NaPANIL

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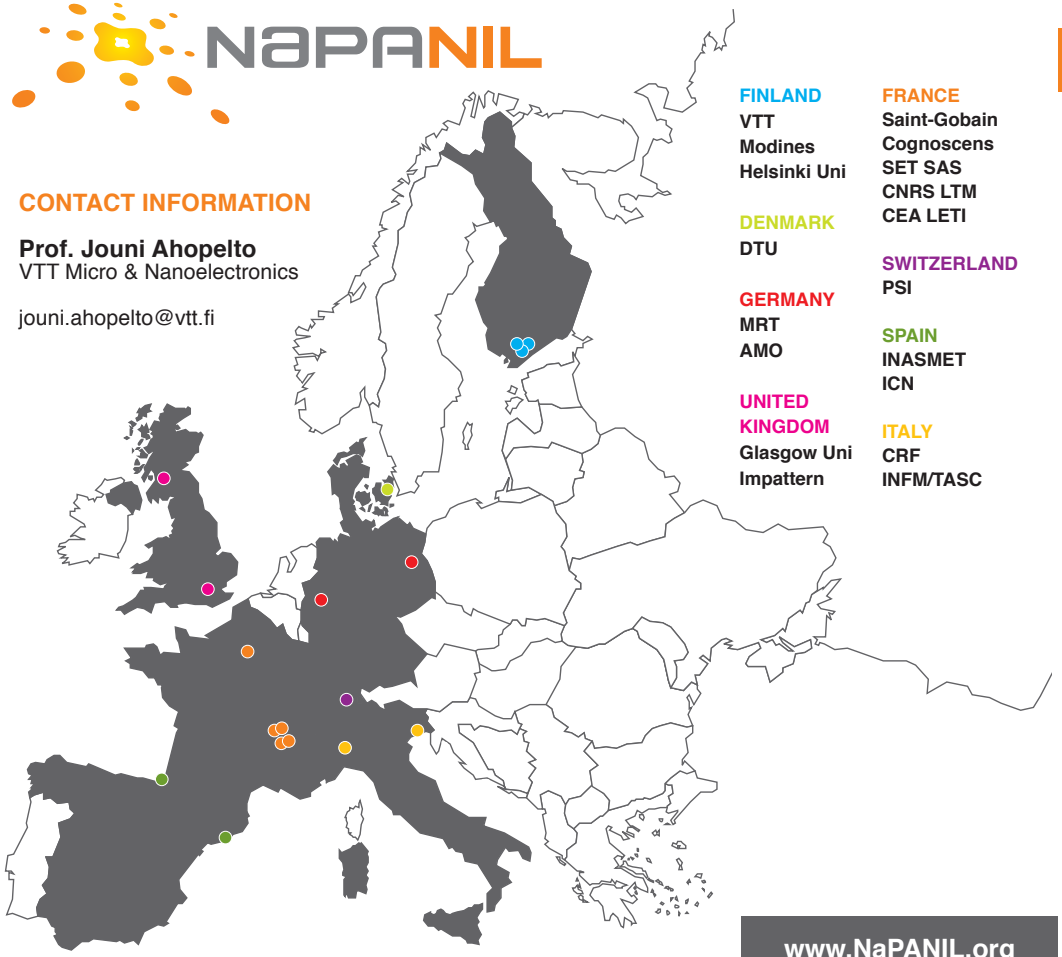

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NANOPATTERNING, PRODUCTION AND APPLICATIONS BASED ON NANOIMPRINTING LITHOGRAPHY

NaPANIL

NaPANIL is a NMP thematic priority, European-funded Framework 7 Large-Scale Project, bringing together 18 partners from: industry, academia, and private institutes, to achieve ambitious goals.

The project targets scalable nanomanufacturing processes for arbitrary 3-dimensional surfaces with features well below 100 nm in the fields of optical components and life sciences. These processes will enable industrial uptake of new ideas and applications relying on nanotechnology innovations.

Pioneering one of the first collaboration in an EU Consortium in new production technologies, where an industrial pull and a technology push are simultaneously working towards the applications of nanotechnology, the project will:

Establish the processes and technologies needed for the next wave of innovative applications including tools, software, materials and stamp developments;

Develop metrology and modelling tools suitable for use in an industrial environment;

Research novel ideas to continue building a cycle of innovation-led, high-market impact 3D nano-manufacturing based on nanoimprinting lithography (NIL).

