

“Advancing Traffic Efficiency and Safety  
through Software Technology, Phase 2 (ATESST2)”

## Tooling

**ATESST2 Final Workshop**  
**June 21 2010**



# Outline

Overall tool development

Quick demo preview

Parallel sidetracks with DSL tools

Conclusion and plans ahead

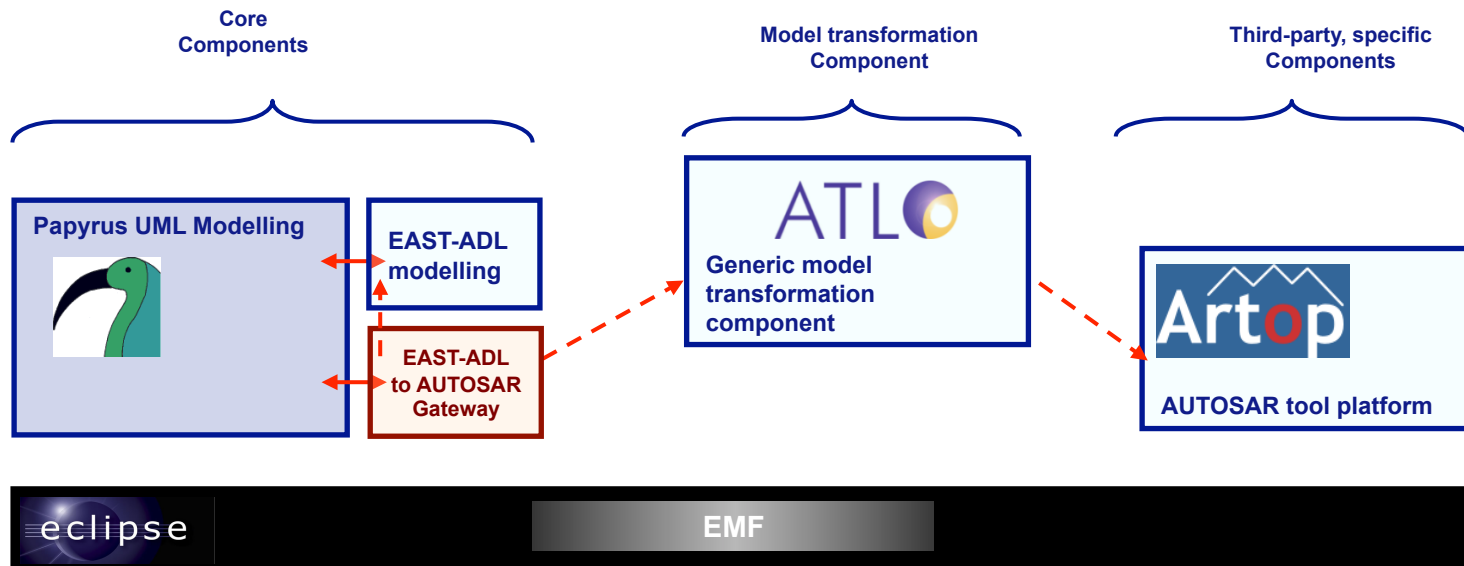
# Overall tool development

- WT4.2
  - ✓ (CEA) workbench based on a customized version of UML2 modeler Papyrus
- WT3.1
  - ✓ (CAR) RIF gateway
- WT3.2
  - ✓ (KTH,HULL) safety analysis with gateway to HipHops
- WT3.3
  - ✓ (TUB) feature/variability plugin
- WT3.4
  - ✓ (CEA) Autosar gateway
  - ✓ (KTH) Simulink gateway
- WT3.5
  - ✓ (CEA): Timing analysis
  - ✓ (CEA,KTH,HULL): Combined analysis (time & safety)
  - ✓ (CEA,KTH,HULL,TUB): Analysis-driven optimization

✓ Available, included in the USB stick  
✓ Experiments only  
✓ Results from collaboration with EDONA (French System@tic cluster), not included in USB stick

