FMI Support Plans

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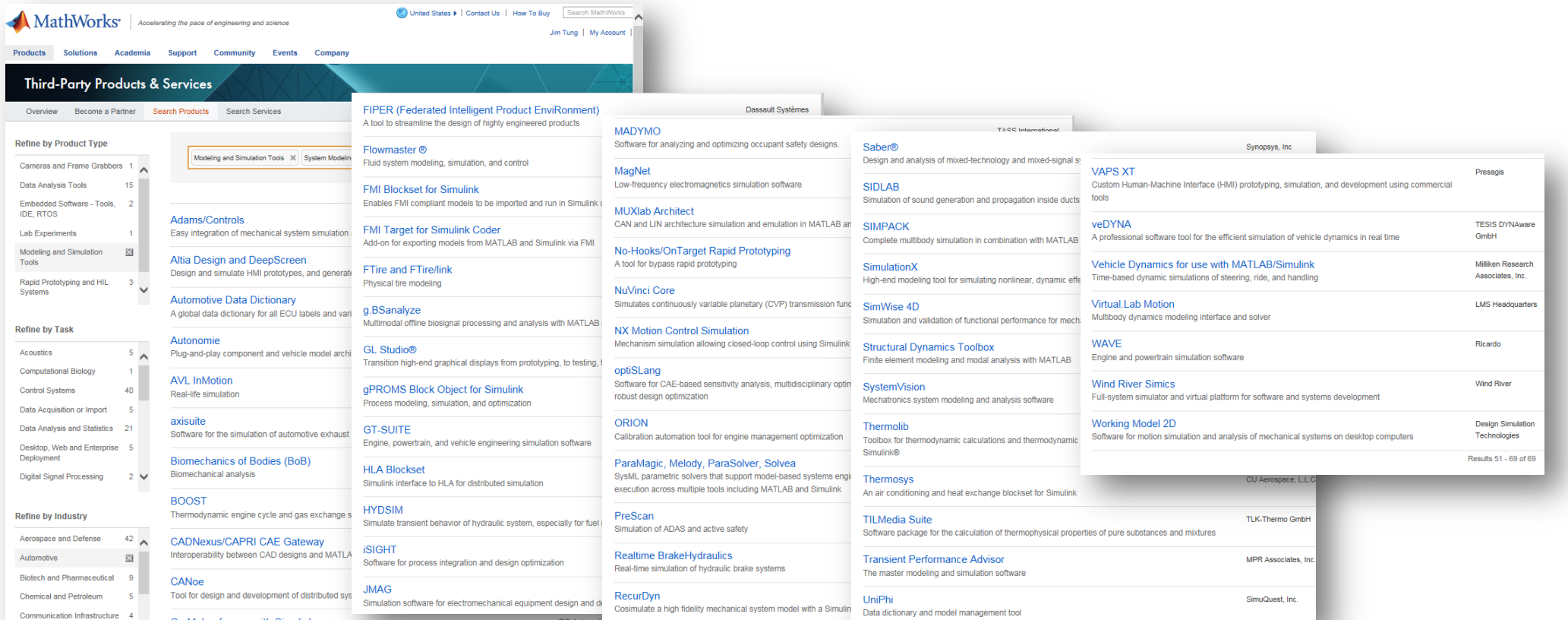
MathWorks

MathWorks View of FMI and S-functions

- S-functions
  - Integral part of Simulink and supported for many years, many releases in the past
  - Maintaining support for the many tools that use it today (~100 modeling tools)
  - Will be enhanced on ongoing basis



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> ➢ For MathWorks it does not mean FMI vs. S-functions
> ➢ It's FMI **and** S-Functions!

