

p.S.H.I.E.L.D.

pilot embedded Systems architecturE for multi-Layer Dependable solutions



EXECUTIVE *summary*

To help safeguard society, pSHIELD will guarantee the Security, Privacy and Dependability (SPD) of Embedded Systems (ES) by making these “built in” features of future designs.

CONTRIBUTION *to SRA*

The use of an overlay approach to SPD and the introduction of semantic technologies address the complexity associated with the design, development and deployment of built-in SPD in embedded systems (ES). The SHIELD approach is based on modularity and expandability, and can be adopted to bring built-in SPD solutions in all the strategic sectors of ARTEMIS, such as transportation, communication, health, energy and manufacturing.

The project aims to meet the considerable challenges by creating an innovative, modular, composable, expandable and high-dependable architectural framework, concrete tools and common SPD metrics capable of improving the overall SPD level in any specific application

domain, with minimum engineering effort. The whole ES lifecycle will be supported to provide the highest cross-layer and cross-domain levels of SPD and guarantee their maintenance and evolution in the longer term.

MARKET INNOVATION *& impact*

The project will have a great impact on the SPD market of the ES. By addressing the reusability of previous designed solutions, the interoperability of advanced SPD technologies and the standardised SPD certifiability, it is possible to estimate an overall 30% cost reduction for a full SHIELD oriented design methodology. The composability of the SHIELD architectural framework will have great impact on the system design costs and time to market of new SPD solutions in ES. At the same time, the integrated use of SPD metrics in the SHIELD framework will have impact on the SPD development cycles because the SHIELD framework qualification, (re-)certification and (re-)validation process will be faster, easier and widely accepted.

RELEVANCE & CONTRIBUTIONS to Call 2009 Objectives

pSHIELD is a pilot project co-funded by the ARTEMIS JOINT UNDERTAKING (Sub-programme SP6) focused on the research of SPD (Security, Privacy, Dependability) in the context of embedded systems.

The SHIELD consortium proposes a compact R&D, or pilot, project (pSHIELD) to address the core concepts of SHIELD, with participation from the core/key partners and extended to a new group of partners from Norway and Portugal. The pilot is intended to be a pioneer investigation enhanced with R&D activities that will be proposed in the future ARTEMIS Calls.

pSHIELD aims to investigate and validate a reduced but still consistent and coherent set of innovative concepts behind the SHIELD project in a limited scenario tailored to the pilot's scope.

The use of an overlay approach to SPD and the introduction of semantic technologies address the complexity associated with the design, development and deployment of built-in SPD in ES. Semantics enables the available technologies to be automatically composed to match the required application specific SPD levels, thereby also reducing the effort needed during all the design, operational and maintaining phases. The pSHIELD approach is based on modularity and expandability, and can be adapted to incorporate built-in SPD solutions within all the strategic sectors of ARTEMIS, such as transportation, communication, health, energy and manufacturing.

R&D INNOVATION and technical excellence

pSHIELD will approach SPD at 4 different levels: node, network, middleware and overlay. For each level, the state of the art in SPD of single technologies and solutions will be improved and integrated (hardware and communication technologies, cryptography, middleware, smart SPD applications, etc.).

The pSHIELD project will be focused on:

- > Demonstrate composability: The main novelty is the composability of SPD functionality at different layers among different technologies, although the mechanism behind the design composability could also be investigated.
- > New technologies: A sub-set of the previous SHIELD technologies will be used to be the very first significant example of SPD composability.
- > Modularity and expandability: As well as SHIELD, pSHIELD will maintain the same features, by preserving the work breakdown structure proposed in SHIELD.
- > Innovative, modular, composable, expandable and highly dependable architectural framework: the pilot project will be lead the design of the core of this architectural framework, thus leaving to a future project its refinement and development
- > Metrics: the other novelty in the SHIELD project that can be investigated and used to validate the first basic functionalities of the framework.
- > Validation of the SHIELD integrated system in one application scenario whereby the architectural framework is validated by means of a reduced number of use cases.

PROJECT partners



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START

June 2010

DURATION

19 months

TOTAL INVESTMENT

€5.4 M

PARTICIPATING ORGANISATIONS

16

NUMBER OF COUNTRIES

6