

Hexcel Additive Manufacturing Leads to Lightweight Complex Components that Enhance Performance on GA-ASI UAV/RPA Systems

Hexcel is a key partner with General Atomics Aeronautical Systems (GA-ASI) in the development and production of carbon fiber-reinforced thermoplastic components for complex structures on GA-ASI unmanned aerial vehicle (UAV)/remotely piloted aircraft (RPA) systems.

GA-ASI selected Hexcel and its HexAM® additive manufacturing technology following an extensive evaluation process that began in 2019. The HexAM process combines a high-performance thermoplastic and milled carbon fiber with selective laser sintering (SLS) technology to produce fully functional HexPEKK® end-use components. HexPEKK parts offer significant weight, cost and time-to-market reduction compared to incumbent molding, machining, or composite technologies while still providing repeatable and validated engineering material properties.

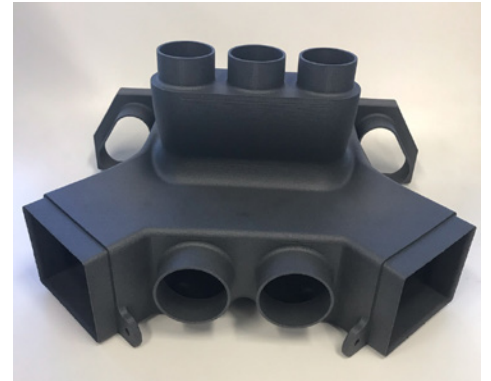
“The HexAM process produces stiff and lightweight components that are critical for aerospace systems,” said Larry Varholak, Vice President of Additive Manufacturing at Hexcel. “We value our collaboration and work with GA-ASI to develop the components for its UAV/RPA systems that enhance performance while lowering costs.”

Using HexAM technology, Hexcel and GA-ASI have produced several complex geometric components that otherwise would be extremely expensive or impossible to produce with traditional composite, molding, or machining methods. Many of the applications are for inner mold line (IML), outer mold line (OML), ducting, and manifolds where the complex geometries enabled by additive manufacturing provide design freedom and an easier and cheaper manufacturing process to improve performance and operation of UAV systems.

In addition to carbon fiber-reinforced PEKK which has excellent mechanical and thermal properties that are ideal for UAV/RPA systems, Hexcel also has developed bonding methods for larger structures that broaden the component application space that GA-ASI can take advantage of HexAM technology.

“The Hexcel team has helped us enhance our Additive Manufacturing applications space,” said Elie Yehezkel, Senior Vice President of Advanced Manufacturing Technologies at GA-ASI. “We are finding HexAM technology and the additive manufacturing process at Hexcel to have a solid foundation of material data that we can use for design and analysis.”

Pictured is a transition duct for an unmanned aerial vehicle (UAV) made by GA-ASI using Hexcel HexAM® additive manufacturing technology. Photo courtesy of GA-ASI.



Through GA-ASI’s engagement with the Hexcel team, they have demonstrated their process to be robust, repeatable, and capable of producing complex parts and assemblies needed for their systems. Despite the carbon-filled PEKK HexAM® process being thermally challenging, Hexcel is knowledgeable at delivering components that can repeatedly meet our dimensional tolerance requirements. Working collaboratively with the Hexcel engineering team helps GA-ASI get to the right design and process quickly.

For GA-ASI, additively manufactured components play a growing role in GA-ASI platforms. HexAM technology provides the flexibility and design freedom of additive manufacturing with the material properties compatible with GA-ASI’s application environmental conditions and with the composites structures of its aircraft, while providing high performance, tool-less and lightweight solutions.

The partnership between Hexcel and GA-ASI continues to propel new applications for HexAM technology. Grounded with a solid foundation of material properties testing, the teams are now able to move quickly from prototyping to production for new applications for the technology on GA-ASI systems.

General Atomics Aeronautical Systems, Inc. (GA-ASI), an affiliate of General Atomics, is a leading designer and manufacturer of proven, reliable Remotely Piloted Aircraft (RPA) systems, radars, and electro-optic and related mission systems, including the Predator® RPA series and the Lynx® Multi-mode Radar. With more than six million flight hours, GA-ASI provides long-endurance, mission-capable aircraft with integrated sensor and data link systems required to deliver persistent flight that enables situational awareness and rapid strike. The company also produces a variety of ground control stations and sensor control/image analysis software, offers pilot training and support services, and develops meta-material antennas.

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