SEVENTH FRAMEWORK PROGRAMME

- **EC FP7 LARGE-SCALE PROJECT**
- **DURATION 48 MONTHS (MAY 2008 to APRIL 2012)**
- **TOTAL VOLUME 16 M€**
- **CONSORTIUM OF 18 PARTNERS FROM 8 EUROPEAN COUNTRIES, 50% OF WHICH ARE INDUSTRIALS**

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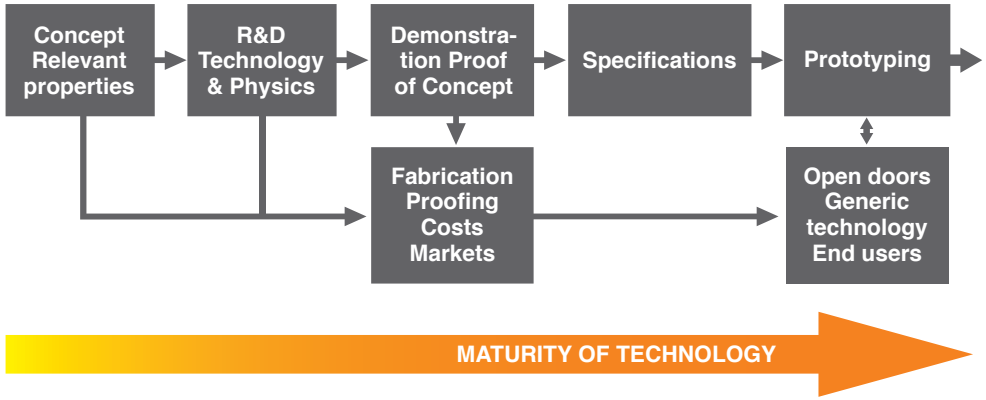
NaPANIL project philosophy follows a five-gated value chain approach for technology implementation.



To achieve the technological targets set for the project, six technical R&D activity areas have been identified:

- Modelling and Design
- Metrology and Standards
- Processes
- Stamps
- Materials
- Tools

All six are supporting the development of the **NIL-based (nanoimprint lithography) nanopattern manufacturing processes** for the Demonstrators: PDOE, LDIR and eHUD and the development of longer term exploratory processes. Considerable overlap between R&D and demonstration activities ensures optimal integration of complementary technologies.

THE INDUSTRIAL DEMONSTRATORS IN NAPANIL

Planar Diffractive Optical Element (PDOE)

In recent years research has introduced new energy efficient and compact light sources like LEDs, and OLEDs. A major challenge remains to demonstrate the efficiency of these devices and make them attractive to both new and existing market segments.

NaPANIL is researching a promising solution by structuring surfaces at the micrometer and nanometer scale. The process can dramatically alter the optical properties of a chosen material, thereby increasing the intensity of the light emitted by manipulation of the geometrical light path or diffusing a single light beam into homogenous illumination.

Emissive Head-Up Display (eHUD)

Information overload for the driver is growing rapidly, leading to the so-called “confusing cockpit”. Advanced display technologies proposed within NaPANIL aim to provide new degrees of freedom in the design of the instrument panel thereby improving delivery of information. Emerging nanopatterning methods based on NIL processes will be used to produce low cost and high optical control surfaces to be integrated in transparent emissive displays. Unlike conventional HUDs, which project images, our emitting layer is integrated into the transparent combiner, ensuring brightness and contrast at all times of the day, enhancing user-technology interactions and improving road safety.

Light Directional Elements (LDIR)

While there is a high demand for cheap, efficient and aesthetic ways to use natural lighting for housing, public and work spaces, current solutions are often heavy and expensive mechanical systems which need maintenance and obstruct the aesthetic aspect of building facades.

NaPANIL addresses the solutions for making large area optical light deviation elements on glass which can be integrated into windows, homogenously redirecting natural light in a cost efficient and aesthetic way. This will allow a better and more comfortable lighting in buildings as well as a substantial reduction of costly artificial lights during daytime.

Nanoimprint lithography (NIL) is a high throughput, high-resolution parallel patterning method for applications ranging from patterned magnetic media to optical devices. A surface pattern of a stamp is replicated into a material, forming complex three dimensional nanostructures to be formed in various materials. All processes in NaPANIL are based on thermal-NIL, UV-NIL, roll-to-roll embossing, single step wafer scale and step & repeat approaches for stamp fabrication and device manufacturing.

For more information: **www.NaPANIL.org**