

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

# EAST-ADL Overview Design Level

ATESST2 Concept presentation 2009 Q2



# EAST-ADL and the Abstraction levels

EAST-ADL models are divided into parts with different abstraction levels

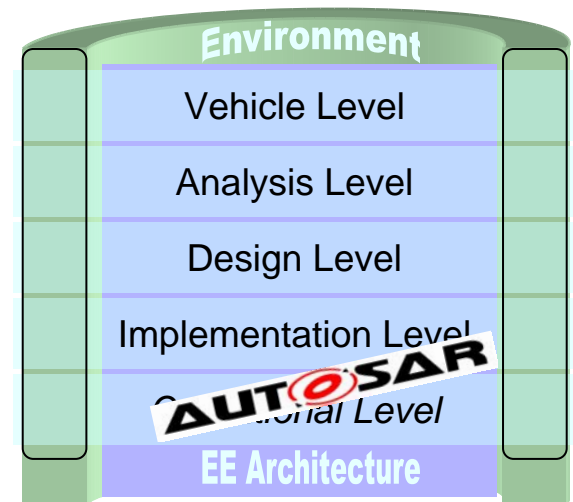
The full EE System is described completely on each abstraction level – “from sensors to actuators”

The Environment is included in the model

The content/concerns and purpose of the abstraction levels differ

Orthogonal aspects:

- Level of Detail
- Level of Integration
- Level of Composition
- Level of Abstraction
- Model of computation
- Views



# Design Level - Overview

Models functional decomposition (implementation-driven)

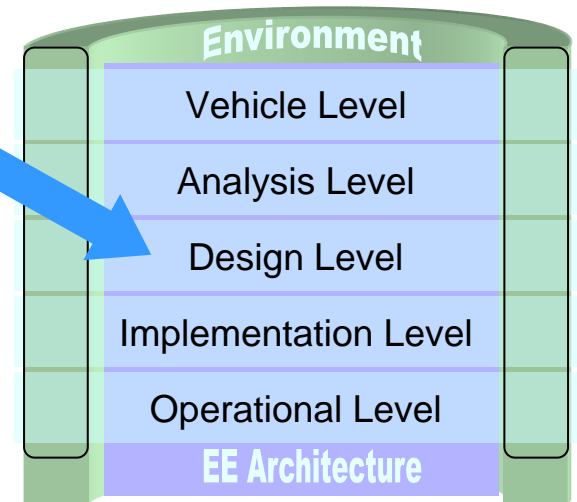
- Functions can be re-allocated w.r.t tasks and ECUs

Signal descriptions using Abstract Data Types

- Parameter - Signal type compliance

Contains implementation level interface aspects (signal data types and timing).

Implementation level sensor and actuator interfacing



# Validation on Design Level

Do the Sensor/Actuator Control Algorithms work

Are all control algorithms appropriately implemented

- All required signals available
- All provided signals really used
- Are all reusable signals reused?

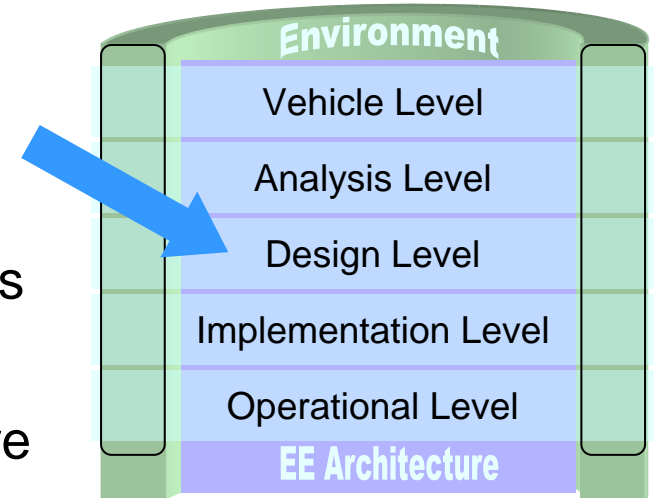
Are the system causal relationships ensured

Are the execution and communication resources  
adequate

Are there remaining critical single-point-of-failure

Sufficient precision and range of variables

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# Execution Semantics of Functions

## Elementary DesignFunction

- Synchronous Behavior:
  - Run-to completion
  - Read All Inputs before execution
  - Compute
  - Write to Outputs
- Time or event triggered

## Composite DesignFunction

- Contains Connectors and prototypes of DesignFunctions
- Precedence constraint to manage execution order
- Governing DesignFunction to manage execution order

