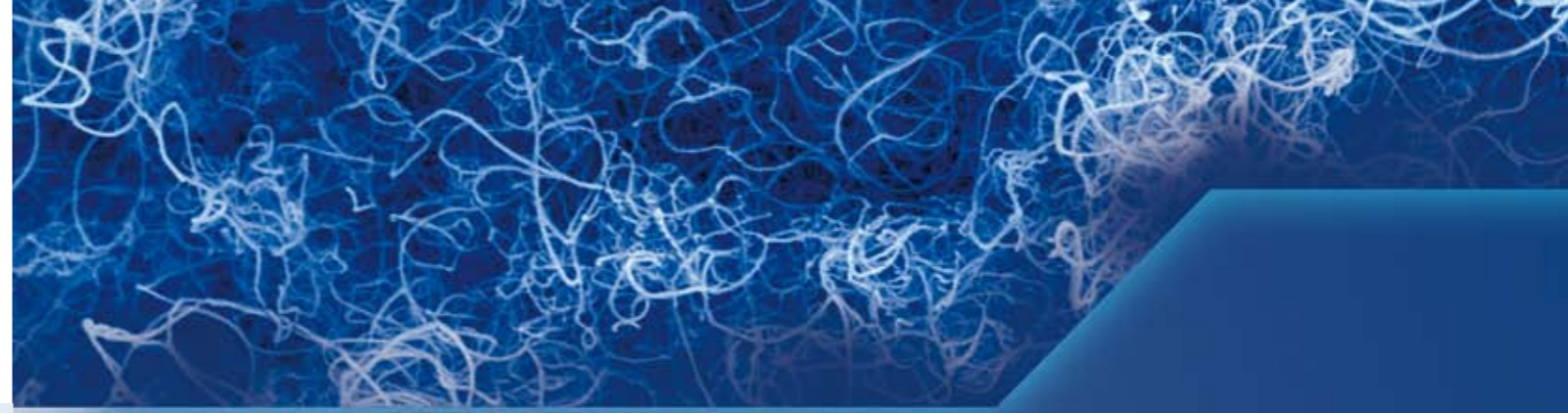
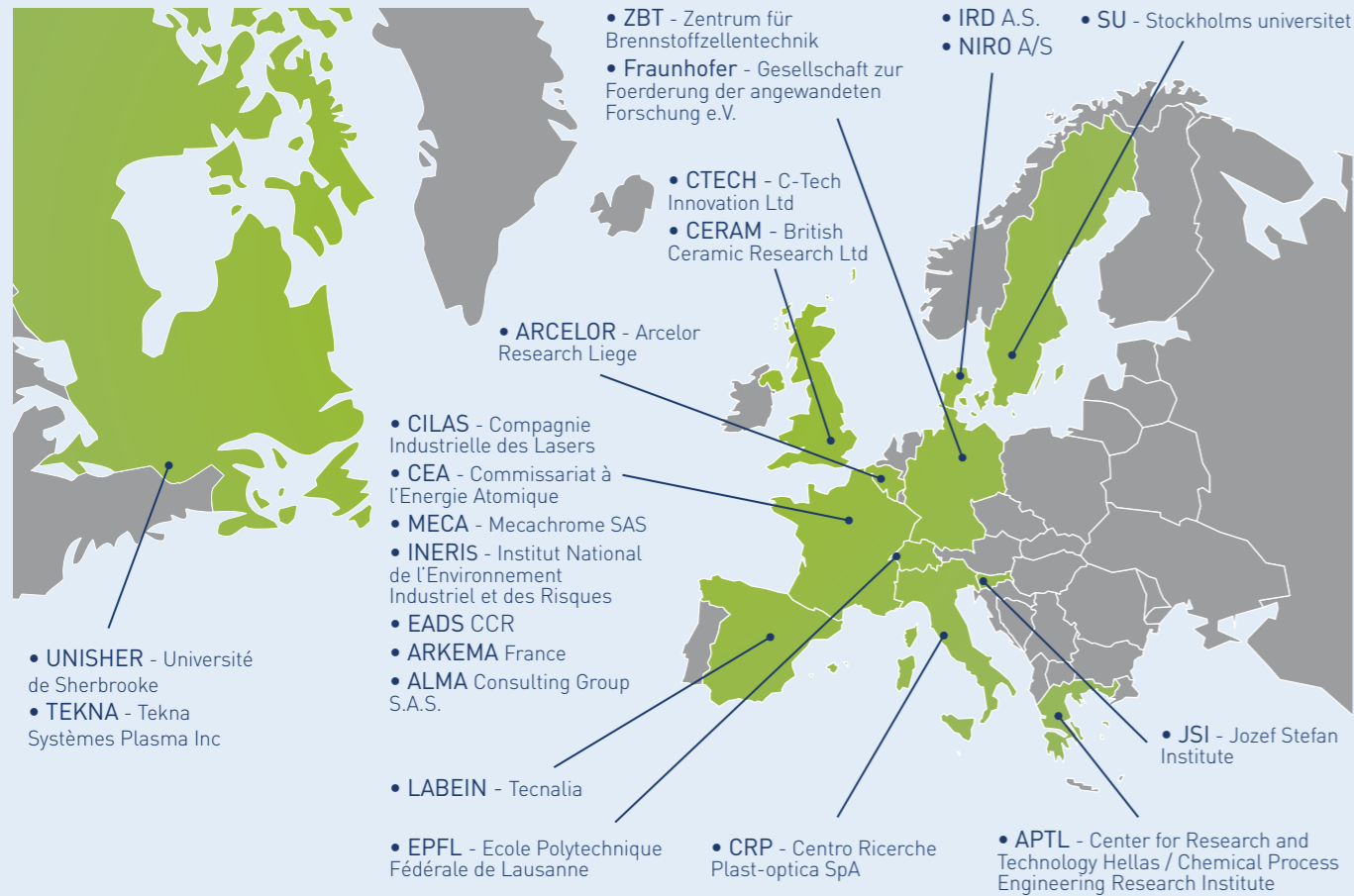


