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Revision chart and history log

Version	Date	Reason
0.1	2006-03-30	First draft
0.2	2006-03-31	Second draft based on feedback from DC (JD)
1.0 060410	2006-04-10	Third draft based on feedback from ETAS (UF)
1.0	2006-04-21	Minor adjustments
1.1	2007-07-04	Updated according to observations/comments from EC review 29/03/2007, Review no. 1 covering project month 1 to 12 (01/01/06 – 31/12/06)

1 Introduction

This task – 7.2 – Exploitation - aims at investigating and preparing the exploitation of the ATESST results – the main result being the EAST-ADL2.0. The eventual exploitation will mainly take place after the project has finished. All partners are part of the task. The purpose of this first deliverable is to describe the strategies for exploitation for the project.

It should be clear that this task (7.2) is closely related to tasks 7.1 and 7.3. Task 7.1 deals with dissemination, thus constituting a first step towards exploration and standardization. In particular, the work on the demonstrator and example systems (task 6.2) will be very important to illustrate what can be achieved with the ATESST results.

In many cases dissemination and exploitation activities will be partly overlapping. For example, consider the case of utilizing ATESST results in undergraduate education at a University. This at the same time provides dissemination of results as well as exploitation of the results.

2 Methodology

The strategies for exploitation have been discussed at the M0 and M1 meetings of the project. In between these meetings, a questionnaire was issued by KTH (based on an initial questionnaire draft from DC) with the purpose to elicitate the views and plans of exploitation by each partner.

The questionnaire had the following content:

Objective: collect your exploitation plans. Please answer the below questions (at least a few lines per question), and give details for the specific ATESST Project results you will focus your exploitation on (question 4).

What will your organisation do after the ATESST project to exploit project results and to deploy them in your organisation, where do you focus on?

What kind of internal dissemination activities will you carry out to communicate the results and exploitable solutions from the ATESST project?

What ATESST results are of most interest to your organisation?

Describe the steps you will take towards deploying these results in your organisation as follows:

- *Type the steps you will take, or the activities that you will start to ensure the project result will be exploited within or by your organization*
- *What is the timing of these activities; start and end?*
- *Type the expected result and effect from your exploitation activity here.*
- *What concrete product may/will come out of your work?*
  Which (measurable) result do you expect to occur in your organization or in client organisations?

The responses to the questionnaire are summarized in the following section.

3 Exploitation strategies

In the following, the exploitation strategies considering the following stake-holders and issues are described:

- automotive industries (OEMs and subsystem suppliers)
- tool suppliers
- standardization efforts
- research and education efforts.

3.1 Strategies with respect to adoption within automotive industries

At the end of the project, the final exploitation plan will elaborate the real exploitation, based on the achieved results. This final delivery will also incorporate and elaborate a strategy on how to best exploit the produced results with respect to industrial practices. Many automotive companies are still mainly relying on word, excel and source code as their main means to handle complex software. Consequently, a guideline on how to introduce model based development in a step-wise manner will be developed as part of this work package. We intend, as far as possible and as resources allow to connect this guideline to the examples and demonstrators being developed as part of Task 6.2.

The automotive partners part of the project represent OEMs (VTEC and DC) and subsystem suppliers (SV). It should be noted that the OEMs in this case also to some extent have the role as consultants within their companies.

Specific efforts by the industrial partners are described in the following:

DC: DaimlerChrysler Research & Technology aims to fill the gap between science and practice and to make new achievements in science available and applicable for vehicle development and production at DaimlerChrysler. The ATESST project addresses many problems and issues regarding vehicle functionality controlled by individual or cooperating embedded systems, their description, modeling and verification. These topics consistently reoccur in discussions and projects with the development departments. Therefore the expected ATESST results will be of high significance for DaimlerChrysler.

Siemens: SV software methods will be improved by the results of the project where merging between ATESST results (EAST-ADL2 languages) will support the process around AUTOSAR standardization. These results will be exploited in the focus of process improvement to be considered for future family of engine management system, and will be promoted internally in SV to other business area.

Volvo: Volvo Technology has a strategic position in the Volvo group with a direct connection to all product companies. New methodology and results are therefore very quickly disseminated to the engineering departments and put into practice. The ongoing integration of the Volvo companies will make direct use of the engineering information support expected from ATESST. The first step to exploitation is the internal deissemination as described in D7.1.1 Dissemination Plan.

3.2 Strategies with respect to tool vendors

It is recognized that tool vendors are important if the EAST-ADL is to be exploited in the future. For this purpose, tool vendors will be specifically targeted in the dissemination including also vendors not part of the project.

Specific efforts by the industrial partners are described in the following:

ETAS: ETAS has expertise in the field of embedded control software tools and hardware, dedicated measurement & calibration tools and hardware, basic software components as well as hardware in the loop test systems. A successful implementation of the WP 6 demonstrator based on the prototypical ATESST tool environment and ETAS rapid development hardware will enable appropriate demonstrations to ETAS customers, e.g. at the competence exchange symposium, a yearly event where ETAS customers talk about their way of using of ETAS products. Needless to say that these activities will start when the demonstrators exist with a certain maturity level.

There are two ways of realizing ATESST features in ETAS products. The direct implementation in ETAS products requires a thorough customer analysis incorporating e.g. the customer reactions on the ATESST demonstrations, while the alternative, i.e. an implementation via the ETAS partner program, provides the ideal means for research-oriented SMEs to develop ATESST plug-ins for established ETAS products like INTECRIO and ASCET.