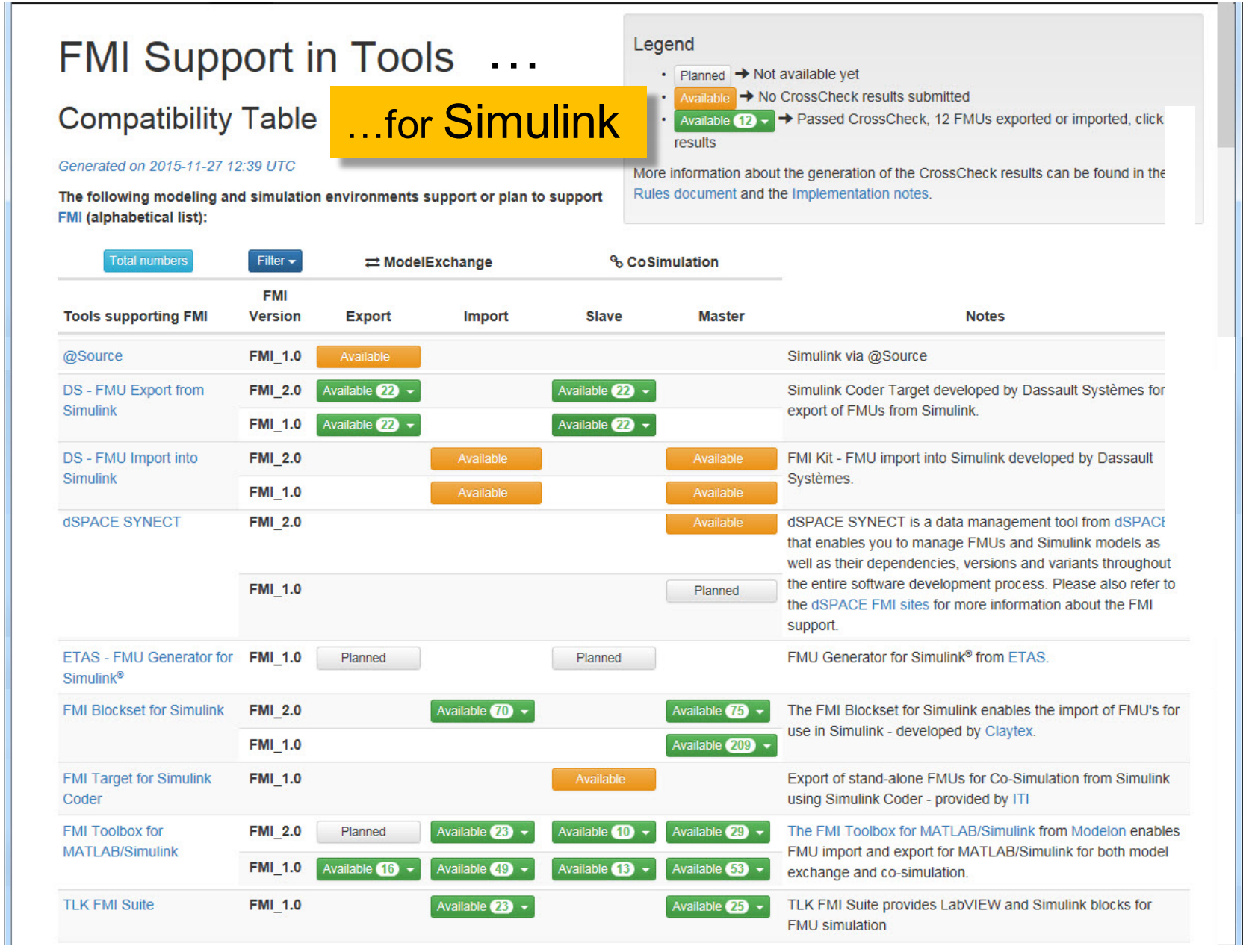
- FMI
  - Emerging specification with version 1.0 being published in 2010, version 2.0 in 2014
  - MathWorks native support for import with Release 2015a
    - Can support other modeling tools that generate FMUs (though there aren't many that are well tested today….)
  - MathWorks plans support based on the evolution of the specification and the level of customer use

Where Can I find MathWorks Native Support?

