Functional validation with a practical SysML / Simulink transformation

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B2i automotive engineering

Algorithms - Diagnostics – Validation & Verification – System Engineering
3 core areas of expertise : Embedded Software, Modeling, Methodology

Turnover	**15,3 Million €**
Headcounts	**250**
R&D (%Turnover)	**6 %**
R&D offices	**2**

SysML FRANCE

AUTOSAR Premium Member

AFIS Association Française d'Ingénierie Système

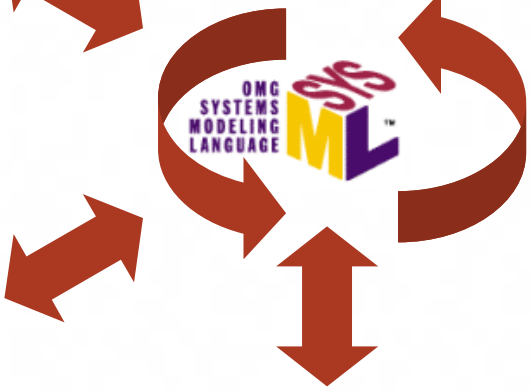
SysML France

MaTeLo

SysML for System Architecture

Requirements

World Wide Collaboration



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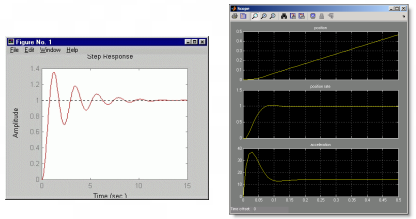
SIMULINK

