

eSONIA

*Embedded Service Oriented Monitoring, Diagnostics and Control:
Towards the Asset-Aware and Self-Recovery Factory*



EXECUTIVE *summary*

The aim of eSONIA is to improve efficiency and safety of industrial facilities by realising the asset-aware and self-recovering plant through the use of IPv6-based embedded devices with specialised on-board services and a middleware that capitalises on the benefits of service-Oriented software architectures. This will be used for the first time in industry to support continuous monitoring/diagnostics/prognostics/control of assets, regardless of their physical location.

CONTRIBUTION *to SRA*

eSONIA delivers on two Industrial Priorities: "Reference designs and architectures" and "Seamless connectivity and middleware". Reference embedded algorithms for processing sensor data and aggregation into key production indicators will be developed in order to produce rich information at source. Reference designs will be developed to visualise key performance indicators. Composability, interoperability and interfacing issues will be resolved by basing all developments on the SOA paradigm implemented as web services.

MARKET INNOVATION *& impact*

eSONIA will have an impact on the efficient development of monitoring systems based on embedded platforms. The adjective "efficient" should be seen from two perspectives: fast development of new solutions based on eSONIA results, and high performance of the system in run-time. Inclusion of SOA technology will ease the integration across diverse systems, ensure the applicability to other technological fields, and therefore stimulate adoption by the market. In the area of embedded platform based solutions, the impact of eSONIA is strong in that it provides a platform designed to speed up the task of developing and deploying new systems. The project will result in a ready-to-use starting point that frees development from the need to deal with low-level technical issues in each new development to focusing instead on innovation and provision of value-adding functions.

RELEVANCE & CONTRIBUTIONS to Call 2009 Objectives

eSONIA falls within the scope of Sub-programme 4 "Efficient manufacturing and logistics". The project contributes to establishing an embedded systems architecture along with methodologies and tools to achieve holistic lifecycle management for manufacturing, distribution, maintenance, recycling and disposal of goods. A complete plant solution concept will be developed, in which production machines and equipment are connected via an optimised platform of both wireless and cabled networks.

Plant status will be monitored in real time, elaborated and visualised in 3D-geolocation mode to infer: continuous tracking of material flow from raw material to final deployed products; efficient runtime planning of product/supplies routes for continuous track & trace systems; efficient automatic maintenance schedules and improved operator dispatch and repair performance; automatic triggering of re-sequencing and line-balancing processes in response to unscheduled maintenance action or equipment failure.

eSONIA systems include an in-plant (Indoor & Outdoor) geo-location system for real-time asset management and a service management system for enhanced manufacturing control. **eSONIA tools** will be developed for 3D visualisation of operations on the factory floor, (asset) health assessment, prognostics and maintenance scheduling.

R&D INNOVATION and technical excellence

In eSONIA, data will be processed at source (field device), so that upper levels are provided with rich and meaningful information. This will avoid the traditional overload of centralised software applications processing the data as well as that of the networking infrastructure. Collected information will be automatically organised through key performance indicators and custom-made interfaces will be developed for visualising this information. Context information will be described semantically and made available, so that the system adapts automatically to context execution. Sensor locations will be automatically discovered/computed using wireless measurements and transmitted using metadata. The traditional way of deploying RFID readers in fixed, strategic locations connected to the network through wired protocols will be overcome by making the readers themselves wireless. This will facilitate deployment in hard-to-reach (and/or mobile) locations. Web services will be made available and interoperable in a multitude of different computing platforms, including embedded devices and low-power wireless devices. Suppliers will be able to remotely connect their devices in the factory through secure connections. Traditional point-to-point connections or Ethernet IPv4-based embedded devices in industrial settings will make room for wireless IPv6-based embedded devices.

PROJECT partners



www.artemis.eu

eSONIA

PROJECT COORDINATOR

Ilkka Lehtinen

INSTITUTION

Hermia Ltd

EMAIL

ilkka.lehtinen@hermia.fi

WEBSITE

www.esonia.eu

START

March 2010

DURATION

36 months

TOTAL INVESTMENT

€12 M

PARTICIPATING ORGANISATIONS

15

NUMBER OF COUNTRIES

4