# WT4.2 Workbench architecture explained

- The component is an extension plug-in for Papyrus
- It uses features from the following components:
  - Papyrus and its EAST-ADL customization plug-in ([www.papyrusuml.org](http://www.papyrusuml.org))
    - Based on EMF based implementations of UML2 and EAST-ADL
  - ATL ([www.eclipse.org/m2m/atl](http://www.eclipse.org/m2m/atl))
    - Provides a generic EMF compliant model transformation engine
  - ARTOP ([www.artop.org](http://www.artop.org))
    - Provides an EMF implementation of the AUTOSAR metamodel



# WT3.1 RIF Plugin

## Main Goal:

Provide an EAST-ADL Modeling User a UI based Eclipse Plugin Mechanism to Import or Export Requirements into/out of an EAST-ADL System Model

## Architecture:

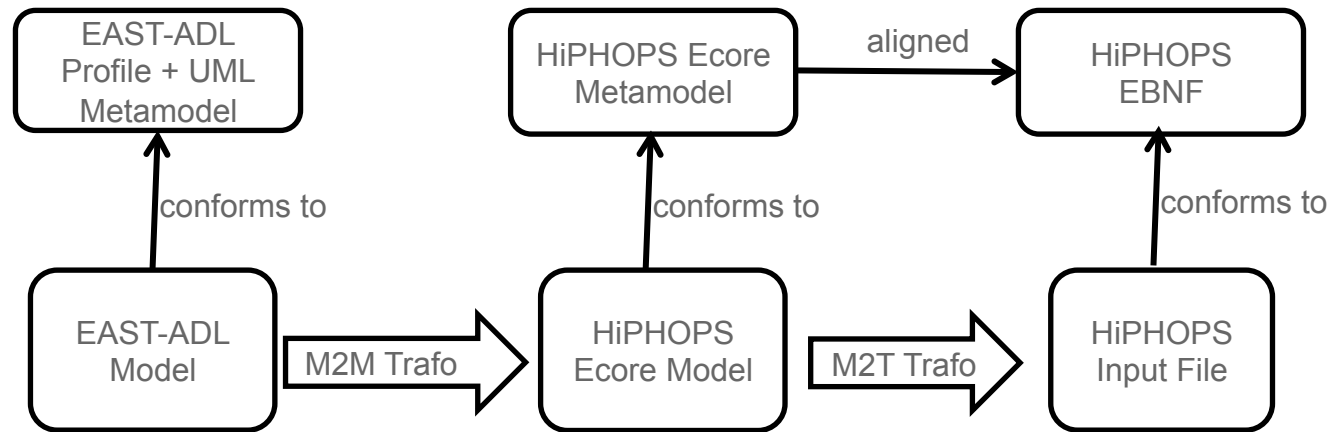
- ATL Transformation Rules: RIF XSD Schema → EAST-ADL UML Profile (Import Direction) + EAST-ADL UML Profile → RIF XSD Schema (Export Direction)
- User Interface to choose EAST-ADL System Model File, RIF XML File, and possibly ATL Transformation rules to use
- Contextual Invoking by right clicking on the EAST-ADL System Model File (Import/Export)
- Contextual Invoking by right clicking on the RIF XML File (New EAST-ADL Model with Requirements Specification)

## Current status:

- Domain language updates identified and agreed upon
- Use cases identified
- Import developed/Export being finalized

