

## 1. Project and consortium description

**Title:** “*Upgrading the capacity of NIRDTP to develop sensing applications for biomedicine using magnetic nanomaterials and nanostructured materials*” - Acronym: **NANOSENS**

- Call: FP7-REGPOT-2012-2013-1 / Funding scheme: Coordination and support action (CSA)
- Grant Agreement No. 316194 / EC Contribution: **2,422,076 €** / Duration: 42 months (2013 – 2016)

**Aim:** to upgrade the research and innovation capacity of the National Institute of Research and Development for Technical Physics (NIRDTP) to the highest European level in *microsensors for medical applications and biosensors based on magnetic nanoparticles and nanowires*.

Central to the activities are *twinning partnerships* with 6 European top level research organisations:

1. Sheffield Centre for Advanced Magnetic Materials and Devices within the Department of Engineering Materials (SCAMMD), *University of Sheffield, United Kingdom*;
2. Department of Materials for Information Technologies in the *Instituto de Ciencia de Materiales de Madrid* (ICMM-CSIC), *Spain*;
3. *Instituto de Engenharia de Sistemas e Computadores para os Microsistemas e as Nanotecnologias* (INESC-MN), Lisbon, *Portugal*;
4. Nanobioelectronics & Biosensors Group in the *Institut Català de Nanotecnologia* (ICN), Barcelona, *Spain*;
5. Solid State Physics group within the Department of Physics and Astronomy, *University of Glasgow* (UGLA), *United Kingdom*;
6. Materials Science Electron Microscopy Department at the *University of Ulm* (UULM), *Germany*.

## 2. Role of the Romanian team

In collaboration with the twinning partners, the NIRDTP team will act to achieve its main objectives:

- *To increase its human potential* by hiring seven experienced researchers, one intellectual property and innovation manager, as well as organising know-how exchanges and trainings for existing and new staff with twinning partners;
- *To increase its technology potential* by purchasing a scanning Auger nanoprobe equipment, upgrading its RF sputtering equipment with laser ablation capabilities, and purchasing a gel electrophoresis system;
- *To increase its scientific visibility* through supported promotion activities, and by organising dissemination workshops and scientific conferences/meetings.

## 3. Research infrastructure

A significant effort is dedicated to *purchasing and upgrading of research equipment*: acquisition of a scanning Auger nanoprobe equipment, upgrading the RF sputtering equipment with laser ablation capabilities, and procurement of a gel electrophoresis system.

The new equipment funded by the NANOSENS project will be *integrated with NIRDTP's existing facilities* to create a European centre of excellence for nanomaterials and nanostructured materials for sensing applications. NIRDTP has a broad range of research infrastructure: e.g., equipment for the preparation of amorphous and nanocrystalline/nanostructured magnetic materials, thin film deposition systems, photolithography structuring systems, electron beam nanolithography installed on a scanning electron microscope, ultra high resolution electron beam lithography workstation, equipment and systems for structural, morphological and dimensional characterisation, systems for magnetic characterisation, electromagnetically shielded room and ISO 5 clean room facilities (class 100), etc.

## 4. Human resources

*14 existing senior and junior NIRDTP researchers* are participating in the implementation of the NANOSENS project. An important part of the project is represented by the hiring of *7 new experienced researchers* and *1 experienced intellectual property and innovation manager* by NIRDTP, leading to the *qualitative and quantitative increase of NIRDTP's human resource*.

The employment announcements are currently published on the EURAXESS Jobs website and on naturejobs.com, with a closing date of 15<sup>th</sup> October 2013.

