Participants

MARCAM ENGINEERING
www.marcam.de

TNO
www.tno.nl

Hydrauvision HYDRAULICS & PNEUMATICS
www.hydrauvision.com

DANISH TECHNOLOGICAL INSTITUTE
www.dti.dk

sirris driving industry by technology
www.sirris.be

FJ · SINTERMETAL
www.fji.dk

Fraunhofer IFAM
www.ifam.fraunhofer.de

mbproto PROTOTYPE & AIDE À LA CONCEPTION
www.mbproto.com

FLYING CAM
www.flying-cam.com

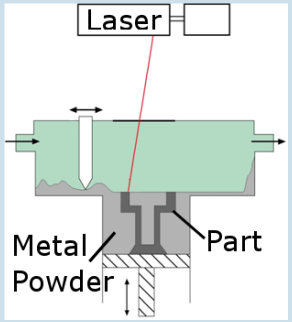
SITEK 45 S.R.L. BUCURESTI - ROMANIA
www.microsisteme.ro

open engineering
www.open-engineering.com

EURO HEAT PIPES
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:
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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

Flying Cam Helicopter

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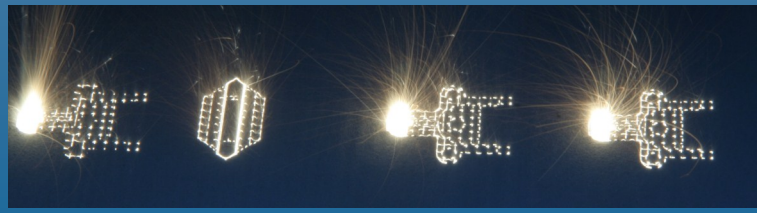
A Case Story



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:

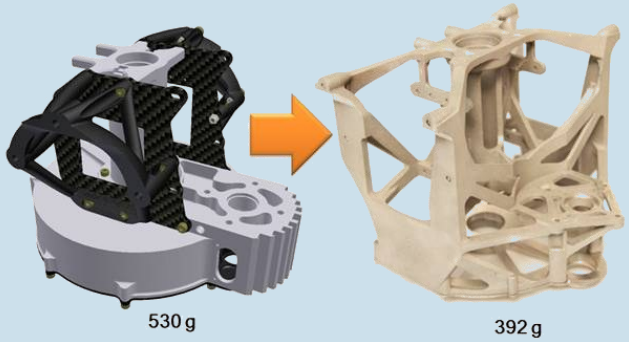
- Gain new knowledge about RM produced light metal items.
- Ease the introduction of RM concepts in the production.
- Increase the use of RM in the industry.
- Reduce the interval between idea and product.
- Reduce the costs and error output of RM.

Introduction

The Flying Cam Helicopter is a small unmanned vehicle that carries filming equipment. It has been used in a wealth of commercials and movies, but it is also applied in other sectors; for example traffic management and emergency assistance.

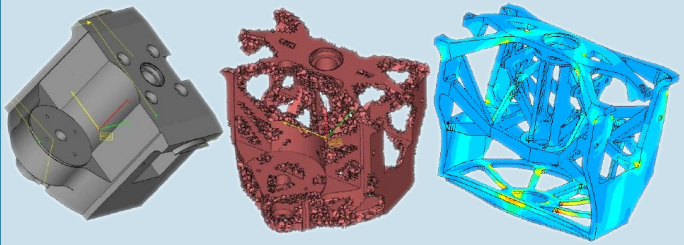
Harry Potter Playing Quidditch—caught by FlyingCam.

Helicopter Frame



It is highly desirable that the frame of the helicopter is as light as possible. Several directions has been investigated, including a complete redesign based on topology optimization (see below) and different building materials like steel, aluminium and titanium.

Topology Optimization



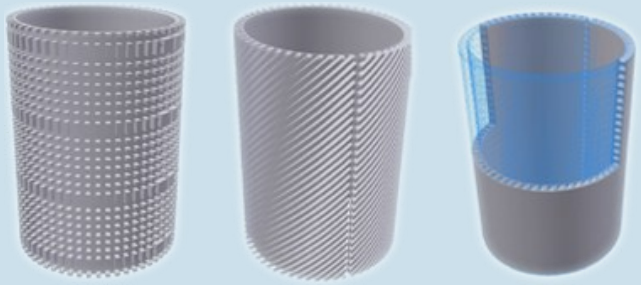
The helicopter frame was redesigned based on topology optimization:

1. Define outer constraints.
2. Remove unnecessary material by topology optimization.
3. Inspired by step 2, redesign the frame.
4. Verify that the redesign meet the requirements regarding weight, stiffness etc.

Work has been done to minimize or fully automate step 3.

Heat Sink

The motor heat sink is also an obvious part to look at when optimizing the helicopter weight. The challenge here is to lower they weight while maintaining (or even improving) the cooling. The solution is to take full advantage of the geometrical freedom of rapid manufacturing and design an advanced internal or external cellular structure, which increase the overall surface area. Several designs have been tested.



Cell Structure Design

Working with detailed cell structures cause several challenges both with respect to the design phase and with the handling of the huge files that are generated. A new set of tools and algorithms has been developed to ease this work, both for the designer and the computer.