August 2017

Newsletter 4

ProSEco in a nutshell

The ProSEco project provides means for collaborative product-service and production process design. The objective is to provide a novel methodology and a comprehensive ICT solution for collaborative design of product-services (Meta Products) and their production processes.

ProSEco status

By August 2017 the ProSEco project is almost reaching the end of the project. In this issue of our Newsletter, 2 months before the project end, we are happy to be able to present the industrial partners applications of the project results. In parallel to these activities, the demonstrators are being prepared to present the ProSEco results extensively and to a wider audience.

This fourth new letter presents the application of the ProSEco solutions in the four Business Cases and follows from the third newsletter issue which presented the project building elements, the main development results of the ProSEco solutions including the Collaborative development platform, engineering tools and methods used for Product Extension Services (PES) development, and ProSEco deployment platform as well as the ProSEco core services. The four Business Cases are at a glance:

- Volkswagen - automotive OEM aiming to introduce new product and customer support services and business models through the ProSEco solutions

- Electrolux - home appliances OEM aiming to build services to support remote condition based maintenance of household appliances

- DESMA - shoe machine manufacturer aiming to build services for personalised design and manufacturing of new shoes

- ONA and ALBERDI - machine producer and parts supplier aiming to make Lean-based design of eco-driven services around machines

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Business case Volkswagen

Volkswagen as an automobile OEM, aims to offer telemetric und online services to their vehicles in order to improve the experience of owing a Volkswagen. A Volkswagen vehicle contains, depending on model, more than 4000 signals exchanged by the ECUs (Electronic Control Units) and communicate over CAN bus every 10ms. Today these signals are used only inside the vehicle to control the functionality and vehicle behaviour but are interesting to provide new telemetric and online services around the vehicle. ProSEco supports the development and provision of such new services about driver and driving behaviour, vehicle and vehicle behaviour and vehicle environment.

ProSEco provides the engineering tools to support Volkswagen in the preparation and selection of the signals that best fit the numerous Product Extension Services that can be obtained and provided with the vehicle signals. Furthermore, it provides core services and facilities for fast deployment of PES.

One important issue is that all data (signals) is owned by the vehicle owner. Therefore, the vehicle owner has to accept and allow the gathering und usage of signals for services. The access and authorization to the data use is also ensured by a ProSEco engineering tool. The PES developed to demonstrate the ProSEco solution are Eco-Driving Monitor and Pollution Monitor for public administration.

Innovation: Enabling of third party service providers to build apps around vehicle data and possibility of cross sectorial service development (e.g. weather service using vehicles as mobile weather stations)

Benefits—External Business, Participating on new 3rd party business (as part of the value chain) , Internal Rapid prototyping, Short evaluation of service ideas
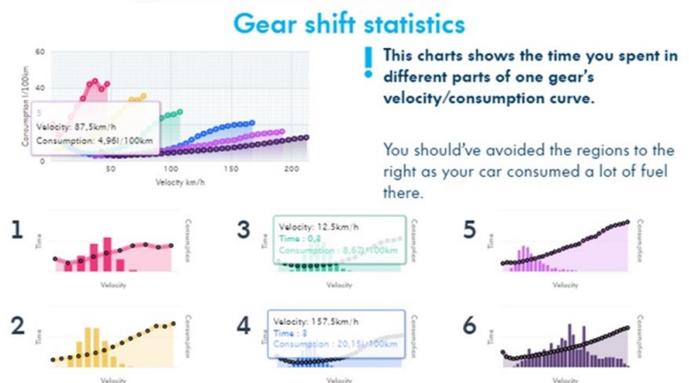
Business case ELECTROLUX

The objectives of Electrolux within ProSEco are to develop services for:

♦ Consumer behaviour analysis — to be able to analyse all data coming from the monitored appliances. This analysis will enable ProSEco to model the customers' behaviours according to their usage of the devices.;

♦ Preventive and Predictive Maintenance — ProSEco will, Instead of finding trends in the user's behaviour, provide historical information on the components behaviour. Ultimately, this analysis will enable ProSEco to find, predict and prevent problems that may occur in a component within the devices.

