

Project profile

MAS

Nanoelectronics for mobile ambient assisted living (AAL) systems



The ENIAC JU project MAS is developing nanoelectronics components for applications in the field of health and wellness, and to create a development platform for the design of complete flexible, robust and safe mobile ambient-assisted-living systems. The project covers remote patient supervision using multi-parameter biosensors and telecommunications networks to improve the quality of the clinical environment as well as to encourage therapy at home. Implementation will require novel nanoelectronics technologies, interfaces, component designs and architectures for a common architectural approach.

Sub Programme

- Nanoelectronics for Health and Wellness

Healthcare addresses a market of more than 10% of the European gross domestic product. An ageing population will have an enormous impact on society and the economy. Today, 20.5% of the EU population is 65 or over; in 2030, 28.7% will have reached that age. Without significantly increasing costs, the healthcare system is now hardly able to guarantee an adequate level of care. By 2030, this will be impossible without dramatic changes.

Mobile ambient-assisted-living (AAL) systems can reduce hospital stays by up to 25% and so reduce overall medical costs by up to 10%. However, the market for health-monitoring devices is characterised by application-specific solutions that are based on diverse architectures and are mutually non-interoperable.

While individual products are designed to meet cost targets, the long-term goal of achieving lower technology costs across current and future sectors will inevitably be very challenging unless a more coherent

approach is used. The goal of the ENIAC JU project MAS is to design and implement a common reference architecture with add-on elements and a standardised interface suitable for many different markets.

Overcoming the barriers

In Europe, the medical-technology industry has revenues of nearly €60 billion and this will double in the next eight years. However, the industry is facing a serious barrier: the development phases of innovative medical applications are very long as a result of the many standards and regulations, and the lack of a mature technology.

MAS will focus on the development of an integrated approach for the areas of health monitoring and therapy support at home as well as for mobile health, wellness and fitness services.

The systems are intended for remote patient supervision using multi-parameter biosensors and secure communications networks for health and wellness monitoring in the home and other environments.

The mixed healthcare and consumer markets will be targeted with MAS-platform-based devices with five application demonstrators:

1. Health and activity monitor;
2. Point-of-care terminal and gateway;
3. Cardiovascular monitor;
4. Diabetes monitor; and
5. Mobile cardiocography to measure fetal heartbeats.

Key developments will address unobtrusive mobile sensor systems with standardised interfaces linked by secure wireless communications to a managing controller. User-friendly interfaces, multiple heterogeneous-sensor networks, low power and power-management form critical elements of the platform. Seamless connectivity, interoperability and co-operation across mobile AAL systems, health-service providers and the patient will be field tested in various environments.

Economies of scale

The expected results of the project include size reduction of body-area-network sensor nodes by greater than 80%, cost reduction of more than 40% over the next six years and reduced power consumption for communications by 50 to 70%.

The main goal of the ENIAC JU project is to provide a generic technology platform with standard interfaces for the development, verification and validation of flexible, robust and safe, mobile AAL systems. The project also addresses applications in the fields of early diagnosis and prevention as well as remote parameter monitoring.

System design platform

MAS is aimed at creating a system design platform based on scalable chipsets to support development of flexible, robust and safe mobile AAL systems and to develop the necessary nanoelectronics components and integrated architectures.

This plan for a common platform will serve two purposes:

1. It will allow for a substantial improvement in the state of the art for nanoelectronics components for these application by introducing and exploiting new design architectures for mobile AAL systems; and
2. It will be used to explore the feasibility of integrating the new remote patient supervision systems using multi-parameter biosensors and telecommunications networks. Significant progress will create new services suitable for various applications in the area of health and wellness and so enable an extended and improved range of care at a lower overall cost.

Common platform

MAS will overcome the many barriers to interoperability in remote medical monitoring and therapy support as well as in the mobile health, wellness and fitness market. This second area has comparable technical requirements but much easier access. Based on such non-healthcare-related applications, a common technology platform will be established and concepts proved. This will ensure not only a shorter time to market for healthcare applications but will also open the access to an additional market worth over €1 billion in 2020.

Nanoelectronics for Health and Wellness

Partners:

- Acondicionamiento Terrassense-LEITAT Technological Center
- Brno University of Technology
- Charité-Universitätsmedizin Berlin
- Corscience
- CSIC- Centro Nacional de Microelectrónica (CNM)
- Czech Technical University
- DICE
- Equalid Solutions
- Evalan
- Fraunhofer FIT
- Friedrich-Alexander-University of Erlangen-Nürnberg, Lehrstuhl Technische Elektronik
- Fundación CIDETEC
- GE Vingmed Ultrasound
- Graz University of Technology
- Infineon Technologies Austria
- Infineon Technologies Germany
- Institute of Microelectronic Applications (IMA)
- Leibniz Universität Hannover, Institute of Theoretical Electrical Engineering
- Lifecare
- Medical University Graz
- Oberthur Technologies
- Philips Consumer Lifestyle
- Philips Electronics Nederland
- Siemens Aktiengesellschaft Osterreich
- SINTEF
- Slovak University of Technology in Bratislava
- T-Systems Enterprise Services
- Vienna University of Technology
- X-FAB Semiconductor Foundries

Project co-ordinator:

- Wolfgang Dettmann, Infineon Technologies

Key project dates:

- Start: April 2010
- Finish: March 2013

Countries involved:

- Austria
- Czech Republic
- France
- Germany
- The Netherlands
- Norway
- Slovak Republic
- Spain

Total budget:

- €27.4 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.