- With release R2015a and beyond, a Pilot Support Package (PSP) is available for supporting simulation and integration workflows using the Functional Mockup Interface (FMI).
- The PSP allows you to import Functional Mockup Units (FMU) version 1.0 or version 2.0 into a Simulink model and supports the following use cases:
  - Model-Exchange
  - Co-simulation

- Contact: fmi-info@mathworks.com to gain access to this.

www.fmi-standard.org/tools



FMI Support in Tools …

…for Simulink

Compatibility Table

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The following modeling and simulation environments support or plan to support FMI (alphabetical list):

Legend

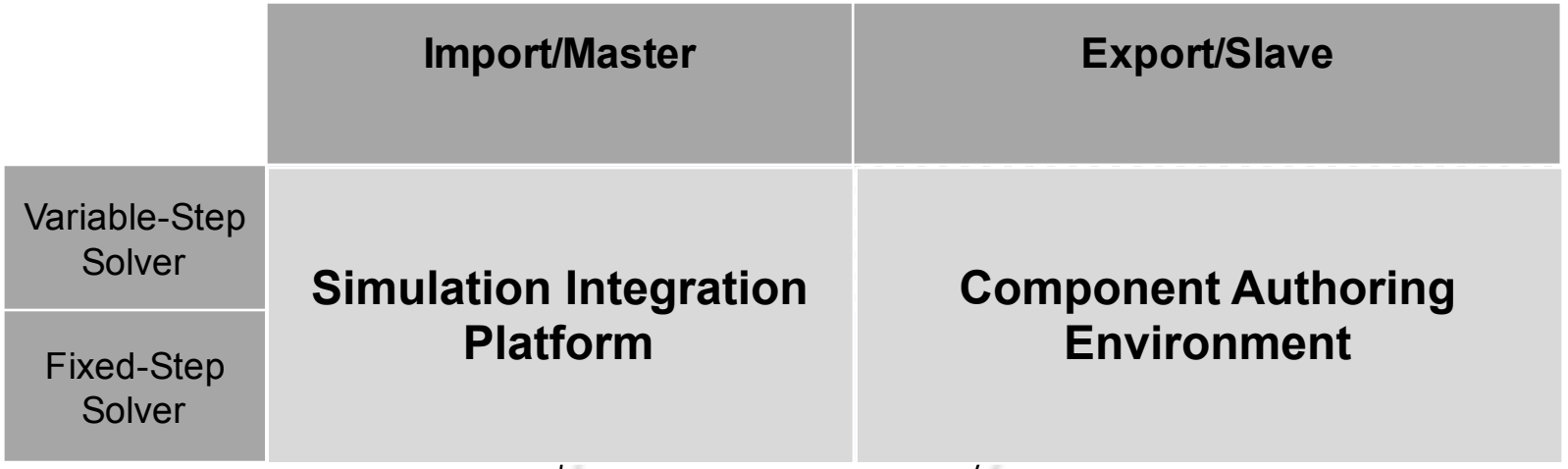
- Planned ➜ Not available yet
- Available ➜ No CrossCheck results submitted
- Available 12 ➜ Passed CrossCheck, 12 FMUs exported or imported, click results

More information about the generation of the CrossCheck results can be found in the Rules document and the Implementation notes.

Total numbers | Filter | ⇄ ModelExchange | CoSimulation

Tools supporting FMI	FMI Version	Export	Import	Slave	Master	Notes
@Source	FMI_1.0	Available				Simulink via @Source
DS - FMU Export from Simulink	FMI_2.0	Available 22		Available 22		Simulink Coder Target developed by Dassault Systèmes for export of FMUs from Simulink.
	FMI_1.0	Available 22		Available 22		
DS - FMU Import into Simulink	FMI_2.0		Available		Available	FMI Kit - FMU import into Simulink developed by Dassault Systèmes.
	FMI_1.0		Available		Available	
dSPACE SYNECT	FMI_2.0				Available	dSPACE SYNECT is a data management tool from dSPACE that enables you to manage FMUs and Simulink models as well as their dependencies, versions and variants throughout the entire software development process. Please also refer to the dSPACE FMI sites for more information about the FMI support.
	FMI_1.0				Planned	
ETAS - FMU Generator for Simulink®	FMI_1.0	Planned		Planned		FMU Generator for Simulink® from ETAS.
FMI Blockset for Simulink	FMI_2.0		Available 70		Available 75	The FMI Blockset for Simulink enables the import of FMU's for use in Simulink - developed by Claytex.
	FMI_1.0				Available 209	
FMI Target for Simulink Coder	FMI_1.0			Available		Export of stand-alone FMUs for Co-Simulation from Simulink using Simulink Coder - provided by ITI
FMI Toolbox for MATLAB/Simulink	FMI_2.0	Planned	Available 23	Available 10	Available 29	The FMI Toolbox for MATLAB/Simulink from Modelon enables FMU import and export for MATLAB/Simulink for both model exchange and co-simulation.
	FMI_1.0	Available 16	Available 49	Available 13	Available 53	
TLK FMI Suite	FMI_1.0		Available 23		Available 25	TLK FMI Suite provides LabVIEW and Simulink blocks for FMU simulation

