About SHAPETRONICS and Nano-Enabled Printed Electronics

The Printed Electronics on metallic 3D objects (SHAPETRONICS) project would be part of the Nano-enabled Printed Electronics demonstration case under the Vanguard Initiative's Pilot on New Nano-enabled Products.

The original concept idea is proposed by a group of renowned European Research & Technology Organisations lead by the CRM group, a collective research centre - located in Wallonia region - focusing on the development of innovative processes and products along the whole manufacture chain of metals, from raw materials to advanced steel applications, ranging in size from laboratory scale to pilot and even semi-industrial production lines. The on-going partnership could include, but not only, the Karlsruhe Institute of Technology (KIT), the Fraunhofer IFAM and the Hahn-Schickard. as well as the regions of Baden-Württemberg and Bremen.

The Vanguard Initiative is an association of 30 EU-regions stimulating Industrial Modernisation through a more effective deployment of new technologies. More in particular, the Initiative aims at providing industrial companies easier access to (networked) facilities for demonstration, to lower technology uncertainty and speed up market uptake of new technologies, more advanced industrial production and new value chains.

Read more at the Vanguard Website:
www.s3vanguardinitiative.eu/cooperations/vanguard-initiative-pilot-project-new-nano-enabled-products

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VANGUARD INITIATIVE
New growth through smart specialisation

Shapetronics

A demonstration case within the Vanguard Initiative on New Nano-enabled Products Pilot




1. Scope & Organisation

The Printed Electronics on metallic 3D objects (SHAPETRONICS) project is a part of the Nano-enabled Printed Electronics demonstration case under the Vanguard Initiative's Pilot on New Nano-enabled Products.

SHAPETRONICS aims to address a benchmark of the printing of active surface functions (electrical printed tracks, sensors, optoelectronic devices) on complex 3D metallic shapes. Numerous methods to enhance the active, technological function of the parts themselves will be evaluated and / or newly elaborated. They are classified in two method approaches:

1) by full coverage material deposition through (masking) stencyl method

or 2) by direct 3D writing function on the surface of the object.

In a collaboration among regions, including the regions of Wallonia, Baden-Württemberg and Bremen, this project proposal consists to work on the development of technologies to apply functionally printed structures directly onto 3D objects. Furthermore, the project will investigate the possibility of 3D printed function coating in harsh environment thank to the use of

- specific dielectric material treatment for metallic support and object, in order to address applications in high pressure sustainability, high temperature, or difficult climatic conditions.

- topcoat 3D printed material for high final protection (often identified in aeronautics 'environment')

In addition, the project aims to develop a technology platform. This platform would be constituted by a panel of available technologies developed in each involved research centers during the project. It would then offer several possibilities of fabrication and techniques to integrate electronics on large area curved objects. Final realisation will be illustrated by demonstrators of 3D active functions.

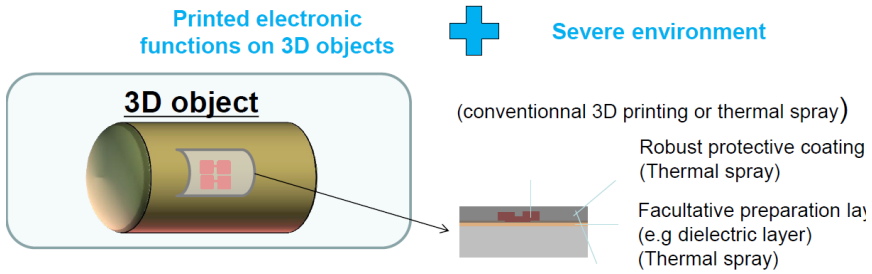
2. Markets for Printed Electronics on Curved Surfaces

The markets for printed electronics can be vast, and applications as well. Examples of curved printed products are depicted in Figure 1, where, given the curved orientation of the printing activity and the certain challenges that some materials pose, the following targeted markets have been identified as the clearly applicable markets of interest:

- IoT,
- Electronics,
- Construction,
- Automotive,
- Energy and
- Aerospace
- Nautical

Opportunities especially arise in the areas of automotive and aeronautics who are believed to benefit the most from developments in the area of printed electronics on curved surfaces.

3. TECHNOLOGY DESCRIPTION



The main advantage of SHAPETRONICS is the access the technology provides to complex shapes. Aeronautic and automotive companies have the most to gain from this printed electronic technology as companies are continuously aiming to develop lighter and thinner products.

The innovations developed by the SHAPETRONICS case could for example lead to significant efficiency gains for car manufacturers where many wires are still used in the doors. Another beneficiary could be the aeronautic industry, as producers need to consider the wiring in the body when designing cost efficient solutions.

4. Status

The SHAPETRONICS project currently finds itself in the process of project consolidation. This means that the core ideas being developed, with the aim of tackle the development of the technology collectively within a consortium. A first prototype for demonstration is available in limited scale.

Possibilities for interregional cooperation are currently being explored. Thus far, the following parties are interested: CRM Group, Fraunhofer IFAM, Hahn-Schickard and KIT.

A cross-regional platform on SHAPETRONICS will require active participation and validation from RTOs and industrial players in order to accelerate the proposed action. In this regard, actors (technology partners) active in the area of printed electronics on curved and metallic surfaces will be approached with regards to their particular interest in collaborating through this platform. If initial results are positive, the platform could be extended to explore possible areas of cooperation between the regions and players.