Leader: Carmeq GmbH

## WT3.2 Safety analysis plugin

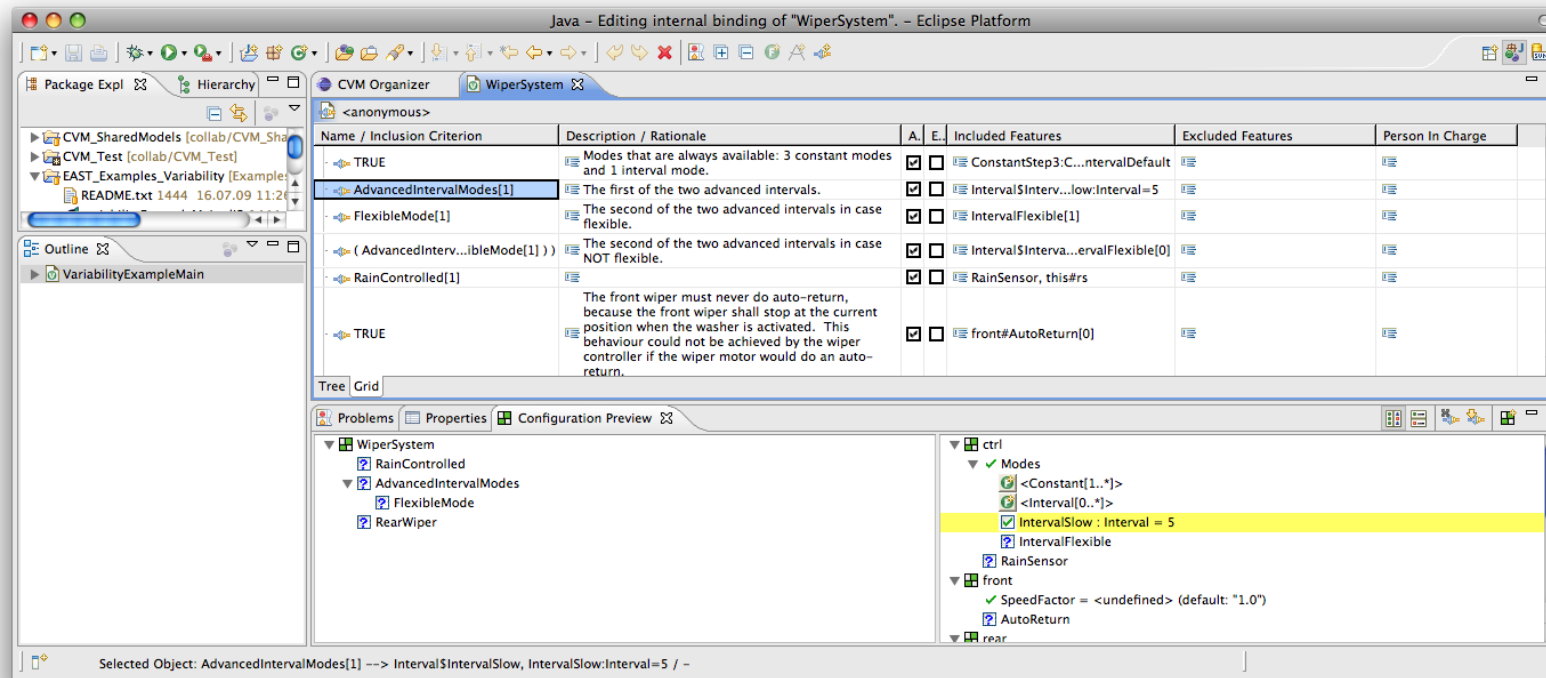


Leader KTH, HULL

Goal: enable safety analysis with HipHOPS engine

Current status: HW/SW error propagation, involves HipHOPS extension provided by HULL

