

dSPACE Release

New Features and Migration

Release 2015-A – May 2015

How to Contact dSPACE

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|---------|--|
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To contact dSPACE if you have problems and questions, fill out the support request form provided on the website at <http://www.dSPACE.com/go/supportrequest>.

The request form helps the support team handle your difficulties quickly and efficiently.

In urgent cases contact dSPACE via phone: +49 5251 1638-941 (General Technical Support)

Software Updates and Patches

dSPACE strongly recommends that you download and install the most recent patches for your current dSPACE installation. Visit <http://www.dSPACE.com/go/support> for software updates and patches.

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About This Document

Contents

This document informs you about the new features of all the dSPACE software products in Release 2015-A. It also gives you an overview of software products with no or minor changes. There are instructions on migrating from earlier dSPACE releases, especially from earlier product versions, if required.

Where to go from here




Information in this section

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Document Symbols and Conventions

Symbols

The following symbols may be used in this document.

| | |
|---|--|
|  | Indicates a general hazard that may cause personal injury of any kind if you do not avoid it by following the instructions given. |
|  | Indicates the danger of electric shock which may cause death or serious injury if you do not avoid it by following the instructions given. |
|  | Indicates a hazard that may cause material damage if you do not avoid it by following the instructions given. |



Indicates important information that should be kept in mind, for example, to avoid malfunctions.



Indicates tips containing useful information to make your work easier.

Naming conventions

The following abbreviations and formats are used in this document:

%name% Names enclosed in percent signs refer to environment variables for file and path names.

< > Angle brackets contain wildcard characters or placeholders for variable file and path names, etc.



Precedes the document title in a link that refers to another document.



Indicates that a link refers to another document, which is available in dSPACE HelpDesk.

Special folders

Some software products, for example, ControlDesk Next Generation and AutomationDesk, use the following special folders:

Common Program Data folder A standard folder for application-specific configuration data that is used by all users.

```
%PROGRAMDATA%\dSPACE\
```

Documents folder A standard folder for user-specific documents.

```
%USERPROFILE%\My Documents\dSPACE\<VersionNumber>
```

Local Program Data folder A standard folder for application-specific configuration data that is used by the current, non-roaming user.

```
%USERPROFILE%\AppData\Local\dSPACE\<ProductName>
```

Accessing Online Help and PDF Files

Objective


After you install your dSPACE software, the documentation for the installed products is available as online help and Adobe® PDF files.

Online help

You can access the online help, dSPACE HelpDesk, as follows:

Windows Start menu Select Start – (All) Programs – <ProductName> – dSPACE HelpDesk (<ProductName>) to open dSPACE HelpDesk with the start page of the selected product displayed. You can also navigate and search in the user documentation of any other installed software product and its supported hardware.

Context-sensitive Press the **F1** key or click the Help button in the dSPACE software to get help on the currently active context.

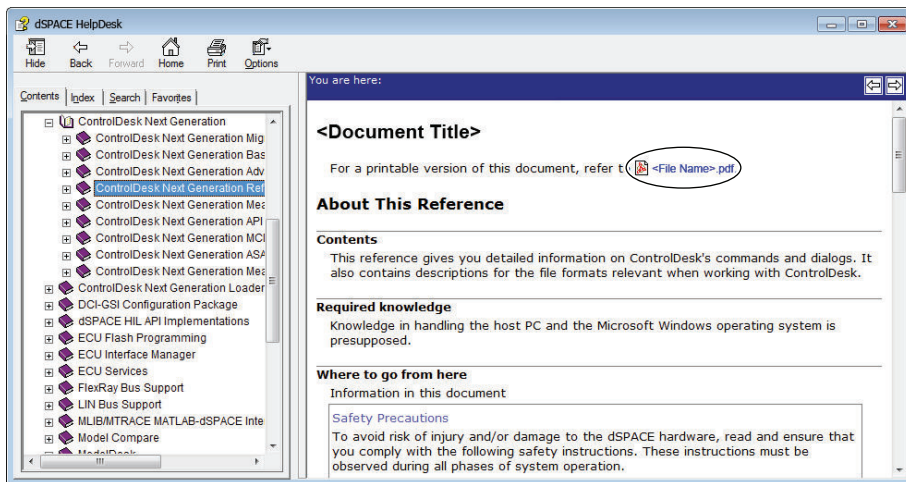
 In some software products, context-sensitive help is not available.

Help menu in the dSPACE software On the menu bar, select Help – Contents or Help – Search (not available in all software products) to open dSPACE HelpDesk. It opens at the start page of the currently active product. You can also navigate and search in the user documentation of any other installed software product and its supported hardware.

PDF files

You can access the PDF files as follows:

dSPACE HelpDesk Click the PDF link at the beginning of a document:



Overview of dSPACE Release 2015-A

Objective Gives you an overview of the new key features in Release 2015-A and information about unchanged products.

Where to go from here Information in this section

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General Enhancements and Changes

Objective The following new features and changes concern several dSPACE products.

Support of new dSPACE hardware With dSPACE Release 2015-A, new dSPACE hardware is introduced:

- **MicroAutoBox II with DS1514 I/O Board**

The DS1514 I/O Board for MicroAutoBox II is similar to the DS1512 I/O Board but comes with a Xilinx® Kintex® FPGA module. For further information, refer to *New Features of RTI/RTI-MP and RTLib* on page 125.

- The DS1007 PPC Processor Board is now available with DS911 Gigalink Modules. These external Gigalinks allow you to connect your DS1007-based modular system with other modular systems based on a DS1005, DS1006 or another DS1007, or with a SCALEXIO system.

Environment variables removed

As of *dSPACE RCP and HIL 2014-A*, the global environment variables that reference the installation path of this release are no longer set during installation. The dSPACE products now work independently of these environment settings.

Any custom code reading the variables `%DSPACE_ROOT%` or `%DSPACE_CONFIG%` must be migrated.

To facilitate the use of some command line tools, such as the `Down` tool for building hand-coded real-time applications, the Windows Start menu now contains a shortcut to a command prompt named *Command Prompt for dSPACE RCP and HIL <Version>*. Environment settings and search paths are then automatically set.

Distribution of 32-bit and 64-bit software

The dSPACE software is distributed on two DVD sets, each with the same content but with the following differences:

- One set with two 32-bit DVDs containing only 32-bit dSPACE software products (e.g., to support 32-bit MATLAB versions).
- One set with two 64-bit DVDs containing:
 - All MATLAB-related dSPACE products which support 64-bit MATLAB versions.
 - All 32-bit dSPACE products which also support 64-bit MATLAB versions.
 - All 32-bit dSPACE products that do not relate to MATLAB (e.g., ControlDesk Next Generation).



You can therefore install dSPACE software from the 64-bit DVD set without changing to the 32-bit DVD set during the installation procedure.

For a list of all dSPACE products contained on the 64-bit dSPACE DVD set and their MATLAB support, refer to *Products on the 64-Bit dSPACE DVD Set* on page 170.

Contents of DVD sets

As of dSPACE Release 2015-A, the dSPACE software is provided on two disks for each DVD set (32-bit and 64-bit). The disks contain the following dSPACE software packages and main products:

- Disk 1:
 - AutomationDesk 5.0
 - ControlDesk Next Generation (ControlDesk 5.4)
 - TargetLink 4.0
 - Model Compare 2.5



Product use prohibited in United States

You are not licensed to use Model Compare in the United States. You are not allowed to use or permit others to use this product in the United States or in any way that violates the laws of the United States.

- SystemDesk 4.4 (supports AUTOSAR 4.x)
- VEOS 3.4
- Various other dSPACE software tools

■ Disk 2:

- RCP and HIL software

"RCP and HIL software" is a generic term for a software package containing several dSPACE software products, such as RTI, ConfigurationDesk, MotionDesk, and ModelDesk.



Disk 2 does not contain any other dSPACE software products.

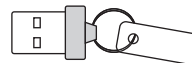
New hardware dongles for dongle licenses

As of dSPACE Release 2014-B, the hardware dongle for dongle licenses is now a CodeMeter instead of a WibuKey. Both are products of WIBU-SYSTEMS and are shown below.

WibuKey dongle



CodeMeter dongle



With dSPACE Release 2014-B, the new CodeMeter hardware dongles are shipped with new dSPACE systems for the first time.

Keep the following compatibility information in mind:

- In general, you can use dSPACE Release 2015-A with an already delivered WibuKey dongle. As of dSPACE Release 2014-B, the

drivers for both dongle versions are installed on your host PC. The driver software automatically detects which dongle is used. No further user action is necessary.

- If you want to use dSPACE Release 2014-A and earlier with the new CodeMeter dongle, you have to install dSPACE Installation Manager 3.8 (or higher) on your host PC. This version contains the driver for the new dongle. You can download the latest version of dSPACE Installation Manager from <http://www.dspace.com/go/imupdate>.
- dSPACE Release 6.3 and earlier versions have not been tested for the new CodeMeter dongle. If necessary, contact dSPACE Support.

Restrictions when working with dSPACE HelpDesk

dSPACE HelpDesk is installed in release-specific folders in C:\Program Files\Common Files\dSPACE on a 32-bit operating system and in C:\Program Files (x86)\Common Files\dSPACE on a 64-bit operating system. For example, if you have installed products from dSPACE Release 2014-B and products from dSPACE Release 2015-A, two dSPACE HelpDesks are available.

Note the following restrictions:

Links to documents might not work and might return the following error message: *Selection is not associated with any topics*. The possible reasons are:

- The documents for the product are not installed because the product is not included in your license key.
- The documents for the product are installed in another dSPACE HelpDesk. For example, if a product in the current dSPACE Release is unchanged, its user documentation is installed in the dSPACE HelpDesk version that the product setup was created for.

After you install dSPACE Release 2015-A, you can find the user documentation in dSPACE HelpDesk 2014-B for the following products:

- TargetLink 4.0
- Model Compare 2.5
- Container Manager 4.3

If you are not sure where to find the user documentation for your product, use the product-specific dSPACE HelpDesk shortcut in the Windows Start menu to open the online help.

Printed user documentation

With dSPACE Release 2015-A, the printed user documentation is not delivered automatically. You can now decide which of the available printed documentation you want to have. For ordering printed documentation, refer to <http://www.dspace.com/go/requestreleasematerial>.



If you do not order printed documentation, use dSPACE HelpDesk or PDF files to obtain information about new features, enhancements, and the safety precautions regarding your products.

Software support discontinuation

As of dSPACE Release 2014-B, the operating system Microsoft Windows XP is no longer supported. The installation of dSPACE software is blocked.

64-Bit Version of RCP and HIL Software

Objective

Most of the RCP and HIL software products now support 64-bit MATLAB versions.

Product support in RCP and HIL (64-bit) software

In general, the RCP and HIL (64-bit) software contains the same products as the RCP and HIL software available on the dSPACE Release 2015-A (32-bit) DVD.

For an overview of RCP and HIL and all other dSPACE software products concerning the 64-bit MATLAB support, refer to *Products on the 64-Bit dSPACE DVD Set* on page 170.

Supported MATLAB versions

The RCP and HIL (64-bit) software supports:

- MATLAB R2013b (64-bit)
- MATLAB R2014a (64-bit)
- MATLAB R2014b (64-bit)
- MATLAB R2015a (64-bit)

See also *Supported MATLAB Releases* on page 166.

Supported MEX compiler

For building MEX functions, the RCP and HIL (64-bit) software supports only Microsoft Windows SDK 7.1.

This compiler is a free download from Microsoft. The compiler requires .NET framework 4.0, which is also available at no charge from Microsoft. Download links and instructions for the compiler and framework can be found at <http://www.mathworks.com/support/compilers/R2015a/index.html>.

You must install this compiler and configure it as a MEX compiler in MATLAB if you intend to use RCP and HIL products that require a MEX compiler, such as:

- RTI CAN MultiMessage Blockset
- RTI LIN MultiMessage Blockset
- Automotive Simulation Models
- MotionDesk Blockset

System requirements

The RCP and HIL (64-bit) software requires Windows 7 Enterprise (64-bit version) with Service Pack 1. Other 64-bit operating systems (Windows XP and Windows Vista) are not supported.

The host PC main memory must be at least 4 GB RAM. 8 GB RAM or more is recommended.

See also *Operating System* on page 167.

Product Version Overview

Objective

The following table is an extract from product version histories showing the product versions of the current release and of the three preceding releases. If a product has new features, there is a link to the brief description in this document.

| Product | dSPACE Release | | | |
|------------------------------|----------------|--------|--------|--|
| | 2013-B | 2014-A | 2014-B | 2015-A |
| AutomationDesk | 4.0 | 4.1 | 4.1 | 5.0 <i>See AutomationDesk on page 37.</i> |
| Automotive Simulation Models | 5.1 | 6.0 | 7.0 | 7.1 <i>See Automotive Simulation Models (ASM) on page 45.</i> |

| Product | dSPACE Release | | | |
|--------------------------------------|----------------|--------|--------|---|
| | 2013-B | 2014-A | 2014-B | 2015-A |
| ConfigurationDesk | 5.0 | 5.1 | 5.2 | 5.3 See <i>ConfigurationDesk</i> on page 77. |
| Container Manager | 4.1 | 4.2 | 4.3 | 4.3 |
| ControlDesk Next Generation | 5.1 | 5.2 | 5.3 | 5.4 See <i>ControlDesk Next Generation</i> on page 83. |
| DCI Configuration Tool | 3.1 | 3.2.2 | 3.3 | 3.4 See <i>DCI Configuration Tool</i> on page 95. |
| dSPACE CAN API | 2.7 | 2.7.1 | 2.7.1 | 2.7.1 |
| dSPACE ECU Flash Programming Tool | 2.2.4 | 2.2.5 | 2.2.5 | 2.2.6 See <i>dSPACE ECU Flash Programming Tool</i> on page 97. |
| dSPACE FlexRay Configuration Package | 3.2 | 3.3 | 3.4 | 3.5 See <i>dSPACE FlexRay Configuration Package</i> on page 111. |
| dSPACE HIL API .NET | 1.5 | 1.6 | 1.7 | 1.8 See <i>dSPACE HIL API .NET</i> on page 99. |
| dSPACE Python Extensions | 1.5 | 1.6 | 1.7 | 1.8 See <i>dSPACE Python Extensions</i> on page 101. |
| dSPACE XIL API | – | – | 2.0 | 2015-A See <i>dSPACE XIL API</i> on page 103. |
| ECU Interface Manager | 1.4 | 1.4.1 | 1.5 | 1.6 See <i>ECU Interface Manager</i> on page 105. |
| Firmware Manager | 1.0 | 1.1 | 1.2 | 1.3 See <i>Firmware Manager</i> on page 109. |
| Model Compare | 2.4 | 2.4 | 2.5 | 2.5 |
| ModelDesk | 3.1 | 3.2 | 4.0 | 4.1 See <i>ModelDesk</i> on page 115. |

| Product | dSPACE Release | | | |
|--------------------------------------|----------------|--------|--------|---|
| | 2013-B | 2014-A | 2014-B | 2015-A |
| Model Interface Package for Simulink | – | – | – | 3.0 See <i>Model Interface Package for Simulink</i> on page 117. |
| MotionDesk | 3.3 | 3.4 | 3.5 | 3.6 See <i>MotionDesk</i> on page 119. |
| MotionDesk Blockset | 2.2.3 | 2.3 | 2.3.1 | 2.3.2 See <i>MotionDesk</i> on page 119. |
| Real-Time Testing | 2.2 | 2.3 | 2.4 | 2.5 See <i>Real-Time Testing</i> on page 123. |
| RTI ¹⁾ | 7.1 | 7.2 | 7.3 | 7.4 See <i>RTI/RTI-MP and RTLib</i> on page 125. |
| RTI-MP ²⁾ | 7.1 | 7.2 | 7.3 | 7.4 See <i>RTI/RTI-MP and RTLib</i> on page 125. |
| RTI AUTOSAR Package | 1.3.1 | 1.3.1 | – | – |
| RTI Bypass Blockset | 3.1 | 3.2 | 3.3 | 3.4 See <i>RTI Bypass Blockset</i> on page 129. |
| RTI CAN Blockset | 3.1 | 3.2 | 3.3 | 3.4 |
| RTI CAN MultiMessage Blockset | 2.9 | 3.0 | 4.0 | 4.1 See <i>RTI CAN MultiMessage Blockset</i> on page 133. |
| RTI Electric Motor Control Blockset | – | – | 1.0 | 1.1 See <i>RTI Electric Motor Control Blockset</i> on page 137. |
| RTI Ethernet Blockset | – | 1.0 | 1.1 | 1.2 See <i>RTI Ethernet Blockset</i> on page 139. |
| RTI Ethernet (UDP) Blockset | 1.3 | 1.3 | 1.3 | 1.4 See <i>RTI Ethernet (UDP) Blockset</i> on page 141. |