Domain Specific Modeling

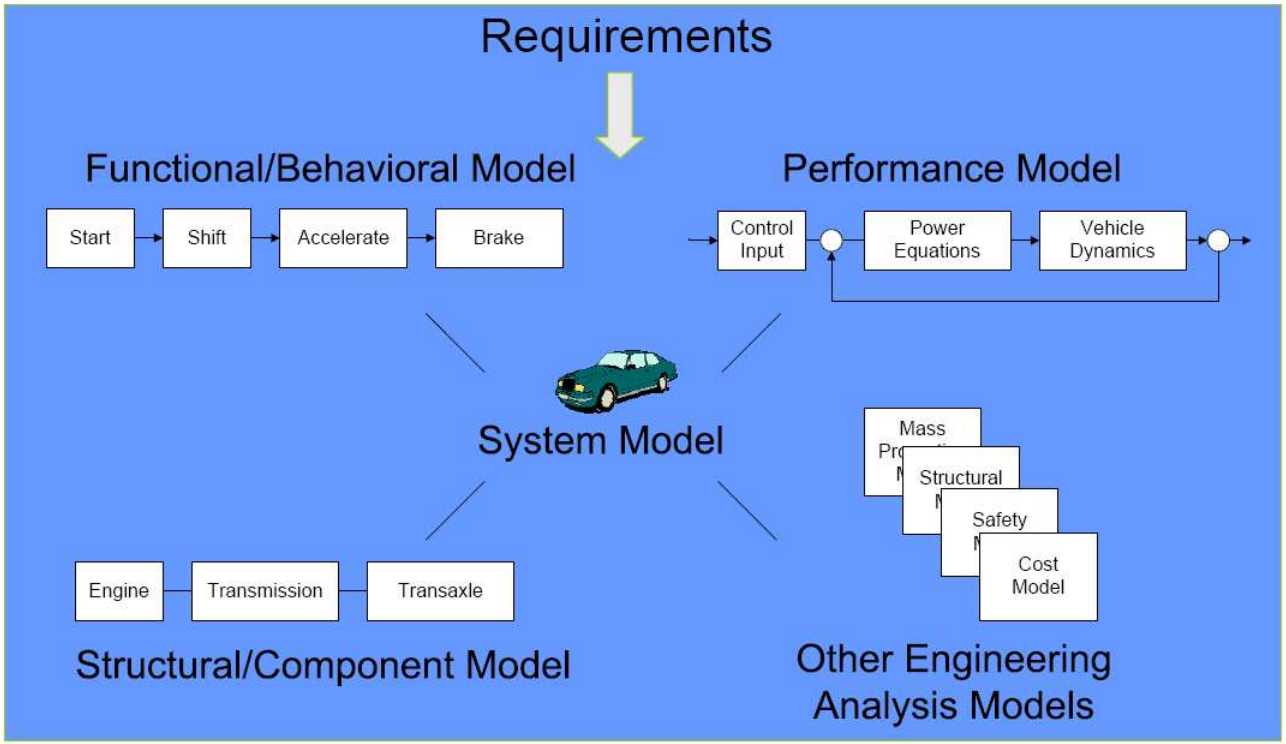


Verification & Validation

Dependability Analysis
& Documentation

SysML

System Modeling



Integrated System Model Must Address Multiple Aspects of a System

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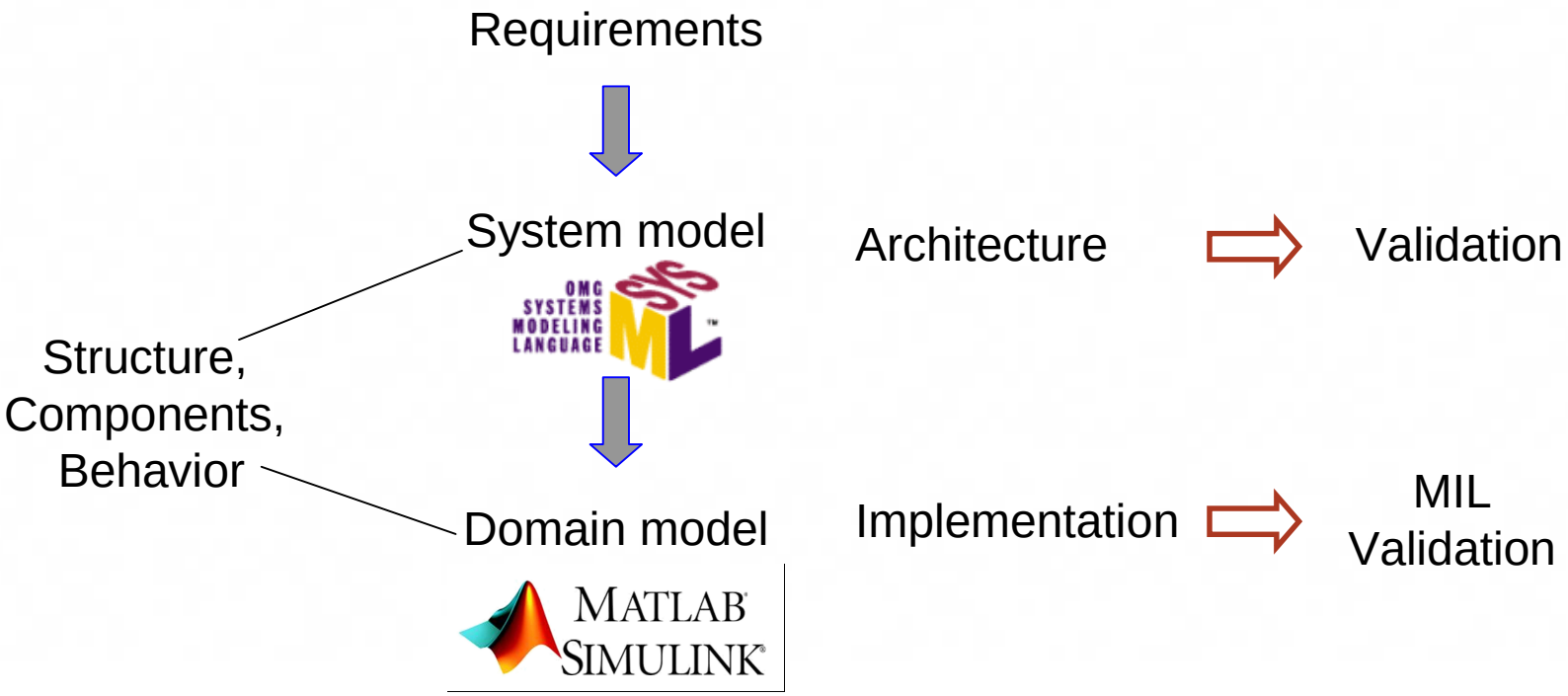
Objective: Interface SysML to Simulink for the Control Domain

