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

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<th>Date</th>
<th>Reason</th>
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<td>First intermediate release</td>
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<td>Second intermediate release</td>
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<td>Final M42 release for review</td>
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1 Introduction

This deliverable provides a description of the presentation material that is developed within the MAENAD project and provides references to this material.

The project presentation material includes:

- Newsletters
- Concept presentations that describe the various conceptual parts of the EAST-ADL language
- Public project deliverables
- IGI Encyclopedia article
- White-paper on EAST-ADL
- Published papers
- The www.maenad.eu web site, providing the above material as well as more information about the MAENAD project.
- Poster, presenting MAENAD
- Wikipedia article on EAST-ADL

Before describing the actual presentation material, let us take a brief look at how dissemination activities are being organized and monitored within the MAENAD project:

The presentation material is closely related to the dissemination actions that take place in the project. Dissemination activities are monitored in the global action list Excel document, which includes four sheets dedicated to dissemination:

**Newsletters**: Includes planning of newsletters, including timing and responsible persons per section

**Publication ideas**: Includes publications under development, or topics that could lead to publications.

**Disseminations**: Performed dissemination activities, e.g. papers, presentations.

**Dissemination venues**: Identified venues where we should submit publications.
2 Presentation material

In this section, an overview of the project presentation material is given.

2.1 Newsletters

During the predecessor projects, ATESST, and ATESST2, an e-mail list (sig-adl) was set up, and during ATESST2, 8 newsletters were distributed. Based on feedback from the development and reception of these newsletters, the following conclusions were made:

- The newsletters should avoid pictures, since they have a tendency to get trapped by anti-virus programs.
- The newsletters should be short and concise, and encourage further reading.
- We need results to publish newsletters, but to avoid that all newsletters are sent out at the end of the project, when all results are finished, they should be synchronized with project milestones and deliverables, as partial results will be available then.

Based on these conclusions the newsletters are planned as follows:

- After each milestone a newsletter is produced, based on results from this milestone. This includes deliverables that are released in this milestone.
- A draft of the newsletter should be available at the Milestone meeting, and the newsletter released when all deliverables are finished.

So far, nine newsletters have been published, they are available on the maenad.eu website “News Page”.

1. Information on project start, press release (sent 2010-12-01)
2. Initial phase: Requirements and needs, EAST-ADL language refinement (2010-02-04)
3. Demonstrators, New language concepts in discussion, methodology (2011-05-06)
4. Language and profile update, methodology, engineering scenarios, modeling platform update, enhancement of Language Support for Analysis, V&V (2011-10-24)
5. Language and profile update, EATOP, Analysis and synthesis algorithms for fully electric vehicles, Methodology (2012-04-02)
6. Information about public workshop, LinkedIn group, Language and profile update, case studies and tool support. (2012-10-02)
7. Language and profile update, Analysis concepts, Methodology (2013-04-08)
8. Milestone 8 update (2013-10-01)
2.2 Concept presentations

MAENAD has published a set of so called concept presentations, covering various EAST-ADL concepts at different level of detail. The purpose is to provide an easily accessible overview and introduction to EAST-ADL. The concept presentations holds also describes EAST-ADL tooling results from the MAENAD project, regarding modeling, synthesis and analysis. The following presentations are currently available:

Introduction
- Overview and Structure
- The relation between EAST-ADL and AUTOSAR
- The Behavior support of EAST-ADL
- The tools and meta-modeling aspects and support of EAST-ADL
- The Methodology of EAST-ADL
- The Variability support of EAST-ADL
- The Requirements support of EAST-ADL

Examples
- Range and mode control
- Regenerative braking
- Propulsion

Analysis Support
- FEV Analysis
- Timing Analysis
- ASIL decomposition
- Dependability analysis
- Optimization
- Behavior: External tools for behavior
- Behavior: Native behavior
- Behavior: Simulation

Tools
- EATOP Tooling
- MAENAD Modeling Workbench
- MAENAD Analysis Workbench
- MetaEdit+ implementation of EAST-ADL
- SystemWeaver implementation of EAST-ADL
2.3 Project deliverables

In the description of work, the public deliverables in Table 1 are defined. The intention is to publish these deliverables on the www.maenad.eu web site, as they are released. This includes deliverable D4.1.1, which is the EAST-ADL language specification.

