Business Cases

Medium size prosthetic titanium components

Lightweight automotive Aluminium components

Mould Inserts

ADLER ORTHO FRANCE

R.B. s.r.l.

beWARRANT

e-Manufacturing Solutions

POLY-SHAPE additive manufacturing

Transilvania University of Brasov

MIND.4D one step beyond

www.dream-euproject.eu

PHOTONICS21 PHOTONICS PUBLIC PRIVATE PARTNERSHIP

FoF Factories of the Future

HORIZON2020

This project has received funding from the European Union's Horizon2020 research and innovation programme under grant agreement n. 723699

Innovation Target

KPI1
at least 15% weight reduction of parts optimized in topology and for Additive Manufacturing

KPI2
reduction of more than 10% of material cost

KPI3
increase over 15% of productivity achieved for PBF process

KPI4
increase over 5% of production speed of laser PBF systems

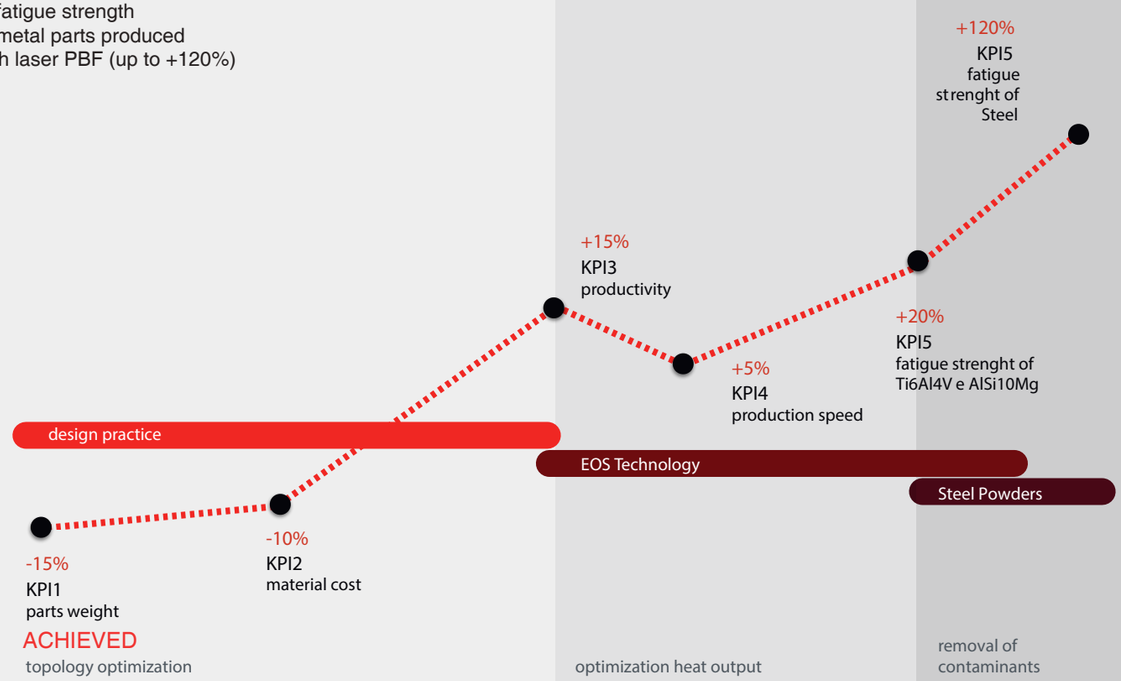
KPI5
increase above 20% of fatigue strength of metal parts produced with laser PBF (up to +120%)

Aims

Widening the application of Additive Manufacturing to medium femoral stems, by overcoming the current limitations through the combined innovation of part modelling, raw material, and process parameters (medium size prosthetic titanium components).

Redesigning the engine subframe mount and producing it by Powder Bed Fusion, with expected ground-breaking drops of weight, cost, and time, (lightweight automotive Aluminium components).

Redesigning the insert by a topological optimization approach to channel design and producing it by Powder Bed Fusion, with improved functionality and impressive prolongation of fatigue life (steel mould inserts with improved functionality and longer fatigue life).



DREAM

Driving up Reliability and Efficiency of Additive Manufacturing

Project

Title: Driving up Reliability and Efficiency of Additive Manufacturing
Acronym: DREAM
Call identifier: H2020-FOF-2016
Topic: FOF-13-2016: Photonics Laser-based production
Funding scheme: Research and Innovation Action
Grant Management number: 723699
Duration: 36 months
Start Date: 01 Oct 2016
Estimated Project Cost and EU Contribution: €3,242,435.00
Project Website: www.dream-euproject.eu

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Consortium

Short name	Partecipant Organization	Country
INSTM (UNI)	Consorzio Interuniversitario Nazionale per la Scienza e Tecnologia dei Materiali	Italy
EOS (LE)	EOS Gmbh Electro-Optical Systems	Germany Finland
UTBv (UNI)	Universitatea Transilvania din Brasov	Romania
BEWG (SME)	BeWarrant	Belgium Italy
MIND4D (SME)	S.C. Mind Four D S.R.L.	Romania
POLYS (SME)	Poly-Shape S.A.S.	France Italy
ADLERFR (SME)	Adler Ortho France S.A.R.L.	France Italy
RB (SME)	R.B. S.R.L.	Italy
FERRARI (LE)	Ferrari S.p.A.	Italy

Objective

The aim of DREAM is to significantly improve the performance of laser Powder Bed Fusion of titanium (PBF), aluminium, and steel components in terms of speed, costs, material use and reliability, also using a Life Cycle approach, whilst producing work pieces with controlled and significantly increased fatigue life, as well with higher strength-to-weight ratios.

The motivation for the project is to go far beyond the state of the art in laser-based Powder Bed Fusion, by mastering of all stages of the process chain; among the numerous industrial applications, the project is focused on components for prosthetic, automotive and moulding applications to optimize the procedure respectively for titanium, aluminium and steel.

DREAM targets the development of a competitive supply chain to increase the productivity of laser-based Additive Manufacturing and to bring it a significant step further towards larger scale industrial use.

The Challenge

1 **Part modeling and topological optimization**

2 **Raw material optimization** to avoid powder contamination

3 **Process optimization,** including innovations of the control software of the Additive Manufacturing machine to enable high throughput production

4 **Validation and Standardisation** of the process on industrial components for three different materials (titanium, Aluminum, and steel)

Project

Project ambition

- **Novel component geometry:**
  a) Part redesign by applying topology optimization/design for Additive Manufacturing
  b) Lower cost, building time and part weight
- **Use of improved and new raw materials:**
  a) Device to remove contamination from the raw material
  b) Use of nanostructured titanium powders
- **Superior process control:**
  a) Better control of the effects of laser parameters on melt track instability/cooling defects
  b) Finer control of the heat input and augmented fatigue life
  c) Innovations of Additive Manufacturing machine control software
  d) Increase of productivity
  e) Higher reliability