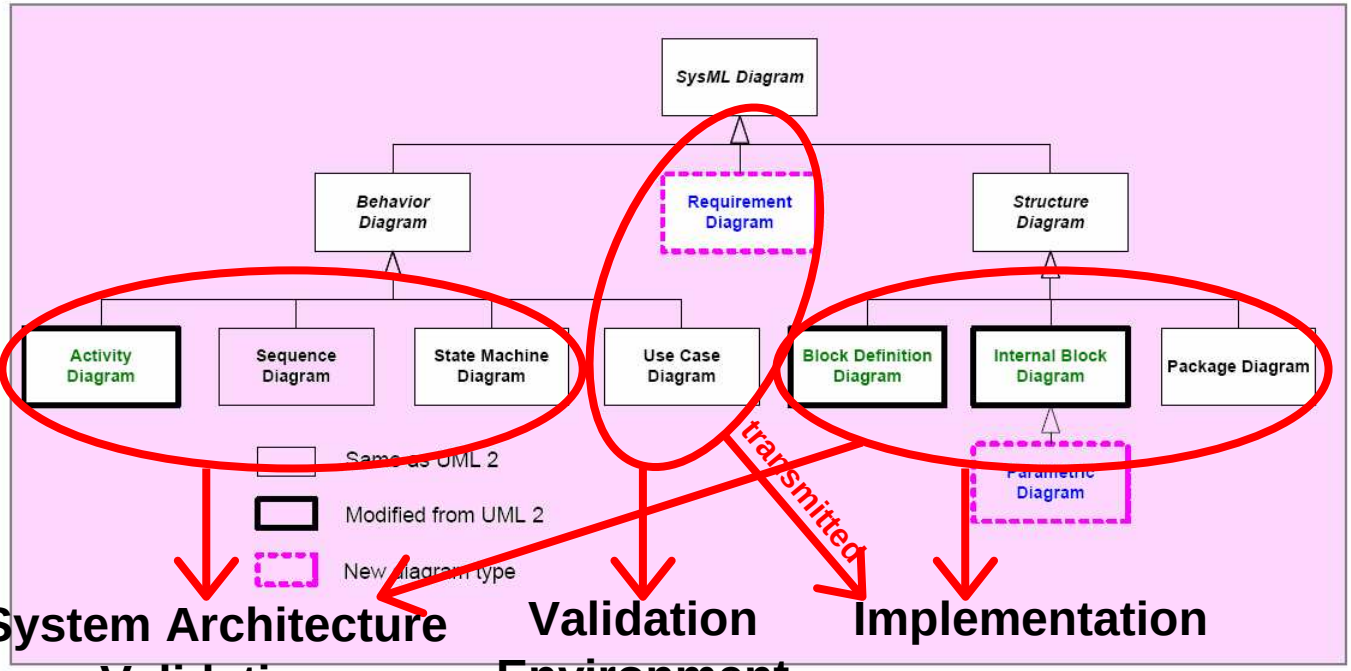


Where is the proper frontier between the architecture and the implementation ?

Can the architecture be validated before doing the implementation?

SysML Diagrams to Translate

SysML Diagram Taxonomy



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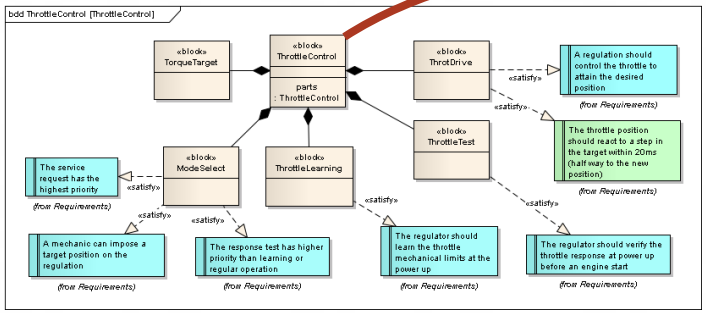
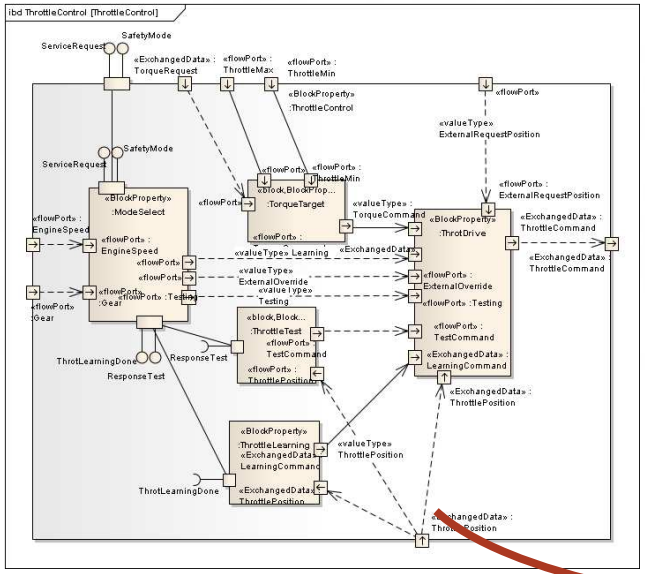
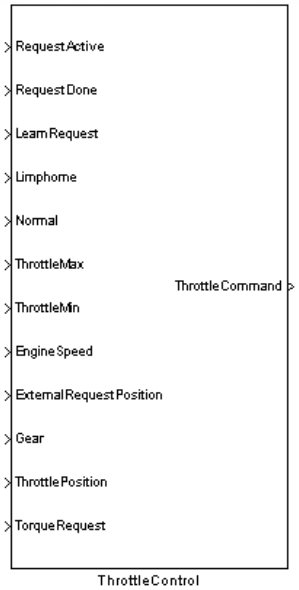
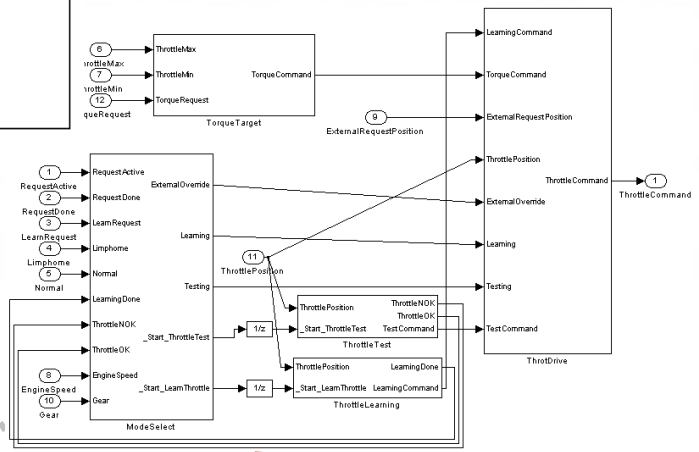
Structure Translation

