Boeing Sets Rapid Pace with 3D-Printed Solar Array Substrates

- Technical innovation cuts production cycle time by up to six months

- First 3D-printed solar arrays will fly Spectrolab solar cells aboard small satellites built by Millennium Space Systems

- Designed to scale from smallsats to Boeing 702-class platforms

EL SEGUNDO, Calif., Sept. 10, 2025 /PRNewswire/ -- Boeing [NYSE: BA] unveiled a 3D-printed solar array substrate approach that compresses composite build times by up to six months on a typical solar array wing program from print to final assembly. This represents a production improvement of up to 50% when compared to current cycle times.

Flight-representative hardware has completed engineering testing and is progressing through Boeing's standard qualification path ahead of customer missions.

"Power sets the pace of a mission. We reached across our enterprise to introduce efficiencies and novel technologies to set a more rapid pace," said Michelle Parker, vice president of Boeing Space Mission Systems. "By integrating Boeing's additive manufacturing expertise with Spectrolab's high-efficiency solar tech and Millennium's high-rate production line, our Space Mission Systems team is turning production speed into a capability, helping customers field resilient constellations faster."

The first 3D-printed solar arrays will fly Spectrolab solar cells aboard small satellites built by Millennium Space Systems. Both non-integrated subsidiaries are part of Boeing's Space Mission Systems organization.

Beyond the arrays themselves, Boeing's approach enables a parallel build of the complete array, pairing a printed, rigid substrate with flight-proven modular solar technologies.

By printing features such as harness paths and attachment points directly into each panel, the design replaces dozens of separate parts, long-lead tooling, and delicate bonding steps with one strong, precise piece that is faster to build and easier to integrate. It is built upon the foundation of Boeing's qualified additive, flight-proven materials and processes.

"As we scale additive manufacturing across Boeing, we're not just taking time and cost out, we're putting performance in," said Melissa Orme, vice president, Materials & Structures, Boeing Technology Innovation. "By pairing qualified materials with a common digital thread and high-rate production, we can lighten structures, craft novel designs, and repeat success across programs. That's the point of enterprise additive, it delivers better parts today and the capacity to build many more of them tomorrow."

Across the Boeing portfolio, the company has incorporated more than 150,000 3D-printed parts, yielding significant schedule, cost, and performance benefits. This includes more than 1,000 radio-frequency parts on each Wideband Global SATCOM (WGS) satellite currently in production and multiple small-satellite product lines with fully 3D-printed structures.

The new array approach is designed to scale from small satellites to larger platforms, including Boeing 702-class spacecraft, targeting market availability for 2026.

By printing the panel's structure and built-in features, Boeing can assemble the array in parallel with cell production. Robot-assisted assembly and automated inspection at Spectrolab further reduce handoffs, improving speed and consistency.

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