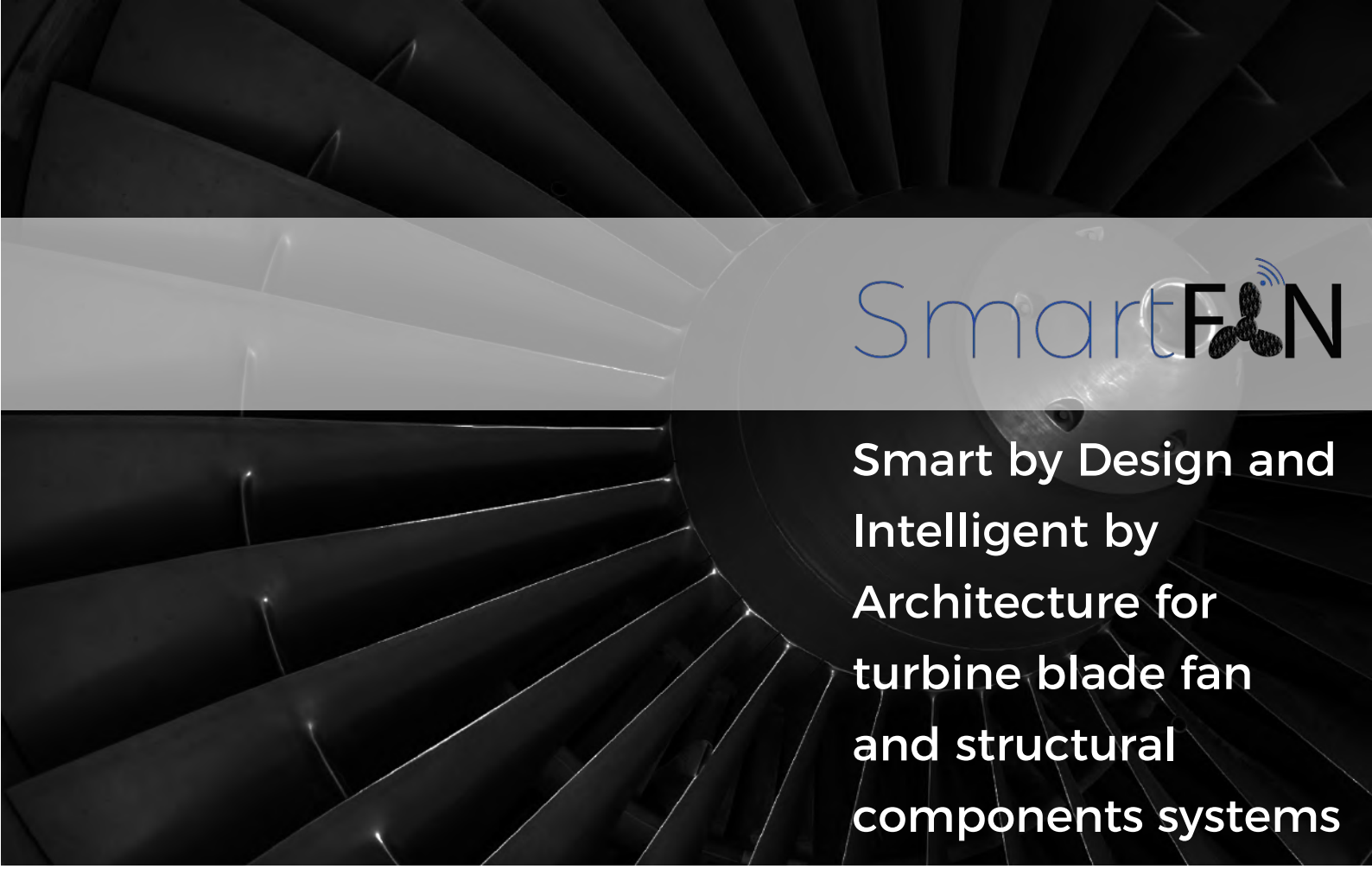

Smart by Design and Intelligent by Architecture for turbine blade fan and structural components systems

Project Full Title

Smart by Design and Intelligent by Architecture for turbine blade fan and structural components systems

Project Acronym

SMARTFAN

Grant Agreement Number

760779

Topic

NMBP-04-2017 Architectured/Advanced material concepts for intelligent bulk material structures

Total cost and EU contribution

EUR 7,989,601.25

Start date of the project

January 1st, 2018

Duration

48 months

Project Coordinator

National Technical University of Athens

Project Website

http://www.smartfan-project.eu

New European Horizon 2020 Research and Innovation action project launched on Architectured /Advanced material concepts for intelligent bulk material structures

In Fall 2017 **SMARTFAN** project has been approved and commenced on January 2018 aiming to **develop smart materials for final application on intelligent structures.** This will be done through **two main concepts**: Layer (L) concept and Grid (G) concept. Different micro- and nano-components, will be used due to their extraordinary physico-chemical properties, to achieve smart functionalities, e.g.:

- Selective sizing of CFs for reinforcement and conductivity variance and sensing;
- Carbon nanotubes (CNTs) and carbon nanofibers (CNFs) for self-sensing properties and conductivity enhancement;
- Micro-containers for self-healing;
- Graphene for electromagnetic fields detection and shielding;
- Colouring agents for marking cracks and defects;
- Piezoelectric materials that will be the base for manufacturing new smart materials.

In order to develop **lightweight composite materials** and transfer the properties of smart components into **bulk materials**, polymer-based matrices, such as Epoxy, PLA, Acrylics etc., will be used due to their compatibility with the above-mentioned components, their **low cost** and their **recyclability/reusability**.
SMARTFAN will develop materials and product architectures, with integrated functionalities, that will interact with their environment and react to stimuli by employing biomimetic, self-sensing, actuating and damage-repairing technologies. Their smartness is based on bio-inspired engineering and intelligent communication through **Internet of Things (IoT)**.
Another goal of SMARTFAN is to develop **"smart" intelligent composites that will be recyclable and reusable**. Innovative processes will be carried out in order to preserve the special physico-chemical properties of smart materials composites (e.g. suitable for the dispersion of their functional components). For example, by doping with carbon-based structures, any damage or deformation in the structure will result in a change of the electrical conductivity of the material, thus, converting the material functions into piezoelectric ones. The performance of the latter depends on the physical characteristics of the carbon structure (i.e., number of layers, geometry, etc.). Conferring smart properties is possible also by using carbon fibres which, in addition to their reinforcement ability, can provide conductivity. A carbon fibre composite, can also adapt its shape according to given external loads or constraints.
The SMARTFAN consortium is complementary, including 3 industries, 9 research institutes and 6 SMEs. By this way SMARTFAN covers **all required expertise and infrastructure** from academic, applied research and industry from **8 different EU countries** (for a detailed overview of the consortium, see http://www.smartfan-project.eu/).
SMARTFAN is an **H2020 project**, meaning that it is co-funded by the European Union (grant of 8 million €). It started on January 1st, 2018 and will last **48 months**. It is coordinated by R-NanoLab of the NATIONAL TECHNICAL UNIVERSITY OF ATHENS.

Further information:

Prof. COSTAS A. CHARITIDIS
Project Coordinator
National Technical University of Athens | School of Chemical Engineering
Mail: charitidis@chemeng.ntua.gr
Phone: +30210772 4046
Project website: www.smartfan-project.eu

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