MA-Project "System Structure and Parameterization" – Current Status and Plans

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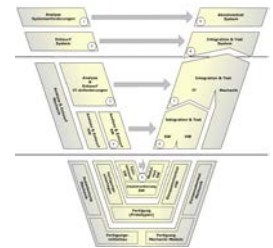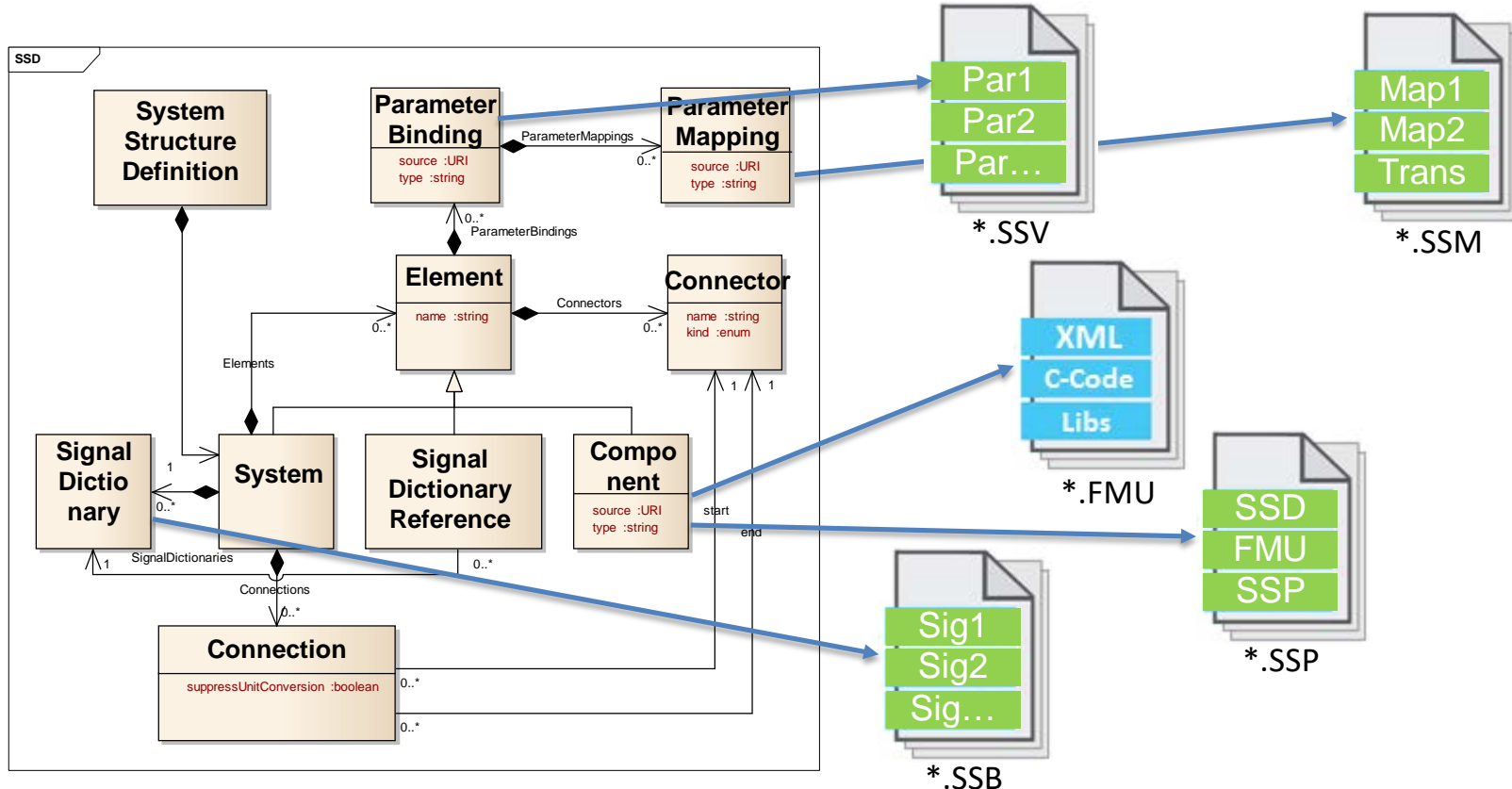
Main Purposes of SSP – Based on FMI standard

- Define a standardized format for the connection structure of a network of components (FMUs in particular).

- Define a standardized way to store and apply parameters to these components.

- The developed standard / APIs should be usable in all stages of development process (architecture definition, integration, simulation, test in MiL, SiL, HiL).

- The work in this project shall be coordinated with other standards and organizations (FMI, ASAM, OMG).