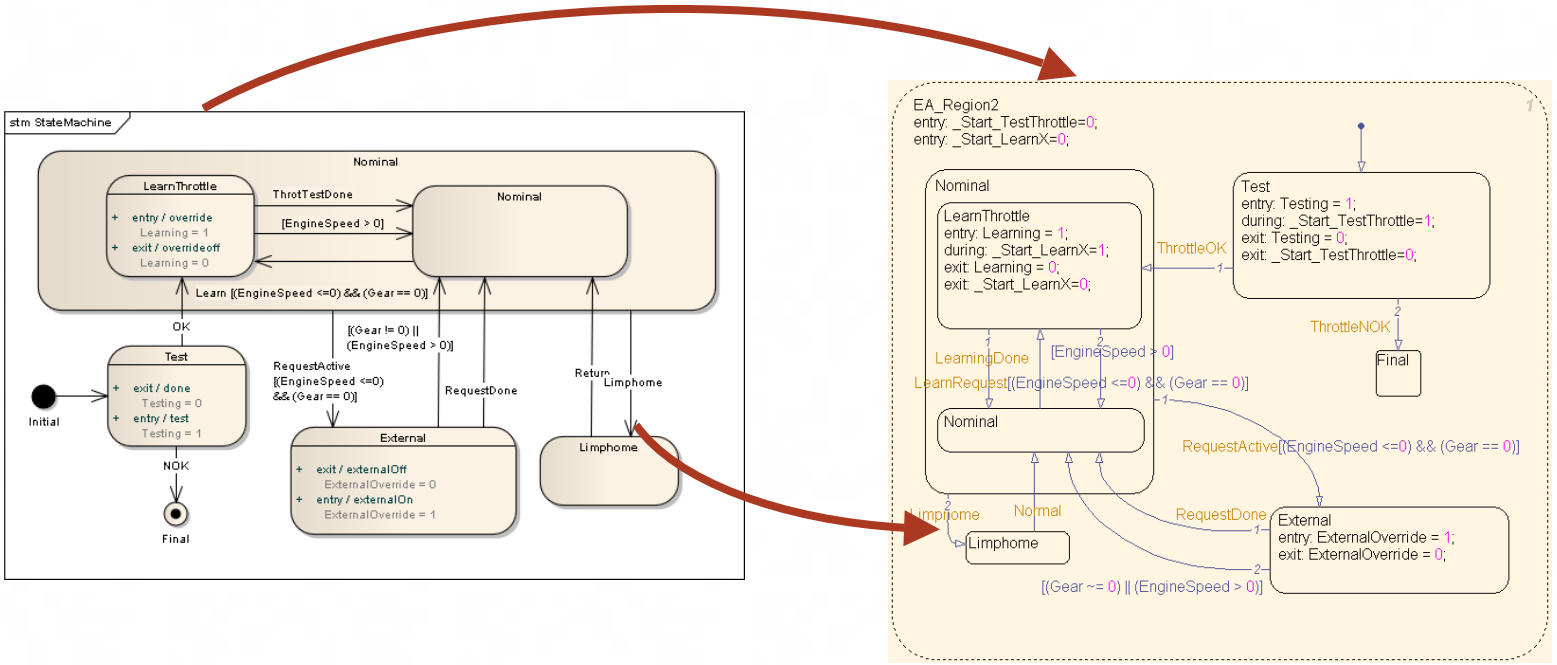






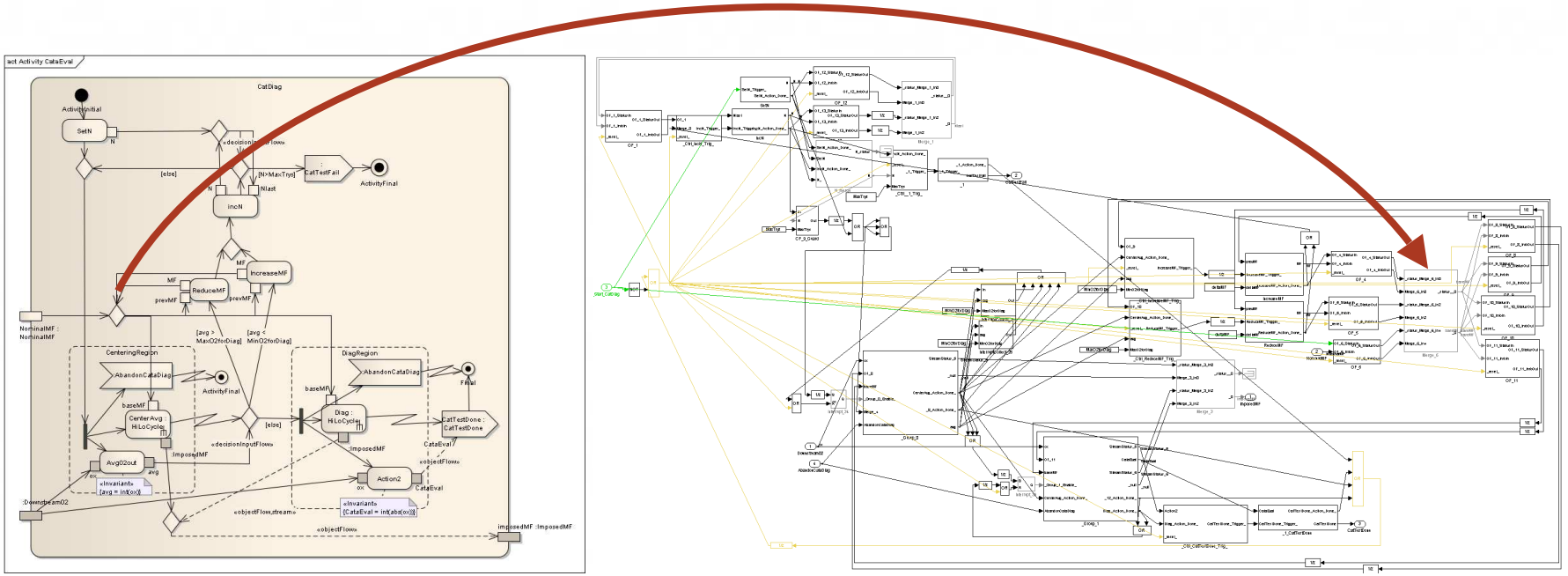


State Machine Behavior Translation



