-based sites to maintain a more up-to-date and accurate catalog of space information.

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– Todd Citron, director of Boeing Advanced Space and Intelligence Systems

PHOTO: PAUL PINNER/BOEING

The new system is expected to triple the capability of detecting threats to U.S. military spacecraft from unfriendly nations and tracking debris in deep space and near the earth.

"More than 60 countries are currently operating satellites, but we aren't always told what they're for," said Todd Citron, director of Boeing Advanced Space and Intelligence Systems. "SBSS will enable the Air Force to maintain a dynamic, daily map that will revolutionize space situational awareness and protect those space assets that are so essential to our military and our economy."

The satellite weighs just over a ton and is about one-eighth the size of a typical communications satellite. Every 90 minutes, it passes over the North and South poles, about 330 miles (540 kilometers) above the earth.

It has a sensor, or telescopic camera, with a large aperture and wide field of vision that gives it an unobstructed view of three-quarters of the sky without having to reposition the satellite. A reprogrammable onboard computer processes the camera's images and can quickly adapt to changing mission requirements. The Satellite Operations Center in Colorado can swing the camera as required, track objects at very high speeds and deliver near-real-time data.

As prime contractor, Boeing is handling systems engineering and integration, the Satellite Operations Center and initial mission operations. Partner Ball Aerospace provided the satellite and sensor that utilize an onboard computer and software Boeing developed.

"This collaboration is about providing critical information to our customers," said Roger Krone, president of Boeing Network & Space Systems. "SBSS will give the Air Force a lot more knowledge, make the nation's assets more secure and keep America at the forefront of space." ■

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GRAPHIC: The Space Based Space Surveillance System satellite, shown in this artist's rendering, has a telescopic camera that will give the U.S. Air Force its only space-based sensor capable of detecting and monitoring debris, satellites and other space objects without the disruptions from weather, atmosphere or time of day that limit ground-based observations. BOEING