

# ATESST

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[Click here to download the UML Modeling tool Papyrus and the EAST-ADL2 profile](#)

## Dear Colleague,

in this ATESSST2 newsletter, we will present the relation between AUTOSAR and EAST-ADL2.

Further information about the ATESSST2 project and the EAST-ADL2 language can be found at <http://www.atesst.org/>

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## General Information



ATESST2 is an FP7 project under DG ICT, General Directorate, Information and Communication Technologies. We are working in a consortium of ten partners to provide enabling technology to automotive embedded systems developers.

We advocate model-based development and suggest an approach based on the EAST-ADL2. The EAST-ADL2 is a meta-model or template for the engineering information related to automotive embedded systems.

EAST-ADL2 concepts have been adopted in other projects, including TIMMO (<http://www.timmo.org/>) and EDONA (<http://www.edona.fr>), and it is being considered for adoption in CESAR (<http://www.cesarproject.eu/>).

*Please note that there will be an Open Workshop of the ATESSST2 project scheduled for the last weeks of June 2010, taking place in Frankfurt. Future newsletters will give you more detailed information about date, place, and the agenda.*

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## **EAST-ADL2 Spotlight**

*ATESST2 defines EAST-ADL2 as a domain-specific language using meta-modeling constructs such as classes, attributes, and relationships.*

*The project also implements a UML2 profile, which is used in UML2 tools for user modeling.*

*The EAST-ADL2 definition also serves as the specification for implementation in domain-specific tools.*

The logo for EAST-ADL2, featuring the text "EAST-ADL2" in a stylized, blue, sans-serif font with a white outline, set against a dark blue background.

## **Webinar: EAST-ADL2 Concept Presentation on 26 January 2010, 13.00 o'clock**

*Relating EAST-ADL2 and AUTOSAR: Concept Presentation on Thursday, February 25, 2010, 13:00-14:00*

You are invited to take part in a web-based overview presentation of EAST-ADL2 and its relation to AUTOSAR on Thursday, February 25, 2010, 13:00-14:00. Below is the meeting link, please connect at 12:30 to test sound and picture.

[Join the meeting.](#)

### **Audio Information**

#### **Computer Audio**

To use computer audio, you need speakers and a microphone, or a headset.

#### **First-Time Users**

Make sure the Office Live Meeting client is installed before the meeting:

- [Download the Microsoft Office Live Meeting client](#)

#### **Troubleshooting**

Unable to join the meeting? Launch the Office Live Meeting client and join the meeting with the following information:

Meeting ID: c7f732b9bcba4fe4a067074ac1275fc7

Entry Code: t074893V71

Location:

meet:sip:Henrik.Lonn@volvo.com;gruu;opaque=app:conf:focus.id:c7f732b9bcba4fe4a067074ac1275fc7%3Fconf-key=t074893V71

If you still cannot enter the meeting, contact [support](#).

### **Notice**

Office Live Meeting can be used to record meetings. By participating in this meeting, you agree that your communications may be monitored or recorded at any time during the meeting.

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### **AUTOSAR Spotlight**

*AUTOSAR defines a software architecture platform by standardization of its infrastructure and a communication layer suitable for distributed systems.*

*The standard also defines description means for the execution platform including control units, network topology, I/O, and middleware and application software components.*

*The platform and the description means make it possible to integrate software from different suppliers on the same hardware. Reuse is favored and dependencies between application software and hardware are avoided.*



### **AUTOSAR Background**

AUTOSAR is today established as the standard format for exchanging design information of automotive E/E systems. The main contributions are:

- definition of a software component technology for application software development,
- definition of a standardized ECU software architecture, and
- definition of a methodology specifying with predefined templates how to exchange design information between actors.

However, the scope of AUTOSAR is confined to exchange and information of the building blocks of the implemented design. It is left outside to describe information on what the E/E systems should fulfill, and it is also left outside to support general architecture decisions. One could say that AUTOSAR is a standard for communicating the resulting solution how an E/E system is implemented by means of components with standardized interfaces. But it does not care about neither the problem to solve nor the information you need on your way to reach the resulting implementation.

