



MAENAD

**Second Workshop on Research
for the Electric Vehicle**

100611

Model-based Analysis & Engineering of Novel Architectures for Dependable Electric Vehicles

Coordinator: Volvo Technology

Partners: Volvo, CRF
Continental, Delphi/Mecel, 4S
MetaCase, Pulse-AR, Systemite
CEA LIST, KTH, TU Berlin, U Hull

Starting Date: 2010-09-01

Ending Date: 2013-08-30

Budget Total/Funding: 4 MEUR / 2 MEUR

Type of project: STREP

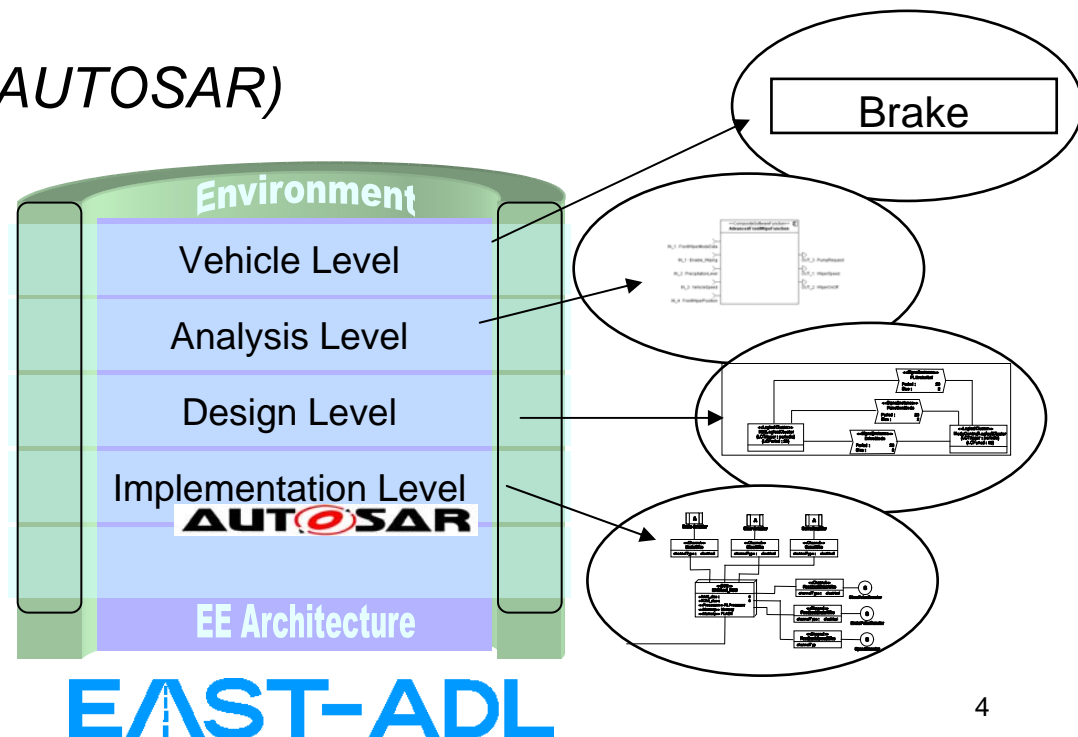


Needs

- FEV requires new algorithms, new components, new architectures
 - Challenging system integration requires adequate representation and tooling as well as methodology
- FEV introduces more EE safety challenges than any vehicle before
 - More authority, more electronics, less/no mechanical backup
 - Safety in the area of high voltage hardware
- Several projects are addressing safety in a cross-domain perspective
 - An automotive adaptation is critical.
- AUTOSAR is gaining momentum
 - A compliant systems and safety engineering approach is critical

Approach

- EAST-ADL modelling approach represent the embedded system in several abstraction levels
- Different kinds of engineering information
 - *Feature content*
 - *Functional content*
 - *Software architecture (AUTOSAR)*
 - Requirements
 - Variability
 - Safety information
 - V&V Information
 - Behavior
- Traceability
- Analysis and synthesis
- Document generation and views



Approach



- EE system modeling based on EAST-ADL has large potential but several challenges remain
 - Methodology
 - Specific modeling concepts
 - Analysis and synthesis
 - Adoption and standardization
- EAST-ADL is taken up in several research projects (CESAR, TIMMO2, SAFE, ...)
 - a project is needed to integrate and harmonize evolution
- ATESSST2 has a momentum in concepts and consortium
 - Gaps are likely at the end of the project
 - Further refinement of identified concepts are likely to be efficient

Approach



- Definition of methods and representation for model-based safety assessment and safety engineering
- Ensure leverage of research results from related projects
- Governance and maintenance of EAST-ADL
 - Secure alignment with AUTOSAR
 - Influence tool vendors to adopt EAST-ADL
 - Participate in exploitation of EAST-ADL
- Improve modeling concepts for FEV
 - System properties characterization and analysis
- Provide patterns and examples of usage for FEV

Exploitation

A decorative graphic at the top of the slide consists of two overlapping circles on the left and three separate circles on the right. The leftmost circle is solid light purple, the one it overlaps is white with a light purple outline, and the three on the right are solid light purple, white with a light purple outline, and solid light purple.

- Modeling approach
- Analysis and optimization approach
- Safety engineering compliant with ISO26262
- Engineering tools
 - AUTOSAR-compliant tooling
 - UML2 tooling
 - Customized (domain-specific) tooling
- Methodology
 - Establishing a typical approach for FEV development

Cluster Collaboration



- Prototype electrical vehicle will be used as case study
 - Safety aspects
 - Electrical system (hardware) aspects
 - Embedded system
- MAENAD tools and concepts are open
 - Projects in the cluster are invited to use and provide feedback
- MAENAD is interested to identify needs and challenges
 - Projects in the cluster are invited to participate in interest group