| Product | dSPACE Release | | | |
|---------------------------------------|----------------|--------|--------|--|
| | 2013-B | 2014-A | 2014-B | 2015-A |
| RTI FPGA Programming Blockset | 2.6 | 2.7 | 2.8 | 2.9 See <i>RTI FPGA Programming Blockset</i> on page 143. |
| RTI LIN MultiMessage Blockset | 2.2 | 2.3 | 2.4 | 2.5 See <i>RTI LIN MultiMessage Blockset</i> on page 149. |
| RTI RapidPro Control Unit Blockset | 2.2 | 2.2 | 2.2 | 2.2.1 |
| RTI USB Flight Recorder Blockset | 1.0 | 1.1 | 1.2 | 1.2 |
| RTI Watchdog Blockset | 1.0 | 1.0 | 1.0 | 1.0 |
| SCALEXIO firmware | 2.3 | 3.0 | 3.1 | 3.2 See <i>SCALEXIO Firmware</i> on page 153. |
| SYNECT server | 1.2 | 1.3.1 | 1.4 | 1.4.1 |
| SystemDesk 3.x ³⁾ | 3.2 | – | – | – |
| SystemDesk 4.x ⁴⁾ | 4.1 | 4.2 | 4.3 | 4.4 See <i>SystemDesk</i> on page 155. |
| TargetLink/TargetLink Data Dictionary | 3.5 | 3.5 | 4.0 | 4.0 |
| Variable Editor | 1.8 | 1.8 | 1.8 | 2.1 |
| VEOS | 3.1 | 3.2 | 3.3 | 3.4 See <i>VEOS</i> on page 159. |

¹⁾ Including the standard I/O blocksets.

²⁾ Including the RTI Gigalink Blockset.

³⁾ Supporting AUTOSAR 3.x

⁴⁾ Supporting AUTOSAR 4.x

If you have not updated regularly, refer to the *New Features and Migration* documents for the dSPACE Releases listed above for information about the new features and necessary migration steps.

New Product Key Features

Objective This is an overview of each product's new key features. For detailed information, refer to the product-specific sections.

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| <i>SCALEXIO firmware</i> | 29 | |
| <i>SystemDesk 4.x</i> | 29 | |
| <i>VEOS</i> | 29 | |

AutomationDesk The new key features of AutomationDesk are:

- Convenient support of signal-based testing
- Update of the HIL API support to XIL API support

- New libraries for accessing MotionDesk and ModelDesk
- Enhancements to the existing libraries: e.g., the new converter blocks in the Evaluation library.
- Enhancements to the AutomationDesk API
- Usability enhancements

For details on the new features, refer to *New Features of AutomationDesk 5.0* on page 37.

**ConfigurationDesk
(Implementation Version)**

For details on the new features, refer to *ConfigurationDesk – Implementation* on page 78.

**ControlDesk
Next Generation**

The new key features of ControlDesk Next Generation (ControlDesk 5.4) are:

- General enhancement:
 - Support of variables using multiscaling tables
- Platform/device enhancements:
 - New XIL API MAPort platform
 - Support of DS1007-based multiprocessor systems
 - Support of Vector Informatik's VN5610 interface for CAN
 - Synchronization between the DS1007 and SCALEXIO
 - DS1007, DS1202 MicroLabBox, SCALEXIO, VEOS: Downloading an application with or without starting it
 - Improvements for virtual validation scenarios:
 - Adding multiple platforms/devices
 - Adding an application instead of a variable description
- Instrument and visualization enhancements:
 - Time Plotter enhancements:
 - Time cursor available
 - Visualization downsampling
 - Support for multi-touch gestures
 - Index Plotter enhancements:
 - Visualization downsampling
 - Support for multi-touch gestures
 - Button instrument enhancement: Visualizing different button states

- Layout enhancements:
 - Adding a Python script to a layout
 - Display of the path to linked layouts
- Instrument Navigator and Layout Navigator:
 - Filtering search results
- Measurement and recording enhancements:
 - Measuring and recording maps, curves and shared axes
 - Recording value blocks
 - Configurable auto repeat behavior
- Data set management enhancements:
 - Online calibration without working data set
 - Configurable display format of parameter values in the Data Set Manager
- Bus Navigator enhancements:
 - Support of DS1007-based multiprocessor systems
 - CAN replay support for the DS1007
 - CAN FD replay support for the DS1005, DS1006, DS1007 and MicroAutoBox II
 - Automatic adaptation of the height and width of Bus instruments
- Signal Editor enhancements:
 - Support of the DS1007
 - Support of the ASAM AE XIL API 2.0.1 standard

For details on the new features, refer to *New Features of ControlDesk Next Generation (ControlDesk 5.4)* on page 84.

DCI Configuration Tool

The new key features of the DCI Configuration Tool are:

- Improved A2L file adaptation
- Display of XCP instance status information
- Improved DCI-GSI2 memory access test

For details on the new features, refer to *New Features of the DCI Configuration Tool 3.4* on page 95.

dSPACE ECU Flash Programming Tool

The new key feature of the dSPACE ECU Flash Programming Tool is:

- Support of further CAN interfaces

For details on the new feature, refer to *New Features of the dSPACE ECU Flash Programming Tool 2.2.6* on page 97.

dSPACE FlexRay Configuration Package

The new key features of the dSPACE FlexRay Configuration Package are:

- Support of MicroAutoBox II variants with DS1514
- Support of multiple computation methods for signal encoding/decoding
- Support of further validity values
- Modified transmission behavior for static PDUs that are enabled via software
- Updating RX signal values when an error value is received

The new key features of the dSPACE FlexRay Configuration Tool are:

- Support of FIBEX 4.1.1 files as database files
- Improved user interface

For details on the new features, refer to *New Features of dSPACE FlexRay Configuration Package 3.5* on page 111.

dSPACE HIL API .NET

The new key features of dSPACE HIL API .NET are:

- Support of multiprocessor systems based on a DS1007 PPC Controller Board
- Support of MAPort stimulus on DS1007 PPC Controller Boards

For details on the new features, refer to *dSPACE HIL API .NET* on page 99.

dSPACE XIL API

The new key features of dSPACE XIL API are:

- Support of multiprocessor systems based on a DS1007 PPC Controller Board
- Support of MAPort stimulus on DS1007 PPC Controller Boards
- Support of 64-bit clients

For details on the new features, refer to *New Features of dSPACE XIL API 2015-A* on page 103.

ECU Interface Manager

The new key features of the ECU Interface Manager are:

- Support of built-in XCP services
- New software module description file schema, featuring:
 - Multicore support
 - Support for context-dependent variables

For details on the new features, refer to *New Features of ECU Interface Manager 1.6* on page 105.

Firmware Manager

The new key feature of the Firmware Manager is:

- Support of multiprocessor systems based on a DS1007 PPC Controller Board

For details on the new feature, refer to *Features of Firmware Manager 1.3* on page 109.

ModelDesk

The new key features of ModelDesk are:

- New graphical user interface of the Traffic Editor
- Processing supports additional functions (functions which are independent from model parameters)
- Supporting InCylinder models
- Road Generator can import roads in OpenDrive format.

For details on the new features, refer to *New Features of ModelDesk 4.1* on page 115.

MotionDesk

The new key features of MotionDesk are:

- New instruments: Multistate Picture and Multistate Text
- New state objects: Cars with wheels which can be rotated automatically
- Extended tool automation

For details on the new features, refer to *New Features of MotionDesk 3.6* on page 119.

Python Extensions

The new key features of dSPACE HIL API Python Implementation for MAPort are:

- Support of multiprocessor systems based on a DS1007 PPC Controller Board
- Support of MAPort stimulus on DS1007 PPC Controller Boards

The new key features of matlablib2 are:

- Support of 64-bit MATLAB versions
- Support of MAT file formats above Level 5, also if no MATLAB has been installed

For details on the new features, refer to *dSPACE Python Extensions* on page 101.

Real-Time Testing

The new key features of Real-Time Testing are:

- Supporting CAN messages in CAN FD format
- Supporting the DS1007 PPC Processor Board as a new platform
- Supporting virtual ECUs on a VEOS platform

For details on the new features, refer to *New Features of Real-Time Testing 2.5* on page 123.

RTI, RTI-MP and RTLib

The new key features of RTI, RTI-MP and RTLib are:

- New supported features for MATLAB R2015a
- Enhanced RTI support for MicroLabBox, such as the Serial Interface Blockset.
- Support of the new DS1514 I/O Board for MicroAutoBox II.
- RTI-MP support for DS1007 PPC Processor Board

For details on the new features, refer to *New Features of RTI/RTI-MP and RTLib* on page 125.

RTI Bypass Blockset

The new key features of the RTI Bypass Blockset are:

- Virtual ECU bypassing on VEOS and MicroAutoBox II
- Support of Renesas target processor families for internal bypassing
- Enhancements to the RTI Bypass Blockset MATLAB API

For details on the new features, refer to *New Features of the RTI Bypass Blockset 3.4* on page 129.

RTI CAN MultiMessage Blockset

The new key features of the RTI CAN MultiMessage Blockset are:

- Support of AUTOSAR System Template 4.2.1 as database files
- Support of MicroAutoBox II variants with DS1514
- CAN partial networking on DS4342 CAN channels
- Support of ISO11898-5 and ISO11898-6 transceiver types for CAN FD

- New J1939 container type
- Modified multiprocessor support

For details on the new features, refer to *New Features of the RTI CAN MultiMessage Blockset 4.1* on page 133.

RTI Electric Motor Control Blockset

The new key features of the RTI Electric Motor Control Blockset are:

- Support of resolver sensors
- Enhancement to the encoder interface

For details on the new features, refer to *Features of RTI Electric Motor Control Blockset 1.1* on page 137.

RTI Ethernet Blockset

The new key feature of the RTI Ethernet Blockset is:

- Enhancement to the configuration features of the blockset, such as socket binding

For details on the new feature, refer to *New Features of the RTI Ethernet Blockset 1.2* on page 139.

RTI Ethernet (UDP) Blockset

The new key feature of the RTI Ethernet (UDP) Blockset is:

- Support of a higher data rate for MicroAutoBox II

For details on the new feature, refer to *New Features of the RTI Ethernet (UDP) Blockset 1.4* on page 141.

RTI FPGA Programming Blockset

The new key features of the RTI FPGA Programming Blockset are:

- Extended Xilinx® software support
- New FPGA frameworks for MicroAutoBox II 1401/1511/1514 and MicroAutoBox II 1401/1513/1514
- New FPGA frameworks for MicroAutoBox II with DS1552B1 Multi-I/O Module
- Enhancements to the FPGA framework for a DS2655 FPGA Base Board
- New FPGA frameworks for a DS5203 FPGA Board

For details on the new features, refer to *New Features of the RTI FPGA Programming Blockset 2.9* on page 143.

RTI LIN MultiMessage Blockset

The new key features of the RTI LIN MultiMessage Blockset are:

- Support of AUTOSAR System Template 4.2.1 as database files
- Default values for unused bits in a frame
- Modified multiprocessor support

For details on the new features, refer to *New Features of the RTI LIN MultiMessage Blockset 2.5* on page 149.

SCALEXIO firmware

The new key features of the SCALEXIO firmware are:

- Support of the DS6101 Multi I/O Board and DS6201 Digital I/O Board.
- Support of Gigalink connection to DS1007 systems

For details on the new features, refer to *New Features of the SCALEXIO Firmware 3.2* on page 153.

SystemDesk 4.x

The new key feature of SystemDesk 4.4 is:

- Support of AUTOSAR 4.2.1, 4.1.3, 4.1.2, 4.1.1, and 4.0.3.

For details on the new feature, refer to *New General Features* on page 156.

VEOS

The new key features of VEOS are:

- Support of model port blocks via SIC import
- FMI 2.0 support
- Bypassing V-ECU functions
- Stimulation of V-ECU inports

For details on the new features, refer to *VEOS* on page 159.

Aspects of Migrating from Previous Releases

Objective

After you install products of the current dSPACE Release, some additional steps might be necessary. The migration steps required when you come from the last dSPACE Release are described in the product-specific migration topics in this document. If you come from an older dSPACE Release, refer to the related *New Features and Migration* document.

Migrating to dSPACE Release 2015-A

Objective

After you install Release 2015-A, some additional steps might be necessary.

Migrating from dSPACE Release 2014-B

Product-specific migration steps Product-specific migration steps are usually performed automatically by the products. For exceptions, refer to the product-specific migration descriptions.

Migrating from dSPACE Release 2014-A or earlier

To migrate from dSPACE Release 2014-A or earlier to Release 2015-A, you also have to perform the migration steps of the intervening dSPACE Releases. All of the required migration steps can be performed with Release 2015-A installed.

For information on the required migration steps, refer to the *New Features and Migration* documents of the intervening dSPACE Releases.

Previous release documents

The PDF files of previous releases are called `NewFeaturesAndMigrationxx.pdf`, where `xx` stands for the release number.

You can find the *New Features and Migration* files for previous releases here:

- In the installation folder of the current dSPACE HelpDesk, see `C:\Program Files<(x86)>\Common Files\dSPACE\HelpDesk 2015-A\Print\PreviousReleases`.
- On the dSPACE DVDs, see `\Doc\Print\PreviousReleases`.
- Download them from www.dspace.com/go/migration. Here you can also find *New Features and Migration* documents for very early releases.

Changes to the Python 2.7 Distribution

Objective

Gives you information on the changes in the Python distribution provided by dSPACE.

If you want to migrate from an earlier version of Python to Python 2.7, refer to the migration steps described in the *New Features and Migration* document for dSPACE Release 2013-B.

You can also find this information on the dSPACE website, refer to <http://www.dspace.com/go/Python27Migration>.

Where to go from here

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Main Changes in Python 2.7

Objective

Provides information on the changes in the Python 2.7 distribution that comes with dSPACE Release 2015-A.

What's New documentation from the Python Software Foundation

The *What's New* document for the updated Python version is available from the Python Software Foundation:

- What's New for Python 2.7
<http://docs.python.org/2.7/whatsnew/2.7.html>

Main Changes of the dSPACE Python Distribution

Objective

The Python distribution provided by dSPACE contains some dSPACE-specific changes.

Components of the dSPACE Python distribution

The Python 2.7 distribution on the dSPACE DVD provides the following Python components.

| Python Component | Version |
|------------------|---------|
| Python core | 2.7.8 |
| PyWin32 | 219.10 |
| Numpy | 1.7.1 |
| Matplotlib | 1.2.1 |
| WxPython | 2.9.4.0 |
| Py2exe | 0.6.9 |
| Comtypes | 0.6.2 |
| PIL | 1.1.7 |
| Python for .NET | 2.0p2 |

General Information on Using Python Installations

Objective

The following information is relevant if you want to use both Python versions on your computer.

Using Python 2.5 and Python 2.7 in parallel

Both Python versions can be used in parallel on your computer, with the following restrictions:

- The file associations for PY and PYW files can only be set to one Python version. This is usually the latest installed Python version.

- Environment variables are used by both Python versions. Their values, for example, for `PYTHONHOME`, must be set to the Python installation you want to work with. For an overview of the environment variables set by Python, refer to <http://docs.python.org/2/using/cmdline.html>.

