

ADDITIVE MANUFACTURING TRENDS IN AEROSPACE

The aerospace industry continues to experience innovation in materials and manufacturing technologies to managing their cost more efficiently. There are pioneering innovations and adopting emerging technologies that are shaping manufacturing globally - one of which is additive manufacturing or 3D printing. From the complex engine parts to cabin interiors, aerospace Industries are turning to the capabilities of 3D printing to produce components to enhance performance of aircraft and/or spacecraft. While the ongoing advancement in the technologies surely lead to more breakthroughs in the industry, tangible benefits to aerospace companies are gaining from 3D printing at present

Reduced Material Weight

The pursuit of lightweight structures is one of the biggest factors for the adoption of 3D printing not only for prototyping but for final part production as well. Unlike traditional manufacturing methods, 3D printing enables engineers to design parts with intricate geometries which can dramatically reduce a part's weight, while maintaining its strength. The reduction of weight leads to reduced material costs and fuel savings

Part Consolidation

Process of additive manufacturing which deposits material layer by layer allows it to consolidate multiple parts into a single functional component. This means simplification in assembly, thereby reducing the number of operations and tooling costs

Improved Part Performance

3D printing engineers and designers have more freedom to explore complex part designs that can deliver maximum performance. No longer restricted by the limitations of most traditional manufacturing methods, aerospace companies are able to rethink how a certain part should perform and develop, test and validate those assumptions through rapid prototyping - another significant benefit that 3D printing provides for manufacturers

ISRO's 3D Printed Components to Space

Wipro, an Indian IT services corporation and EOS German additive Manufacturing had built India's first Additive Manufacturing (AM) engineered component for ISRO. The Component is North-West Feed Cluster 2x2 Part of GSAT19 launched in June 2017. The 3D printed components along with hybrid CFRP (Carbon Fiber Reinforced Polymer) technology. The material used for manufacturing is Aluminium. The product designed to make lighter and single part. The component designed by Space Application Centre, ISRO

Indian made World Lightest Satellite with 3D Printed Components

Kalam SAT , a Femto Satellite and widely-claimed to be the world's lightest satellite was built by an Indian High school student team. The probe is composed of 3-D printed reinforced carbon fiber polymer. The weight of the probe is just 64 grams and it is fitted in a 3.8 centimetres cube

NASA's Human-supporting Rover has FDM (Fused Deposition Method) Parts

NASA engineers designed and developed 70 3D-printed parts made of ABS(Acrylonitrile Butadiene Styrene), PC (polycarbonate) and PC/ABS built on a Fortus Production 3D printer and used on rover to perform at harsh conditioned Mars

European Space Agency Making Multi-Dome Lunar Base with 3D Printing Concept

Multi-dome lunar base being constructed a based on the 3D printing concept. Once assembled, the inflated domes are covered with a layer of 3D-printed lunar regolith by robots to help protect the occupants against space radiation and micrometeoroids

References

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*Commencing from February Issue, Editorial Board decided to come up with a new column **Technology Spark** which impacts developments in aeronautical Sciences, Aerospace, Propulsion and allied fields.*

- Editors