Overview of File Definitions

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List of features

- Hierarchical description of systems of connected components

- Components: FMUs and external SSPs/SSDs, extensible to models, …

- Parameter bindings both at component and system-level,
including transformations and name/unit-mapping

- Signal dictionaries support cross-hierarchical data pools (e.g for busses)

- Packaging of SSDs, FMUs, Parameters, … into one bundle (SSP)

- Light-weight support for variant handling at SSP level
(multiple SSDs sharing components, parameters, resources)

- Optional exchange of graphical information (similar display across tools)

- URI references to all resources: Integration with other systems via URIs

Parameter Handling with Simulation Data Management Systems and Authoring Tools

- Results from workshop with SDM vendors:
  - Direct connection between SDM and authoring tools is not the preferred way
  - Parameter and system structure exchange could be done via file transfer (SSP standard)
  - Further measures will be taken to make a proof of concept

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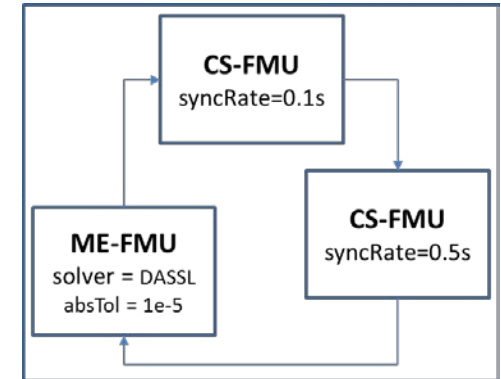
Integration of FMUs for SIL & HIL with SSP: Reuse of the System Structure

- The System Structure defined for SIL can be reused for HIL testing

- It becomes possible to reuse more models, configurations, tests, layouts and parameters

- A Data Management tool controls the lifecycle of the SSP

Data Management

Model Management

SIL Integration

SIL Configuration

SSD
FMU
SSP

*.SSP

HIL Integration

HIL Configuration
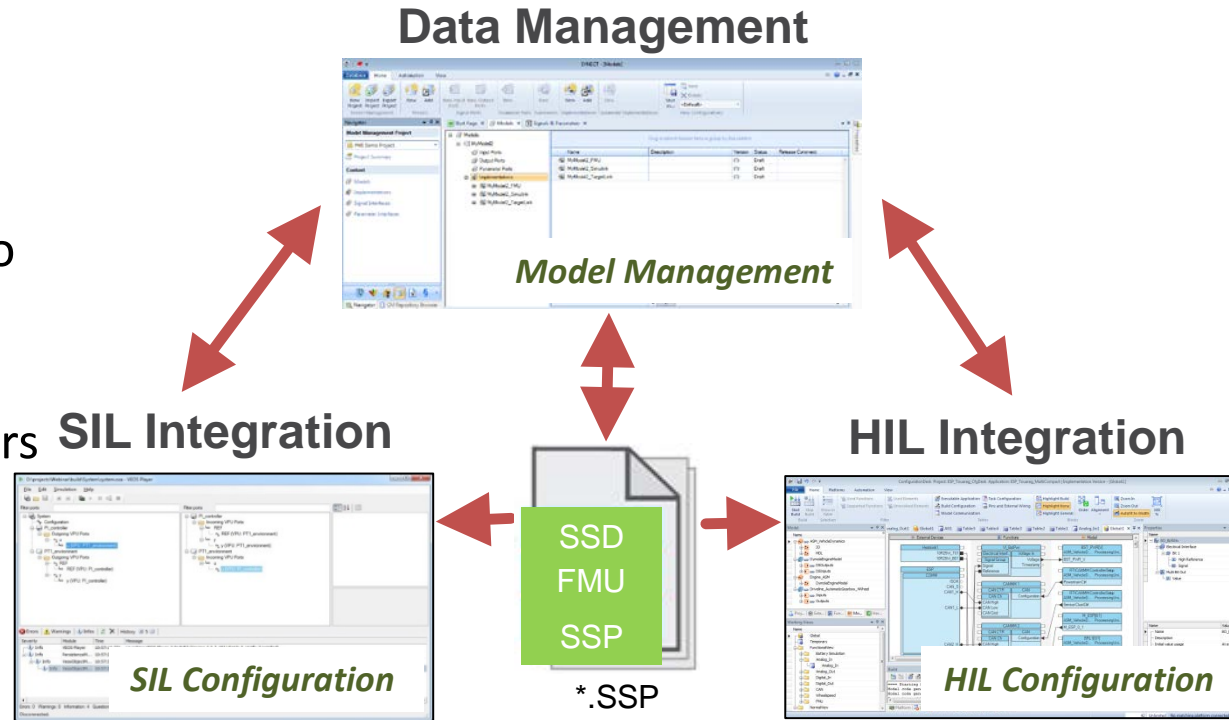
Potential further work

- Components can support more than FMUs/SSPs:
  - New ADAS Sensor Interfaces currently in development (Object Lists)
- Open Issues in SSP
  - Start values for Inputs
    - Subsystems / t=0
  - Initial state of the system
  - Experiment setup
    - Start time, stop time, selected results
    - Selection of solver, -settings, subsystem handling
  - FMU-instance specific settings
    - e.g. Sync rate, (Co-)Simulation mode, Import Settings
- Reliability check
  - Similar to FMI Crosschecks

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Existing prototypes with support of SSP

- Model.CONNECT^{TM} by AVL – Scope
- Integration Tool FMI Bench by PMSF
- Co-Simulation Player" (Cybernet)
- TLK MoBA Lab by TLK
- FMI Composer by Modelon
- FMI Kit – FMI Library for Simulink by Dassault
- SSP support by solidThinking Activate® by Altair

Requested Features from FMI

- Nice support of vectors / arrays for parameters and signals

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Current Roadmap for First Release

Topic	Due Date
Presenting on Modelica Conference	2017-05-15/17
End of Beta test phase	2017-09-30
Initiate website	2017-05-31
Review of existing documents	2017-05-31
Release Beta version	2017-06-01
Review of existing documents	2017-10-14
Release version 1.0	2017-11-30