Using dSPACE test automation with both Python versions in parallel

If your test automation scripts use dSPACE Python modules distributed either via the dSPACE Python 2.5 setup or via the dSPACE Python Extensions setup available up to dSPACE Release 2013-A, and you do not want to migrate your scripts, you have to work with both Python versions.

Enhancements to the Standard Python 2.7 Distribution

Objective

There are some dSPACE-specific enhancements to the standard Python 2.7. These either ensure the same behavior as before or solve known bugs. The following enhancements are available with dSPACE Release 2015-A.

Enhancements to solve known Python bugs

The following change has been made to solve a known bug from Python 2.7:

- Changes to the PyWin32 package from the former versions were adopted.
- The Python for .NET package was fixed to run with .NET 4.5.2.
- The Python for .NET package was fixed to run with WPF user interfaces.

For the latest information on bugs in Python 2.7 and their solutions, see <http://bugs.python.org>.



To identify the PyWin32 files changed by dSPACE, the version number of the files was changed from 219.0 to 219.10.

AutomationDesk

New Features of AutomationDesk 5.0

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General enhancements

Convenient support of signal-based testing AutomationDesk now provides a convenient way to create tests where it is required to capture signals and evaluate them using reference signals.

- Signal Editor

With the Signal Editor, you can graphically create and display signals. If a signal consists of several segments, each segment can be configured separately. For example, you can specify the evaluation method to be used for a segment.

- Signal-Based Testing library

The Signal-Based Testing custom library provides specialized functionality for stimulating, capturing and evaluating signals either as a sequence element or as an automation block. The required test case description is an STZ file that you can create with the Signal Editor.

- Signals viewset

The Signals viewset provides a default view configuration for signal-based testing.

XIL API support AutomationDesk now supports the ASAM AE XIL API 2.0.1 standard. This is the successor of the ASAM AE HIL API 1.0.2. According to the XIL API support, all the HIL API elements in AutomationDesk are renamed to XIL API. For example, the HIL API library is now called XIL API library. Because the XIL API standard is an enhancement to the HIL API standard, existing HIL API applications are compatible to XIL API. The renaming has also been done in the HIL API Convenience library and for the relevant converter blocks in the Evaluation library. Projects are automatically migrated to the new XIL API data objects and blocks.

Further developments of AutomationDesk libraries are focussed on the XIL API standard. The model access port (MAPort) supports not only the new dSPACE platforms DS1007, MicroLabBox and SCALEXIO, but also the other platforms, such as DS1005, DS1103 or MicroAutoBox. New AutomationDesk projects should therefore use data objects and automation blocks in the XIL API library or the XIL API Convenience library instead of the PlatformAccess library. With the new support of the Electrical Error Simulation port (EESPort), you can use the XIL API library and the XIL API Convenience library now instead of the data objects and automation blocks for failure simulation in the ControlDeskNG Access library. For further information, see below.

DS1007 MP support AutomationDesk supports DS1007 PPC Processor Boards used in a multiprocessor system. See also *New Features of RTI/RTI-MP and RTLib* on page 125.


Enhanced user interface These user interface enhancements facilitate working with AutomationDesk:

- The viewer components in AutomationDesk, such as the Breakpoints Viewer or the Inconsistencies Viewer, provide new features to filter the contents.
- The default viewsets have been updated and optimized for the three basic use cases:
 - Sequences for creating and handling sequences
 - Signals for signal-based testing
 - Executions for executing and debugging
- You can create your own edit dialogs and associate them to the related data objects.
- The allocated RAM memory is now displayed in the status bar. This continually informs you about the overall load of your PC and possible lacks of memory in your sequences.


New automation libraries

Signal-Based Testing library The Signal-Based Testing library is a custom library. It is implemented by using the Test Builder library and therefore provides the same features, such as slots for data objects and operations, and the evaluation and reporting methods of the Test Builder blocks. The framework for signal-based testing is given in the specific TestCase sequence element and in the TestBlock automation block that you can use in any type of sequences. If you want to work more flexibly than with this standard framework, you can use the StimulateAndCapture and the Evaluate blocks in your own framework.

With this library, you can automate the typical workflow when you use signals in a test scenario.

For further information, refer to *Signal-Based Testing Library* ( *AutomationDesk Library Reference*).

MotionDesk Access library With the MotionDesk Access library, you can automate access to MotionDesk. For example, you can open MotionDesk, load a project and start an animation.

For further information, refer to *MotionDesk Access* ( *AutomationDesk Library Reference*).

Enhancements to the libraries

The following libraries have been enhanced:

HIL API library / XIL API library The HIL API library has been replaced by the XIL API library. It provides the same features as the HIL API library and also the following enhancements:

- The main enhancements are:
 - The Testbench instance has been added, which provides the overall port configuration, for example.
 - The factory concept of the XIL API is represented by several specific data objects.
 - The XIL API library now also supports the EESPort for electrical error simulation. The library provides the required data objects for creating and handling error configurations consisting of error sets and errors.
- The enhancements in the Common folder are:
 - The new TaskInfo and VariableInfo data objects are available in the MetaInfo folder.
 - The data objects and automation blocks for stimulus handling have been moved from MAPort - Stimulus to Common - SignalGenerator.
 - The SignalDescriptionsReader and SignalDescriptionsWriter data objects in the Signal folder have been renamed SignalDescriptionSetReader and SignalDescriptionSetWriter.
 - The new Attributes data object is available in the ValueContainer folder.

For further information, refer to *XIL API* ([AutomationDesk Library Reference](#)).

HIL API Convenience library / XIL API Convenience library The HIL API Convenience library has been replaced by the XIL API Convenience library. It provides the same features as the HIL API Convenience library and also the following enhancements:

- The library now also supports electrical error simulation. Therefore, the library is separated into the two folders called Model Access Port and Electrical Error Simulation Port.
- The library now directly contains all the required automation blocks. It is not necessary to add automation blocks from the XIL API library to your sequence.

The added automation blocks for the MAPIPort are:

- InitMAPIPort
- ReleaseMAPIPort
- Capture - StartCapture
- Capture - StopCapture
- Capture - ReleaseCapture
- SignalGenerator - LoadToTarget
- SignalGenerator - StartSignalGenerator
- SignalGenerator - DestroyOnTarget
- SignalGenerator - ReleaseSignalGenerator
- SimulationApplication - LoadSimulationApplication
- SimulationApplication - StartSimulation
- SimulationApplication - StopSimulation
- The new Electrical Error Simulation Port folder provides automation blocks for failure simulation.

The automation blocks for the EESPort are:

- InitEESPort
- ReleaseEESPort
- PrepareSinglePinError
- PrepareMultiPinError
- Trigger
- DeactivateError

For further information, refer to *XIL API Convenience* ([AutomationDesk Library Reference](#)).

Evaluation library The Evaluation library provides new automation blocks:

- **GetSignalFromXILAPISignalDescription**
This block is used to convert an XIL API signal description to an evaluation signal.
- **GetSignalFromXILAPISignalDescriptionSet**
This block is used to convert a specific signal from an XIL API signal description set to an evaluation signal.

- CalculateCorrelations

This block is used to calculate the correlation of two input evaluation signals. You can flexibly configure the calculation: for example, by specifying the correlation method and the normalization mode to be used.

- GetConditionTrueTimes

This block is used to get the time values from a signal where a specified condition is fulfilled.


- IsInsideRegion

This block is used to evaluate a signal to see whether it is inside a region that is defined by vertical and horizontal absolute tolerances of the reference signal.

- IsInsideDynamicRegion

This block is used to evaluate a signal to see whether it is inside a region that is defined by vertical and horizontal, and absolute and relative tolerances of the reference signal.

According to the XIL API support, the converter blocks for HIL API signals have been renamed. AutomationDesk projects that contain `GetSignalFromHILAPICaptureResult`, `GetSignalFromHILAPISignalValue` and `GetSignalFromHILAPISignalGroupValue` converter blocks are automatically migrated when the project is opened.

For further information, refer to *Evaluation* ( *AutomationDesk Library Reference*).

MATLAB Access library The MATLAB Access library now supports 64-bit MATLAB versions without the need to install the same MATLAB version as the 32-bit version on the PC.

Enhancements to the COM API

The AutomationDesk COM API provides the following enhancement:

- Access to data objects of the XIL API library

For further information, refer to  *AutomationDesk API Reference*.

Discontinuations for future versions

The following libraries, automation blocks and data objects will be discontinued in future versions of AutomationDesk:

- Test Framework library

You should migrate your projects based on the Test Framework library to the Test Builder library. For migration help, see <http://www.dspace.com/go/TestBuilderMigration>.

- `InitCaptureResultIDFReader` and `InitCaptureResultIDFWriter` automation blocks in the HIL API / XIL API library

Because the IDF format will be discontinued in future versions, you should replace these automation blocks with the `CaptureResultReader` and `CaptureResultWriter` data objects supporting the MDF format. For detailed information, refer to `CaptureResultReader (Data Object)` ([📄 AutomationDesk Library Reference](#)) and `CaptureResultWriter (Data Object)` ([📄 AutomationDesk Library Reference](#)).

The elements that are planned to be discontinued are specially marked in the user interface.

Automotive Simulation Models (ASM)

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| <i>ASM Traffic Blockset</i> | 66 |
| <i>ASM Trailer Blockset</i> | 68 |
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Information in other sections

| |
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| <i>Migrating ASM Models</i> (📖 ASM User Guide) |
| Provides general information on the migration process of ASM models. |

All ASM Blocksets

New Features of All ASM Blocksets

Rapid accelerator (32-bit setup)

For rapid accelerator code generation the Microsoft Windows SDK 7.1 compiler must be used for the 32-bit version also.. Code generation for Rapid Accelerator Mode with another compiler will fail (e.g., with the `don't know how to make... lcc.lib` error message for the LCC compiler).

ASM Base InCylinder Blockset

Where to go from here

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| <i>Migrating to ASM Base InCylinder Blockset 2.0</i> | 47 |

New Features of ASM Base InCylinder Blockset 2.0

ModelDesk support

The blocks of the ASM InCylinder Base Blockset now support parameterization by ModelDesk.

Migrating to ASM Base InCylinder Blockset 2.0

SOFTECU_SETUP

The block has been synchronized with the mean value engine models. The `Const_i` parameter has been removed. The `Const_num_Cyl_[]`, `Const_num_Inj_Port_[]` and `Const_num_Inj_Direct[]` parameters have been changed to inports. The `Const_CylinderOffset[]` and `Const_num_Cyl_vector[]` signals have been added.

TURBO_CONTROL

The block has been expanded and moved to the ASM Turbocharger Library. For details, see *Migrating to ASM Turbocharger Blockset 3.1* on page 70.

INCYLINDER_SETUP, ENGINE_SETUP

The `INCYLINDER_SETUP` block has been renamed to `ENGINE_SETUP`. New parameters with the number of SCR cells (`Const_num_SCR_Cell`), number of maximum ignitions (`Const_max_num_Ign`) and number of active ignitions (`Const_num_Ign`) have been added. Each of these parameters also has a new output connected to a Goto block.


THROTTLE_VALVE

The former `THROTTLE_VALVE` has been split into `THROTTLE_MECHANICAL` and `THROTTLE_VALVE`. `THROTTLE_VALVE` now contains only the mass flow calculation of the former `THROTTLE_VALVE`.

| | |
|---|--|
| THROTTLE_MECHANICAL | The new THROTTLE_MECHANICAL block contains the mechanical part of the former THROTTLE_VALVE. |
| DIRECTINJECTOR_CONTINUOUS, DIRECT_INJECTOR | The DIRECTINJECTOR_CONTINUOUS block has been renamed to DIRECTINJECTOR. In the ASMSignalBus, the phi_Inj[degbTDC] signal has been corrected to phi_Inj[bTDC] and the t_Inj[s] signal to t_Inj[us]. The migration recreates the old signal. |
| HEAT_RELEASE_ARRHENIUS | The limitation of the combustion process due to available air mass and fuel mass has been improved. Due to this incompatible development, the migration links the block to a former version. |
| HEAT_RELEASE_CHMELA | The limitation of the combustion process due to available air mass and fuel mass has been improved. Due to this incompatible development the migration links the block to a former version. |
| SINGLEZONE_CYLINDER | The Const_num_Cyl parameter has been corrected to Const_max_num_Cyl. The lower limit for air mass has been changed from eps to zero. Due to this incompatible development, the migration links the block to a former version. |
| WALL_HEAT | The Const_num_Cyl parameter has been corrected to Const_max_num_Cyl. |
| EXHAUST_VALVE | The Const_num_Cyl parameter has been corrected to Const_max_num_Cyl. |
| INTAKE_VALVE | The Const_num_Cyl parameter has been corrected to Const_max_num_Cyl. |

ASM Diesel Engine Blockset

Migrating to ASM Diesel Engine Blockset 2.1

| | |
|--------------------------------------|--|
| EGR_VALVE | The internal variable PsiFun has been renamed to MapPsi to provide generic function sets for valves in ModelDesk Processing. No functional change has been performed. |
| LP_EGR_VALVE | The internal variable PsiFun has been renamed to MapPsi to provide generic function sets for valves in ModelDesk Processing. No functional change has been performed. |
| LP_EGR_VALVE ENGINE_SETUP | The internal variable PsiFun has been renamed to MapPsi, to provide generic function sets for valves in ModelDesk Processing. No functional change has been performed. |
| TURBO_CONTROL | The block has been expanded and moved to the ASM Turbocharger Library. For more details, see <i>Migrating to ASM Turbocharger Blockset 3.1</i> on page 70. |
| ENGINE_SETUP | New parameters (Const_max_num_Rail, Const_num_SCR_Cell, Const_num_ExhSys) are introduced in the pre-update variant of the ASM project (...\Simulation_asmmigratepre\IniFiles\mig1400\engdiesel\mig1400_engine_setup.m). For detailed information on pre-update variants, refer to <i>Keeping the Project Consistent</i> ( ASM User Guide). |
| HPP_CRANKBASED | A former version of this block has been created: HPP_CRANKBASED_1_0. |

ASM Diesel Exhaust Blockset

Where to go from here

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| <i>Migrating to ASM Diesel Exhaust Blockset 2.1</i> | 50 |

ASM Diesel Exhaust Blockset 2.1

SCR soft ECU

A soft ECU to control SCR has been introduced.

SCR_CATALYST

The block is now vaectorable: i.e., several SCR catalyts can be calculated with a single block.

Migrating to ASM Diesel Exhaust Blockset 2.1

PUMP_HOSE

A new parameter (`Const_m_AdBlue_init`) is added in the pre-update variant of the ASM project (`..\Simulation_asmmigratepre\IniFiles\mig1400\diesekh\mig1400_pump_hose.m`). For detailed information on pre-update variants, refer to *Keeping the Project Consistent* ([📖 ASM User Guide](#)).

ASM Diesel InCylinder Blockset

Where to go from here

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| <i>Changes in the ASM Diesel InCylinder Demo Model</i> | 51 |
| <i>Migrating to ASM Diesel InCylinder Blockset 2.0</i> | 51 |

New Features of ASM Diesel InCylinder Blockset 2.0

ModelDesk support

The blocks of the ASM InCylinder Diesel Blockset now support parameterization by ModelDesk.

Changes in the ASM Diesel InCylinder Demo Model

**ModelDesk
Parameterization**

The ASM InCylinder Demo is now fully supported by ModelDesk. The parameterization has been changed from ASMPara to ModelDesk Processing. The Initialization Variant folder has been updated from ModelDesk.

Measurement Interface

The Measurement Data blocks are updated with the LUT1D blocks of the ASM Drivetrain Basic Library. The interface itself has been moved from MDL_USERINTERFACE/Engine to MDL_USERINTERFACE/Environment.

Migrating to ASM Diesel InCylinder Blockset 2.0

**COMMON_INCYLINDER_DIESEL_PARAMETERS,
COMMON_ENGINE_PARAMETERS**

The COMMON_INCYLINDER_DIESEL_PARAMETERS block has been renamed to COMMON_ENGINE_PARAMETERS.

