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Review Paper on Rapid Prototyping of Application use in Aerospace Industry

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Abstract: *The Term "Rapid Prototyping" (RP) refers to a class of technologies that can automatically construct physical models from Computer-Aided Design (CAD) data or is a group of techniques used to quickly fabricate a scale model of a physical part or assembly using three-dimensional computer-aided design (CAD) data. The "three-dimensional printers" allow designers to quickly create tangible prototypes of their designs rather than two-dimensional pictures. Such models have numerous uses. They make excellent visual aids for communicating ideas with co-workers or customers apart from design testing. For example, Aerospace Engineer might mount a model aerofoil in a wind tunnel to measure lift and drag forces . 3D printer is the method of converting 3D design into reality. Firstly define what is meant by 3D printing & what is significant of it. 3D printing technology is also called as rapid technology in which three-dimensional objects are created. In this technology, there are three steps followed for any 3D printing Model viz. designing, printing & finishing. With this technology, we save time and cost and also it saves the waste of material.*

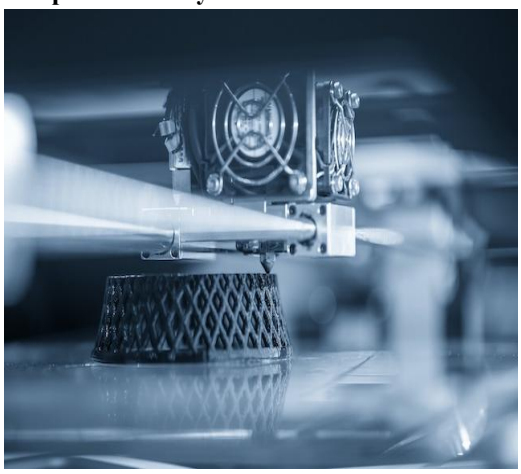
Keywords: Rapid Prototyping, Computer-Aided Design

I. INTRODUCTION

Rapid prototyping 3D printing technology has revolutionized the manufacturing industry in recent years, including the aerospace industry. The aerospace industry is a highly regulated and complex industry where even the smallest changes can have a significant impact on safety and performance. With the help of 3D printing technology, aerospace engineers can rapidly create and test designs, reducing costs, and improving the time-to-market for new products.

3D printing, also known as additive manufacturing, involves building three-dimensional objects layer by layer from a digital model. In the aerospace industry, 3D printing is used for a wide range of applications, including prototyping, tooling, and end-use parts manufacturing. This technology offers several advantages over traditional manufacturing methods, such as the ability to create complex geometries and reduce material waste.

3d Printing Technology Used In Aerospace Industry-



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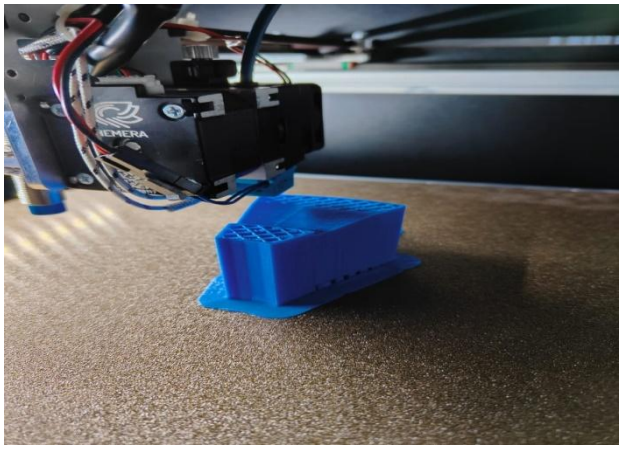

3d Printing machine macking part on aero space

Used Of 3d Printing Technology in Aerospace Industry-

1. Rapid Prototyping: 3D printing allows aerospace engineers to create prototypes of new designs quickly and inexpensively. This can help to reduce the time and cost of the product development process, as it eliminates the need for traditional prototyping methods, such as casting or machining.
2. Tooling: 3D printing can also be used to create tools and fixtures for manufacturing processes. This technology offers the advantage of being able to produce complex geometries that may not be possible using traditional tooling methods. Additionally, 3D printing can be used to create custom tooling for specific manufacturing processes, reducing the need for expensive and time-consuming customization.
3. End-Use Parts Manufacturing: 3D printing can be used to manufacture end-use parts for aircraft and spacecraft. This technology offers the advantage of being able to produce parts with complex geometries that may not be possible using traditional manufacturing methods. Additionally, 3D printing can reduce the time and cost of producing parts, as it eliminates the need for tooling and reduces material waste.

Luminescence Material

1. Plastics: Plastics are the most commonly used materials for 3D printing. They are easy to work with, relatively inexpensive, and come in a wide range of colours and properties. Some common types of plastics used in 3D printing include ABS, PLA, PETG, Nylon, and TPU.
2. Metals: Metals are used in 3D printing for applications that require strength, durability, and heat resistance. Some commonly used metals include aluminium, titanium, and steel. Metal 3D printing is more complex and expensive than plastic 3D printing, but it offers superior strength and durability.
3. Ceramics: Ceramic 3D printing is a relatively new technology that allows for the creation of complex ceramic objects with intricate shapes and details. This technology is still in the experimental stage, but it has the potential to revolutionize the ceramics industry.

Experiment on 3d printer machine in aerospace industry-

1. Material Testing: One of the most important aspects of aerospace engineering is the selection of materials for various components. 3D printing allows engineers to test the mechanical properties of various materials, including their strength, durability, and heat resistance, under different conditions.
2. Design Optimization: 3D printing technology enables aerospace engineers to create complex geometries that may not be possible using traditional manufacturing methods. Engineers can experiment with different designs and geometries to optimize the performance of aircraft and spacecraft components.
3. Prototyping: 3D printing technology can be used to rapidly create prototypes of new aerospace parts. This allows engineers to test new designs and iterate quickly, reducing the time and cost of product development.

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II. CONCLUSION

In conclusion, 3D printing technology has revolutionized the aerospace industry by offering numerous benefits in terms of design flexibility, cost reduction, and speed of prototyping. With 3D printing, aerospace engineers can create complex geometries; optimize designs, and rapidly prototype new parts. 3D printing also allows for customization of aerospace components, as well as the production of lightweight and durable parts.

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