

DREAM

Driving up Reliability
and Efficiency of
Additive Manufacturing

Public Press Release

Title:
Driving up Reliability and
Efficiency of Additive
Manufacturing

Topic:
FOF-13-2016 – Photonics Laser-
based production

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723699

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EUR 3,242,435

Project Website:
<http://www.dream-euproject.eu>



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DREAM, acronym of “Driving up Reliability and Efficiency of Additive Manufacturing”, has been funded under the Horizon 2020 Factories of the Future Initiative with an EU contribution of more than 3,2 million euro. The Project has started in **October 2016** and its specific aim is to significantly improve the performances of laser Powder Bed Fusion of titanium, aluminium and steel components in the following terms: weight reduction, production speed increase, material cost reduction, process productivity increases and fatigue test increase with a sustainable Life Cycle Approach.

In order to upscale the results and to reach an industrial relevant level of productivity, the project has focused on **four main challenges**: part modeling and topology optimization, raw material optimization to avoid powder contamination, process and software innovation, validation and standardisation of the process on industrial components for the different materials.

DREAM project will end on December 31st, 2019 and it has set ambitious goals that led to the achievement of outstanding results, ranging from lightening of components thanks to topological optimization to a substantial increase in the productivity and reliability of this technology. In particular, **parts have been redesigned** by applying topology optimization/design for Additive Manufacturing: the new geometries allow for a reduction of costs (-10%), building time (10%) and part weight (-15%). **Improved quality of raw metal powders** has been achieved through the development of procedures for cross-contamination identification and quantification; moreover, a novel device to remove contaminants from the raw metal powders has been developed and tested within the production process and novel nanostructured alloys have been developed as possible candidates for PBF. DREAM project has implemented also the *control processes*: powder bed fusion machine control software has been developed, specifically, for a better control of the effects of laser parameters on melt track instability/cooling defects, a finer control of the heat input and a 20% augmented fatigue life. This superior control process has allowed **to increase the productivity (+15%) the reliability of the AM process**.

DREAM project has tested the application of Additive Manufacturing on **three relevant end-users test cases**: engine automotive aluminium components of Ferrari S.p.a., medium size prosthetic titanium components of Adler Ortho S.p.A and steel mould insert of the Italian Company Mold & Mold.

Ferrari has achieved **19% weight reduction** re-designing one of its automotive component. The chosen test case included all the structural requirements such as stiffness, strength, fatigue and crash.

Adler Ortho has developed a particularly competitive femoral stem within this project: it has been able to achieve a **15% reduction in the used material, to optimize the trabecular structure** around the prosthesis which allows greater osseointegration and therefore greater secondary stability of the prosthesis, and **to use a particularly advanced titanium powder** that allows to improve the mechanical performance of the device and also the thermal treatments downstream of the additive manufacturing process.

Mold & Mold reinvented the concept of cooling channel, we developed **a new material specifically designed for injection molding** and we improved the process and the affordability of this process.

“I think that one of the main strengths of the project has been the construction of a consortium that involves all the players in the value chain, from the producer of the raw materials and the machines to the end user.” said **Elena Bassoli**, DREAM Project Coordinator “This has allowed a synergistic collaboration that has allowed to exploit the enabling capacities of additive manufacturing”. **Isella Vicini**, DREAM Project Manager and Dissemination Manager, said also that “The synergy between the partners has been so good and technically valid that we can think about a continuation of both the project and the relationships between the partners for other activities.” The project results are now visible on a short video published on the project website.

So, visit the website: <http://www.dream-euproject.eu>

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