# WT3.3 Feature/Variability plugin



Leader TUB

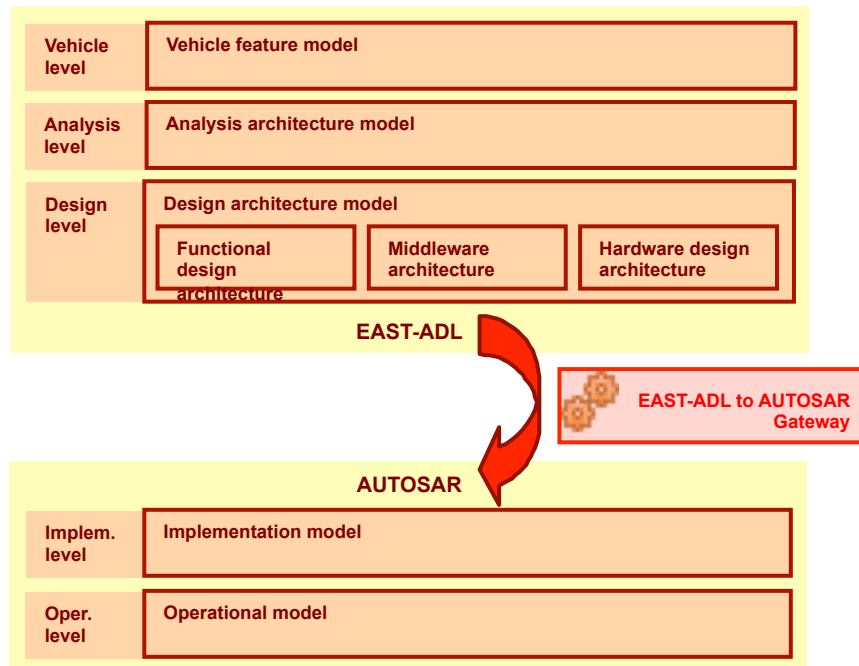
Goal: to provide support for the management of feature-oriented modeling at vehicle level and vehicle configuration support on to the artifact level

Tool is twofolds:

1. CVM feature modeling editor
2. Bridge with EAST-ADL Papyrus

Evaluated by Continental on demonstrator models

# WT3.4 Autosar gateway



Result from collaboration with EDONA  
(French System@tic cluster)

Leader CEA

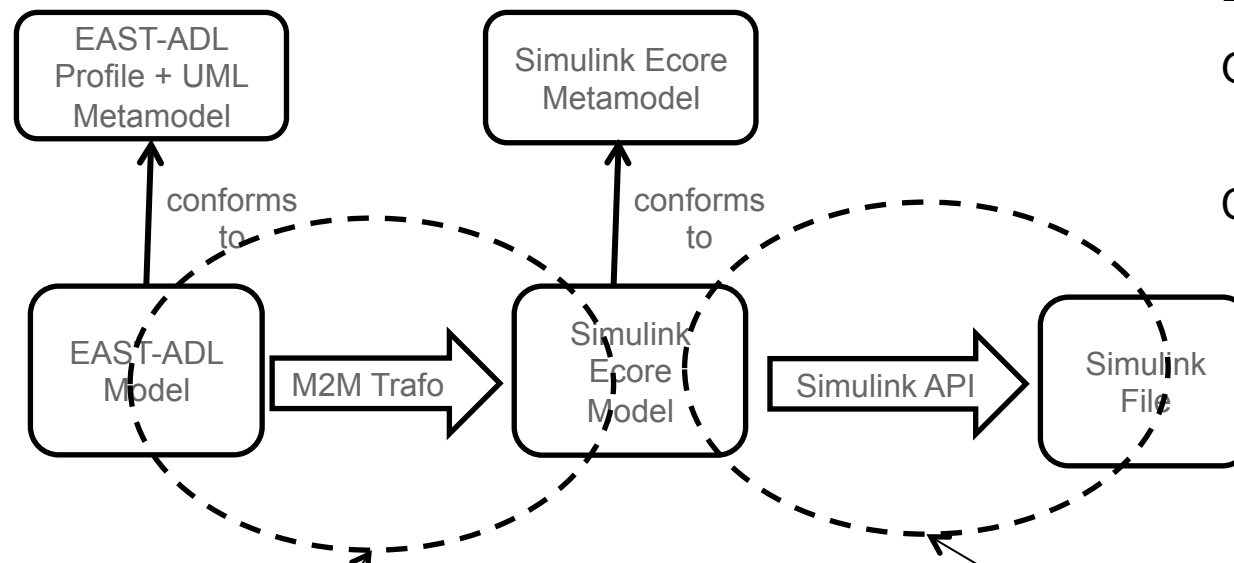
The refinement activity between EAST-ADL and AUTOSAR is:

- Tedious and Repetitive
  - Error prone
  - Time consuming
  - Uneasy as it is necessary to manage AUTOSAR consistency and to make mapping (function / software) choice at the same time
- Automated mapping taking into account allocation constraints and hardware architecture.