The environment taken into consideration are:

♦ Physical — Where the actual devices rest. These devices are the source of the data that will be analysed within ProSEco;

♦ Cyber-Physical — The limbo environment where both the physical and the virtual world meet. It is where the data is received from the devices and processed into the ProSEco environment;

♦ Advanced Support — The environment where the PESs run. Here the data is processed, stored and analysed using a mix of core services within the ProSEco environment and specifically developed ones.

In the future Electrolux believes that connected appliances offer a possibility for a life-long relationship between the company, as a manufacturer and the user of its products. Moving beyond the user's behaviour understanding and predictive maintenance, connectivity makes it possible to offer personalized, value added services in a way the appliance industry has never seen before. For example, taking into account relevant user data, it will not just be able to help users cook a meal like a professional, it will be possible to suggest the ingredients and order them according to the preferences.
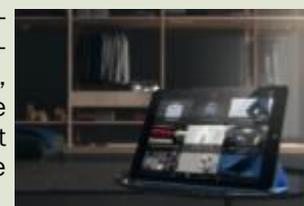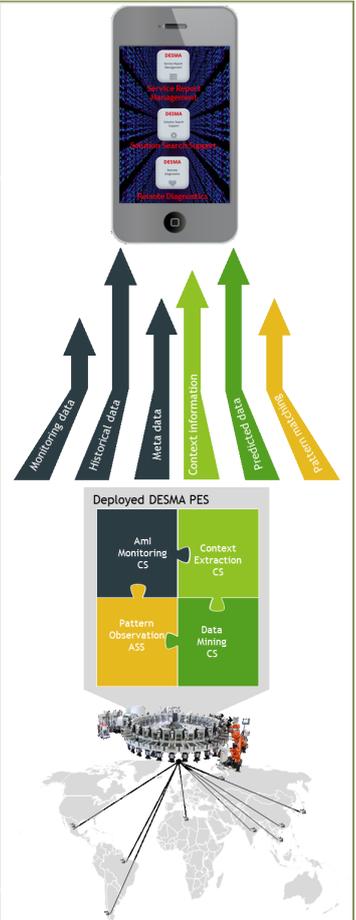
Business case DESMA

DESMA provides machines for the shoe industry. Their motivation in ProSEco was a totally improved maintenance service system for their complex production and automation systems that uses as information basis (1st) influencing ambient environment information, (2nd) data directly from the manufacturing systems (ISA'95 Level 1-3) and (3rd) also data from operators (e.g. technical (e.g. maintenance) reports). ProSEco was a suitable project to focus these challenges.

The figure on the right side shows the result of using ProSEco in DESMA: A configured DESMA PES, which is deployable on several production systems and reachable from everywhere. The PES provides classical monitoring, historical data, machine meta data, context information, predicted data, and pattern management, observation and matching information/functionalities from/for their machines. These information and functionalities are further exploited by Service Report Management, Solution Search Support and Remote Diagnostics applications for the improvement of their maintenance service system.

For DESMA ProSEco shows a high business potential of PES for machine builders like DESMA. ProSEco PES development accelerates traditional machine service and cuts down costs by making relevant service mission specific information instantly available to all resources. Avoided international technician travel not only minimizes loss of production and wasted material but also CO_2 emission for people transport. ProSEco allows DESMA to fully exploit the meta products concept by lean development, test and management of new PES ideas. DESMA is now in a position to drastically increase the number of PES products combined with shortened time to market. Demonstration of

Business case ONA and ALBERDI

Located in the Basque Country, ONA is a manufacturer of Electrical Discharge Machines (EDM) founded in 1952. ONA produced one of the world's first Sinking Electrical Discharge Machine (SEDM) in 1956. Experience gathered since that time in the field of EDM machines manufacturing has made ONA the leading EDM machine manufacturer in the European Union. ONA is a SME awarded with ISO 9001 and ISO 14001, with worldwide presence, by means of Owner offices and/or relationships with Subsidiaries and Distributors. With 14.000 machines installed worldwide, ONA exports about 90% of its production to 60 countries on the 5 continents.