A parameter and output signal for m_Air_ref[kg] has been added.

IGNITION_DELAY

The number of maximum delay steps can now be changed during simulation on real-time platforms. To change the number, the simulation has to be stopped and restarted.

ASM Drivetrain Basic Blockset

Where to go from here

Information in this section

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| <i>Migrating to ASM Drivetrain Basic Blockset 4.1</i> | 54 |

New Features of ASM Drivetrain Basic Blockset 4.1

LUT2D

This block is new. It can be used to include measurement data in the model. For the block a new subsystem is created in `ASM_DrivetrainBasic_lib/Driver/Measurement`.

CLUTCH blocks

To simulate the kiss point, a new parameter (`Map_Trq_Clutch_Red`) has been introduced. The parameter describes the clutch nominal torque capacity as a function of the clutch actuation signal: i.e., clutch pedal position or lockup clutch control.

The affected blocks are:

- CLUTCH
- LOCKUP_CLUTCH

SOFT_ECU_TRANSMISSION_BASIC

The block has been completely revised and a new approach has been implemented. The new block offers a better overview, a more robust implementation and several new functionalities.

The new `SOFT_ECU_TRANSMISSION_BASIC` block offers the following features:

- Robust automatic shift strategy with gear skipping functionality
- Revised implementation of tiptronic control
- New lockup clutch control strategy
- Clutch and accelerator pedal control for automated manual transmissions

SHAFT_RIGID

This new block represents a general shaft. The block calculates the shaft speed from the shaft inertia and the applied torques.

| | |
|---------------------------------------|---|
| TEST_BENCH | The dynamometer inertia is now considered as a parameter. |
| LONGITUDINAL_CONTROLLER_HYBRID | This new block simulates the driver behavior to follow a reference velocity by controlling the accelerator and brake pedals. The new block does not use the vehicle parameters and can be used as a modular block. |
| GEAR_SHIFTER | <p>A startup gear other than 1 is now possible. This builds up a more realistic behavior for the simulation of truck driving.</p> <p>In addition, the startup behavior has been improved by introducing a new PID controller instead of the previous feedforward plus PI controller. The accelerator pedal actuation during the startup phase is now smoother and the reference engine speed can be reached more efficiently.</p> |

Migrating to ASM Drivetrain Basic Blockset 4.1

| | |
|------------------------------------|--|
| CLUTCH | A new parameter has been added: <code>Map_Trq_Clutch_Red</code> . The parameter is initialized with a linear relationship, so the previous behavior of the block remains unchanged. |
| LOCKUP_CLUTCH | A new parameter has been added: <code>Map_Trq_Clutch_Red</code> . The parameter is initialized with a linear relationship, so the previous behavior of the block remains unchanged. |
| GEARBOX_MT | The damping coefficient of the gearbox input shaft has been added as a mask parameter: <code>Const_Damping_Gear_In</code> . |
| GEARBOX_AT | The damping coefficient of the gearbox input shaft has been added as a mask parameter: <code>Const_Damping_Gear_In</code> . |
| SOFT_ECU_TRANSMISSION_BASIC | The new <code>SOFT_ECU_TRANSMISSION_BASIC</code> block cannot be automatically migrated, due to the new added block parameter. Therefore, during migration, the link to the <code>SOFT_ECU_TRANSMISSION_BASIC</code> block is changed to the former implementation, in <code>FormerVersions/SOFT_ECU_TRANSMISSION_BASIC_7_0</code> . |

To use the new implementation, the `SOFT_ECU_TRANSMISSION_BASIC` block, drag it from the ASM Drivetrain Basic Library to the model. However, a hand adaptation of the inports, outports and parameters is necessary.

TEST_BENCH

The block cannot be automatically migrated, due to the new added block parameter. Therefore, during migration, the link to the `TEST_BENCH` block is changed to the former implementation in `FormerVersions/TEST_BENCH_2_0`.

To use the new implementation, drag the `TEST_BENCH` block from the ASM Drivetrain Basic Library to the model. However a hand adaptation of the parameters is necessary.

DRIVING_RESISTANCES

The block parameters are separated in a new subsystem inside the block. The driving resistances are added to the `ASMSignalBus` block.

LONGITUDINAL_CONTROL

In the new `LONGITUDINAL_CONTROL` block, the tractive resistance force is calculated instead of the tractive resistance acceleration. During migration, this calculation is compensated to keep the old behavior unchanged.

GEAR_SHIFTER

The block cannot be automatically migrated, due to the big changes in the inports and the block parameters. Therefore, during migration, the link to `GEAR_SHIFTER` is changed to the former implementation in `FormerVersions/GEAR_SHIFTER_7_0`.

To use the new implementation, drag the `GEAR_SHIFTER` block from the ASM Drivetrain Basic Library to the model. However, a hand adaptation of the inports, outports and parameters is necessary.

ASM Electric Components Blockset

Where to go from here

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| <i>Migrating to ASM Electric Components Blockset 3.0</i> | 57 |

New Features of ASM Electric Components Blockset 3.0

Hybrid vehicle demos

There are two new demo models for simulating parallel hybrid drivetrain structures:

- Vehicle Dynamics Hybrid
- Engine Gasoline Hybrid

These models contain components for modifying standard automotive drivetrains and simulate mechanical and electrical components such as clutches, electric machines, and the battery.

The Vehicle Dynamics Hybrid model simulates the dynamics of a passenger car. The vehicle is composed of an engine, electric components, rigid parallel hybrid drivetrain, rigid vehicle body, and four wheels. The model represents the vehicle's longitudinal, lateral, and vertical dynamics and simulates in detail a rigid parallel hybrid drivetrain, suspension kinematics and compliance, tire-road friction forces and moments, steering and brakes. The combustion process in the engine is not modeled.

The Engine Gasoline Hybrid model is a Simulink model used to simulate turbocharged gasoline engines with manifold or direct injection in combination with electric components and a parallel hybrid drivetrain model including automatic transmission.

To enable the simulation of state-of-the-art hybrid modes such as electric driving, power boost or recuperation, both demo models include a soft ECU for hybrid powertrain management.



To run the Vehicle Dynamics Hybrid demo model, the ASM Electric Components Library must be used in combination with the ASM Vehicle Dynamics Library and the ASM Environment Library.

To run the Engine Gasoline Hybrid demo model, the ASM Electric Components Library must be used in combination with the ASM Engine Gasoline Library and the ASM Drivetrain Basic Library. Otherwise some Simulink blocks of the demo model will have bad links to the missing libraries.

Air conditioning

The modeled air conditioning system consists of electric components, such as a compressor and fan driven by an electric motor, and thermal interior model components such as the refrigerant circuit, air duct, and cabin. The system also includes a soft ECU Air Conditioning model which regulates the cabin temperature.

The model simulates the air conditioning system of an electric vehicle in which the compressor and fan are driven electrically.

The model of the thermal interior is used to determine the average temperature in the vehicle cabin. This value depends on the ambient temperature, the manipulation via the air conditioning system, the fan, and the vehicle's material parameters.

**ControlDesk Next
Generation experiments**

ControlDesk projects are available for all six ASM Electric Components demos. The layouts include graphics, which give an overview of the components used in the demo models. Detailed information and simulation results of the components are also shown.

Migrating to ASM Electric Components Blockset 3.0

PTC_GRID_DEFROSTER

The unit conversion of the temperature signal $T[\text{degC}]$ in ASMSignalBus has been corrected.

LIGHTING_SYSTEM

The division by zero has been adapted to handle zero power values.

ASM Environment Blockset

Where to go from here

Information in this section

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| <i>New Features of ASM Environment Blockset 4.2</i> | 58 |
| <i>Migrating to ASM Environment Blockset 4.2</i> | 58 |

New Features of ASM Environment Blockset 4.2

LONGITUDINAL_CONTROLLER_HYBRID

This block is new. It simulates the driver behavior when following a reference velocity by controlling the accelerator and brake pedals. The block does not use the vehicle parameters and can be used as a modular block.

GEAR_SHIFTER

A startup gear other than 1 is now possible. This builds up a more realistic behavior for the simulation of truck driving.

In addition, the startup behavior has been improved by introducing a new PID controller instead of the previous feedforward plus PI controller. The accelerator pedal actuation during the startup phase is now smoother and the reference engine speed can be reached more efficiently.

ROAD

The ROAD block now supports dynamically-sized distance calculations to allow independent movement of the fellow vehicles in ASM Traffic.

Migrating to ASM Environment Blockset 4.2

CONTROLLER

The new CONTROLLER block calculates the tractive resistance force instead of the tractive resistance acceleration. During migration, this calculation is compensated to keep the old behavior unchanged.

GEAR_SHIFTER

The block cannot be automatically migrated, due to major changes in the inports and the block parameters. Therefore, during migration,

the link to the GEAR_SHIFTER block is changed to the former implementation in FormerVersions/GEAR_SHIFTER_10_0.

To use the new implementation, drag the GEAR_SHIFTER block from the ASM Environment Library to the model. However, a hand adaptation of the inports, outports and parameters is necessary.

ROAD

In models containing ASM Traffic, the signal dimension for distance calculation is increased.

ASM Gasoline Engine Basic Blockset

Where to go from here

Information in this section

| | |
|---|----|
| <i>New Features of ASM Gasoline Engine Basic Blockset 2.0.1</i> | 60 |
| <i>Migrating to ASM Gasoline Engine Basic Blockset 2.0.1</i> | 60 |

New Features of ASM Gasoline Engine Basic Blockset 2.0.1

PORT_INJECTOR

A new block has been introduced to replace the Injector_Si block. The internal interpretation of the injector offset time has been changed for consistency reasons.

COMBUSTION_TORQUE_SI

The block has a map to determine the engine output temperature in dependence on engine speed and mean indicated pressure.

Migrating to ASM Gasoline Engine Basic Blockset 2.0.1

COMBUSTION_TORQUE_SI

The new Map_T_Out_Engine and Const_PT1_T_EngOut parameters are initialized with default values in the premigrate variant. The corresponding T_Out_Engine output is terminated.

TURBO_CONTROL

The block has been expanded and moved to the ASM Turbocharger Library. For details, see *Migrating to ASM Turbocharger Blockset 3.1* on page 70.

Injector_Si

A former version of this block, called Injector_Si_4_0, has been created.

ENGINE_SETUP

New parameters (Const_max_num_Rail, Const_num_SCR_Cell, Const_num_ExhSys) are introduced in the pre-update variant of the ASM project

(..\Simulation_asmmigratepre\IniFiles\mig1400\enggasbas\mig1400_engine_setup.m). For detailed information on pre-update variants, refer to *Keeping the Project Consistent* ([📖 ASM User Guide](#)).

ASM Gasoline Engine Blockset

Where to go from here

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| <i>New Features of ASM Gasoline Engine Blockset 3.1</i> | 62 |
| <i>Migrating to ASM Gasoline EngineBlockset 3.1</i> | 62 |

New Features of ASM Gasoline Engine Blockset 3.1

PORT_INJECTOR

A new block has been introduced to replace the old INJECTOR block. The internal interpretation of the injector offset time has been changed for consistency reasons.

Migrating to ASM Gasoline EngineBlockset 3.1

EGR_VALVE

The internal variable PsiFun has been renamed to MapPsi, to provide generic function sets for valves in ModelDesk Processing. No functional change has been performed.


TURBO_CONTROL

The block has been expanded and moved to the ASM Turbocharger Library. For more details, see *Migrating to ASM Turbocharger Blockset 3.1* on page 70.

Injector

A former version of this block has been created: `Injecor_4_0`

ENGINE_SETUP

New parameters (`Const_max_num_Rail`, `Const_num_SCR_Cell`, `Const_num_ExhSys`) are introduced in the pre-update variant of the ASM project (`...\Simulation_asmigratepre\IniFiles\mig1400\enggas\mig1400_engine_setup.m`). For detailed information on pre-update variants, refer to *Keeping the Project Consistent* ( *ASM User Guide*).

HPP_CRANKBASED

A former version of this block has been created:
HPP_CRANKBASED_1_0

Related topics

Basics

- *Migrating ASM Models* (📖 ASM User Guide)

ASM Gasoline InCylinder Blockset

Where to go from here

Information in this section

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| <i>Changes in the ASM Gasoline InCylinder Demo Model</i> | 64 |
| <i>Migrating to ASM Gasoline InCylinder Blockset 2.0</i> | 64 |

New Features of ASM Gasoline InCylinder Blockset 2.0

ModelDesk support

The blocks of the ASM InCylinder Gasoline Blockset now support parameterization by ModelDesk.

Changes in the ASM Gasoline InCylinder Demo Model

ModelDesk Parameterization

The ASM InCylinder Demo is now fully supported by ModelDesk. The parameterization has been changed from ASMPara to ModelDesk Processing. The Initialization Variant folder has been updated.

Measurement Interface

The Measurement Data blocks are updated with the LUT1D blocks of the ASM Drivetrain Basic Library. The interface itself has been moved from MDL_USERINTERFACE/Engine to MDL_USERINTERFACE/Environment.

Migrating to ASM Gasoline InCylinder Blockset 2.0

PORTINJECTOR_CONTINUOUS, PORTINJECTOR

The PORTINJECTOR_CONTINUOUS block has been renamed to PORTINJECTOR. In the ASMSignalBus, the phi_Inj[degbTDC] signal has been corrected to phi_Inj[bTDC] and the t_Inj[s] signal to t_Inj[us]. The migration recreates the old signal.

**COMMON_INCYLINDER
GASOLINE_PARAMETERS,
COMMON_ENGINE_PARAM
ETERS**

The COMMON_INCYLINDER GASOLINE_PARAMETERS block has been renamed to COMMON_ENGINE_PARAMETERS. A parameter and output signal for $Rm[J](molK)$ has been added.

CATALYST

The block can now handle vectorized inputs of lambda.

ASM Traffic Blockset

Where to go from here

Information in this section

| | |
|---|----|
| <i>New Features of ASM Traffic Blockset 3.2</i> | 66 |
| <i>Migrating to ASM Traffic Blockset 3.2</i> | 66 |

New Features of ASM Traffic Blockset 3.2

Fellow movement

ASM Traffic now supports independent movement definition for the fellow vehicles. The fellow movement is defined using ModelDesk's TrafficEditor.

Migrating to ASM Traffic Blockset 3.2

Scenario definition files

The format of the traffic scenario MAT files has been changed. In previous versions, the traffic scenario was defined as a matrix parameter of fixed size that was passed to the TRAFFIC_SCHEDULER block as a block parameter. The parameter format has been changed to a vector of variable size to accommodate the various new features of the new Traffic Editor in ModelDesk. The scenario definition files now contain the TrafficVector variable, instead of the previously used TrafficMatrix variable. During migration, the scenario MAT files in Simulation/IniFiles/Traffic are migrated automatically. To manually migrate scenario MAT files, use the `asm_migrate_traffic` script. The `Simulation/IniFiles/asm_traffic_ini.m` script is adapted to the new variable name. `TrafficMatrix` entries are replaced by the new `TrafficVector` name.

TRAFFIC_SCHEDULER

The TRAFFIC_SCHEDULER block now supports independent movement of fellow vehicles. The `Dist_Response[m]` input signal and the `Dist_Def_Trff[]` output signal are now sized dynamically. During the migration process, the dimension of both signals is increased. New `Angle_Yaw_Fellows_Ref_Scheduler[deg]` and

UserSignals_Fellows output signals are added. The new outputs are terminated during the migration process. The CurrentSegment[] and t_local[s] signals are now available for each fellow vehicle and each user signal. The new signals for fellow vehicle movement are: CurrentSequence_Fellows[], CurrentSegment_Fellows and t_local_Fellows[s]. Equivalent signals are available for the UserSignals. The old CurrentSegment[] and t_local[s] signals are connected to constant blocks with the value **-99999**.



The new Traffic Editor requires modifications in the automation interface. Refer to *Classes for Creating Traffic Scenarios* ([ModelDesk Automation Reference](#)).