Evaluated by Continental (Toulouse)



# WT3.4 Simulink gateway



Leader KTH

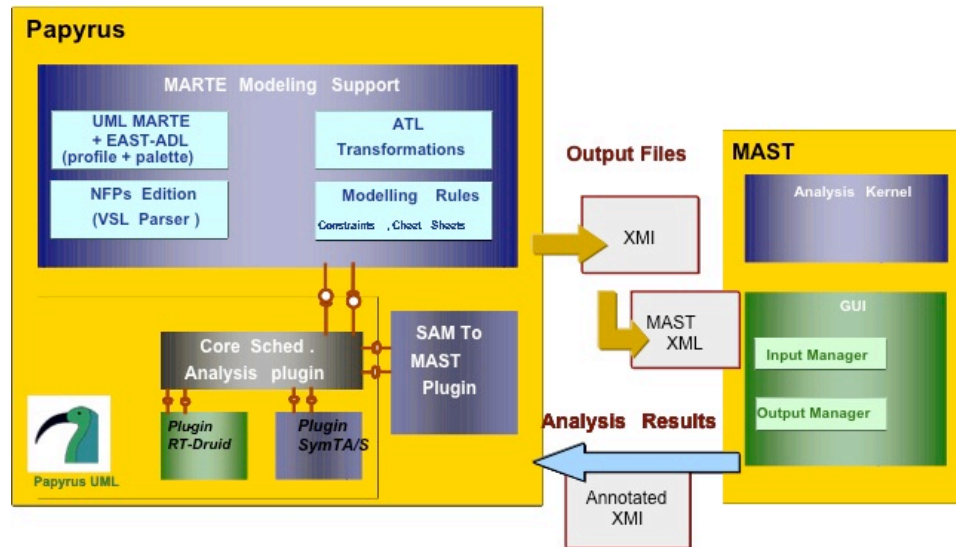
Goal: enable import/export from Simulink models

Current status: structure import/export possible

Step 1: Model to Model Transformation Using ATL

Step 2: Using MATLAB/Simulink API and JAVA to access Simulink models

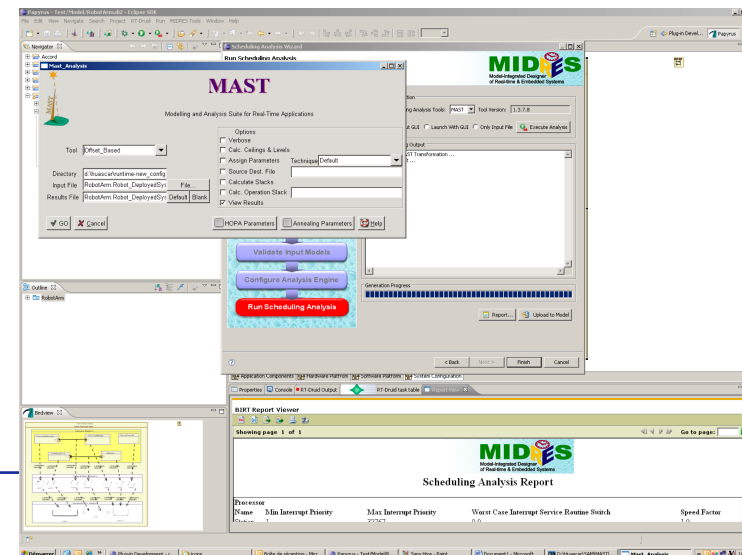
# WT3.5 Timing analysis



Result from collaboration with EDONA (French System@tic cluster) Leader CEA

Goal: perform timing analysis at Design level based on timing assumptions captured through timing constructs annotations

Evaluated by Continental (Toulouse) and used in architecture optimization experiments in ATESST2