ALBERDI is a SME company based in Azkoitia, Basque Country (Spain) specialized in the mechanization and décolletage of parts and the assembly of subgroups following the client's drawings and requirements. Main families of products manufactured by ALBERDI are small and medium size components and sub-assemblies. ALBERDI is working with most of the machine tool manufacturers in the Basque Country and is one of ONA's value chain suppliers. In 2016 ALBERDI led the foundation of the Munibe Group Machining Solutions S.L., which is located in Azkoitia and grouped 4 machine companies with 65 employees and more than 8000m2 of installations.

ONA objectives at ProSEco are focused on satisfying their specialized customer profiles (subcontracting and high tech companies) by:

♦ Looking for critical eco-parameters, such as, energy consumption, consumables consumption, and usage of components (electrodes, dielectric, filters, etc.) that release harmful emissions

♦ Providing new personalized services to be offered together with the machine, to allow capturing data about machine use and performance to manage and control the eco-parameters, the real time production costs, the environmental costs and the EDM process capabilities

The objectives of ALBERDI at ProSEco are:

♦ To improve the parts production management system by being able to analyse different manufacturing alternatives and to choose the one that best fits the customer preferences, taking into account: mechanical costs, delivery time or environmental impact of each of the manufacturing processes

♦ To provide a better collaborative service-offer to their customers taking into account customers' requirements such as geometry, raw material and other characteristics of the part
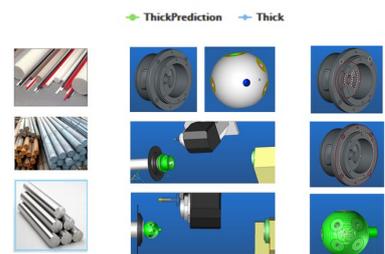
Past Events

- **Several special sessions organised in scientific conferences:**

  - In ICE 2017 (Madeira, Portugal from 27th to 29th of June 2017) the "Innovative Development of Intelligent Product - Service Systems". The following paper was submitted and accepted for publication:

    - Scholze, Sebastian; Ana Teresa, Correia; Nagorny, Kevin, "Special Session - Innovative Development of Intelligent Product-Service Systems Services for development of Situational Aware Intelligent PSS".

  - In INDIN 2017 (Emden, Germany from 24th to 26th of July) the "Collaboration in Intelligent Product Ecosystems", together with the project DIVERSITY (GA no 636692) and the project SAFIRE (GA no. 72363). Several papers were submitted and accepted for publication. Some examples:

    - Oliviu Matei, Carmen Anton, Sebastian Scholze, Claudio Cenedese, "Multi-Layered Data Mining Architecture in the Context of Internet of Things".

    - Ana Correia, Dragan Stokic, Sebastian Scholze, "Context Sensitive Collaborative Product Service System Development Environment".

    - Guilherme Brito, Giovanni di Orio, José Barata "Orchestrating Loosely Coupled and Distributed Components for Product/Process Servitization".

- **Many articles in scientific journals. Some examples are:**

  - Sebastian Scholze, Jose Barata, Dragan Stokic, "Holistic Context-Sensitivity for Run-Time Optimization of Flexible Manufacturing Systems", Journal Sensors 2017, 17, 455.

  - Stephen Fox, "Mass Imagineering, mass customization and mass production: Complementary cultures for creativity, choice and convenience", Journal of Consumer Culture, May 2017, doi:10.1177/1469540517705945.

May 2017: in Brussels, Belgium: ProSEco was presented in the European Business Summit.

June 2017: in Cluj, Romania: ProSEco was present at the Open Innovation 2.0 Conference 2017

ProSEco presence in the social media:

ProSEco LinkedIn group: https://www.linkedin.com/groups/8184999

ProSEco research group: https://www.researchgate.net/project/ProSEco