Common product model for requirements management and model based development

As an extension of the project 2007-01635, "Common product model for requirements management and model-based development", is a continuation project with the same title carried out.

The projects aim to contribute to the development of future environments for the development of automotive electronics (software and hardware). The project's main objective is to support vehicle safety, innovation and product development efficiency by developing methodologies and a demonstrator related to requirements management and model-based development.

The project has developed a refined and complete edition of the development environment, Sesammtool, to demonstrate and verify the results from the original project. The tool have evolved in small steps and these steps have been evaluated and the experience has been used for the next step. This iterative development method of a computer-based specification tool has proven to be effective and the result is a very well functioning demonstrator that can now be used for further evaluation for use in real projects.

Objective

The overall aim is to increase creativity, stimulate innovation and improve the quality and development efficiency by developing methods and a demonstrator for requirements management in complex embedded systems. The enhanced software, which the new working method and tool results in, contributes to improved safety and ultimately safer vehicles in the future. Improving development practices and increase transparency for the various software that are integrated in the vehicle control systems is a must to ensure that the growing number of safety related software functions really keeps the quality required.

The project is a continuation of the project 2007-01635, with the same name: "Common product model for requirements management and model-based development ". The purpose of the continuation of the project was to develop a second refined and complete edition of the tool to verify and demonstrate the results from 2007-01635, and to demonstrate and distribute the results of the project to the participants organizations.

Results and deliverables

The project resulted in a tool, Sesammtool, to edit and analyze dependencies between use cases and ECU systems over time. At the same time has an associated data model been developed.
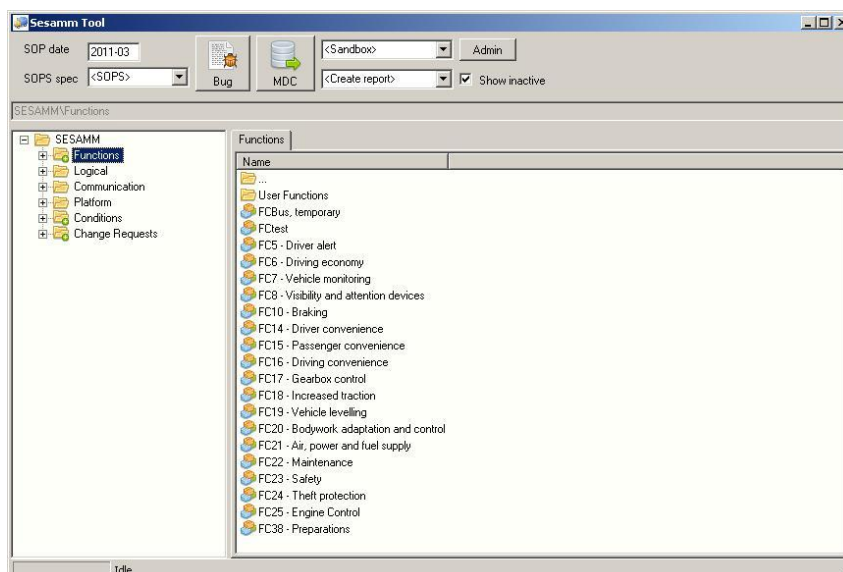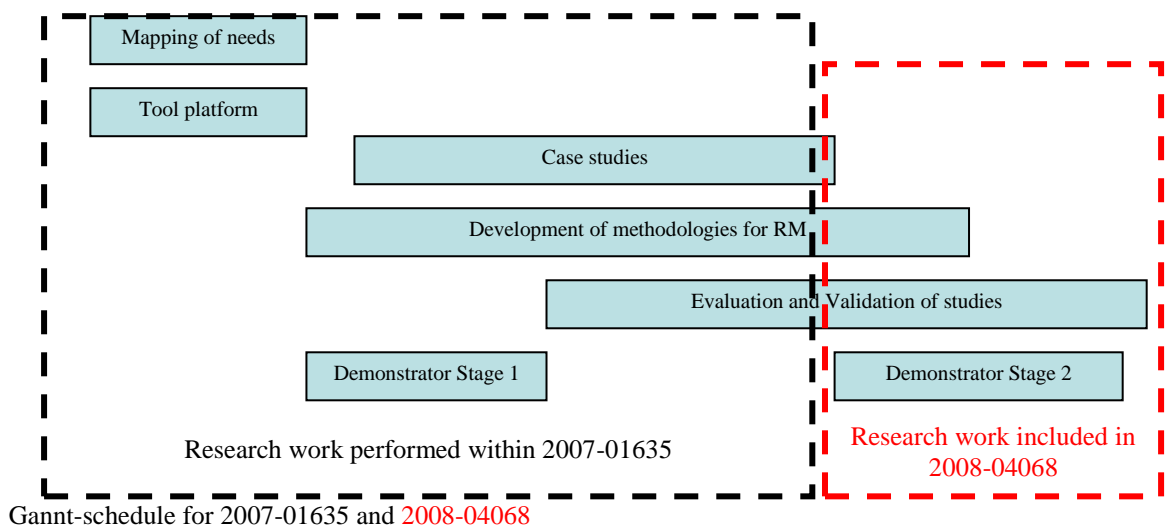
User interface of the software have been specified and developed. Different structural models for the databases have been developed, tested and evaluated. Analysis of these results has then demonstrated how the structural model works best for different application types.

Project realization

The project was performed from 1:st of January 2010 to 1:st of June 2011 as a collaboration between Scania CV AB and the Royal Institute of Technology in Stockholm, KTH.
At the time of the application it was planned that Chalmers would participate in the continuation project (CTH attended 2007-01635). Their participation, however, was replaced during the project by the consulting firm Tritech Technology AB, because the organization at Chalmers did not have resources available at the time and at the same time Tritech's skills complement the other project participants in a very good way at that stage.

The project is based on the project 2007-01635 and based on the results from that project, a prototype application (Demonstrator Stage 2) has been developed.

| Mapping of needs |
| Tool platform |
| Case studies |
| Development of methodologies for RM |
| Evaluation and Validation of studies |
| Demonstrator Stage 1 |
| Demonstrator Stage 2 |

Research work performed within 2007-01635

Research work included in 2008-04068

Gannt-schedule for 2007-01635 and 2008-04068

The working methodology was to develop the application iteratively. The software developers worked in direct contact with system architects, ie those that define and after implementation evaluate functions, structure models and user interface.

The continuation project has in terms of resources become much larger for Scania compared to what was estimated at the time of the FFI application. Scania think it is very important to develop a complete development environment in order to demonstrate and validate the research carried out in the parent project and has therefore been willing to provide these additional resources.

Project outcomes

The project has resulted in skills development and knowledge sharing within the industry and academia and also between industry and academia.
More hands-on the project has resulted in a prototype application, Sesammtool, used as a test platform to test different database structures and user interface to a program for managing complex document structures.

The methodology for the development of the prototype application was an effective way to develop a data model for product structure. The fact that the deficiencies in the data model is visualized well in the application, made it possible to use an iterative development model, which proved to be a very effective way of working.

Participating parties and Contact person

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Publications and dissemination of results

Scania internal presentation of the project and its results have been on "RE-Teknikmöte" 2011-01-21, an engineering meeting at the department of Electrical System Development, with participation of all managers and expert engineers within the department.
 "Sesammtool" is described and easily searchable with "scania wiki", which is an encyclopedia accessible from Scania's intranet.
The tool is now being tested by software engineers in different departments in Scania.

The results of this project is also known at KTH and Tritech Technology AB.

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