Very similar representations
Simulink has a precise notation for guards

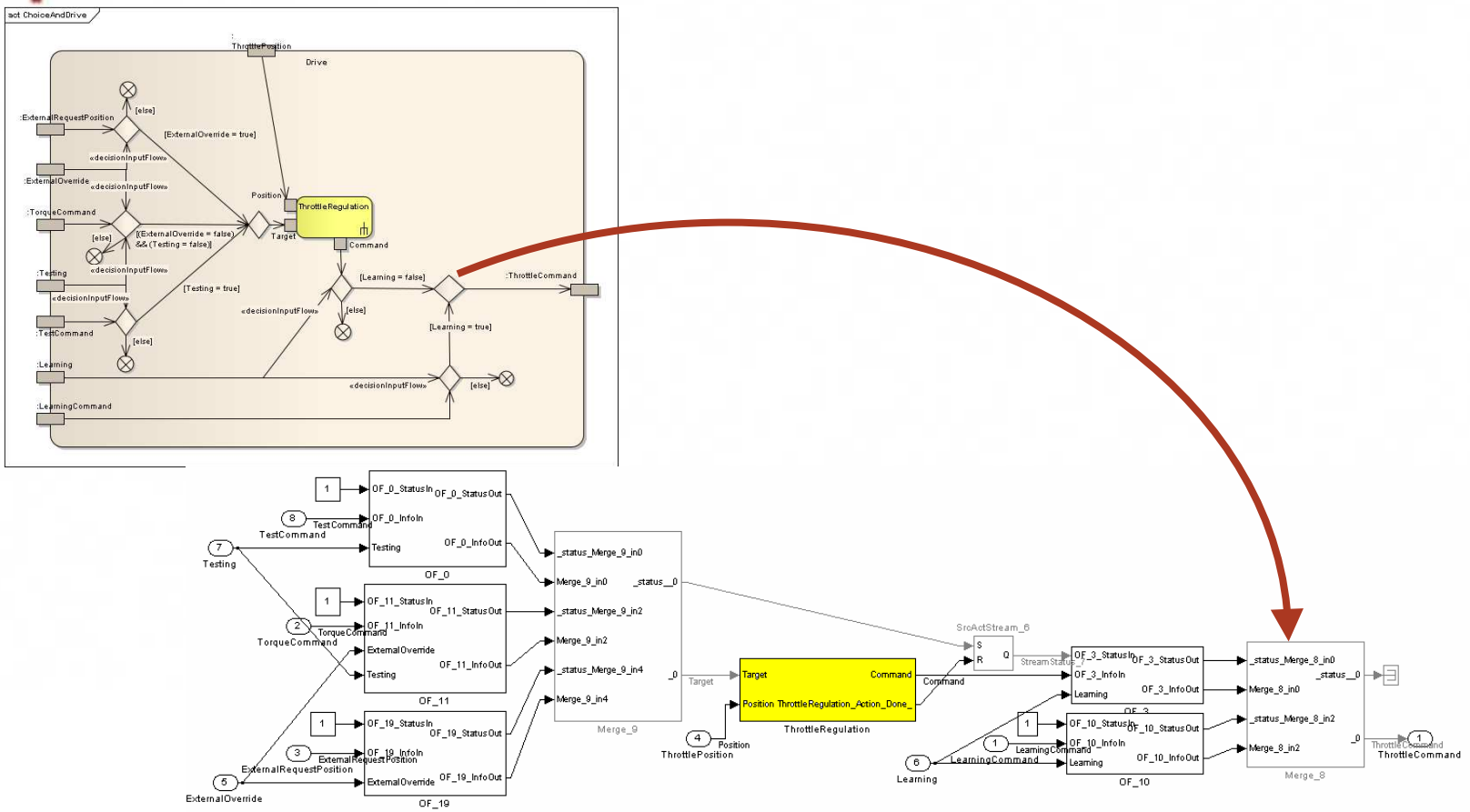
Activity Behavior Translation 1



