1 Work progress and achievements during the period

Please provide a concise overview of the progress of the work in line with the structure of Annex I of the JU Grant Agreement. ***For each work package*** *-- except project management, which will be reported in section 3.5--please provide the following information:*

- *a summary progress towards objectives, supported by measurable indicators and details for each task and each partner;*
- *highlight clearly significant and tangible results;*
- *a statement on the information flow between the Project and other related Project(s) part-financed under the ARTEMIS JU, the Community Frame Work Programme, and/or National Research Programmes);*
- *a statement on the dissemination activities and exploitation perspectives including an updated positioning with respect to the competitive situation in the field addressed by the Project and to other Projects (inside and outside ARTEMIS JU).*

Task 7.1 Dissemination activities:

pSHIELD is a pilot project developing and establishing prototypes for security, privacy and dependability in embedded systems. As the total project duration is limited to 19 months, the main focus is on advances in core technologies for embedded systems. The established technology developments are disseminated internally in the project, through contact with targeted industries, through scientific publications, through industrial publications, and through workshops and exhibitions.

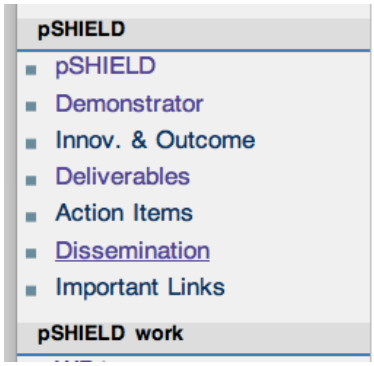

Fig 7.1: Dissemination has an own standing on the pSHIELD wiki, same as the description of the Demonstrator

pSHIELD has the following areas for dissemination:
- internal dissemination to project partners,
- targeted industrial dissemination
- industrial publications
- scientific dissemination
- contribution to workshops and exhibitions.

Internal dissemination to project partners

Internal dissemination has been arranged to share knowledge among the consortium partners and present the latest status and developed pSHIELD results. Such session has been envisioned to enhance cooperation and synergy. A project assembly had been held during 12-13. July 2011 in Rome and WP7 arranged a dedicated internal dissemination session for that. The agenda of this session has been distributed through an internal wiki page: http://pshield.unik.no/wiki/PA_Rome_20110712-13#Dissemination_session_.2F_partners_prototypes_presentation

We collected all available pilot prototype developments and explained the goals of each prototype. A detailed discussion on the middleware followed, including the envisaged path for integration og the prototypes. As focus is on developments rather than tedious integration work, the project decided to go for specific demonstrators in the areas:
- a demonstration of composability of SPD functionality,
- integration across heterogeneous platforms,
- hardware prototypical implementations of specific layers,

Details of these prototypical demonstrators are listed on Web, and will be presented during the Review Meeting in September 2011.

Another way of dissemination is through the intensive use of the semantic MediaWiki, which was specially developed for this project. The semantic MediaWiki can be seen as a quality control instrument, because all events within the project are captured through this tool. Details of the functionality of the semantic MediaWiki were described in the deliverable D1.1.1, and thus can you left out here.

Through the use of semantic technologies we ensure that we have consistent information, and that related information is "not longer away than two clicks". The usage of the wiki has shown a high usability for phone conferences and meetings, while the day-to-day work documentation on the wiki is rather an exception. Most partners prefer the traditional file format information.

Targeted industrial dissemination

As the main goal of the shield is to generate impact in this area, the main focus has been on the dissemination of prototypical results to targeted industries. The 2nd focus has been to establish an ecosystem such that the solution developed by pSHIELD will be ready for the market in a relatively short timeframe. With this respect we collaborate with the telecom industry to ensure standardisation of communication and SPD features through heterogeneous platforms.

Targeted industrial dissemination in pSHIELD concentrates on the areas off hardware development for embedded systems and integration of pSHIELD embedded systems into standardised machine-to-machine or machine-to-business to business environment. Within the area of hardware development, the prototypical developments aren't yet ready to to come into the market, thus they are only demonstrated to selected partners. In this area we have 3 main demonstrations being a components for secure, medication such as encryption off radio interfaces, platforms for embedded systems, and mattresses and middleware for SPD is functionality.

Establishing an ecosystem for pSHIELD means collaborating with relevant partners. As communication from the embedded systems towards end customers is seen as a major part, pSHIELD collaborated with the Telecom industry, in this case Telenor. Through this collaboration we ensure that results will be ready for standardisation in ETSI, the European Telecommunication Standards Institute. We have identified ETSI TS102.690, the Functional architecture for an M2M platform" as a promising starting point. However, this standard currently concentrates on the signalling and communication from a sensor system to the M2M platform and further to other entities, and does not envisage the SPD requirements on the embedded system.

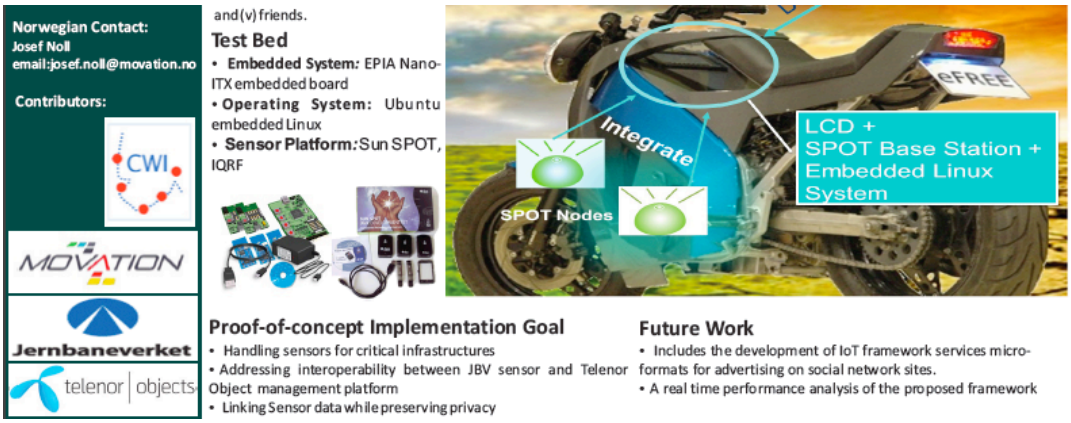

Fig 7.2: View of the pSHIELD embedded system as provided to the Telenor Innovation Fair

