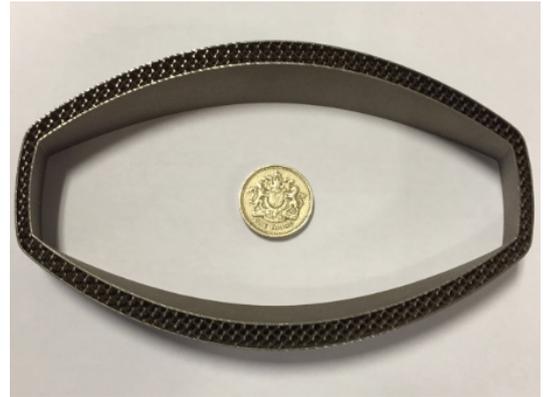


## LIGHT Q7 meeting at Delcam Ltd in Birmingham

Consortium partners met on Tuesday September 15th 2015 for their seventh quarterly meeting at the Delcam office in Small Heath, Birmingham. Delcam is one of the world's leading suppliers of advanced CAD/CAM solutions for the manufacturing industry and in LIGHT Delcam is both a contributor by developing lattice software and the coordinator of the project as a whole.

The LIGHT project (full title Inspiring New Design Freedoms and Light-Weight Solutions for Metal Additive Manufacturing) is funded by the UK's innovation agency, the Technology Strategy Board. Potential improvements in the economy and performance of Metal Additive Manufacture (MAM) components will be investigated by the use of specialised software. The project has three main objectives:

- To demonstrate additive manufacturing for three typical end-users by manufacturing light weight parts to demonstrate the benefits of AM utilising lattices and hollow structures.
- To develop an innovative CAD/CAM solution for lightweight product design for AM, including lattice structure design tools.
- To inspire new design freedoms for metal additive manufacturing to create advanced lightweight structures and products.



*Figure 1: Sample build for HiETA: cross section of the nozzle filled with a Gyroid lattice structure in Inconel718*

The current phase of the project focuses on finalising the optimisation and executing the three chosen demonstrator cases. The first one is the airbrake door hinge (in Maraging steel) from the Bloodhound SSC car, the second one for HiETA Technologies is a thrust nozzle demonstrator (using Ti64) and Magna Parva's earth re-entry capsule demonstrator (in Inconel718). The airbrake door hinge design has been optimised over the past quarter to a macro lattice design for the main part of the hinge. The full thrust nozzle design has been completed a while ago and several test builds were made of a critical section of the nozzle to validate the key lattice parameters (unit cell size and shell thickness). Figure 1 shows one of these cross sections with the exposed internal Gyroid lattice structure built by partner CRDM on a metal machine. The overall design for the earth re-entry capsule was completed already, however to satisfy the weight requirements, an optimised unit cell design was developed to bring the overall weight on target. Next step is to make sample cubes using this new unit cell to determine their mechanical properties and validate the overall design. In parallel the joining of sub-sections of lattices into one large lattice is also continuing.

Software developed in parallel to the demonstrator work is used to create the different lattice geometries, where unit cell design and volume fraction are the primary design variables. Both Simpleware and Delcam work together on developing the lattice software. End-users have had the opportunity to use a beta of PartBuilder to design various lattice solutions. The software developments themselves have reached the final stage. Focus points lie on improved lattice filling algorithms, symmetrical lattices and improving the user interface of the software. An update of the PartBuilder software is scheduled to be released to the end-users within the next couple of weeks.

In the last part of the meeting the initial concepts and plans for a dissemination workshop were discussed. Such a workshop will be a public event where all of you can see and hear about the lessons learnt within the LIGHT project. Stay tuned to find out the exact details of the event via our regular dissemination channels (website, email and Twitter).

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**For more information** visit the website [www.light-project.co.uk](http://www.light-project.co.uk) or send an email to [info@light-project.co.uk](mailto:info@light-project.co.uk).

### **Acknowledgements**

As the UK's innovation agency, one of the main roles of the Technology Strategy Board is to achieve business and economic growth for the UK. One way the organisation supports this is through funding innovative Collaborative Research and Development (CR&D) projects. Collaborative research and development (R&D) encourages businesses and researchers to work together on innovative projects in strategically important areas of science, engineering and technology – from which successful new products, processes and services can emerge, contributing to business and economic growth. Find out more about the CR&D programme here: <https://www.gov.uk/guidance/innovation-apply-for-a-funding-award#find-an-innovation-funding-programme>