MathWorks Plans for FMI

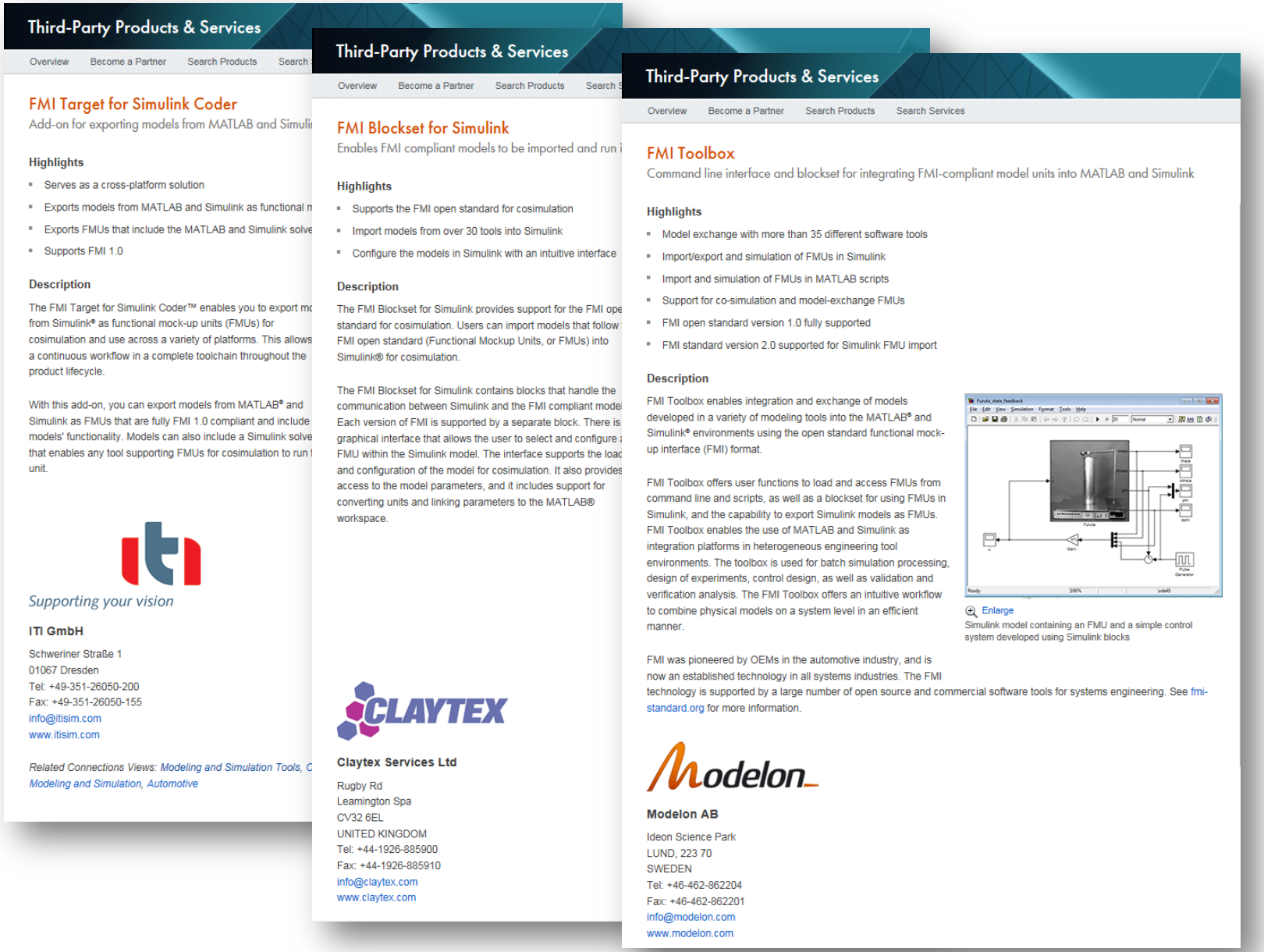


Phase 1: Import
- 2015: FMI 1.0 & 2.0
- Supports **R2015a** and later
- Downloadable Support Packages

Phase 2: Export – fixed step solver
- 2016: Prototype for gathering feedback from selected customers
- Plan to support **R2015a** and later
- Licensing & business model under development

MathWorks Plans for FMI

- We have Connection Partners that support earlier releases



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FMI Target for Simulink Coder

Add-on for exporting models from MATLAB and Simuli

Highlights

- Serves as a cross-platform solution
- Exports models from MATLAB and Simulink as functional m
- Exports FMUs that include the MATLAB and Simulink solve
- Supports FMI 1.0

Description

The FMI Target for Simulink Coder™ enables you to export mo from Simulink® as functional mock-up units (FMUs) for cosimulation and use across a variety of platforms. This allows a continuous workflow in a complete toolchain throughout the product lifecycle.

With this add-on, you can export models from MATLAB® and Simulink as FMUs that are fully FMI 1.0 compliant and include models' functionality. Models can also include a Simulink solve that enables any tool supporting FMUs for cosimulation to run unit.

Supporting your vision

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Related Connections Views: Modeling and Simulation Tools, C Modeling and Simulation, Automotive

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FMI Blockset for Simulink

Enables FMI compliant models to be imported and run i

Highlights

- Supports the FMI open standard for cosimulation
- Import models from over 30 tools into Simulink
- Configure the models in Simulink with an intuitive interface

Description

The FMI Blockset for Simulink provides support for the FMI ope standard for cosimulation. Users can import models that follow FMI open standard (Functional Mockup Units, or FMUs) into Simulink® for cosimulation.