FELLOW_POSITIONS

The FELLOW_POSITIONS block has a new input: Angle_Yaw_Fellows_Ref_Scheduler[deg]. A constant block with the default value **0** is added to the new input during migration.

FELLOW_PARAMETERS

The default output values have been modified. No further migration is necessary.

SENSOR_ENABLE

The coding of the TrafficState signal of the TRAFFIC_SCHEDULER block has been changed. The SENSOR_ENABLE block has been modified accordingly. The sensor calculation is now enabled if the TrafficState has the value **3** (in previous releases the value was **4**).

ASM Trailer Blockset

Migrating to ASM Trailer Blockset 2.3.1

| | |
|--|---|
| TIRE_MODEL_MAGIC_FORM ULA_TRAILER_xxx | The bus signals are now used as a vector. |
| TIRE_MODEL_TMEASY_TRAI LER_xxx | The incorrect signal name F_x_Dyn_RR_Tire_CoorSys_CP[N] has been fixed. |
| ABA_ACCELERATION_DOLL Y | There has been a hotfix in the calculation of the generalized acceleration. |
| SENSOR_POS_TRAILER | There is a new inport for the calculation of horizontal sensor signals. |
| BALL_JOINT_ACCELERATIO N_TRAILER | There has been a hotfix in the calculation of the generalized acceleration. |
| TRAILER_CARDAN_ANGLE_ AND_GRAVITY | The calculation for horizontal sensor signals has been added to the block. |
| DOLLY_CARDAN_ANGLE_A ND_GRAVITY | The calculation for horizontal sensor signals has been added to the block. |
| SUSCOMP_RIGID_SYM_TRAI LER_FRONT | A bug concerning the mirrored compliance right wheel was fixed. |
| SUSCOMP_RIGID_SYM_TRAI LER_REAR | A bug concerning the mirrored compliance right wheel was fixed. |
| SUSCOMP_RIGID_SYM_TRAI LER_REAR_2ND | A bug concerning the mirrored compliance right wheel was fixed. |
| SUSCOMP_RIGID_SYM_TRAI LER_REAR_3RD | A bug concerning the mirrored compliance right wheel was fixed. |

ASM Truck Blockset

Migrating to ASM Truck Blockset 2.2.1

| | |
|--|--|
| TIRE_MODEL_MAGIC_FORM ULA_XXX | The bus signals are now used as a vector. |
| TIRE_MODEL_TMEASY_XXX | The incorrect signal name <code>F_x_Dyn_RR_Tire_CoorSys_CP[N]</code> has been fixed. |
| TORSIONAL_FRAME_ACC_V EHICLE_2ND | There has been a hotfix in the calculation of the generalized acceleration. |
| SENSOR_MOTION_VEHICLE _2ND | There is a new inport for the calculation of horizontal sensor signals. |
| VEHICLE_CARDAN_ANGLE_ AND_GRAVITY | There is a new <code>RotationMatrix_V_to_VH</code> output for horizontal sensor signals. |
| SUSCOMP_RIGID_SYM_REA R_2ND | A bug concerning the mirrored compliance right wheel was fixed. |
| SUSCOMP_RIGID_SYM_REA R_3RD | A bug concerning the mirrored compliance right wheel was fixed. |

ASM Turbocharger Blockset

Where to go from here

Information in this section

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| <i>Migrating to ASM Turbocharger Blockset 3.1</i> | 70 |

New Features of ASM Turbocharger Blockset 3.1

TURBO_CONTROL_MODE

The TURBO_CONTROL_MODE block sets the control state of the TURBO_CONTROL block. It decides whether to use the PI controller to pass through the Feed Forward Control Signal from the Measurement Data or to deactivate the controller.

Migrating to ASM Turbocharger Blockset 3.1

MAPS_TC

The block has been extended with a new inport. Now it is not mandatory to define the engine speed as the first element of the engine operation point. This is a requirement for in-cylinder models. The Ctrl_TC[0_1] inport has been renamed to Ctrl_VTG[0_1].

A new Ctrl_WGate[0_1] inport has been added.

A Sw_Ctrl_TC parameter has been added to decide whether to use Ctrl_VTG or Ctrl_WGate as input of the internal map. The migration has no functional effect.

MAPS_TC_2STAGE

The block has been extended with a new inport. Now it is not mandatory to define the engine speed as the first element of the engine operation point. This is a requirement for in-cylinder models. No functional change has been performed.

TURBO_CONTROL

The block has been enhanced and moved to the ASM Turbocharger Library. A new inport was added so that the block now can switch between calculating the control signal and feeding it forward from an

internal map. The names of the parameters have been changed. An output was added to output the signal for minimum actuation. When migrating, a subsystem is used as a shell to transfer the parameters to the new names and to replicate the exact old behavior with the new library block.

WASTEGATE_VALVE

The internal variable PsiFun has been renamed to MapPsi, to provide generic function sets for valves in ModelDesk Processing. No functional change has been performed.

WASTEGATE_VALVE_HP

The internal variable PsiFun has been renamed to MapPsi, to provide generic function sets for valves in ModelDesk Processing. No functional change has been performed.

ASM Vehicle Dynamics Blockset

Where to go from here

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| <i>New Features of ASM Vehicle Dynamics Blockset 3.1</i> | 72 |
| <i>Migrating to ASM Vehicle Dynamics Blockset 3.1</i> | 73 |

New Features of ASM Vehicle Dynamics Blockset 3.1

SENSOR_MOTION The **SENSOR_MOTION** block now also calculates the horizontal sensor signals.

STABI_COMP_FRONT This subsystem is new. It calculates the stabilizer compliance effects.

DRIVETRAIN blocks The drivetrain blocks in the library have been combined into subsystems to provide a better overview and easy access. The blocks are divided according to their functionalities.

CLUTCH blocks To simulate the kiss point, a new parameter (**Map_Trq_Clutch_Red**) has been introduced. The parameter describes the clutch nominal torque capacity as a function of the clutch actuation signal: i.e., clutch pedal position or lockup clutch control.

The affected blocks are:

- CLUTCH
- CLUTCH_RIGID
- LOCKUP_CLUTCH
- LOCKUP_CLUTCH_RIGID
- CLUTCH_4WD
- CLUTCH_4WD_RIGID

ENGINE_OPERATION_BASIC This block is new. It detects the engine operation state from the engine speed and the ignition as well as the starter request switch. The block activates the starter and gives information about the engine operation state.

| | |
|-------------------------------------|--|
| SOFT_ECU_TRANSMISSION | <p>The SOFT_ECU_TRANSMISSION block has been completely revised and new approaches have been implemented. The new block offers a better overview, a more robust implementation and several new functionalities.</p> <p>The new block offers the following features:</p> <ul style="list-style-type: none"> ■ Robust automatic shift strategy with gear skipping functionality. ■ Revised implementation of tiptronic control. ■ New lockup clutch control strategy ■ Clutch and accelerator pedals control for automated manual transmissions. |
| SHAFT_RIGID | <p>This new block represents a general shaft. The block calculates the shaft speed from the shaft inertia and the applied torques.</p> |
| TEST_BENCH | <p>The dynamometer inertia is now considered as a parameter.</p> |
| STEERING_3DOF_VARIABLE_RATIO | <p>It is now possible to configure the location of a steering column spring damper system with respect to the two cardan joints. It is now also possible to configure the offset angle between the steering wheel zero degree mark and the upper cardan joint. These features can be configured using the <i>SW_LocationColumnStiffness</i> and <i>Const_InitialAngle_UpperCardanJoint</i> variables.</p> |

Migrating to ASM Vehicle Dynamics Blockset 3.1

| | |
|-------------------------------|---|
| MC_PHERSON_STRUT | <p>The block has a new output for partial derivative calculation of stabilizer, spring and damper kinematics.</p> |
| SUSKIN_FRONT_ASYM_3DOF | <p>The block has a new output for partial derivative calculation of stabilizer, spring and damper kinematics.</p> |
| SUSKIN_FRONT_SYM_3DOF | <p>The block has a new output for partial derivative calculation of stabilizer, spring and damper kinematics.</p> |
| SUSKIN_RIGID_SYM_FRONT | <p>The block has a new output for partial derivative calculation of stabilizer, spring and damper kinematics.</p> |

| | |
|---|--|
| SUSPENSION_KINEMATICS_FRONT_ASYMMETRIC | The block has a new output for partial derivative calculation of stabilizer, spring and damper kinematics. |
| SUSPENSION_KINEMATICS_FRONT_SYMMETRIC | The block has a new output for partial derivative calculation of stabilizer, spring and damper kinematics. |
| TIRE_MODEL_MAGIC_FORM_ULA_xxx | The bus signals are now used as a vector. |
| TIRE_MODEL_TMEASY_xxx | The incorrect signal name F_x_Dyn_RR_Tire_CoorSys_CP[N] has been fixed. |
| SENSOR_MOTION | There is a new Rotation Matrix inport for the calculation of horizontal sensor signals. |
| COORDINATE_TRANSFORM_ATION | There is a new output for the horizontal sensor signal: RotationMatrix_V_to_VH |
| VEHICLE_MOVEMENT_INFO_CAR | The ASMProperties have been corrected from VEHICLE_MOVEMENT_INFO to VEHICLE_MOVEMENT_INFO_CAR. |
| STEERING_3DOF_VARIABLE_RATIO | <p>Two new parameters have been added to the block:</p> <ul style="list-style-type: none"> ■ SW_LocationColumnStiffness to configure the position of the steering column spring damper system with respect to cardan joints ■ Const_InitialAngle_UpperCardanJoint to configure the offset angle between the steering wheel 0deg mark and the upper cardan joint <p>During migration, the two variables are initialized with the values 2deg or 0deg, respectively so the former behavior of the block remains unchanged.</p> |
| CLUTCH | A new parameter (Map_Trq_Clutch_Red) is added to the block. The parameter is initialized with a linear relationship, so the former behavior of the block remains unchanged. |
| CLUTCH_RIGID | A new parameter (Map_Trq_Clutch_Red) is added to the block. The parameter is initialized with a linear relationship, so the former behavior of the block remains unchanged. |

| | |
|------------------------------|--|
| LOCKUP_CLUTCH | A new parameter (Map_Trq_Clutch_Red) is added to the block. The parameter is initialized with a linear relationship, so the former behavior of the block remains unchanged. |
| LOCKUP_CLUTCH_RIGID | A new parameter (Map_Trq_Clutch_Red) is added to the block. The parameter is initialized with a linear relationship, so the former behavior of the block remains unchanged. |
| CLUTCH_4WD | A new parameter (Map_Trq_Clutch_Red) is added to the block. The parameter is initialized with a linear relationship, so the previous behavior of the block remains unchanged. |
| CLUTCH_4WD_RIGID | A new parameter (Map_Trq_Clutch_Red) is added to the block. The parameter is initialized with a linear relationship, so the former behavior of the block remains unchanged. |
| SOFT_ECU_TRANSMISSION | The block cannot be automatically migrated, due to the new added block parameter. Therefore, during migration, the link to the SOFT_ECU_TRANSMISSION block is changed to the former implementation in FormerVersions/SOFT_ECU_TRANSMISSION_8_0 . To use the new implementation, the SOFT_ECU_TRANSMISSION block, drag it from the ASM VehicleDynamics Library to the model. However, a hand adaptation of the inports, outports and parameters is necessary. |
| GEARBOX_MT | The damping coefficient of the gearbox input shaft is added as a mask parameter: Const_Damping_InputGear |
| GEARBOX_MT_RIGID | The damping coefficient of the gearbox input shaft is added as a mask parameter: Const_Damping_InputGear |
| GEARBOX_AT | The damping coefficient of the gearbox input shaft is added as a mask parameter: Const_Damping_InputGear |
| GEARBOX_AT_RIGID | The damping coefficient of the gearbox input shaft is added as a mask parameter: Const_Damping_InputGear |
| ENGINE_BASIC | The engine full load, i.e., the engine effective torque at full accelerator pedal position, is calculated and added to the ASMSignalBus block. |

TEST_BENCH

The block cannot be automatically migrated, due to the new added block parameter. Therefore, during migration, the link to the TEST_BENCH block is changed to the former implementation in FormerVersions/TEST_BENCH_1_0.

To use the new implementation, drag the TEST_BENCH block from the ASM VehicleDynamics Library to the model. However a hand adaptation of the parameters is necessary.

CRANK_SHAFT

The crankshaft inertia is added to the ASMSignalBus block.

CRANK_SHAFT_RIGID

The crankshaft inertia is added to the ASMSignalBus block.

SUSCOMP_RIGID_SYM_FRONT

A bug concerning the mirrored compliance right wheel was fixed.

SUSCOMP_RIGID_SYM_REAR

A bug concerning the mirrored compliance right wheel was fixed.

ConfigurationDesk

Objective

ConfigurationDesk is a tool that can be applied in many different use scenarios. You can use it to implement real-time applications and configure RapidPro hardware.

ConfigurationDesk – Implementation

Where to go from here

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| <i>New Features of ConfigurationDesk 5.3 (Implementation Version)</i> | 78 |
| <i>Migrating to ConfigurationDesk 5.3</i> | 82 |

New Features of ConfigurationDesk 5.3 (Implementation Version)


Model Interface Package for Simulink

The following ConfigurationDesk components were combined into a new product called Model Interface Package for Simulink:

- dSPACE Model Port Block Library
- dSPACE Model Separation Block Library
- dSPACE Run-Time Target (`dsrt.tlc`)

For information on the features of Model Interface Package for Simulink, refer to *Features of the Model Interface Package for Simulink 3.0* on page 117.

Adding Simulink implementation containers to an executable application

ConfigurationDesk lets you add Simulink implementation containers (SIC files) to your executable application. A Simulink implementation container is a container file (ZIP file) containing the model code of a Simulink behavior model. You can generate a Simulink implementation container using the Model Interface Package for Simulink. For details, refer to *Features of the Model Interface Package for Simulink 3.0* on page 117 and *Integrating Simulink Implementation Containers in Executable Applications* ( *ConfigurationDesk Real-Time Implementation Guide*).

Implementing bus communication via Bus Manager

ConfigurationDesk provides the Bus Manager, a new component to implement bus communication in real-time applications for SCALEXIO systems.

With the Bus Manager you can implement CAN and LIN bus communication for simulation purposes, for example, to perform a

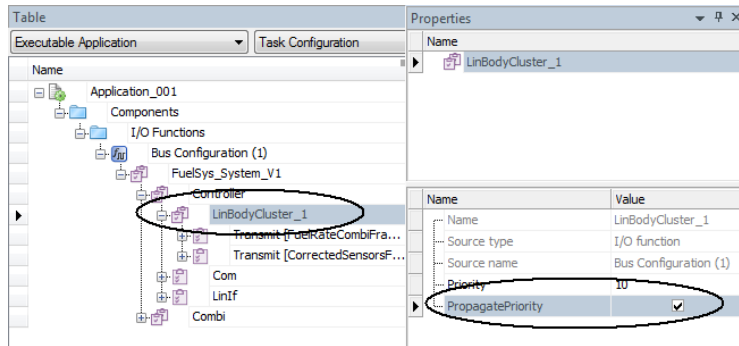
restbus simulation. You can import multiple communication matrix files of various file formats and configure the communication of multiple communication clusters at a time.

The Bus Manager allows you to implement bus communication without a model interface, this means independently from a connected behavior model. However, you also can work with a behavior model, that is modeled in MATLAB/Simulink or another modeling tool.

For details on the Bus Manager, refer to [ConfigurationDesk Bus Manager Implementation Guide](#).

Grouping tasks in a hierarchical structure

ConfigurationDesk displays task groups and tasks of a bus configuration in a hierarchical structure in the Executable Application table view. The task groups provide the PropagatePriority property. If the PropagatePriority checkbox is selected, changes on the priority are propagated to the task group's subelements.




New features of the FMU support

ConfigurationDesk 5.3 supports Functional Mock-up Units complying with the FMI 2.0 standard for Co-Simulation.

