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This Boeing team's skills at producing Delta IV rocket fairings helped protect critical national security satellites during launch

by Melissa Mathews

It's usually the tail end of the rocket that gets all the early attention, providing an impressive fiery display as the spacecraft is hurled into orbit. But mission success also depends on what's on top of the rocket: a piece of metal called the payload fairing that protects the rocket's cargo during the sometimes brutal ride to orbital speed.

"There's no room for error," said Tracy Allen, Boeing's manufacturing production manager for a Huntington Beach, Calif., team that made fairings for the Delta IV. The fairing not only protects the payload from launch to orbit but also must jettison properly for deployment of the satellite or spacecraft.

Allen and his colleagues built the 65-foot-long (20-meter-long) aluminum isogrid fairings for the Delta IV heavy-lift launch vehicle. The design was based on 41 similar fairings Boeing made for the Titan IV rocket. Isogrid refers to the triangular grid pattern formed by stiffeners on the inboard side of the fairing structure.

The team delivered its final product last September, with fairings for two future launches in inventory. While their management works on opportunities for new orders, team members have moved on to other work. But they'd jump at the chance to work together again.

Their story is one of challenges and solutions. And they attribute their success to Lean+ practices and good old-fashioned teamwork.

"The team took it upon themselves to make an excellent product," said program manager Thomas Fung. "We had parts issues and tool problems, but the guys really stepped up and took pride and worked through the issues."

The aluminum fairing team went through a major transition when Boeing merged its Delta Program with Lockheed Martin's Atlas Program to form United Launch Alliance in 2006.

"There were a lot of process changes in the transition phase because we were working with a new company," Fung said. "We had part shortages because of vendor issues, and that caused an impact to the schedule. We had personnel changes, and we had to spend a lot of time transferring knowledge. We had culture differences from Lockheed Martin's Atlas program as to how Boeing does things."

Added Mike Miller, director of structures for the Delta and Atlas vehicles at United Launch Alliance: "None of these folks should

have anything less than a complete sense of pride knowing the product they built and the support they provided has enabled our mission success."

Finding ways to use Lean+ tools was key to their efficiency.

"We benefitted from some of our Lean concepts, such as 'point of use.' All of our supplies and parts were located where we were using them. Kits were detailed and toolboxes were 'shadowed,'" or marked to highlight tools that were unaccounted for, Allen said. "It was a very visual workshop—you could walk into the assembly area and know if something was out of place."

Good work practices translated into a quality product. Of the 45 isogrid fairings Boeing produced for both the Titan and Delta programs, the last fairing had the fewest manufacturing discrepancies and came in at a lower-than-expected cost, Fung said.

"Each fairing was top-quality, a good product," said Tone Pekich, responsible structures engineer on the project. "They all have their challenges, and some take a little bit more work depending on the issues that come up. They're like our kids, and all kids are special."

The team found additional inspiration in the nature of the customer. All of the payload fairings went to United States national security missions. They'll watch with pride when their final two fairings launch soon on National Reconnaissance Office missions.

"We were part of helping the warfighters to combat terrorists," Fung said.

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The customer agrees. The isogrid fairing, according to Miller, "has protected some of the most important assets we've launched and has maintained an impeccable track record of hardware quality and overall system reliability."

Team members say there are lessons to be learned across the Boeing enterprise as a result of their experiences. "The Lean+ tools can be applied to any office, any shop, any engineering process," Allen said. "Anything that has more than one step—it's all applicable." ■

PHOTOS: (Left) Tracy Allen, Boeing manufacturing manager for Network and Tactical Systems, is shown with tooling used to assemble payload fairings in Huntington Beach, Calif. PAUL PINNER/BOEING **(Right)** A Delta IV Heavy rocket with a National Reconnaissance Office payload lifts off from Cape Canaveral, Fla., in January 2009. UNITED LAUNCH ALLIANCE