Table 1. List of public deliverables

<table>
<thead>
<tr>
<th>Del. no.</th>
<th>Deliverable name</th>
</tr>
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<tbody>
<tr>
<td>D2.1.1</td>
<td>Engineering Scenarios and Requirements for FEV</td>
</tr>
<tr>
<td>D2.2.1</td>
<td>Design Methodology</td>
</tr>
<tr>
<td>D3.1.1</td>
<td>Language Concepts Supporting Engineering Scenarios</td>
</tr>
<tr>
<td>D3.2.1</td>
<td>Analysis and Synthesis Concepts Supporting Engineering Scenarios</td>
</tr>
<tr>
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<td>EAST-ADL Language Specification</td>
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<tr>
<td>D4.2.1</td>
<td>EAST-ADL profile for MARTE</td>
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<tr>
<td>D4.3.1</td>
<td>EAST-ADL XML Schema</td>
</tr>
<tr>
<td>D5.1.1</td>
<td>MAENAD Modelling Workbench</td>
</tr>
<tr>
<td>D5.2.1</td>
<td>MEANAD Analysis Workbench</td>
</tr>
<tr>
<td>D5.3.1</td>
<td>Tool adaptations for EAST-ADL</td>
</tr>
<tr>
<td>D6.1.1</td>
<td>Preliminary Case study Definition and metrics</td>
</tr>
<tr>
<td>D6.1.2</td>
<td>Case study Definition and metrics</td>
</tr>
<tr>
<td>D6.1.3</td>
<td>Case study analysis and safety assessment</td>
</tr>
<tr>
<td>D7.1.1</td>
<td>Project presentation material</td>
</tr>
<tr>
<td>D7.2.2</td>
<td>Standardization plan and activities</td>
</tr>
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</table>
2.4 White paper of EAST-ADL

During the ATESSST2 project, a gap was identified for stakeholders interested in EAST-ADL at a more detailed level than the concept presentations (compare section 2.2), but without having to go through the language specification (compare section 2.3). A solution in terms of a white paper was proposed within MAENAD, a document that describes e.g. the general benefits of using of EAST-ADL, why the language is designed the way it is, and how the different language extensions work, in a condensed publication. The target size of the paper was approximately 50 pages.

The white paper was developed, partly based on gathering of available material such as the IGI Encyclopedia article (described in the next section), but also new material. It has been internally reviewed by new partners in MAENAD, and also updated based on feedback from external users.

The white paper was released during the last MANEAD year, and is available from the maenad.eu web site.

![EAST-ADL White Paper](image)

Figure 1: The EAST-ADL white paper
2.5 The IGI Encyclopedia Article

IGI Global is a publisher of journals, books, encyclopedias, and teaching cases on information science and IT management. MAENAD got invited to write an article about EAST-ADL. This is a 13-page document describing EAST-ADL in overview, background, modeling concepts (Functional Abstraction, Timing Modeling, Requirements Modeling, Functional Safety Modeling, Variability Modeling and Behavior Constraint Modeling), methodology and related concepts. The article was prepared in April 2012, and updated based on feedback August 2012.

2.6 The MAENAD website

Figure 2: The maenad.eu website

The www.maenad.eu website was opened shortly after the project start, and contains information about the project. The objective is to have all the public dissemination material described in this deliverable available here.

According to website statistics from the site provider, there is an increasing interest in the project, with around 50 visits per day, see Figure 1.
Visits is the number of individual visitors of the site. Whenever a request is made to the server from a given visitor, the amount of time since a previous visit by the same visitor is recorded. Only if this time difference is greater than 30 minutes, it is considered a new Visit.
2.7 Poster

A poster has been developed and shown in various contexts relevant for MAENAD. The first occasion was at the TIMMO-2-USE workshop.

The first poster shows project administrative information and overall project approach. The second poster goes more into technical details through a basic EAST-ADL model with relevant concepts.
2.8 Wikipedia article on EAST-ADL

Although Wikipedia is not considered to be a very reliable source, many people use Wikipedia as a first place to get an overview of a subject and find references to further reading. Hence, it is important to keep this information correct. A general update on the Wikipedia article of EAST-ADL was made, including information about MAENAD. The article was reviewed within MAENAD before being published. The page is available at:


For a snapshot, see Figure 4.
2.9 Workshops

MAENAD has exchanged in Web-based workshops with other projects to discuss and harmonize concepts. Examples includes timing discussions with TIMMO-2-USE and methodology and safety discussions with SAFE, where MAENAD concepts were disseminated and TIMMO-2-USE and SAFE feedback was collected.

An open workshop was held in Berlin in September 2012 together with the projects AMALTHEA, TIMMO-2-USE and SAFE. The goal of the workshop was to present results and plans from the projects to an interested audience. The projects explained the challenges addressed and the solutions provided in the areas of methodology, representation and tooling.

Figure 5. Plenary and walk-around sessions from the AMST Workshop 2012.

Another open workshop was arranged in November 2013 together with EAST-ADL Association, Hosted by Volvo GTT/ATR in Gothenburg. The purpose was to describe EAST-ADL, show concrete examples of its usage along with various tools that support EAST-ADL and assist, automate and rationalise part of the system design process. The workshop also discussed and shared experiences on industrial deployment of EAST-ADL and development of automotive systems. Three formats were included, a set of plenary presentations, a walk-around session with tool demos and a panel discussion.
2.10 Publications

Main results from the project will be disseminated through scientific publications. The goal is to produce 5 collaborative journal papers, 15 collaborative conference papers within the project.