## Parallel side tracks

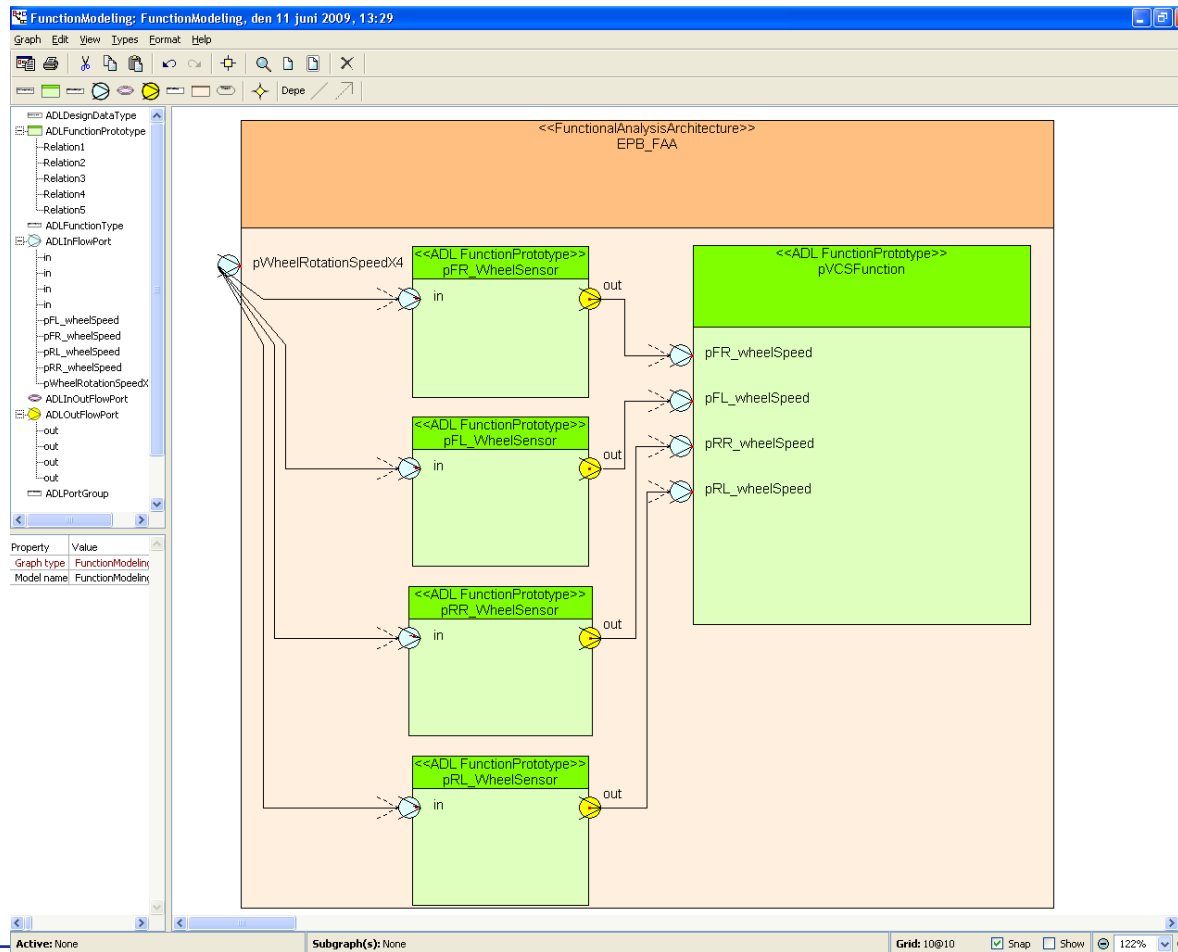
Beside the main UML2 implementation of the EAST-ADL2 language and tool support, there are DSL implementation under-development

- MetaEdit+ by KTH
- VSA by MGH

Benefits are:

- Verification of consistency between profile and metamodel
- Broaden community use

