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

Motivation and Objectives

Fully Electrical Vehicles pose new challenges to the engineering of the electrical and embedded systems. Chassis and powertrain systems will have more authority, share common resources, and rely less on mechanical backups. Complex power management and optimization algorithms are needed to ensure durability of components, high performance, range of travel and low energy consumption.

To succeed in meeting these challenges, appropriate engineering support is required

- The objective of MAENAD is to
- Assist the safety process defined in the ISO 26262 automotive safety standard
- Provide effective prediction of quality attributes (dependability and performance)
- Provide tool support for the automated exploration of design spaces (dependability, performance and cost optimization).

Project Plan, Milestones, and Deliverables

The project will provide modelling concepts and tooling based on identified engineering needs and a methodology defined in the project. An electrical vehicle will be used to assess and provide feedback on project results.



Project Plan, Milestones, and Deliverables

- Identifying engineers' needs regarding development, verification and validation of FEV systems.
- Definition of a methodology for using EAST-ADL in the context of FEV.
- Refining EAST-ADL to meet identified engineering needs and methodology
- Definition of an EAST-ADL domain language metamodel according to AUTOSAR.
- Definition of an EAST-ADL UML profile and AUTOSAR compliant XML exchange format
- Development and refinement of tools for supporting EAST-ADL.
- Validation of concepts and tools on prototype electrical vehicle.



Achievements

- Identification of requirements for modelling support for ISO26262 and relevant FEV standards
- Identification of methodology elements supporting ISO26262 in an EAST-ADL context
- Tool development for EAST-ADL on Papyrus UML, SystemWeaver, MetaEdit + and EATOP
- Analysis and synthesis tooling including FTA/FMEA, ASIL decomposition and AUTOSAR generation
- Modelling examples illustrating FEV and safety concerns

Organisational Information

Budget 4 M€ Duration 42 months DG / Unit INFSO / G2 Coordinator Henrik Lönn, Volvo Technology

Partners:

Vehicle Manufacturers: Volvo Technology, Centro Ricerche FIAT Automotive Suppliers/Consultants: Continental, Delphi/Mecel, 4S Group

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Tool Vendors: ArcCore, MetaCase, Systemite **Research Institutes and Universities:** CEA LIST, KTH Stockholm, TU Berlin, University of Hull