Below are the publications that until now have been issued.

2.10.1 Journal papers


2.10.2 Conference papers


Tagliabo, Fulvio; Torchiaro, Sandra; Lönn, Henrik; Johansson, Rolf; Chen, De-Jiu; Papadopoulos, Yiannis; Walker, Martin; Sandberg, Anders: Modelling Support for the Automotive Functional Safety Standard, Sixth International Conference on Dependability and Computer Systems DepCoS-RELCOMEX June 27- July 1 2011

Qureshi, Tahir Naseer; Chen, DeJiu; Lönn, Henrik; Törgren, Martin: From EAST-ADL to AUTOSAR Software Architecture: A Mapping Scheme, the 5th European Conference on Software Architecture (ECSA 2011), Essen, Germany, 13-16 September 2011.

Papadopoulos, Yiannis; Walker, Martin; Lönn, Henrik: Automatic allocation of system safety requirements to components of a system architecture using HiP-HOPS, Model Based Safety Assessment Workshop, Toulouse France 14-17/03/2011


Qureshi Tahir Naseer, Chen, De-Jiu, Persson Magnus and Törngren Martin, Towards the Integration of EAST-ADL and UPPAAL for Formal Verification of Embedded System Architectures, in Worshop on ime Analysis and Model-Based Design, from Functional Models to Distributed Deployments (TiMoBD). Taipei, Taiwan, October 9, 2011.


Ernest Wozniak, Chokri Mraidha, Sebastien Gerard, "Guided Task Model Construction for Automotive Systems based on Time Budgets" Work-in-Progress at 17th Internation Conference Emerging Technology and Factory Automation (ETFA), September 17-21, Cracovie, Poland


S. Voget, Safe development by adaptation of standardized safety concepts in AUTOSAR 4.0, ERTS 2012

S. Voget, Collaboration in Automotive - The Eclipse Automotive Industry Working Group, ERTS 2012

S. Voget, Definition of a standard for model based safety development and analysis compliant to ISO26262, Safetronic 2013


2.10.3 Book chapters


2.10.4 Dissertations


2.10.5 Presentations

Lönn, Henrik: Timing Modelling and Analysis in an Automotive Context, DaNES Timing Analysis Workshop, Copenhagen February 2011

Lönn, Henrik, European Green Cars Initiative “Portfolio of European Green Cars Projects” Workshop, Workshop Poster and the Brochure presented, 31th May 2011

Yiannis Papadopoulos, EAST-ADL and HIP-HOPS: Model-based design and evaluation, Seminar, Flemish Mechatronics institute, Leuven, December 2011

Lönn Henrik and Rolf Johansson: Supporting ISO26262 with EAST-ADL, SAFE project Seminar, February 2012


Henrik Lönn: Model-based Analysis & Engineering of Novel Architectures for Dependable Electric Vehicles, 3rd European Green Cars Initiative Clustering Event, July 2012

Lönn, Henrik: Models Meeting Automotive Design Challenges, ECMFA, July 2012


Lönn, Henrik: MAENAD Project status for EUCAR Integrated Safety Board, May 2012

Yiannis Papadopoulos, EAST-ADL and HIP-HOPS: Model-based design and evaluation, Seminar, ITI GmbH office, Dresden, January 2012

Renato Librino: La sicurezza funzionale dei sistemi "off the shelf" (SEooC) secondo l'ISO 26262 e le metodologie di sviluppo per l'integrazione tra OEM e componentisti realizzate in MAENAD con CRF, Volvo e Continental; National Instruments Automotive Forum 2012, Turin (Italy), June 6th 2012.


Henrik Lönn: Early Phase Functional Integration of Control Systems: IQPC Chassis and Safety Architecture; Stuttgart 2013

Oscar Ljungkrantz: "Case study about ISO 26262 in the EAST-ADL/Autosar context", IQPC Conference "Experiences with ISO 26262", March 2013

DeJiu Chen: System modeling for self-adaptive embedded computer systems. 1st WORKSHOP ON PROGRAMMING CYBER PHYSICAL SYSTEMS, Budapest, June, 2013


Figure 6. Mark-Oliver Reiser co-presenting at the Automotive Variantcon 2013 (we.CONNECT)

Figure 7. DeJiu Chen participating the Dagstuhl Seminar 12272 on Architecture-Driven Semantic Analysis of Embedded Systems (http://www.dagstuhl.de/de/programm/kalender/semhp/?semnr=12272)
3 Summary

There are various artifacts channels for project dissemination, and dissemination of EAST-ADL and related technology solutions identified, targeted at slightly different audiences, e.g. academic (Publications), industry managers (Concept presentations, White paper), Engineers, EAST-ADL tool developers (specifications, EAXML schema), other projects (Newsletters, website, workshops) or general public (IGI Encyclopedia, Wikipedia,). We believe these all are relevant in regard to the overall objectives of MAENAD.