The FMI Blockset for Simulink contains blocks that handle the communication between Simulink and the FMI compliant model Each version of FMI is supported by a separate block. There is graphical interface that allows the user to select and configure FMU within the Simulink model. The interface supports the load and configuration of the model for cosimulation. It also provides access to the model parameters, and it includes support for converting units and linking parameters to the MATLAB® workspace.

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FMI Toolbox

Command line interface and blockset for integrating FMI-compliant model units into MATLAB and Simulink

Highlights

- Model exchange with more than 35 different software tools
- Import/export and simulation of FMUs in Simulink
- Import and simulation of FMUs in MATLAB scripts
- Support for co-simulation and model-exchange FMUs
- FMI open standard version 1.0 fully supported
- FMI standard version 2.0 supported for Simulink FMU import

Description

FMI Toolbox enables integration and exchange of models developed in a variety of modeling tools into the MATLAB® and Simulink® environments using the open standard functional mock-up interface (FMI) format.

FMI Toolbox offers user functions to load and access FMUs from command line and scripts, as well as a blockset for using FMUs in Simulink, and the capability to export Simulink models as FMUs. FMI Toolbox enables the use of MATLAB and Simulink as integration platforms in heterogeneous engineering tool environments. The toolbox is used for batch simulation processing, design of experiments, control design, as well as validation and verification analysis. The FMI Toolbox offers an intuitive workflow to combine physical models on a system level in an efficient manner.

Enlarge

Simulink model containing an FMU and a simple control system developed using Simulink blocks

FMI was pioneered by OEMs in the automotive industry, and is now an established technology in all systems industries. The FMI technology is supported by a large number of open source and commercial software tools for systems engineering. See fmi-standard.org for more information.

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