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## EAST-ADL2 Model Structure

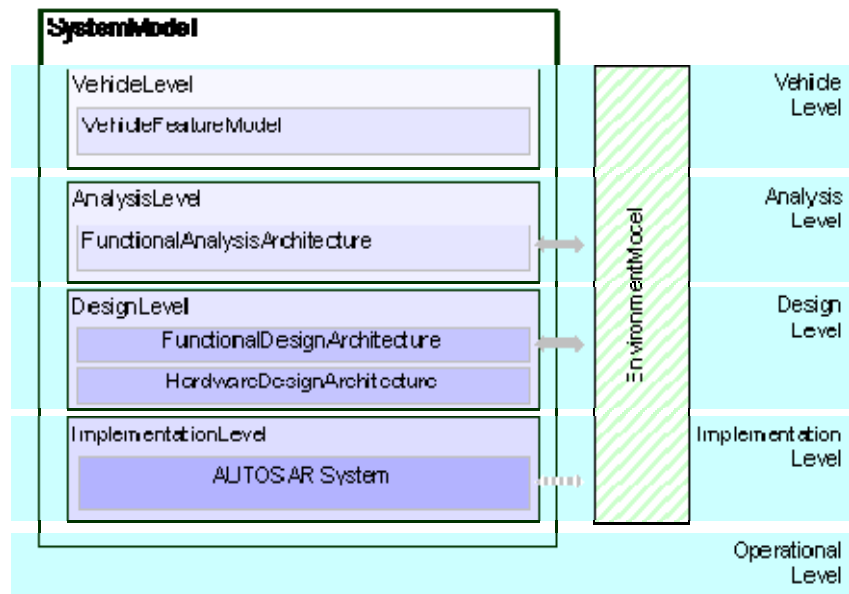
EAST-ADL2 models are organized according to the abstraction level of the contained information. There is a System Model container that holds four models denoted Vehicle, Analysis, Design and Implementation Level. Each of these models is, together with the environment model, a complete representation of the vehicle but covers only the concerns of the abstraction level at hand.

The Vehicle Level holds features representing the externally perceivable aspects of the vehicle.

The Analysis Level contains an abstract functional architecture, where the structure and behavior of the pure functionality of the electric/electronic architecture is defined.

The Design Level contains a concrete functional architecture, where functions are refined to their final specification. The solution represents sensors and actuators, is divided into application versus platform functionality, is prepared for distribution over several nodes, etc. It also contains a hardware architecture serving as a target for preliminary allocation.

Implementation Level, finally, contains the software architecture and detailed hardware topology with ECU specifications. The software architecture realize the function architecture from design level, but is (re-)organized to meet non-functional requirements on the final implementation. These may include resource consumption, timing, cost, reusability, sourcing, etc.



[Click here to download a presentation of how AUTOSAR models relate to EAST-ADL2](#)

## Relating AUTOSAR and EAST-ADL2 Models

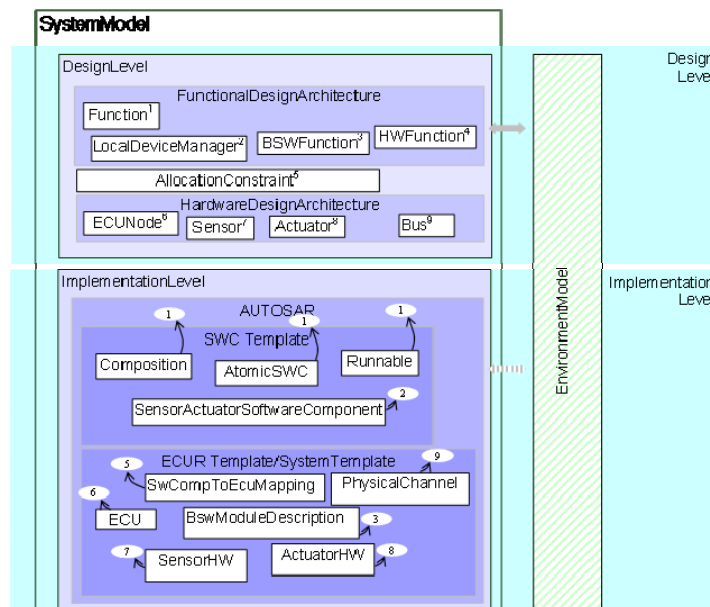
The EAST-ADL2 model on Design Level is realized by the AUTOSAR entities on Implementation Level. It is therefore possible to trace between entities in EAST-ADL2 and AUTOSAR. The granularity of this depends on the needs and possibilities at hand.