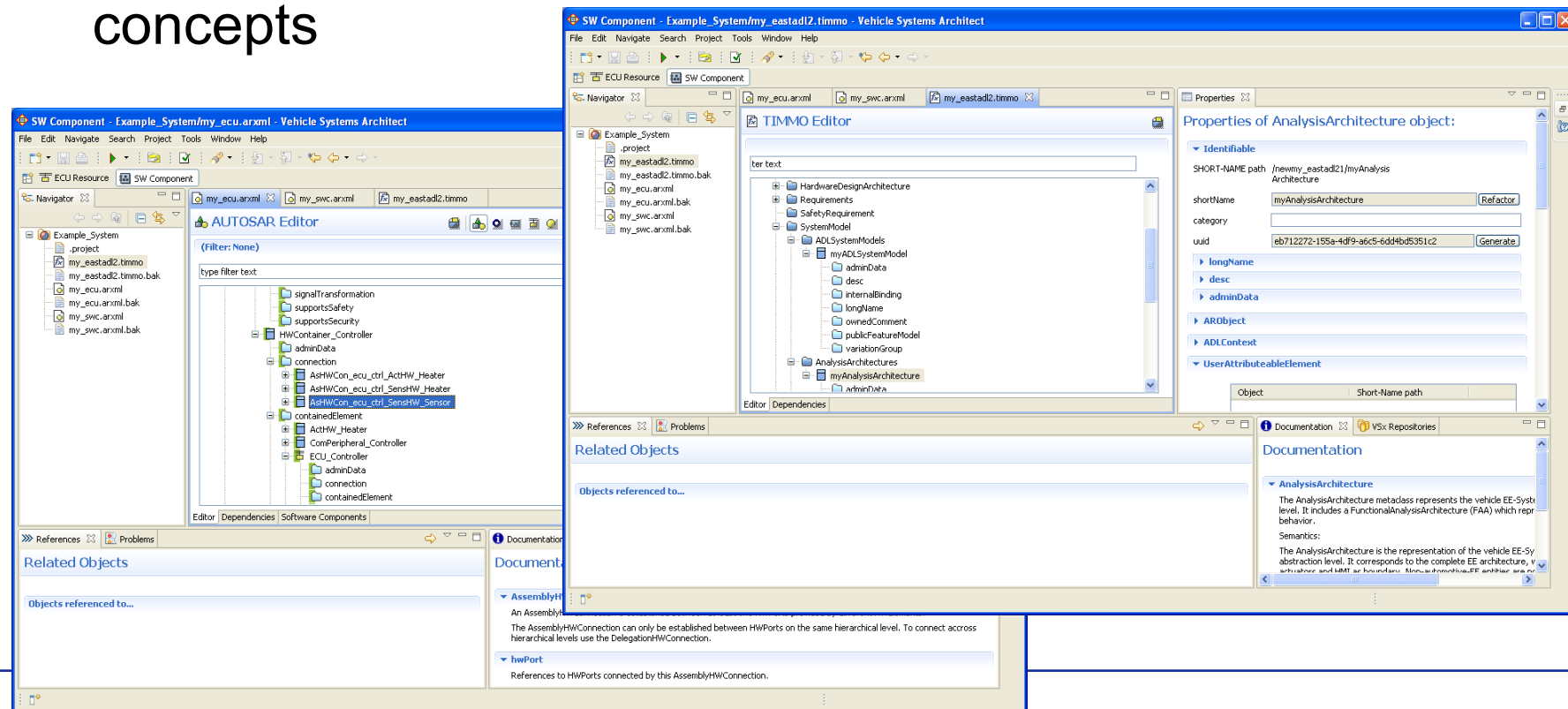
# EAST-ADL modeling in Metaedit+



# Vehicle Systems Architect

AUTOSAR authoring tool

Prototype version extended with EAST-ADL2 and TIMMO concepts



## Conclusion and plans ahead

- Workbench provides sound basis for EAST-ADL modeling and exchange with other tools and languages
- Analysis-driven tool specification with experimental case study
- Methodology and tool-support oriented investigation:
  - Eclipse tool support system cheatsheets, hints, etc.
  - Link from EPF to such tool support
- Planning for an integration as an Eclipse MDT sub-project, along with Papyrus MDT