

“On the fly” production and design thanks to 3D printing

The expression “on-the-fly” means that an action is done spontaneously and in response to a specific need or demand. In manufacturing, this means that a product or a design is created or changed immediately during processing, in response to a customer’s request. Thanks to 3D printing, production and design are being revolutionised by an increase in the potential and efficiency of on-demand production. This revolution has affected many fields, from automotive to military production.

The U.S. Armed Forces

The U.S. Armed Forces has been experimenting with 3D printing for quite a long time. One advantage relies in the on-demand production of parts for military vehicles and weapons (even for UAVs). In some cases, the replacement parts could take years to create, but the United States Armed Forces have now **cut** this time **down** to days thanks to 3D printing.

A new project that the U.S. Army Research Laboratory is now working on, involves the 3D printing of new, lightweight, resistant vehicle parts such as **brackets**, propulsion systems and **weapons**. In particular, the project includes the use of lightweight metals such as titanium, titanium alloys and hybrid ceramic/polymer-matrix composites.

Audi

The Car Manufacturer Audi, has also been involved in the use of 3D printing for the on-demand production of car parts. One of the most important benefits is the reduction in the time customers have to wait when ordering complex parts. Using an SLS-type process, they can quickly make lighter parts with complex internal geometry or functions.

The use of additive manufacturing for the production of car parts has contributed to Audi’s goal of developing a worldwide 3D printing network with Volkswagen. The implementation of 3D printing in the on-the fly manufacturing process enabled Audi to win the 2018 3D Printing Industry Award for Automotive Application of the Year.

The NASA and ESA experiment

Astronauts need to be able to make their own spare parts, tools and materials on demand; for this reason, the first 3D printer was sent to the International Space Station in 2014.

Working in zero gravity, it has since produced dozens of parts and also shown that microgravity had no engineering-significant effects on the process, thus demonstrating that a 3D printer works normally in space and can be a solution for new logistics systems for missions of long duration.


bracket: *staffa*
to cut down: *tagliare, ridurre*
weapon: *arma*



Astronaut Samantha Cristoforetti standing next to a 3D printer.

A UAV (Unmanned Air Vehicle) is a military aircraft that is guided autonomously by remote control, and that is designed to interfere with or destroy enemy targets.

SLS stands for “selective laser sintering”, a 3D technology that uses a laser to sinter powdered plastic material into a solid structure based on a 3D model.

1  **Answer the questions.**

1. What does the phrase "on-the-fly" mean?

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2. What kind of project is the US Army Research laboratory working on?


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3. What is the major benefit Audi has obtained by using 3D printing in its production?

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4. What is the effect of 3D printing technology on space travel?

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2  **Surf the Internet and look for three more applications of 3D printing in fields such as the car industry, aerospace projects, the military and medicine, then compare them with your classmates.**

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