Participants

www.marcam.de

www.tno.nl

www.hydrauvision.com

www.dti.dk

www.sirris.be

www.fji.dk

www.ifam.fraunhofer.de

www.mbproto.com

www.flying-cam.com

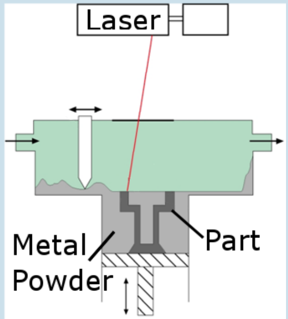
www.microsisteme.ro

www.open-engineering.com

www.ehp.be

Background

Rapid Manufacturing (RM) is the production of parts in various materials directly from a 3D CAD file. RM is a so-called *Layer Additive Process,* which means that the parts are constructed with micrometer thin layers. This layer-by-layer production approach provide designers with unprecedented geometrical freedom when optimizing properties and functions of their products. Furthermore, RM supports batch sizes down to a single part, since no special tools are needed.



http://rm-platform.com

Further Information

Please take a look at:

http://compolight.dti.dk

Project coordinated by the Danish Technological Institute, Olivier Jay:
E-mail: oja@dti.dk

Funding

CompoLight is funded by the European Union within the 7th Framework Programme.

SEVENTH FRAMEWORK PROGRAMME

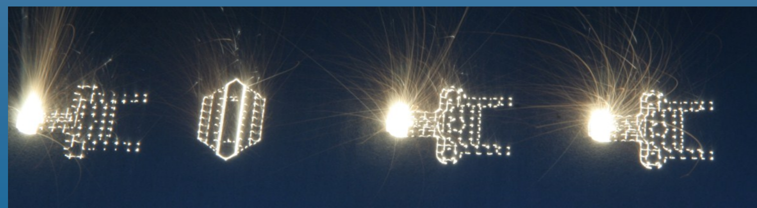
Project period: 11/2008 — 11/2011
Budget: 4.6 M€

COMPOLIGHT

Big Manifold

-

A case study



CompoLight Objective

The purpose of CompoLight is to develop processes and methods which improve the design and manufacturing of three types of lightweight metal components:

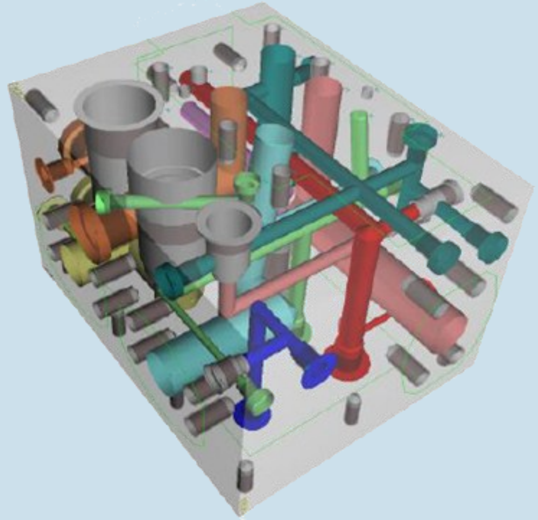
- Parts with interior canals.
- Parts with cavities .
- Porous parts.

CompoLight will:

- Gain new knowledge about RM produced light metal items.
- Ease the introduction of RM concepts in the production.
- Increase the use of RM in the industry.
- Reduce the interval between idea and product.
- Reduce the costs and error output of RM.

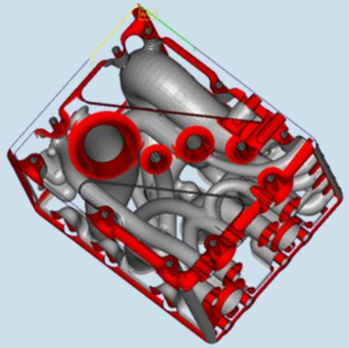
Traditional Design

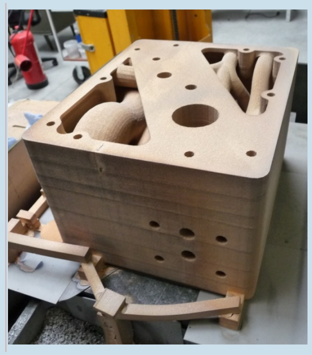
The “big manifold” is a hydraulic element of a pump for a plastic extrusion machine . The original part measures **26.5x20x16.5 cm^3** and weighs **55 kg**.



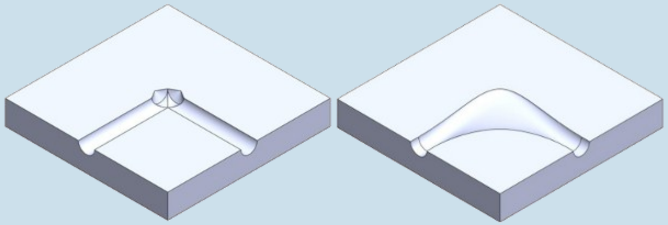
Optimized Design

By optimizing the volume with complex internal channels instead of drilling straight channels, it is possible to decrease the size to **24 x 20 x 15 cm^3** and the weight to **18 kg**.





Internal channels and RM



Taking advantage of the geometric freedom of RM processes, it is possible to build complex internal channels including variable cross sections and integration of ribs to improve the flow, heat exchange or other parameters while keeping the stiffness of the part. RM technology is successfully applied within conformal cooling, hydraulic parts and many other fields.

Redesign Phase

Released from the standard geometrical constraints, the designer is free to optimize the *function* of the part. In this case, the pressure loss through the part was optimized via flow simulations.