# From Sensor to Actuator

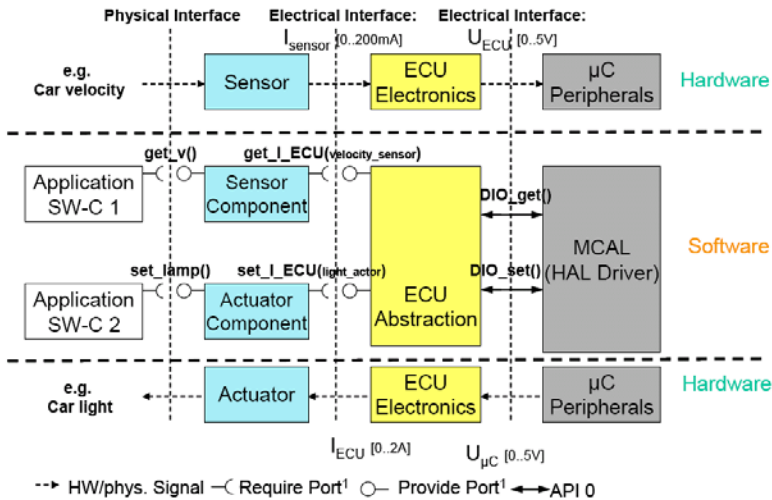
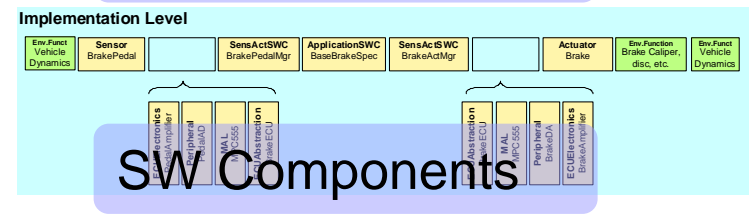
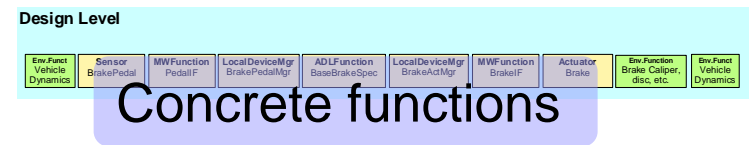
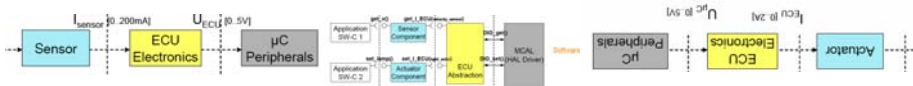
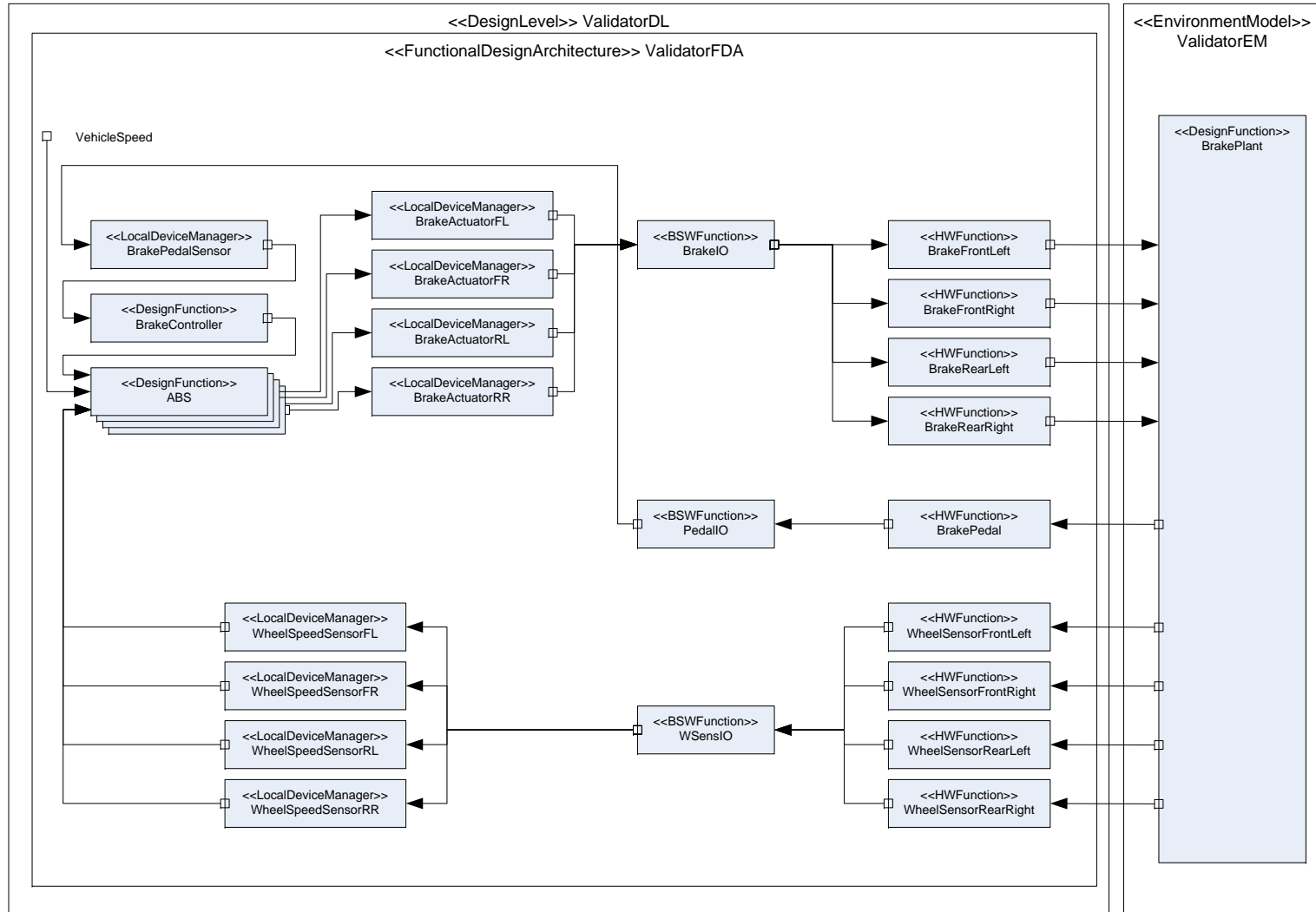


Figure 4: Hardware Interaction



# Example – Functional architecture



# Example – Hardware Architecture

