WSN DPCM

Wireless Sensor Network Development, Planning, Commissioning and Maintenance

COMPLETED

WSN·DPCM

EXECUTIVE *summary*

WSN-DPCM develops a full platform to address the main Wireless Sensor Network (WSN) challenges for smart environments that includes the middleware for heterogeneous wireless technologies and an integrated engineering toolset for Development, Planning, Commissioning, and Maintenance activities for expert and non-expert users.

CONTRIBUTION *to SRA*

WSN-DPCM will contribute to several high-level targets set out in the SRA:

> Development cycles will be reduced by the platform integrated simulation and analysis capabilities

> Research fragmentation will be reduced by providing a common platform to improve research result generation, comparison, validation and dissemination within the WSN community.

> The obstacles created by the lack of openness of middleware and standards implementations will be reduced, since part of the platform source code will be open to the community, thus allowing its wide use in academic environments and some industrial applications.

> The ability to manage complexity will be improved, while reducing development effort.

> It will create a reference WSN Tool platform for further development of standardization recommendations.

> It will help close the design productivity gap between potential and capabilities.

MARKET INNOVATION *& impact*

WSN-DPCM will have a significant market impact on the WSN tool market, since it delivers a novel, integrated toolset targeting several vertical application domains.

The toolset leveraging on the middleware will provide the needed value to allow the WSN application developers to raise the focus of their efforts from hardware, platforms, tools details and implementation. It will enable developers to move towards higher added-value aspects, such as the creative use of the WSNs for effectively solving customer problems and improving application quality.

The platform will reduce the cost of WSN system design by lowering the barriers to entry and hold-up problems in the field, the skill requirements for the developers and the level of detail for the project implementations. Moreover, the open character of several parts of the platform will also lower the cost of hardware migration for WSN applications.

RELEVANCE & CONTRIBUTIONS *to Call 2010/2011 Objectives*

WSN-DPCM will develop an integrated toolset leveraging on an OS-agnostic middleware to address important WSN technology shortcomings that prevent its wide adoption.

WSN-DPCM is relevant to the implementation and deployment of preliminary application for smart homes, private and public area monitoring as defined in APS3: Smart Environments, and also contributes to the three ARTEMIS industrial priorities:

> **Design methods and tools:** WSN-DPCM will develop an integrated toolset and platform that includes development, deployment, commissioning and maintenance.
> **Seamless connectivity and middleware:** WSN-DPCM will develop a middleware to encapsulate hardware dependencies and allow cross connectivity among different wireless vendors.
> **Reference designs and architectures:** WSN-DPCM will ease the creation of new WSN systems based on legacy designs and/or on library components, by enhancing composability and modularity.

The integrated toolset and the middleware are expected to lead to implementation and deployment of prototype WSN-based applications for private and public monitoring.

Two demonstrator scenarios with high cross-domain applicability to address societal needs will be implemented within the smart location application scenario:
> **Outdoor Parking Demonstrator:** A WSN will detect free parking slots, guiding drivers to them.
> **Environmental Quality Demonstrator:** A WSN will measure the air quality as well as noise, light and electromagnetic levels on city streets.

These two demonstrators will serve also as validation and evaluation of the toolset and the middleware to ensure that the integrated platform can be used as a Tool Platform to design Smart Environments.

R&D INNOVATION *and technical excellence*

Unlike current WSN design offerings, the WSN DPCM toolset will contribute to the WSN community by providing solutions including a complete set of development, planning, commissioning, and maintenance tools.
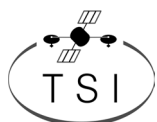
WSN-DPCM will offer a real end-to-end integrated tool-chain solution to promote a true model-driven architecture in all design and operational views of a system:
> **Development**, which will promote reusability of software components and will guarantee functional and behavioural portability among different hardware platforms and vendors.
> **Planning**, which will assist the network deployment to shorten the deployment time by minimising the number of trial-and-error iterations, while at the same time reducing the number of nodes.
> **Commissioning and Operational Maintenance**, which will help put the whole smart environment into operation and assist the users that will operate and maintain it.

The integrated toolset extends beyond the Graphical user Interface level to seamlessly handle the information flow between the tools, supporting model-based functionality composition, as well as easy propagation and back-annotation of changes among the various tool views.

The integrated environment will be supported by the middleware which will acti as the backbone of the software infrastructure. This middleware, in contrast to existing solutions, will provide a multi-level framework including functionality composition and adaptation. It will also allow the definition of a vertical software infrastructure to couple the different engineering views.

PROJECT *partners*