## 5. Expected results

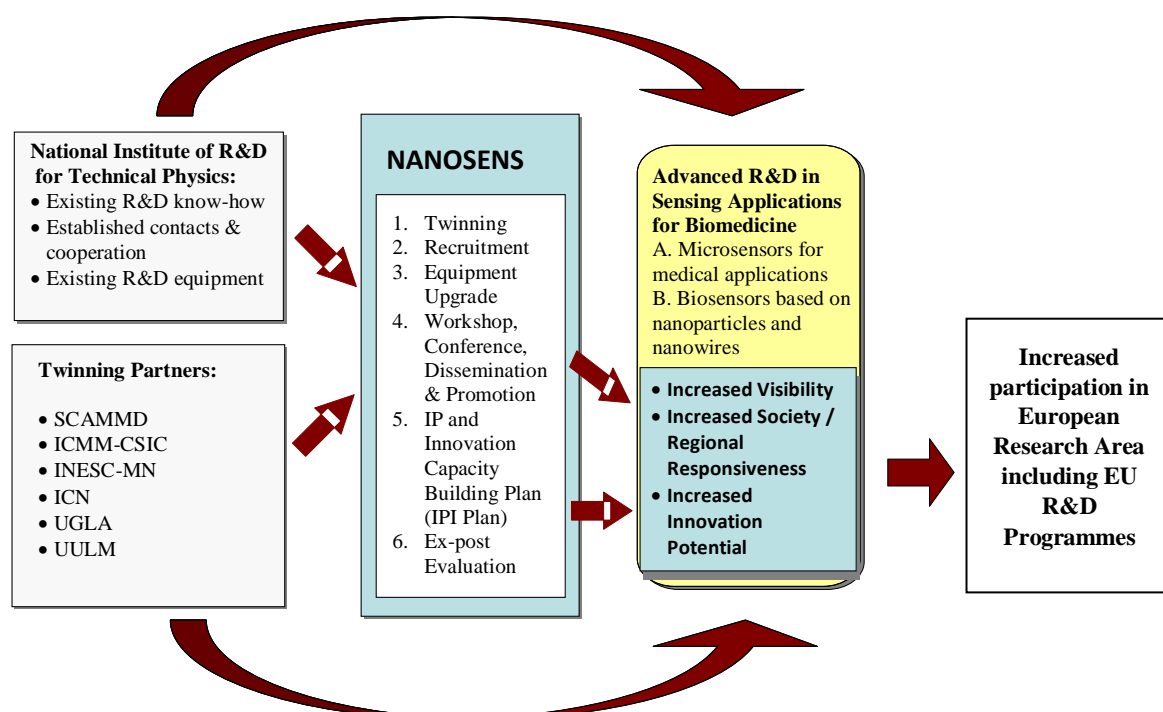
The expected results are *new technologies, patent applications, technologically transferable products* and *numerous scientific publications*. A potential *interest of companies with activities in the field of medical sensors and biosensors* is highly anticipated.

There are also *economic, social and environmental benefits* of the topics undertaken. Important economic effects will follow the *exploitation of results* by technological transfer toward companies interested in the production and commercialization of the proposed microsensors and biosensors.

*New opportunities for participating in EU funded projects* in the fields of microsensors for medical applications and biosensors for nanomedicine will be created as a result of the proposed activities. The benefits brought by the future employment of the achieved microsensors and biosensors for a *healthier society* must be also mentioned.

## 6. Impact of the results on the Romanian society and scientific community

Overview of NANOSENS and its expected impacts:



NIRDTP has *close links with the regional sensing sector*, such as research institutions and SMEs (e.g. DELPHI S.A. Iași, CONTINENTAL S.A. Iași, Michelin S.A. Craiova, Antibiotice S.A. Iași, S.C. Gradient S.R.L. Iași). Therefore, NANOSENS's research and innovation capacity building activities will also benefit local organisations. NIRDTP, endowed with state-of-the-art facilities, with researchers possessing solid expertise, and pursuing advanced scientific topics, will become an *attractive research environment*. These factors will facilitate the *reintegration of Romanian scientists working abroad* in academic positions and in industry. This will be helpful in reducing the negative effects of the brain-drain.

## 7. Integration of the Romanian team in international research networks

NANOSENS will *increase NIRDTP's research capacity to make a major contribution in biosensors and microsensors*. In so doing, NANOSENS will help NIRDTP to address Horizon 2020 objectives.

NIRDTP's twinning activities *will develop its research partnerships* with the European twinning partners who have excellent track records in EU collaborative research projects. Also, bilateral seminars will be organised between NIRDTP and the twinning partners to discuss potential joint research proposals for submission to Horizon 2020.