No 1-to-1 correspondence

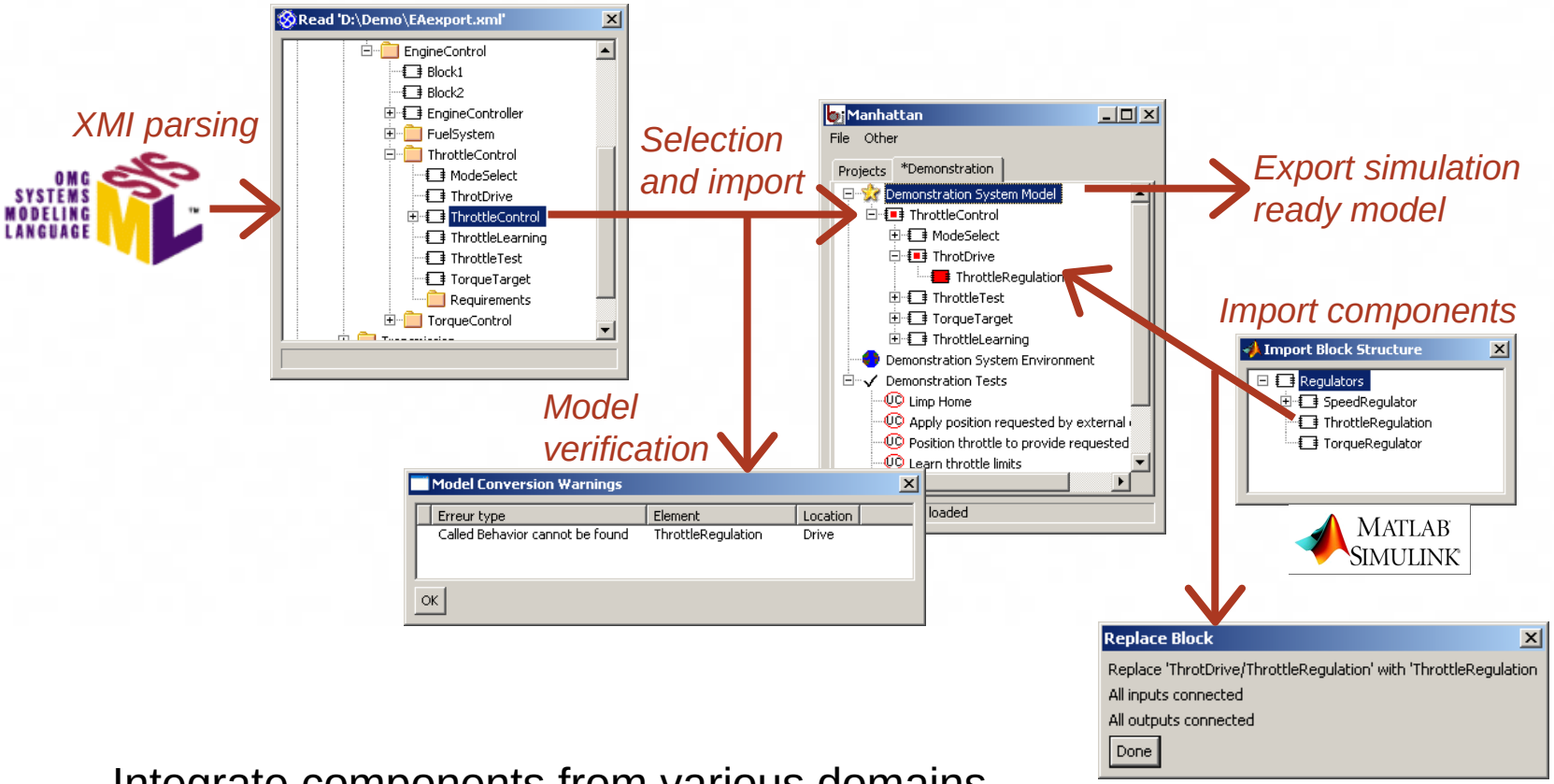
Dynamic behavior including loops, interrupts, events …

