

Fact Sheet

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DSP Undergoes Six Sigma; Project Further Improves Spacecraft Performance

After more than 30 years of building and integrating Defense Support Program (DSP) satellites for the United States Air Force, with 21 satellites launched and two more set to launch in coming years, Northrop Grumman is still finding ways to improve on its product.

The company has managed this feat using Six Sigma, a structured, data-driven process for improving business performance. Six Sigma concentrates on reducing variability in processes and focuses on eliminating the causes of defects within a process; it was implemented across all aspects of the Space Technology sector's business in 2001.

In 2002, Northrop Grumman undertook a project aimed at improving the DSP spacecraft's battery building process. While power to the spacecraft is provided by solar panels, three on-board 84-pound batteries provide electrical power during solar eclipses and when power loads exceed solar array output. Eclipses occur twice a year and last from a few seconds to 55 minutes, depending on the exact spacecraft orbit parameters.

The Six Sigma project team looked at the DSP battery buildup at each step of fabrication, assembly and testing to ensure procedures were in place to catch discrepancies and errors. Then they established a process to identify and correct errors immediately — maximizing the probability that the completed battery will successfully pass final test and certification, while minimizing the cost and lost schedule time due to rework that might not show up until final acceptance testing.

“DSP is a cornerstone of our nation's defense capability, and one of the most important things about this project is that it ensures the satellites will be ready for launch when the Nation needs them,” said Peggy Paul, Northrop Grumman's DSP program manager. “Another important aspect of this project is that

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provides additional insurance on DSP's already extraordinary on-orbit reliability and life cycle. When a program is as important as this one, it's critical that we do the best possible job on every aspect."

Paul added that the project is expected to produce a cost avoidance of \$250,000 per spacecraft.

Since the first satellite launch in 1970, DSP has detected and provided early warning of missile launches, space launches and nuclear explosions. DSP satellites have performed their critical mission as the spaceborne segment of NORAD's Tactical Warning and Attack Assessment System with exceptional reliability, exceeding their specified design lives by 150 percent.

The satellites have been upgraded five times, enabling them to provide accurate, reliable data in the face of new mission requirements — more threats, smaller targets, advanced countermeasures. Each upgrade improved DSP's capability, survivability and life expectancy.

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