Mentor Graphics: Mentor Graphics Hungary/MGH, former VCT has been committed to providing solutions for the automotive industry for decades and, as a result, co-operates with all major OEMs and suppliers. By means of this network, VCT/MGH will promote the solutions provided within this project for future products. VCT/MGH will also promote the results within the worldwide VCT/MGH sales-organization.

3.3 Strategies with respect to standardization bodies

The relation to various standardization activities is treated in Task 7.3 in the ATESST project. More in depth technical descriptions of related standardization approaches, as well as a description of similarities and differences of these approaches with respect to the EAST-ADL are described in the ATESST state of the art report [1].

Investigation and pursuing standardization is strongly related to exploitation. The strategies to go about this are described here since Task 7.3 does not have an intermediate deliverable.

The standardization efforts that are most relevant in the respect that the ATESST project have the possibility to influence the forthcoming standard include

- **Autosar** [2] - is a partnership that involves all European automobile constructors with the objective to establish an open standard for automotive electronic and software architectures. It is expected to serve as a basic infrastructure for the management of functions within both future applications and standard software modules. The goals include modularity, scalability, transferability and re-usability considerations. Compared to ATESST, Autosar is mainly focussed on the software architecture, software platforms, interfaces and lower level descriptions.
- Activities inside the OMG real-time & embedded areas, especially with respect to the **MARTE** profile [3]. UML1.x and UML2 are not directly useful for safety critical systems. The MARTE profile of the UML is addressing this and aims at defining paradigms for modelling of time-, scheduling-, and performance-related aspects of real-time systems, and also providing some support for Quality of Service and Fault Tolerance.

Other related standards include the **SysML**, [4], a visual modelling language for systems engineering applications, that is also planned to be a profile of the UML2 (developed in coope-ration between OMG and INCOSE), and **AADL** [5]. The AADL is a textual and graphical language supporting model-based engineering of embedded real-time systems. The AADL has been approved and published as SAE Standard AS-5506 by SAE in Nov 2004. From a systems modelling perspective, the AADL is more narrow in scope compared to the EAST-ADL, and for example does not contain functional and requirements descriptions. The AADL is already a standard and the SysML is just about to be accepted. The ATESST project will consider the alignment of the EAST-ADL to these standards.

For Autosar and Marte, ATESST will during the project present the EAST-ADL2.0 to the standardization bodies in order to provide information and influence ongoing standardization efforts.

The relation is complicated by the fact that these efforts are closed, but facilitated for ATESST since some of the partners are partners in these standardization efforts as follows:

- Autosar: DC and SV are core members, ETAS, VTEC and MGH are premium members. It is estimated that Autosar deliverables will be confidential at least until the end of 2006.
- CEA is a core member of the MARTE standardization work. The potential for attaching EAST-ADL to MARTE is being explored including investigation of technical issues, releases and overlap. A first open MARTE deliverable expected by the summer.

Thus with respect to exploitation, CEA will promote ATESST results at the OMG. DC, SV, ETAS, MGH, and VTEC, will, provided ATESST results are validated successfully, promote ATESST results within Autosar.

In addition VCT/MGH will disseminate the knowledge gained from this project within other partnerships such as the LIN- and FlexRay consortia.

ATESST will also consider the possibility to pursue the EAST-ADL as a de facto standard. This could in particular be a relevant scenario if the intended standardization efforts fail.

3.4 Strategies with respect to exploitation with respect to research and education

The partners of ATESST are involved in several other research projects and likely to be involved in several more in the near future. Depending on the nature of these projects, the partners have the intention to promote the usage of the EAST-ADL in such projects.

Within the ongoing EASIS [7] project, the use of the current EAST-ADL1.0 is already being investigated.

VTEC, DC and KTH are part of a project proposal (named Dyscas) currently under negotiation with the EC, where the use of the EAST-ADL is being recommended. This project will tentatively start mid 2006.

The University partners, KTH and TUB, have the intention to introduce ATESST results as appropriate within relevant courses. The precise timing of this introduction will depend on the maturity of the results. However, already, results such as the state of the art survey would be relevant to exploit in education. The further exploitation in education can take several forms including:

- use EAST-ADL2 as basis of diploma/M.Sc. theses

- use EAST-ADL2 as part of courses that involves ingredients on model-based development, including course on automotive software engineering and embedded control systems development.

In addition, TUB intends to examine the potential of the EAST-ADL2 in other (non-automotive) domains, and if this is not feasible, investigate why this is the case. Both KTH and TUB expect that the work on developing the EAST-ADL2 may be the source for new research topics.

4 References

[1] ATESST: Deliverabe 6.1 Elicitation of overall needs and requirements on the ADL. Part I Scenarios

[2] ATESST: Deliverabe 6.1 Elicitation of overall needs and requirements on the ADL. Part II State of the art and State of Practice

[3] ATESST: Deliverable D7.1.1 Dissemination Plan

[4] Autosar: Webpage reference March 30, 2006: http://www.autosar.org

[5] Request for Proposal of a "UML profile for Modelling and Analysis Real-time Embedded Systems6" realtime / 2005-02-06). http://www.omg.org/cgi-bin/doc?realtime/2005-2-6

[6] SysML Partners, Systems Modeling Language (SysML) Specification (ad/05-01-03), http://www.omg.org/docs/ad/05-01-03.pdf.

[7] www.aadl.info

[8] Architecture and Analysis Description Language – AADL: SAE standard AS5506, issued Nov. 2004. See also www.aadl.info and http://www.sae.org/servlets/productDetail?PROD_TYP=STD&PROD_CD=AS5506

[9] http://www.easis-online.org