AUTOSAR's software component template defines the application software architecture. The architecture is hierarchically defined, and a coarse-grained relation between EAST-ADL2 Design Level and AUTOSAR may be defined between AUTOSAR compositions (on any level of hierarchy) and EAST-ADL2 functions. The Realization relation is used to trace from AUTOSAR entity to EAST-ADL2 entity.

A fine-grained traceability may be defined between an AUTOSAR runnable and one or several EAST-ADL2 elementary functions, i.e. the leaf functions in a functional hierarchy.

EAST-ADL2 supports the distinction between functionality intended for AtomicSoftwareComponents (function), SensorActuatorSoftwareComponents (LocalDeviceManager), and BasicSoftware (BasicSoftwareFunction). Further, the transfer functions of sensors, actuators and other hardware devices may be defined as HardwareFunctions in EAST-ADL2. These are not directly related to AUTOSAR elements. Instead, the traceability is defined from AUTOSAR SensorHW, or any other HWElement to the corresponding EAST-ADL2 HardwareComponent. The HardwareComponent, in turn, is associated with the HardwareFunction defining its transfer function.

The figure below shows entities on the respective abstraction level. Arrows denotes typical realization relations, but the arrow is cut for readability.

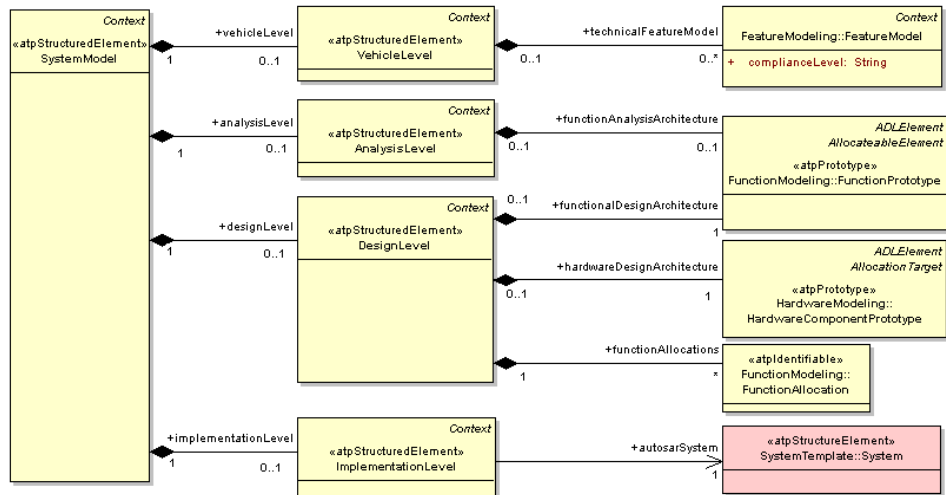


## EAST-ADL2 Metamodeling Approach

The domain model of EAST-ADL2 is defined as a UML2 model, each concept of the language is documented with syntax and semantics in the UML tool Sparx Systems Enterprise Architect. This approach is similar to how the metamodel is defined in AUTOSAR, where the result define the templates used to exchange model information.

EAST-ADL2 refer to the AUTOSAR System to describe the Implementation Level of an EAST-ADL2 System Model. The relations between AUTOSAR elements to elements in the other abstraction layers are modeled with Realization relationships as defined by EAST-ADL2. This allow for explicit tracing by extending the AUTOSAR concepts. It is the intent of ATESS2 to also allow for extension of AUTOSAR elements with requirements, dependability, and variability concepts.

The modeling guidelines as defined by AUTOSAR are used when defining the EAST-ADL2 domain model. This makes the domain model valid as a metamodel and allows it to fit seamlessly with the AUTOSAR metamodel with regards to the use of the model for definition of exchange format, tools, etc. Within the ATESS2 project the main goal of the Domain Model is to serve as the specification of the Architecture Description Language. As a part of the project a UML2 Profile is implemented with this specification as basis. The implemented profile imports the SysML profile which also has served as an inspiration when defining the domain language on e.g. requirements.



If you choose to receive/not to receive future ATESS2 newsletters, please inform [owner-sig-adl@vtec.volvo.se](mailto:owner-sig-adl@vtec.volvo.se).

The ATESS2 consortium



