

Project profile

ESEE

Environmental Sensors for Energy Efficiency



40% of energy consumption in Europe is for heating, cooling and lighting of buildings, while in commercial airplanes, optimizing the air control systems could reduce by 5% the fuel consumption. The ENIAC JU project ESEE will develop wireless sensor networks for smart management of the air conditioning systems in offices and other public buildings, in homes, and in specific closed environments such as an aircraft cabin, demonstrating significant energy savings and applicability to other systems in which the energy consumption depends upon human presence like heating or lighting.

Sub Programme

- Energy Efficiency

Objectives

Modern society faces severe challenges due to the impact of the use of energy, which is required in the way we live today. A key challenge in the coming years is providing solutions for the enabling and execution of regulations towards reduced carbon dioxide emissions, in the end targeting zero emission consumption wherever possible. ESEE intends to provide novel solutions for energy efficient indoor air management, generating energy savings at the system/application level. It shall demonstrate them in various markets like air control inside buildings, monitoring the cabin on aircrafts, and indoor air control in electric cars. To this effect, ESEE shall create a technological basis for energy efficient indoor air management that will take into account the presence of persons; this approach will have an applicability going beyond the strict subject of this project; for example, it could be extended for applications like intelligent lighting. The platform

will consist of connected, innovative sensor systems for air quality control enabling a complementary indoor air quality management solution.

Work and consortium, expected results

The concept of ESEE is to simultaneously perform efficient indoor air quality management and presence detection within:

- offices, public buildings: many persons present, usually in defined time slots
- private homes: few persons, but other effects like too high humidity in highly isolated houses
- aircrafts: specific closed environment.

Research will be performed on several different sensor technology approaches, focusing on innovative approaches based on silicon MEMS technologies, surface reactions and spectroscopic methods. In addition, the project will create and investigate an appropriate sensor network and innovative communication ap-

proaches to enable air management systems to react on information from different sensors.

The consortium includes many partners with significant experience in meeting end users expectations in innovative processes. They will drive the project where possible, will be demanding towards technology developers and will be vigilant towards stated requirements. Focus on end users expectations will be a significant topic throughout the project. Furthermore, the partners developing the wireless sensor network will continuously interact during the project with partners developing the sensors and nodes.

The solutions will be validated in a realistic test environment, e.g. under the environmental conditions of an aircraft or in pilot buildings provided with HVAC systems.

Impact

According to the European Union Directive on the Energy Performance of Buildings (EPBD 2002/91), 40% of energy consumption in Europe is due to heating, cooling and lighting operations within buildings. In commercial airplanes, the energetic impact of introducing smart air control systems can amount to roughly 5% of the total fuel consumption. ESEE will develop and demonstrate the impact of the wireless sensor networks in these applications. It is expected to generate societal benefits by providing healthy air in indoor environments in combination with a considerable amount of reduction in

the use of energy by providing new fresh air only when necessary. The applications of the interconnected sensors can be easily extended to other presence dependent use cases of energy, e.g. heating and lighting.

Energy Efficiency

Partners

- INFINEON TECHNOLOGIES AG
- SIEMENS AG
- FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V
- EADS DEUTSCHLAND GMBH
- FRIEDRICH-ALEXANDER-UNIVERSITÄT ERLANGEN NÜRNBERG
- TWT GMBH SCIENCE & INNOVATION
- eesy-id GmbH
- NXP SEMICONDUCTORS NETHERLANDS BV
- Evalan BV
- STICHTING IMEC NEDERLAND
- TECHNISCHE UNIVERSITEIT EINDHOVEN
- Vabrema B.V.
- Munisense BV
- TEKNOLOGIAN TUTKIMUSKESKUS VTT
- Fläkt Woods Oy
- METSO AUTOMATION OY
- Murata Electronics Oy
- VAISALA OYJ
- COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES
- COMPAGNIE INDUSTRIELLE D'APPLICATIONS THERMIQUES SA
- Analytical Pixels Technology
- III V LAB GIE
- AEROVIA
- CENTRE TECNOLOGIC DE TELECOMUNICACIONS DE CATALUNYA
- IQUADRAT INFORMATICA SL
- ACONDICIONAMIENTO TARRASENSE - LEITAT TECHNOLOGICAL CENTER

Project co-ordinator:

- Wolfgang Dettmann, Infineon

Key project dates:

- Start: 01.04.2013
- Finish: 31.3.2016

Countries involved:

- Finland
- France
- Germany
- Spain
- The Netherlands

Total budget:

- € 29.1 million



The ENIAC Joint Undertaking, set up in February 2008, co-ordinates European nanoelectronics research activities through competitive calls for proposals. It takes public-private partnerships to the next level, bringing together the ENIAC member states, the European Commission and AENEAS, the association of R&D actors in this field, to foster growth and reinforce sustainable European competitiveness.

Details correct at time of print but subject to possible change. Updates will be included in the project summary at the end of the project.

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