New features of the V-ECU support

Supported V-ECU Implementation container versions The following table shows the tool versions that export V-ECU implementation containers, and the related container versions.

| V-ECU Implementation Container Exported From | Container Version |
|--|-------------------|
| SystemDesk 3.x / TargetLink 3.5 | 1.0 |
| SystemDesk 4.2 | 2.0 |
| SystemDesk 4.3 / TargetLink 4.0 | 2.1 |
| SystemDesk 4.4 | 2.2 |

Automatic specification of preprocessor macros For V-ECU implementation container version 2.1 or later, ConfigurationDesk automatically specifies the preprocessor macros that are necessary for a successful build process. For details, refer to *Configuring the Build Process for ConfigurationDesk Applications Containing V-ECU Implementations* ( *ConfigurationDesk Real-Time Implementation Guide*).

New features concerning hardware support

Support of new real-time hardware ConfigurationDesk supports the following new SCALEXIO hardware boards:

- DS6101 Multi I/O Board
- DS6201 Digital I/O Board

Adding a DS2655 FPGA Base Board to hardware topology Now you can add a DS2655 FPGA Base Board or DS2655M1 I/O Modules to a hardware topology from scratch in the Hardware Resource Browser.

New implementation features

Renaming block and port names in graphical windows The following elements that are used in an active ConfigurationDesk application can now be renamed directly in graphical windows:

- Device blocks, their port groups and ports
- Function blocks
- Model port blocks and their ports (only for model port blocks which a created in ConfigurationDesk and are unresolved)


Global settings for extending the signal chain

ConfigurationDesk lets you specify global settings that are used for creating model port blocks when you use the Extend signal chain - Create Suitable Model Port Block command.

The settings are globally valid for all available function block types in the function library. The settings apply independently from projects and applications in ConfigurationDesk.

You can specify the following global settings:

- The data type of the created model port: Inherited or Float64
- The structure of the created model port block: Grouped or ungrouped

For details, refer to *Configuration Page* ( *ConfigurationDesk Real-Time Implementation Reference*).

Model port mapping via drag and drop ConfigurationDesk lets you perform model port mapping easily via drag & drop. For details, refer to *Methods for Model Port Mapping* ([📖 ConfigurationDesk Real-Time Implementation Guide](#)).

Configurable real-time testing access You can deactivate the real-time testing access of an application process to TRC file entries of other application processes. This increases the number of available communication channels in a multi-processing unit system. ConfigurationDesk provides the **Local real-time testing access only** checkbox for this purpose. For details, refer to *Application Process Properties* ([📖 ConfigurationDesk Real-Time Implementation Reference](#)).

New filter features

Filtering by associated working views ConfigurationDesk lets you display signal chain elements only from a specific working view in a browser or table view.

Filtering for unused elements ConfigurationDesk lets you filter for elements that are not used in the signal chain.

Displaying all the subelements of elements matching the filter criteria In a hierarchy, ConfigurationDesk lets you display all the subelements of elements matching the filter criteria, even if the subelements do not match the filter criteria. You can do so via the **Include Subelements** checkbox.

Support of different SYNECT server versions

When you use ConfigurationDesk in connection with the SYNECT server, ConfigurationDesk now lets you work with SYNECT server versions of different dSPACE Releases (starting with the SYNECT server version in dSPACE Release 2014-B).

Unsupported new features of MATLAB

Unsupported new features of MATLAB R2014a The following feature introduced with MATLAB R2014a are not supported:

- Simulink data dictionaries

Simulink is able to store design data that your model uses in a data dictionary as a permanent repository.

Unsupported new features of MATLAB R2014b The following features introduced with MATLAB R2014b are not supported:

- Simulink Function subsystems

You cannot use dSPACE blocks(e.g., model port blocks from the dSPACE Model Port Block Library) in a Simulink Function subsystem. The contents of Simulink Function subsystem are not generated into the TRC file.

- Blocks from the dSPACE Model Port Block Library and the Model Separation Block Library do not appear when you use the Smart Editing Cues feature.

Migrating to ConfigurationDesk 5.3

New XML schema for custom function blocks

A new XML schema was implemented for custom function blocks (see `<InstallationFolder>\ConfigurationDesk\Implementation\UserFiles\CustomFunctionTypeSchema_V3_1.xsd`). ConfigurationDesk lets you update custom function files to the new schema via the Create Updated Custom Function Type XML command.



You cannot downgrade an updated custom function file to the previous schema version. Make sure to back up the existing files before the update.

Using parallel build for referenced models

If you work with MATLAB R2015a, the following applies:

If you build referenced models with activated MATLAB workers, the build might fail or the results might be erroneous. You have to remove all build results from modified referenced models in the `s1prj` folder beforehand. To solve this problem, you can install the following MathWorks® patch:

<http://www.mathworks.com/support/bugreports/1199590>.



ControlDesk Next Generation

Where to go from here

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| <i>New Features of ControlDesk Next Generation (ControlDesk 5.4)</i> | 84 |
| <i>Migrating to ControlDesk Next Generation (ControlDesk 5.4)</i> | 92 |

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|  <i>ControlDesk Next Generation Migration Guide</i> Explains migration from ControlDesk 3.x, CalDesk and prior versions of ControlDesk Next Generation to ControlDesk 5.4. |
|  <i>ControlDesk Next Generation Migration of ControlDesk 3.x Automation</i> Explains migration from ControlDesk 3.x automation to ControlDesk Next Generation automation. |

New Features of ControlDesk Next Generation (ControlDesk 5.4)

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| <i>New General Features (ControlDesk 5.4)</i> | 84 |
| <i>New Features of Platform Management and Platforms/Devices (ControlDesk 5.4)</i> | 84 |
| <i>New Visualization and Instrument Features (ControlDesk 5.4)</i> | 86 |
| <i>New Measurement and Recording Features (ControlDesk 5.4)</i> | 88 |
| <i>New Bus Navigator Features (ControlDesk 5.4)</i> | 89 |
| <i>New Data Set Management Features (ControlDesk 5.4)</i> | 90 |
| <i>New Signal Editor Features (ControlDesk 5.4)</i> | 90 |

New General Features (ControlDesk 5.4)

Support for variables using multiscaling tables

ControlDesk now supports variables using multiscaling tables. A multiscaling table maps numerical source values to different scalings.

Refer to *Basics on Variables Using Conversion Tables* ([📖 ControlDesk Next Generation Basic Practices Guide](#)).

New Features of Platform Management and Platforms/Devices (ControlDesk 5.4)

New XIL API MAPort platform

ControlDesk provides the new XIL API MAPort platform. The platform lets you access a simulation platform via the XIL API MAPort for working with it in ControlDesk.

For instructions on registering and configuring, refer to *How to Register and Configure an XIL API MAPort Platform* (📖 *ControlDesk Next Generation Basic Practices Guide*).

Support for DS1007-based multiprocessor systems

ControlDesk now supports DS1007-based multiprocessor systems. Refer to *Basics on the DS1007 PPC Processor Board Platform* (📖 *ControlDesk Next Generation Basic Practices Guide*).

Support of Vector Informatik's VN5610 interface for CAN

ControlDesk now supports the VN5610 interface from Vector Informatik for CAN. Refer to *Supported CAN Interfaces* (📖 *ControlDesk Next Generation Basic Practices Guide*).

Synchronization between the DS1007 and SCALEXIO

ControlDesk now supports Gigalink communication for synchronization between the DS1007 and SCALEXIO. In ControlDesk, you have to add the related platforms to a simulation time group.

DS1007, DS1202 MicroLabBox, SCALEXIO, VEOS: Downloading an application with or without starting it

When you load an application to the DS1007, DS1202 MicroLabBox, SCALEXIO, or VEOS via the Platform/Device Manager, you can now decide whether to load the application with or without a subsequent start of the application.

- Select the Real-Time Application / Offline Simulation Application - Load and Start command from the platform's context menu, or drag an application file from Windows Explorer to the platform node.

The application is always started automatically after it is loaded.

- Select the Real-Time Application / Offline Simulation Application - Load command from the platform's context menu, or use the *right* mouse button to drag an application file from Windows Explorer to the platform node.

The application is not started after it is loaded. After downloading, the application state is STOPPED.

Improvements to virtual validation scenarios

Adding multiple platforms/devices For virtual validation scenarios, ControlDesk offers a simplified way to add and configure platforms and devices that refer to an application containing virtual ECUs and optionally an environment model executed on VEOS or SCALEXIO.

For instructions, refer to *How to Add Multiple Platforms/Devices in Virtual Validation Scenarios* ([ControlDesk Next Generation Basic Practices Guide](#)).

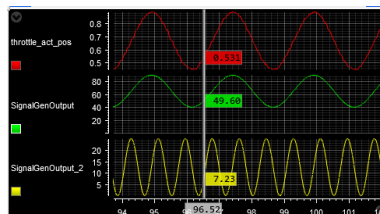
Adding application instead of variable description ControlDesk allows you to add an application file instead of a variable description file to a VEOS or SCALEXIO platform in the experiment. This can be useful if you work with an application *without an environment model*, for example.

Refer to *Real-Time Application / Offline Simulation Application - Add to Experiment* ([ControlDesk Next Generation Reference](#)).

New Visualization and Instrument Features (ControlDesk 5.4)

Time Plotter enhancements

Time cursor available You can now use a time cursor to specify a time position in the Time Plotter chart. The time position of the cursor and the related signal value can be displayed as shown in the following illustration:



Refer to *Basics of Handling the Time Plotter* ([ControlDesk Next Generation Basic Practices Guide](#)).

Visualization downsampling The Time Plotter now allows you to control the amount of visualized data for each signal it displays. You can downsample the visualized data by defining a time interval. All measured data points in this interval, such as the mean value or the maximum value in the interval, are represented by the visualized data points.

Refer to *How to Display Curves with Mean, Minimum, and Maximum Values* ([ControlDesk Next Generation Basic Practices Guide](#)).

Support for multi-touch gestures On a touch screen, you can use multi-touch gestures to move and zoom into the chart.

Refer to *Zooming and Moving the Chart (Time Plotter)*
(📖 *ControlDesk Next Generation Basic Practices Guide*).

Index Plotter enhancements

Visualization downsampling The Index Plotter now allows you to control the amount of visualized data for each signal it displays. You can downsample the visualized data by defining an interval of (measured) data points. All measured data points in this interval, such as the mean value or the maximum value in the interval, are represented by the visualized data points.

Refer to *How to Display Curves with Mean, Minimum, and Maximum Values* (📖 *ControlDesk Next Generation Basic Practices Guide*).

Support for multi-touch gestures On a touch screen, you can use multi-touch gestures to move and zoom into the chart.

Refer to *Zooming and Moving the Chart (Index Plotter)*
(📖 *ControlDesk Next Generation Basic Practices Guide*).

Button instrument enhancement

You can now customize button style settings, such as the text and background color.

Check button You can now customize the button style settings for each button state individually.

Refer to *Button Style Settings Properties (Check Button)*
(📖 *ControlDesk Next Generation Reference*).

On/Off button You can now customize button style settings for each button individually.

Refer to *Buttons Properties* (📖 *ControlDesk Next Generation Reference*).

Push button You can now customize button style settings for each button individually.

Refer to *Buttons Properties* (📖 *ControlDesk Next Generation Reference*).

Radio button You can now customize the button style settings for the checked and unchecked button states individually.

Refer to *Buttons Properties* (📖 *ControlDesk Next Generation Reference*).

Layout enhancements

Adding a Python script to a layout You can add one Python script to each layout and assign Python code to the events of the selected layout. This lets you extend the layout's functionality via automation more flexibly.

The script is executed automatically each time the layout is initialized.

The script is stored together with the layout. So when you copy and paste the layout, the copied layout contains the same functionality extension as the original one.

Refer to *Script Property* ([📖 ControlDesk Next Generation Reference](#)).

Display of the path to linked layouts If you imported a layout as a *link*, you can now let ControlDesk display the path to the layout as a relative or absolute path.

Refer to *Layout Properties* ([📖 ControlDesk Next Generation Reference](#)).

Instrument Navigator and Layout Navigator: Filtering search results

You can now filter the search results in the Instrument Navigator and Layout Navigator. If activated, only the search results containing the search string and their parent objects are visible.

Refer to:

- *Instrument Navigator* ([📖 ControlDesk Next Generation Reference](#))
- *Layout Navigator* ([📖 ControlDesk Next Generation Reference](#))

New Measurement and Recording Features (ControlDesk 5.4)

Measuring and recording maps, curves and shared axes

ControlDesk now lets you measure and record maps, curves and shared axes. To record maps, curves and shared axes, the ASAM MDF 4.x (MF4) file format must be selected.

Refer to *How to Perform an Immediate Recording* ([📖 ControlDesk Next Generation Basic Practices Guide](#)).

Recording value blocks

ControlDesk now lets you record value blocks.

Refer to *How to Perform an Immediate Recording* ([📖 ControlDesk Next Generation Basic Practices Guide](#)).

Configurable auto repeat behavior

For applications of the following platforms, you can now specify whether to re-arm the start trigger for the next capture in an automatically repeated measurement immediately or after a delay for data upload:

- DS1007 PPC Processor Board
- DS1202 MicroLabBox
- SCALEXIO
- VEOS

Refer to *Triggered Raster Properties* ([📖 ControlDesk Next Generation Reference](#)).



There are migration aspects related to this new feature. Refer to *Modified default auto repeat behavior* on page 93.

New Bus Navigator Features (ControlDesk 5.4)

Support for DS1007-based multiprocessor systems

ControlDesk's Bus Navigator now also supports DS1007-based multiprocessor systems.

CAN replay support for the DS1007

The Bus Navigator now supports the replay of CAN messages on the DS1007.

CAN FD replay support for dSPACE platforms

The Bus Navigator now supports the replay of CAN FD (CAN with Flexible Data Rate) messages on the following dSPACE platforms:

- DS1005
- DS1006
- DS1007
- MicroAutoBox II

Refer to *Features of the Bus Navigator Specific for CAN* ([📖 ControlDesk Next Generation Advanced Practices Guide](#)).

Automatic adaptation of the height and width of Bus instruments

You can now specify a minimum height and width of Bus instruments. You can also specify whether to extend the height and width of Bus instruments automatically to fit their contents.

Refer to *Bus Navigator Page* ([📖 ControlDesk Next Generation Reference](#)).

New Data Set Management Features (ControlDesk 5.4)

Online calibration without working data set

In most cases, you will use a working data set to calibrate parameter values on a platform or device. If no working data set is available and you have no need for offline calibration, you can write parameter values directly to a platform or device and read them from there.

Refer to:

- Write to Hardware ([📖 ControlDesk Next Generation Reference](#))
- Read from Hardware ([📖 ControlDesk Next Generation Reference](#))

Specifying the display format of parameter values in the Data Set Manager

You can now specify the display format of parameter values in the Data Set Manager using a `printf` declaration of the C programming language.

Refer to *Data Set Manager Page* ([📖 ControlDesk Next Generation Reference](#)).

Checking data sets for inconsistency before import

Before you import a data set you can now use tool automation to check the data set for inconsistent parameters.

Refer to *Automating Data Set Management* ([📖 ControlDesk Next Generation Advanced Practices Guide](#)).

New Signal Editor Features (ControlDesk 5.4)

Support of the DS1007

ControlDesk's Signal Editor now also supports stimulus generation on the DS1007 PPC Processor Board platform.




One signal generator for a DS1007-based MP/MC application can stimulate variables of only one application process.

Support of the ASAM AE XIL API 2.0.1 standard

The Signal Editor now lets you import/export signal description sets and signal generators according to the ASAM AE XIL API 2.0.1 standard.

New Data File segment The Signal Editor now provides the new, ASAM AE XIL API 2.0.1-compatible Data File segment type. It lets you specify a segment's content via a linked MF4 data file.

Refer to *How to Create and Configure a Data File Segment* ( *ControlDesk Next Generation Advanced Practices Guide*).

Migration aspects Keep the *migration aspects in mind* (refer to *Migrating signal description sets and signal generators* on page 93).



