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IN(3D)USTRY TREND ARTICLE

Additive manufacturing solutions will help the Space industry really take off

Sending satellites into orbit is both expensive and complex. Breaking free of Earth's orbit is costly and the demanding conditions of space can be extremely difficult to endure, which means that satellite parts need to be both very light and very strong. The advantages of additive manufacturing for space applications are evident and the entire space industry is excited about the possibilities that 3D printing can offer. Some of the latest solutions developed available in the market for payload components will be presented at IN(3D)USTRY next October 3-5 at Fira de Barcelona.

Among the main examples will be Thales Alenia Space, a division of the global Thales Group, one of the key innovators in the rapidly growing space infrastructure industry, which includes launch vehicles, spacecraft and especially satellites. The group has recently revealed it has sent as many as 79 3D printed metal parts into orbit along with over 350 polymer 3D printed satellite components.

One of the areas where both metal and polymer 3D printing can offer some of the clearest benefits is in payload applications. These are the electronic and mechanical parts that actually make a satellite perform the function it was built for. Such as, for example, covering an entire continent with a TV signal. Needless to say, it is extremely important that they continue to perform flawlessly, since repair operation in space can be very expensive if not entirely impossible.

"3D printing technologies are opening up so many amazing possibilities and everyone in the space industry is very excited about it," says Angel Martinez Martin, Payload - Physical Design Manager at Thales Alenia Space Spain. With extensive experience in space applications, Mr Martinez Martin is one of the foremost experts in the use of AM for both electrical and mechanical payload components. He will be speaking at the IN(3D)USTRY show, where he will present several new solutions that the company has developed using AM.

Mr Martinez has published extensive work on the use of AM both for part optimization and for reducing post-assemblies, making the manufacturing process faster. "We use AM to make parts that are lighter but also to make parts that would be almost impossible to manufacture by traditional methods," he explains. "With optimization methodologies and Additive Manufacturing technologies in tandem, we have got unprecedented results in terms of mass saving and thermo-mechanical performances".

At Thales Alenia Space, AM technologies have many different applications. Some of the most fascinating ones include the use of experimental thermopolymers loaded with nanoparticles to directly manufacture complex, electrically conductive or ESD (Electrostatic Discharge) parts. "Working with these materials, that our partners develop specifically for us, allows us to envision many future applications for AM in our field of expertise, however – Mr. Martin Martinez adds - some of the most useful applications of FDM 3D printing today are in tooling. It allows us to produce custom tools on-demand, implementing the specific mechanical properties we require."

Metal 3D printing technologies, primarily powder-bed selective laser melting (SLM), are used for mechanical parts. "For metal parts such as brackets, holders or even gyroscopes, the advantages offered by AM are mainly in the production of bionically inspired, highly optimized lattice structures," Mr Martin

Martinez explains. "These are much lighter but can also guarantee the same mechanical stiffness and stress resistance. With AM we can produce them as single parts instead of as a set of as many as twenty parts that need to be assembled manually."

AM is offering new solutions that are going to help the space industry solve real problems. The objective of the IN(3D)USTRY conference and exhibit is to discover how these solutions can be implemented in other sectors as well to help the sustainable and optimized manufacturing industry of tomorrow really take off.

About IN(3D)USTRY

Organized by Fira de Barcelona, IN(3D)USTRY From Needs to Solutions is the global hub that brings together every year all the players shaping the advanced and additive manufacturing ecosystem to foster the technological improvement of these innovative systems. It will be held from October 3 to 5 at Fira de Barcelona's Gran Via venue.

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