## Consortium



## Acknowledgement

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The SAPHIR project addresses the NMP priority.

It has been running since October 1, 2006.

### Project Coordinator:

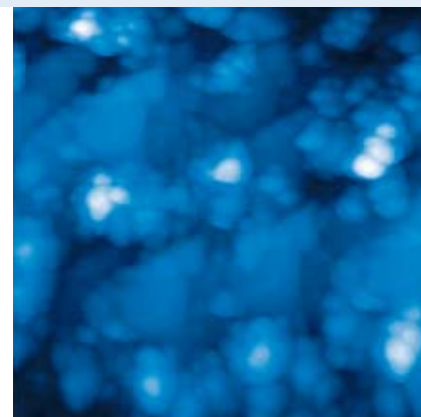
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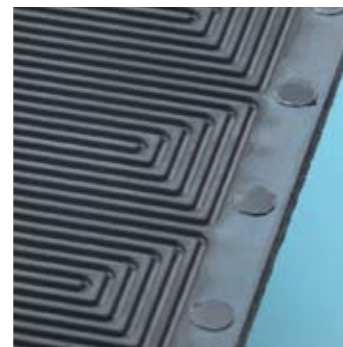


## Context and impacts

There is an increasing need to develop novel functional and structural products with improved mechanical, physical and chemical performances for European industry. Indeed, the development of such products concerns several markets ranging from automotive applications, space & aeronautic components to new technologies for energy. Domains with a planetary impact such as environment, health and safety are also concerned. Nanotechnologies could play a key role in promoting innovation in design and the realisation of multifunctional products for the future, either by improving usual products or creating new functions and new products.

The development of nanotechnologies appears to be a real innovative solution in order to improve existing technologies and to create new products for the future. Nevertheless, this huge evolution of the industry of materials can only happen if the main technological and economic challenges are solved complying with societal acceptance. Mastering of potential risks over the whole life cycle of the products should be achieved by an integration of the elaboration channels and taking into account recycling.

