TIMMO-2-USE ITEA2 Project
Timing Model – Tools, algorithms, languages, methodology, USE cases

TIMMO-2-USE is an ITEA2 project funded by the national authorities in France, Germany and Sweden. Below is a press release informing about the start of the project:

TIMMO-2-USE aims at increasing the efficiency and accuracy in handling timing-related issues in the complex development of automotive real-time embedded systems. TIMMO-2-USE stands for TIMing MOdels - TOols, algorithms, languages, methodology, and USE cases which summarizes the main objectives of the project, i.e., the development of novel tools, algorithms, languages, and a methodology validated by use cases. TIMMO-2-USE is an ITEA2 project (ITEA 2 project 09033) with 17 partners from France, Germany, and Sweden. The project started in October 2010 and has a duration of 2 years. The project is funded by the national agencies of France, Germany and Sweden.

Network-based electronic systems in today’s vehicles are of big and increasing complexity. Mastering different types of timing constraints and behaviour in the AUTOSAR-based supply chain of the complex development process is of crucial importance when designing distributed real-time automotive systems. On the one hand this requires an adequate transition of timing information in the complete development process throughout the different abstraction levels. On the other hand, an efficient exchange of timing information is necessary between different tools and between different roles in the overall tool and supply chain, e.g., between OEM and Tier-1 suppliers.

TIMMO-2-USE will address the specification, transition and exchange of different types of timing information throughout different steps of the development process. The general goal is to evaluate and enhance standards for different applications in the development by different technical use cases covering multiple abstraction levels and tools. For this, TIMMO-2-USE will bring the AUTOSAR standard and EAST-ADL2 into different applications like WCET analysis and in-the-loop scenarios. This will bring new algorithms and tools for the transition and conversion of timing information between different tools and abstraction level based on a new advanced methodology which, in turn, will be based on a combination of the TIMMO and the ATESST2 methodologies.

The main impact of TIMMO-2-USE will be:

- **Shortened, predictable development cycle:** An extended and further developed infrastructure for handling timing constraints, containing additional features, will increase the predictability and effectiveness of the development cycle even more. As a result, both development cost and development time are expected to go down due to fewer costly design iterations, while at the same time the resulting design will moreover be more reliable.

- **Reduced time-to-market by massive reuse:** Reusing components annotated with timing information for the construction of a new system will enable the derivation of more accurate system timing behaviour at early development stages. Therefore the system can be developed with a reduced number of design iterations.

- **More efficient communication and collaboration between different parties involved in development:** This will support cooperative development scenarios and reduce the risk of mutual misunderstanding between different parties contributing to the design of the same system, for example OEMs and Tier-1 suppliers, and lead to safer and more accurate systems.

- **Reduced development risk with improved quality:** A formal and unambiguous foundation for reasoning about time provides a steady basis and a common ground for better cooperation between tools with respect to timing information based on commonly agreed, industry-wide standards like AUTOSAR.

TIMMO was the path paving for introducing WCRT/WCET timing analysis into the first phases of AUTOSAR-based automotive software development. The introduction of this technology is heading at an improved design quality and results in a reduced number of design iterations with lower time-to-market. However, it is still an open issue how to convert high level timing information to timing constraints in real-time implementations. For this, TIMMO-2-USE will consider the complete timing information flow including the conversion of timing information between different levels of abstraction and formats. This will take tool and process automation to a higher level of productivity. Automatic exchange of timing information between different levels of abstraction and the integration of tool based on new technologies will result in faster and less iteration in the development cycle. As a result, TIMMO-2-USE expects 10%-20% improvements time-to-market with proper solutions for the management of timing information through all process steps.

The TIMMO-2-USE partners represent automotive OEMs (Volvo Technology Corporation, Sweden (Coordinator)), automotive suppliers (Continental Automotive, Germany, Delphi France, France, Robert Bosch, Germany), tool vendors (AbsInt, Germany, Arcticus systems, Sweden, dSpace, Germany, INCHRON, Germany, Rapita systems, UK, Real-time at work, France, Time Critical Networks, Sweden, Syntavision, Germany) and research (Chalmers university of technology, Sweden, INRIA, France, Mälardalen university, University of Paderborn).

The project budget is about 6.5 mio EUR and the duration is two years.

Contact: daniel.b.karlsson@volvo.com or wolfgang@acm.org
Webpage: http://www.timmo-2-use.org/