During the reporting period pSHIELD engaged in the following targeted dissemination:

- An prototype of the pSHIELD personal node platform (embedded Linux) was provided to ESIS Norway and Telenor Objects, who used the platform within the electrical motorcycle of ESIS. This motorbike is part of the Telenor Innovation Fair at Fornebu, Norway (see Fig 7.2).
- Contact to the National Hospital “Rikshospitalet” was established. A presentation of "Security, Privacy and Dependability" of embedded systems was provided in spring 2011, with the goal of elaborating the applicability of pSHIELD integrated sensors for eHealth purposes, together with Telenor Objects. The feedback is documented on the wiki: http://

pshield.unik.no/wiki/PSHIELD_Dissemination , mainly stating the lack of standards in this area.

- Another target company was Simlink, providing a SIM card with a WLAN beacon. Such a card will allow to have security options with OTA (over the air application install) and controlling of devices. We identified Simlink as an interesting technology for micro- and personal-nodes, being able to provide several sensor applications in the market.
- The first installation of the embedded system in the measurement vehicle of the Norwegian Rail Authority showed the need for an autonomous system. Most of the "of-the-shelf" products used in this integration did not support the autonomous operation, causing the installation on the train to be delayed to Q3.2011.
- Installation of a pSHIELD Sensor Network is underway with the Italian Railway provider, expecting the installation to take place in Q3.2011
- Further instustrial actors are identified, namely ABB and the Norwegian Defence Research Establishment (FFI). Workshops are planned for Q3.2011 to establish the potential for pSHIELD results.

Scientific dissemination

Scientific dissemination of projects such as pSHIELD have a starting phase of 6 to 9 months prior to the first publications, and most of the publications come within the second and third year. pSHIELD is different, focussing on knowledge being present in the companies, and bringing these knowledge both to the scientific audience and the targeted industrial partners. Already during the first six months pSHIELD partners published two scientific papers and educated one master student. This second period shows an increase of the scientific dissemination with in total three papers, out of which one paper was accepted as a Journal Paper.

The following scientific articles has been published (or accepted for publication) –

- Fiaschetti A., Lavorato F., Suraci V., Palo A., Taglialatela A., Morgagni A., Baldelli A., Flammini F., "On the use of semantic technologies to model and control Security, Privacy and Dependability in complex systems" Proc. Of 30th International Conference on. Computer Safety, Reliability and Security (SAFECOMP'11), Sep. 2011. Naples, Italy
- Sarfraz Alam, Mohammad M. R. Chowdhury, Josef Noll, "Interoperability of Security-enabled Internet of Things", to appear in Wireless Personal Communication Special Issue on "Internet of Things and Future Applications", Springer-Netherland, 2011.
- Mohammad M. R. Chowdhury, Josef Noll, "Securing Critical Infrastructure: A Semantically Enhanced Sensor Based Approach", 2nd International Conference on Wireless Communications, Vehicular Technology, Information Theory and Aerospace & Electronic System Technology, WiRELESS ViTAE 2011, Chennai, India, Feb. 28-Mar. 2011.

In total four PhD students have dedicated their research work to pSHIELD. The following PhD thesis where the majority of the works has been done as a part of pSHIELD scientific tasks is scheduled to finish by the end of this year.

Sarfraz Alam, "Secure interworking of sensor systems in heterogeneous business environments" (tentative titel), PhD thesis, to be finished in Q4.2011

Besides pSHIELD has planned to participate the following events –

ARTEMIS and ITEA Co-Summit in Helsinki, Finland on 25-26. October 2011. pSHIELD is expected to demonstrate the latest results of the project through a live prototype.

Significant outcomes:

- A dedicated internal dissemination session has been arranged to improve knowledge sharing, cooperation and synergy.
- Two scientific articles published in high quality conferences and one journals have been published in this period, making in total five scientific publications from pSHIELD.
- A PhD thesis is expected to be submitted by the end of this year.
- Industrial dissemination has identified necessary players to establish an ecosystem for industrial applications of pSHIELD. Besides the Telecom industry represented through Telenor contacts have been established to ABB, one of the leading power automation companies.
- Dissemination activities are currently collected on the pSHIELD wiki, and will be transferred from there to the public Web page and the D7.1.2 report

Task 7.2 Exploitation activities:

Industrial exploitation of pSHIELD results are currently under discussion. Areas for exploitation are:

- Sensor platform,
- Semantic middleware, and the
- encrypted communication hardware.

The pSHIELD sensor platform was already deployed in the ESIS electrical motorbike and the measurement vehicle of the Norwegian Rail Authority (JBV). However, an extension to an industrial platform would require a.o. Dashboard functionality, GUI, user interface, End-to-end security, including encryption, and access control. Thus we currently favour another phase of developments together with the telecom and power industry in order to develop closer to actual industrial needs.

Significant outcomes:

- The draft Exploitation plan has been circulated among the consortium members for feedback, suggestions and contributions. Only high-level feedback was given. We envisage to detail the feedback through dedicated phone conferences.