Migrating to ControlDesk Next Generation (ControlDesk 5.4)

Where to go from here

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|  <i>ControlDesk Next Generation Migration Guide</i> Explains migration from ControlDesk 3.x, CalDesk and prior versions of ControlDesk Next Generation to ControlDesk 5.4. | |
|  <i>ControlDesk Next Generation Migration of ControlDesk 3.x Automation</i> Explains migration from ControlDesk 3.x automation to ControlDesk Next Generation automation. | |

Migrating to ControlDesk Next Generation (ControlDesk 5.4)

To migrate from ControlDesk 5.3 to ControlDesk 5.4 and reuse existing experiments, you might have to carry out the following migration steps.

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| <i>No evaluation of Python-specific environment variables</i> | 93 |
| <i>Migrating to ControlDesk 5.4</i> | 93 |
| <i>Migrating signal description sets and signal generators</i> | 93 |
| <i>Modified default auto repeat behavior</i> | 93 |
| <i>Migrating from CalDesk, ControlDesk 3.x, or prior ControlDesk Next Generation 4.3 versions</i> | 94 |

Discontinuations in ControlDesk 5.4

No evaluation of Python-specific environment variables As of ControlDesk 5.4, Python-specific environment variables such as `PYTHONHOME` are no longer evaluated by ControlDesk's Internal Interpreter and when they are used in extension scripts.

Migrating to ControlDesk 5.4


Migrating signal description sets and signal generators

ControlDesk's Signal Editor lets you import/export signal description sets and signal generators.

The following table shows the compatibility between signal description sets and signal generators and the ASAM standard version:

| Signal Description Sets and Signal Generators Last Saved with ... | Compatible with ... |
|---|-----------------------|
| ControlDesk 5.3 or earlier | ASAM AE HIL API 1.0.2 |
| ControlDesk 5.4 or later | ASAM AE XIL API 2.0.1 |

When you open a project last saved with ControlDesk 5.3 or earlier in ControlDesk 5.4 or later, signal description sets and signal generators are automatically migrated to be compatible with ASAM AE XIL API 2.0.1.



Migrated signal description sets and signal generators cannot be used anymore with ControlDesk 5.3 or earlier.

However, a backup of the original project is stored in the project root folder during migration.

During migration:

- If a Condition was specified for a Duration segment property, this condition is applied to the new Stop Trigger segment property, which is ASAM AE XIL API 2.0.1-compatible.

The Duration segment property is disabled and ignored whenever a Stop Trigger segment property is specified.

- Segments that have the Measured Data type are renamed Signal Value.

Modified default auto repeat behavior As of ControlDesk 5.4, you can specify whether to re-arm the start trigger for the next capture in an automatically repeated measurement immediately ("Immediate" Auto repeat behavior) or after a delay for data upload


("Delayed" Auto repeat behavior) for measurement rasters in applications of the following platforms:

- DS1007 PPC Processor Board
- DS1202 MicroLabBox
- SCALEXIO
- VEOS


Up to and including ControlDesk 5.3, the "Immediate" Auto repeat behavior was implicitly selected for measurement rasters in applications of newly created platforms. This default setting could not be changed with ControlDesk 5.3 or earlier.

Migration aspects:

- As of ControlDesk 5.4, the default setting for measurement rasters in applications of newly created platforms is the "Delayed" Auto repeat behavior.
- When you open a project last saved with ControlDesk 5.3 or earlier in ControlDesk 5.4 or later, the "Immediate" Auto repeat behavior is preselected for measurement rasters of platforms listed above.

As of ControlDesk 5.4, you can change the setting. For details, refer to *Triggered Raster Properties* ( *ControlDesk Next Generation Reference*).

Migrating from CalDesk, ControlDesk 3.x, or prior ControlDesk Next Generation 4.3 versions

To migrate from CalDesk, ControlDesk 3.x, or prior ControlDesk Next Generation versions and reuse existing experiments, you might have to carry out additional migration steps. For information on the migration steps, refer to *Migrating to ControlDesk Next Generation* ( *ControlDesk Next Generation Migration Guide*).

DCI Configuration Tool

New Features of the DCI Configuration Tool 3.4

Improved A2L file adaptation

The DCI Configuration Tool comes with improvements related to the adaptation of an existing A2L file for use with a DCI-GSI2.

Refer to *A2L File Page* ([📖 DCI Configuration](#)).

Display of XCP instance status information

The DCI Configuration Tool now displays status information on the XCP slave instances of a DCI-GSI2. You can see which XCP instances are used and which Ethernet connection parameters they have.

Refer to *DCI-GSI2 Status Page* ([📖 DCI Configuration](#)).

Improved DCI-GSI2 memory access test

The DCI Configuration Tool now allows the execution of the memory access test on a DCI-GSI2 using a configurable range of ECU interface frequencies. The statistical analysis helps you to determine the optimal ECU interface clock frequency.

Refer to *How to Perform Start-Up Diagnostics on a DCI-GSI2* ([📖 DCI Configuration](#)).

dSPACE ECU Flash Programming Tool

New Features of the dSPACE ECU Flash Programming Tool 2.2.6

Support of Vector Informatik's VN5610 interface

The dSPACE ECU Flash Programming Tool now supports the VN5610 interface from Vector Informatik for CAN.

Refer to *Supported ECU Interface Types* ([📖 ECU Flash Programming](#)).

Support of Eberspächer Electronics interfaces for CAN

The dSPACE ECU Flash Programming Tool now supports the following interfaces from Eberspächer Electronics (formerly TZM) for CAN:

- FlexCard Cyclone II
- FlexCard Cyclone II SE
- FlexCard USB

Refer to *Supported ECU Interface Types* ([📖 ECU Flash Programming](#)).

dSPACE HIL API .NET

New Features of dSPACE HIL API .NET 1.8

Enhanced platform support

dSPACE HIL API .NET using the MAPort implementation supports multiprocessor systems based on DS1007 PPC Processor Boards.

For further information on the dSPACE HIL API .NET implementation, refer to [📖 dSPACE HIL API .NET Implementation Document](#).

Stimulus support for DS1007

The MAPort stimulus is supported by DS1007. However, if you use a DS1007 as a multicore or multiprocessor system, you can stimulate only variables that are contained in the subapplication that the signal generator is running in.

dSPACE Python Extensions


New Features of dSPACE Python Extensions 1.8

Enhanced platform support

Multiprocessor systems based on DS1007 PPC Processor Boards are supported by:

- dSPACE Platform Management API
- dSPACE HIL API Python Implementation (MAPort)

For further information, refer to  *dSPACE Platform Management API Reference*.

For further information on the dSPACE HIL API Python Implementation, refer to  *dSPACE HIL API Python Implementation Document*.

Support of 64-bit MATLAB

matlablib2 now supports 64-bit MATLAB versions without installing the related 32-bit MATLAB versions.

Stimulus support for DS1007

The MAPort stimulus is supported by DS1007. However, if you use a DS1007 as a multicore or multiprocessor system, you can stimulate only variables that are contained in the subapplication that the signal generator is running in.

MAT file support

With matlablib2 you can handle MAT files with formats above Level 5 even if no MATLAB has been installed.

dSPACE XIL API

New Features of dSPACE XIL API 2015-A

| | |
|---------------------------------------|---|
| Enhanced platform support | <p>dSPACE XIL API (MAPort) supports multiprocessor systems based on DS1007 PPC Processor Boards.</p> <p>For further information on the dSPACE XIL API implementation, refer to 📖 dSPACE XIL API Implementation Guide.</p> |
| Stimulus support for DS1007 | <p>The MAPort stimulus is supported by DS1007. However, if you use a DS1007 as a multicore or multiprocessor system, you can stimulate only variables that are contained in the subapplication that the signal generator is running in.</p> |
| XIL API MAPort server support | <p>The dSPACE XIL API MAPort server is applicable with 64-bit client applications.</p> |
| Enhanced MAPort demos | <p>The MAPort demos are now also available in the M format used by MATLAB. The demo applications access the MATLAB interface for .NET.</p> |
| Enhanced MAPort functionality | <p>The following methods are now supported:</p> <ul style="list-style-type: none">■ DAQLock for the MAPort class■ CaptureStartTime for the CaptureResult class |
| Enhanced EESPort functionality | <p>The XIL API EESPort for electrical error simulation supports the DS1450 Bus FIU Board.</p> |

ECU Interface Manager

Where to go from here

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| <i>New Features of ECU Interface Manager 1.6</i> | 105 |
| <i>Migrating to ECU Interface Manager 1.6</i> | 106 |

New Features of ECU Interface Manager 1.6

Support of built-in XCP services

The ECU Interface Manager now also supports XCP services that are already integrated in an ECU application. With the ECU Interface Manager, you can add additional service calls to these built-in XCP services, which allows you to prepare XCP-service-based bypassing.

Multicore support

Multicore support is available with the new generic schema (see below).

Support for context-dependent variables

Context-dependent variables are used in multicore applications and AUTOSAR applications. The content of such a variable depends on the specific content of a global variable used in the ECU application.

The supplier can define *context-dependent variables* to work with the same initial values in different contexts without changing the global variable. For example, related to a specific context, a *context-dependent variable* can be used in more than one function of the ECU application. Using *context-dependent variables*, the ECU supplier can ensure data consistency for bypassing.

To be displayed in the ECU Interface Manager, *context-dependent variables* must be described in the software module description file. The generic schema lets an ECU supplier describe *context-dependent variables*.

For details, refer to *Describing Context-Dependent Variables* ([📖 ECU Interface Manager Reference](#)).

New software module description file schema

As of ECU Interface Manager 1.6, ECU suppliers can now use a generic schema to create a software module description file (→ *Software module description file* ([📖 ECU Interface Manager Guide](#))).

For details on the generic schema, refer to *Generic Schema of Software Module Description Files* ([📖 ECU Interface Manager Reference](#)).

Migrating to ECU Interface Manager 1.6

Migrating projects last saved with a former version of ECU Interface Manager

In ECU Interface Manager 1.6, you can reuse projects that were last saved with a former version of the ECU Interface Manager.

When you open such a project for the first time, you are asked whether to update it:

- When you start the update, you can continue working with the project with ECU Interface Manager 1.6.
- When you postpone the update, actions are blocked except for exporting the application. You can update the project later.
- When you save the project, you are asked whether to overwrite the old project file:
 - When you overwrite the old project, you can no longer use it with a former version of the ECU Interface Manager.
 - When you do not overwrite the old project, you have to specify another location and/or name for the project file. This lets you keep a version of the project that you can work with in the former version of ECU Interface Manager.

New software module description file schema

As of ECU Interface Manager 1.6, ECU suppliers can now use a generic schema to create a software module description file (→ *Software module description file* ([📖 ECU Interface Manager Guide](#))).

You can also import software module description files based on the dSPACE-specific schema, which was originally introduced with ECU Interface Manager 1.0.



Multicore support and further developments are not available with the dSPACE-specific schema. Use the generic schema instead.

For details on the generic schema, refer to *Generic Schema of Software Module Description Files* ([📖 ECU Interface Manager Reference](#)).

Firmware Manager


Features of Firmware Manager 1.3

Enhanced platform support

The Firmware Manager supports multiprocessor systems based on DS1007 PPC Processor Boards. However, it is not possible to update or repair the firmware components of the entire multiprocessor system. This must be done separately for each processor board.

Usability improvements

The commands to switch between the update mode and repair mode is now also available as a menu command.

For further information, refer to *Firmware Manager Reference* ( *Firmware Manager Document*).

dSPACE FlexRay Configuration Package

Where to go from here

Information in this section

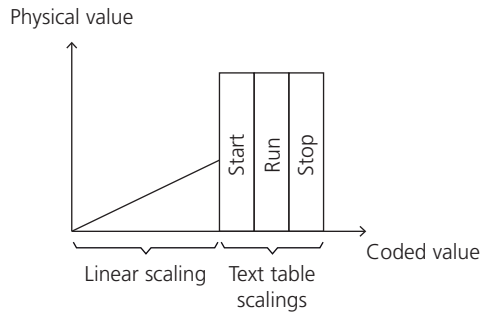
| | |
|---|-----|
| <i>New Features of dSPACE FlexRay Configuration Package 3.5</i> | 111 |
| <i>Migrating to dSPACE FlexRay Configuration Package 3.5</i> | 114 |

New Features of dSPACE FlexRay Configuration Package 3.5

FlexRay Configuration Package

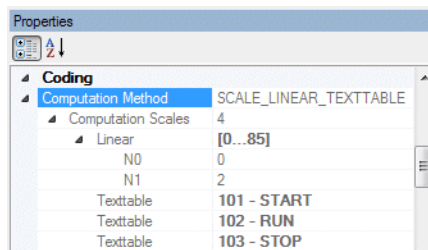
New supported hardware The FlexRay Configuration Package supports the MicroAutoBox II DS1514 variants.

Support of multiple computation methods for signal encoding/decoding The FlexRay Configuration Tool now supports the SCALE-LINEAR TEXTTABLE computation method. It allows you to combine a linear (or identical) scaling and one or more text table scalings to a multiscaling for signal encoding/decoding. The following illustration shows an example:



Multiscalings are supported for PDU-based modeling.

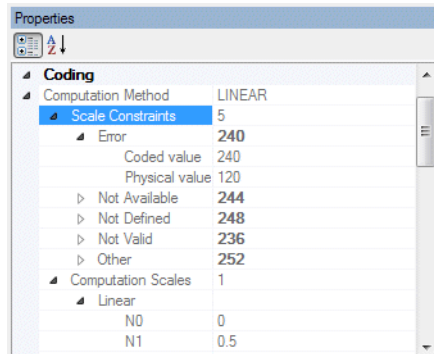
The Properties view displays the information of the computation method for each signal. You can see how numerical values are mapped to the different scalings.



For all the signals that use multiscalings for signal encoding/decoding, the Port data type must be specified accordingly. The FlexRay Configuration Tool provides a comfortable way to set the correct property value simultaneously for all relevant signals with one mouse click. Refer to *Generators Page* ([FlexRay Configuration Tool Reference](#)).

Support of further validity values FlexRay Configuration Package 3.5 now supports further validity values beyond 'VALID' and 'NOT VALID'. Validity values are derived from scale constraint definitions in the communication cluster. Scale constraints determine value ranges that are particularly significant. The FlexRay Configuration Package now also supports the following validity values: 'ERROR', 'NOT AVAILABLE', 'NOT DEFINED', and 'OTHER'.

If the imported communication cluster file contains scale constraint definitions for a signal, they are displayed in the Properties view:



The parameterization of the validity ports in the Simulink model and the validity-relevant TRC variables is done in the same way: the same validity values are used for the ports and the TRC variables.

Modified transmission behavior for static PDUs that are enabled via software Under certain conditions, the transmission behavior of a static PDU that is enabled via software has been changed in FlexRay Configuration Package 3.5. If an LPDU that will be sent does not contain any updated PDU, now a null frame is sent instead of the LPDU with old payload data.

The behavior change applies to the following conditions and settings:

- You work with FIBEX+, FIBEX 3.x, FIBEX 4.1.x, or AUTOSAR system description files.
- SWEnable Configuration is set to 'Control of L-PDU commit to FlexRay buffer' (refer to *General Page* ([FlexRay Configuration Tool Reference](#)))
- Static TX buffer transmission mode is set to 'Event (null frame used)' (refer to *Generators Page* ([FlexRay Configuration Tool Reference](#)))

Update of RX signal value when error value is received With older versions of the FlexRay Configuration Package, the value of an RX signal was not updated when the received value is not valid. With FlexRay Configuration Package 3.5, you can specify whether RX signal values are to be updated in any case, independently from the validity of the received signal values.

Refer to *General Page* ([FlexRay Configuration Tool Reference](#)).

FlexRay Configuration Tool

Support of FIBEX 4.1.1 The FlexRay Configuration Tool now also supports FIBEX 4.1.1 files for describing FlexRay networks.

Improved user interface The FlexRay Configuration Tool comes with changes to the user interface to make working with FlexRay configurations easier and more intuitive. Here are three examples:

- The filters have been reorganized.
- There is a new sorting of the attributes of a selected element or task in the Properties view.
- The Task Schedule View can always be displayed on top.