SAPHIR aims at implementing direct production of nanoparticles through the development of a global integrated concept (from the synthesis to the final products) with a responsible approach. Indeed, the main breakthrough is to connect individual processes so that the handling of powders is avoided. By means of safe recovery and conditioning systems, such as suspensions or nanostructured granulates, nanoparticles can be manipulated without risk. The transformation of these suspensions or granulates through conventional and emerging processes needs to be adapted, as most of these processes have only been developed for the manufacture of micro-structured components. SAPHIR proposes an innovative approach that promotes a paradigm change on how raw materials are considered in the industrial value chain. Indeed, integration of the safe production of nanoparticles, their recovery, conditioning and finally their processing, enable to achieve net shape products, obtained directly from raw materials and able to meet specific requirements for a given application.



## Project objectives

The general objective of this project is the safe, integrated and controlled production of multifunctional nanostructured products including their recycling and ensuring competitive production technologies

**Safe:** all along the production sequence, no nanoparticles release will be encountered. This includes synthesis, recovery, conditioning, processing and handling.

**Integrated:** the whole production sequence consists in linking in a safe way existing or emerging elementary processes.

**Controlled:** the production sequence is controlled by innovative systems covering:

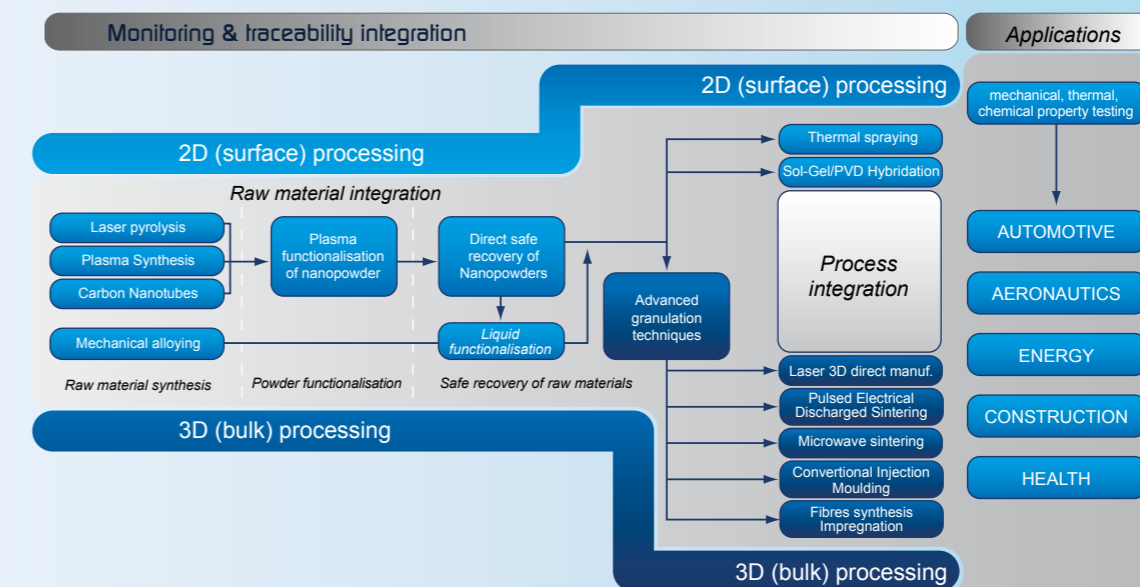
- the efficiency of the processes (on-line instrumentation including vision and real-time data acquisition systems)
- the reliability of the products (non-contact 3D sensors for shape control)
- the safety of global production sequence with a special attention to the potential release of nanoparticles
- the traceability all along the life-cycle of the product

**Recycling:** recyclability issues will be addressed from design to the end-life of the products.

**Competitiveness:** Increase of competitiveness of the products both in pricing and performance is one of the project goals. Chemical, mechanical and thermal properties of final manufactured products should be improved. Industrial demonstration platforms will enable the assessment of both the technical and economic effectiveness of the "factory for nano's" concept.



## Strategy



Research activities are developed through three main modules: safe production of nanoparticles, processing and the development of pilot (demonstration) plant. In parallel, a special care is dedicated to prior product specifications, industrialisation and dissemination.