



Newsletter



Issue 03 – November & December 2007

Welcome to the third issue of the Custom-Fit newsletter.

First of all, with Christmas just around the corner we would like to wish you all the best for the Yuletide season and 2008. May the coming year be full of successes both personally and in business.

This newsletter will introduce you to the process of Helmet Customisation and a rapid manufacturing procedure, which uses a high viscosity powder material, being developed by TNO in the Netherlands. We have also included the decisions made last 23rd of November by the Competitiveness Council of the European Union concerning the Joint Technology Initiatives that have been budgeted for. As always, we will finish with information about the upcoming events.

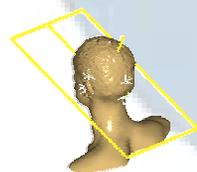
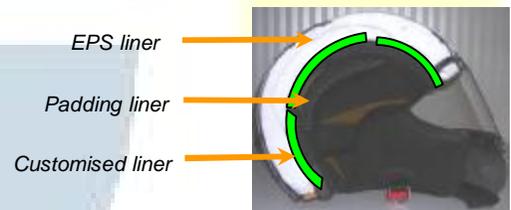
We really hope you enjoy reading this.

The Customised Helmets

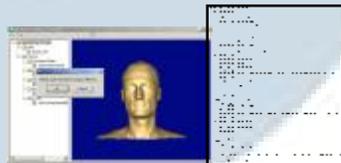
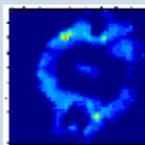
NHTSA estimates that "helmets saved 1658 motorcyclist lives in 2006 and that 752 more could have been saved if all motorcyclists had worn helmets". So knowing this, the question is why some motorcyclists do not use a helmet. And the first answer that comes to mind is that of comfort.

The Custom-Fit project aims to improve the fit and comfort of helmets through customisation. Its goal is to design a new part that will go between the existing padding (for comfort) and the Expanded Polystyrene (EPS) liner (for safety), as shown in the photograph.

The flowchart process is capture (geometric and non-geometric data) and process data, design (external shape and internal lattice) and RM, at the moment, using Laser Sintering but going towards the use of PPP or other manufacturing techniques (See CF Newsletter, issue 02).



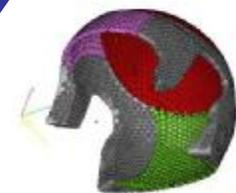
Scanning of head geometry, taking pressure maps and a comfort interview with the rider



All geometric and non-geometric data put in an NSF file to produce a CAD model of rider's head



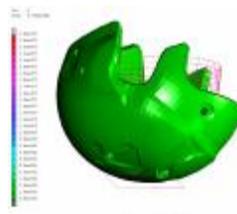
Automated design of customised liner



Design of lattice structure (based on a simple honeycomb design)



Liner manufactured using additive manufacturing technique



Once the design is complete, the CF helmet design is crash tested, virtually (drop and pull off tests)

Printing Multi Materials and Graded Structures Now Possible



Close up of the print head

A new additive production system, based on High Viscosity Inkjet Printing, is being developed by TNO in the Netherlands under the endorsement of the Custom-Fit project. The system uses several print heads that produce continuous streams of material droplets at high frequency.

Currently, most additive manufacturing machines are only capable of printing one type of material. However the High Viscosity Inkjet Printing machine is capable of printing multi-materials simultaneously.

Not only is the TNO inkjet process capable of printing multi-materials, it also enables the mixing and grading of materials in any desired combination. This will enable the manufacturing of products where two or more materials are graded but there will be no distinct boundary between the different materials.

This will result in products with unique mechanical properties. To enable the modelling of products with multi-material and graded structures, TNO has developed a CAD modeller known as Innerspace. InnerSpace enables a designer to define material property distributions and also the distribution profile. The software uses the STL file as the source file and the STL model defines the outer boundary of the object. It can define the material distribution for a whole object or just part of the object at any location. The data files from InnerSpace are very small and thus easy to transfer.

Within Custom Fit, the system has been designed and used to print bio-compatible materials; the next step for the project will be to print scaffolds for implants using bio-resorbable materials, with varying porosity and graded inclusion of medicines, e.g. growth enhancers and anti-biotics.

The European Competitiveness Council reinforces EU Research

Last November, 23rd the **Competitiveness Council of the European Union** agreed to provide €7.6 billion for the public and private partnerships to establish four Joint Technology Initiatives (JITs). These initiatives are related to embedded systems technologies (ARTEMIS), nano-electronic technologies (ENIAC), innovative medicines (IMI) and European aeronautics (CLEAN SKY). This is Integrated into the Seventh Framework Programme.

In addition, they made progress regarding the creation of the European Technological Institute (EIT). Research ministers agreed they should have a governing body consisting of a director and an executive committee. It will be primarily created for energy, climate change and information technology issues. This would open the way for the first Knowledge and Innovation Communities (KICs).

Other subjects considered by the council, were the €300 million awaiting parliamentary consent for the Ambient Assistive Living Scheme, that would allow the elderly population to live independently for as long as possible. Finally the needs to facilitate researcher mobility and international cooperation were discussed.

(Information from http://cordis.europa.eu/fetch?CALLER=EN_NEWS&ACTION=D&SESSION=&RCN=28747)

Upcoming Events

-  Southern Manufacturing Exhibition. Farnborough, UK. February 6th–7th.
-  ICERP 2008 - International Conference and Exhibition on Reinforced Plastics. Mumbai, India. February 7th-9th.
-  MEDTEC UK 2008. Birmingham, UK. February 13th-14th
-  18th International Conference Molding 2008. San Francisco, USA. February 18th-20th.
-  More: <http://www.custom-fit.org/index.php/events/>