Activity Behavior Translation 2



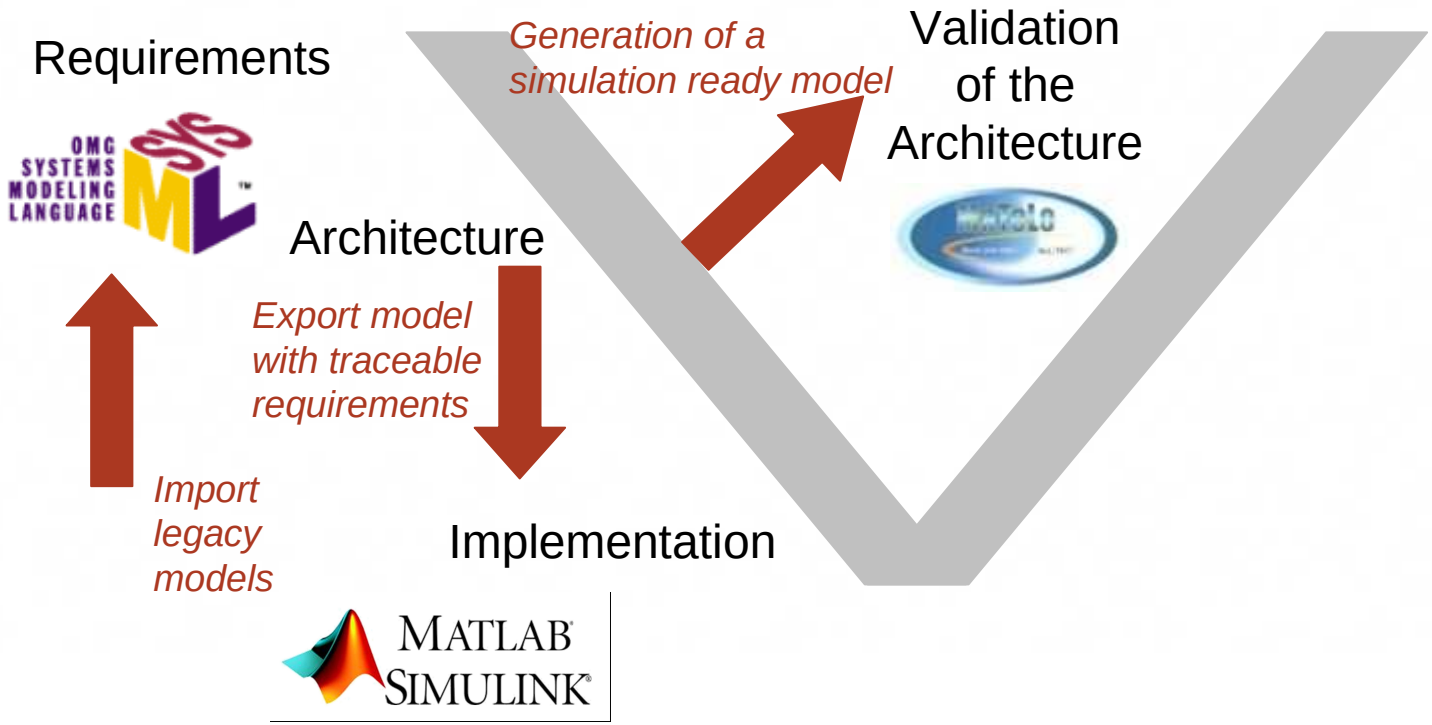
Simple, static, activity

Heterogeneous model construction



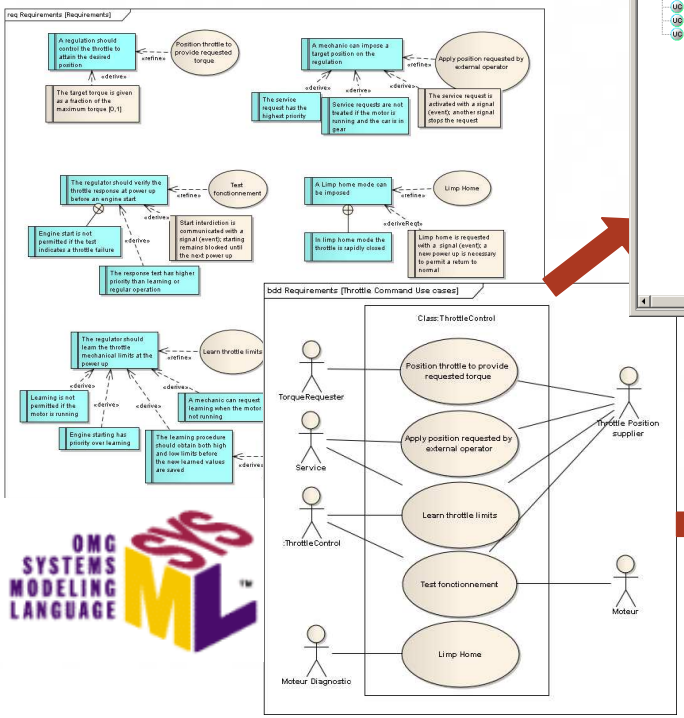
Integrate components from various domains
Into a single system model with a SysML architecture

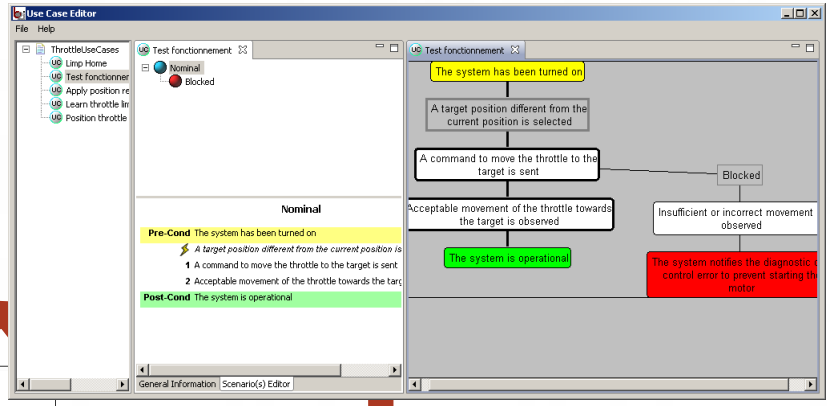
SysML to Simulink Translation in the Development Process

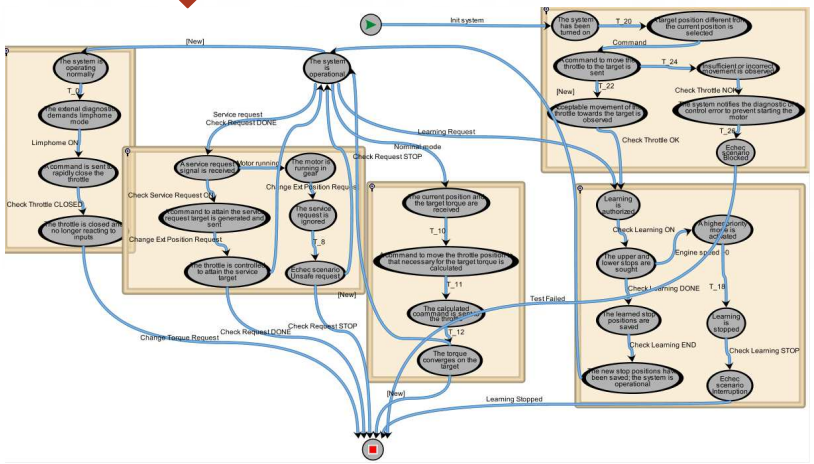


3 interfaces developed for placing SysML in the complete development context

Requirements Based Functional Validation







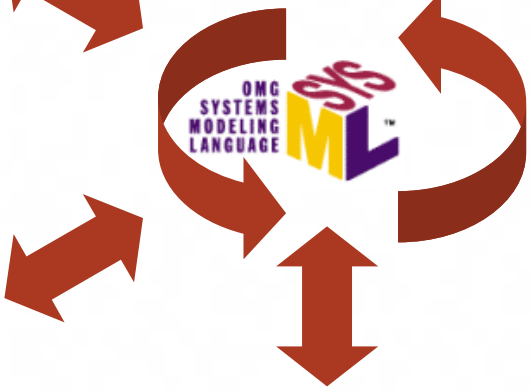
Develop use case scenarios

Use cases and Requirements used to construct validation model

SysML for System Architecture

Requirements

World Wide Collaboration



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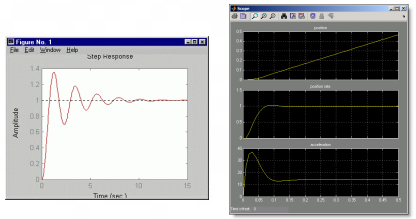

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