

Lightening the Launch Load

Satellite structures lighten up with inventive use of additive manufacturing

BY ED MUIR, BOEING WRITER

INNOVATION EXCITATION

Boeing engineer Michael D'Olio monitors vibration testing of additively manufactured satellite antennas.

PHOTO: BOEING

Principal Senior Technical Fellow Rich Aston leads a team of engineers always trying to build the proverbial better mousetrap.

"We always strive to find new and better ways to innovate," said Aston. "Learning and teaching are core values of our team."

Applying their knowledge and creativity to inventions, Aston's team created a fully additively manufactured, or 3D-printed, metallic satellite spacecraft structure. The structural panels are lighter, require less labor and dramatically reduce cycle time compared to the design and manufacture of previous structures.

ADDITIVE ASSEMBLIES

Boeing engineer Emily Woods prepares a 3D-printed satellite panel for assembly. Producing the panels with additive manufacturing reduces structure assembly time to less than one hour.

PHOTO: BOEING

OUTSIDE THE BOX

Rachel Zilz, Woods, Nicole Schoenborn and Rich Aston team up to assemble an additively manufactured satellite that they designed. The 3D-printed construction eliminates secondary labor operations.

PHOTO: BOEING

Benefits of this 3D-printed product

- The fabrication lead time for the high-strength aluminum used on the structure is days rather than months for traditional honeycomb composite panels, enabling engineers to respond faster and with more agility if a customer requests changes.
- The 3D-printed construction eliminates secondary labor operations such as match drilling and match bonding.
- The design features a roughly 99% part count reduction, reducing potential supply chain strain.
- Structure assembly time is dramatically reduced to 53 minutes, compared to weeks for a traditional composite design.

"Our team is often focused on the next project, so it's nice to step back and realize what we've accomplished," said engineer Nicole Schoenborn.

The team earned the 2023 Boeing Special Invention Award, which recognizes technical innovations that have brought new and improved capabilities to aerospace and realized significant benefits for the company and its customers. [IQ](#)