

# Assured Performance of Additively Manufactured and Composite Parts through Embedded Sensing and Life Cycle Monitoring: An Enabler for in-Space Use

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Lightweight composites have a range of applications in aerospace where operational costs and mission (payload) capabilities depend significantly on component weight. Additive manufacturing of the composite components expands the design and production space allowing for complex part geometries. A limiting factor to the utilization of the composites in high value applications, such as aerospace generally, and particularly for in-space applications, is the ability to determine the part quality both at the time of production as well as through the lifetime of the component. Work on monitoring the performance of additively manufactured and autoclaved composites that encompasses the design and manufacturing as well as use in operational environments will be discussed. Optimization of the component design for manufacturability, the use of process monitoring sensors during the component build as well as embedding of carbon nanotube yarn based structural sensors will be described.

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