Migrating to dSPACE FlexRay Configuration Package 3.5

Modified data type of Validity port

Because FlexRay Configuration Package 3.5 now supports further validity values in addition to 'VALID' and 'NOT VALID', the data type of the Validity port has changed from Boolean to Uint32.

If you want to reuse existing FlexRay models reading or writing the signal validity status via the Validity port, you must migrate the models. You must use the FlexRay Configuration Tool to generate new configuration data and code for the FlexRay configuration. Then update your Simulink model, replace the Validity control elements in the mapping subsystems of the PDU blocks (if any), and start the build process.

ModelDesk

Where to go from here

Information in this section

| | |
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| <i>New Features of ModelDesk 4.1</i> | 115 |
| <i>Migration to ModelDesk 4.1</i> | 116 |

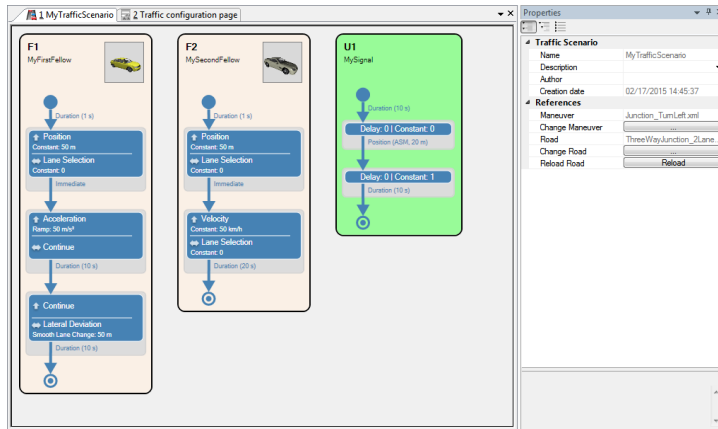
New Features of ModelDesk 4.1

Traffic Editor

The graphical user interface of the Traffic Editor has been completely changed. It provides the following features:

- Easy and intuitive scenario definition adapted from UML.
- Adjustable maximum number of fellow vehicles and user signals based on the simulation model.
- The fellow definitions are independent from each other.
- You can specify fellow-dependent and fellow-independent user signals.
- Intuitive copy and paste of scenario elements
- Updated fellow geometry synchronization with MotionDesk

The following illustration shows an example of the Traffic Editor.



Processing

Plotting The settings for the plotting configurations have been improved.

Additional functions You can specify additional functions that are calculated during processing. The additional functions are independent from the function specified for parameters.

Parameterizing

Automotive Simulation Models You can parameterize the Automotive Simulation Models in this release. For details on the Automotive Simulation Models, refer to *Automotive Simulation Models (ASM)* on page 45.

InCylinder models Now ModelDesk supports the InCylinder models.

Road Generator

You can now import roads in the OpenDrive format. The imported roads are migrated to ModelDesk road format. Then they can be used in ModelDesk experiments.

Migration to ModelDesk 4.1

Tool automation of Traffic Editor

The tool automation interface of the Traffic Editor has been changed. It is not possible to use older scripts with the new Traffic Editor.

Model Interface Package for Simulink

Features of the Model Interface Package for Simulink 3.0

Model Interface Package for Simulink

The following ConfigurationDesk components were combined into a new product called *Model Interface Package for Simulink*:

- dSPACE Model Port Block Library
- dSPACE Model Separation Block Library
- dSPACE Run-Time Target (`dsrt.tlc`)

The dSPACE Run-Time Target allows you to generate a Simulink implementation container from your Simulink behavior model (see below).

You can also continue to add Simulink models directly to your ConfigurationDesk application.



The *Model Interface Package for Simulink* is the successor to the *dSPACE Target for Offline Simulation*, which will be delivered for the last time with dSPACE Release 2015-A. For migration aspects, refer to the following topics:

- [Information for Former DsOffSim Users](#) ([PDF Model Interface Package for Simulink - Modeling Guide](#))
- [Migrating to VEOS 3.4](#) on page 161

Simulink implementation container

Model Interface Package for Simulink provides methods for you to start the model code generation in MATLAB/Simulink, and to combine the generated model code into a Simulink implementation container (SIC file). Besides the model code, the SIC file contains static code parts and a description of the model interface. Among others, the behavior model may also contain blocks from the dSPACE Model Port Block Library. You can add a Simulink implementation container to a ConfigurationDesk application, or import it into VEOS Player.

Benefits of Simulink implementation containers

With a Simulink implementation container, you can separate the model code generation from the build process. This approach has the following benefits:

- Simulink behavior models can be used in ConfigurationDesk and VEOS Player using the same build target. This avoids the need for adaptations for the simulation platform in the models.
- Simulink implementation container variants can be exchanged in a ConfigurationDesk application without model code generation, because model code generation is not necessary for a build process.
- You do not need a MATLAB installation for the build process.
- Executable applications can contain Simulink implementation containers from different MATLAB versions.

Refer to  *Model Interface Package for Simulink - Modeling Guide*.

MotionDesk

Where to go from here

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| <i>New Features of MotionDesk 3.6</i> | 119 |
| <i>Migrating to MotionDesk 3.6</i> | 121 |

New Features of MotionDesk 3.6

Instruments

- MotionDesk has two new instruments.
 - A Multistate Picture instrument can display different pictures depending on the value of a variable. You can specify several number ranges and their appropriate picture for a Multistate Picture instrument. In addition you can display the numeric value next to the picture.
 - A Multistate Text instrument can display different strings depending on the value of a variable. You can specify several number ranges and their appropriate strings for a Multistate Text instrument.
- Instrument positioning

You can now specify the position of all the instruments in pixel values or percentage values of the current view size.

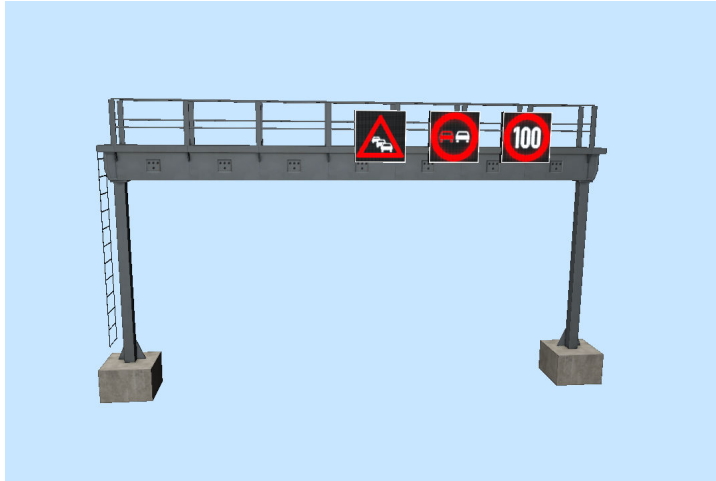
3-D object library

The MotionDesk 3-D object library has new state objects.

Cars with wheels New cars are available as state objects. The cars have wheels that can rotate automatically. It is not necessary to

calculate the motion in the simulation for such cars. The rotation of the wheels are calculated by MotionDesk during visualization. The state objects are especially suitable for visualizing traffic scenarios.

Gantry sign Gantry signs are available as state objects. Depending on the values of the state, the displays of a gantry can display different traffic signs such as limits or no overtaking. The following illustration shows an example.





Vivid road textures

The roads and embankments have new textures that look more realistic. The road texture has worn-out areas, randomly generated potholes, and small cracks. The embankments have flowers and the color of the grass varies. The following illustration shows an example.



| | |
|---|--|
| Loading sequence of the MDF file and scene | You can specify the loading sequence of the MDF file and scene via an option on the Visualization page. |
| Tool automation | The tool automation has been extended: <ul style="list-style-type: none"> ■ You can get or set the fellow index of a movable object. ■ You can get or set the name of the data stream of a movable object. ■ You can get the list of experiments of the active project. ■ You can get the name and path of the experiment file of the active experiment. |
| Updating the scene | MotionDesk supports the update of the traffic fellows that are defined by the new Traffic Editor, see <i>New Features of ModelDesk 4.1</i> on page 115. |

Migrating to MotionDesk 3.6

| | |
|--|---|
| Migrating from MotionDesk 2.1.6 and earlier | As of MotionDesk 2.2, there is a different project/experiment structure for managing experiment data. Earlier MotionDesk projects must therefore be migrated. For details, refer to <i>Migrating from MotionDesk 2.1.6 and Lower</i> ( <i>MotionDesk Guide</i>). |
| Migrating from MotionDesk 2.2.1 and earlier | Because MotionDesk now uses a new format for the 3-D objects, scenes and custom 3-D objects must be migrated. For details, refer to <i>Migrating from MotionDesk 2.2.1 and Lower</i> ( <i>MotionDesk Guide</i>). |
| Migrating from MotionDesk 3.4 | LED instruments are migrated to Multistate LED instruments automatically. |

Real-Time Testing

New Features of Real-Time Testing 2.5

CAN FD

Real-Time Testing supports CAN messages in the CAN FD format.

New supported platforms

- Real-Time Testing supports virtual ECUs on VEOS.
- Real-Time Testing supports the new platform, DS1007 PPC Processor Board.

RTI/RTI-MP and RTLib

New Features of RTI/RTI-MP and RTLib

MicroLabBox

Enhanced RTI support The board blockset for MicroLabBox (RTI 1202) now provides RTI blocks for a serial interface connection. The serial interface supports the transceiver modes RS232, RS422 and RS485 with a baud rate of up to 230 kBd or 10 MBd.

For further information, refer to *Serial Interface* ([📖 MicroLabBox RTI Reference](#)).

The `DIO_CLASS1_HWINT_BLx` block now displays more information in the block, such as the identifier of the interrupt-generating block.

For further information, refer to *DIO_CLASS1_HWINT_BLx* ([📖 MicroLabBox RTI Reference](#)).

Booting from USB mass storage device Via the board's USB interface, it is now possible to load an application from the connected mass storage device at system start. To manage the application files on the USB device, the board's web interface now includes the USB Management page. The page provides functions to select an application for autobooting or to create an application image from a currently running application, for example.

For further information on the board's features, refer to [📖 MicroLabBox Features](#).

MicroAutoBox

New MicroAutoBox I/O board The DS1514 is a new I/O board for MicroAutoBox II. It provides the same features as the DS1512 I/O Board, but contains a different FPGA module. The Xilinx® Kintex®-7 FPGA (XC7K325T) provides more than twice of the logical cells and

slices provided by the FPGA module mounted on the DS1512 I/O Board. The new FPGA module is supported by Xilinx's Vivado implementation software.

The following MicroAutoBox variants are expected to be available at the middle of 2015:

- MicroAutoBox II 1401/1511/1514
- MicroAutoBox II 1401/1513/1514

Improved input voltage range detection The DS1511 I/O Board and the DS1552 Multi-I/O Module are available as *B1* versions providing an analog input voltage range of ± 10 V instead of 0 ... 5 V. The implementation software is now able to check whether the hardware that is used suits the specified settings in the real-time application and stops the execution at a mismatch.

RTLib1401 therefore provides the following new functions that let you specify the input voltage range:

- `adc_tp4_single_init2`
- `adc_tp4_burst_init2`
- `adc_1552_tp1_single_init2`

MicroAutoBox II configuration tool The FPGA Type 1 page of the MicroAutoBox II configuration tool lets you enable the autoboot state of the FPGA Type 1 unit available with a DS1512 or DS1514 I/O Board.

The FPGA is then automatically programmed at restart by the bitstream that is stored in the flash memory.

You can set the autoboot state only, if no other tool is accessing the board.

Discontinuation of MicroAutoBox I/O boards The following MicroAutoBox II variants will be available only until end of 2015:

- MicroAutoBox II 1401/1501
- MicroAutoBox II 1401/1504
- MicroAutoBox II 1401/1505/1507

The software support continues at least up to end of 2018. We recommend that you use the successor variants of MicroAutoBox II with the I/O boards DS1511, DS1512, DS1513 and DS1514. The MicroAutoBox II variant 1401/1507 will still remain available.

For further information on the board's features, refer to [MicroAutoBox Features](#).

DS1007

RTI-MP support for DS1007 You can now use RTI-MP also for the external Gigalinks of a DS1007 PPC Processor Board with DS911 Gigalink Modules when using a multiprocessor application and the internal virtual Gigalinks when using a multicore application.

Booting from USB mass storage device Via the USB interface of the board, it is now possible to load an application from the connected mass storage device at system start. To manage the application files on the USB device, the board's web interface now includes the **USB Management** page. The page provides functions to select an application for autobooting or to create an application image from a currently running application, for example.

For further information on the board's features, refer to [DS1007 Features](#).

**Limitations when using
MATLAB R2015a**

Note the following limitations when you use RTI/RTI-MP with MATLAB R2015a:

■ Using muxed triggers

Simulink Coder from MATLAB R2015a generates incorrect code for muxed triggers. Using muxed triggers in MATLAB R2015a is not recommended.

■ Using a parallel build for referenced models

The Parallel Computing Toolbox from MathWorks® allows the parallel build of referenced models on a multicore PC. However, if you use MATLAB R2015a to build referenced models with activated MATLAB workers, the build might fail or the results might be erroneous.

As a workaround, you have to remove all build results from modified referenced models in the `s1prj` folder beforehand.

Look regularly at the MathWorks® bug reports for a solution, for example, at

<http://www.mathworks.com/support/bugreports/1199590>.

RTI Bypass Blockset

Where to go from here

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| <i>Migrating to RTI Bypass Blockset 3.4</i> | 130 |

New Features of the RTI Bypass Blockset 3.4

RTI Bypass Blockset

Virtual ECU bypassing The RTI Bypass Blockset supports virtual ECU (V-ECU) bypassing on VEOS and MicroAutoBox II. V-ECU bypassing means implementing bypassing use cases in the context of a virtual ECU. The RTI Bypass Blockset lets you develop a bypass model for a virtual ECU (which must be prepared for bypassing) as usual, and then integrate the new ECU function(s) in the virtual ECU for offline simulation on VEOS or for execution on MicroAutoBox II. Thereby you can switch between V-ECU and real ECU interfaces easily without changing the ECU function model.

For further information, refer to the [RTI Bypass Blockset Reference](#).

For V-ECU bypassing on VEOS, the RTI Bypass Blockset uses the already established 'INTERNAL' bypass interface type. dSPACE provides the `dSPACE_INTERNAL_Bypass_v1_4_0.aml` AML file for a new version of the `IF_DATA dSPACE_INTERNAL_BYPASS` entry in this context.

For V-ECU bypassing on MicroAutoBox II, the RTI Bypass Blockset comes with the new 'VECU' bypass interface type. In connection with the new bypass interface, the interface-specific

IF_DATA dSPACE_VECU_BYPASS entry is provided by the AML file dSPACE_VECU_Bypass_v1_0_0.aml.

For further information, refer to the [📖 Interface Description Data Reference](#).

Support of Renesas target processor families for internal bypassing The RTI Bypass Blockset now also supports internal bypassing for the Renesas target processor families.

RTI Bypass Blockset MATLAB API

Support of enhancements to RTI Bypass Blockset The RTI Bypass Blockset MATLAB API supports the enhancements to the RTI Bypass Blockset.

Refer to the [📖 RTI Bypass Blockset MATLAB API Reference](#).

Migrating to RTI Bypass Blockset 3.4

Working with models from earlier RTI Bypass Blockset versions 3.x and 2.x

The current release contains RTI Bypass Blockset 3.4, which is compatible with earlier blockset versions 3.x and 2.x. However, there are some points to note:

- *Working with models from RTI Bypass Blockset 2.5 or earlier*

Data management was changed in comparison to the prior RTI Bypass Blockset versions. If you have a Simulink model built with RTI Bypass Blockset 2.5 or earlier and open it with RTI Bypass Blockset 3.4, the old data dictionary file (with file name extension .dd) is replaced by a new data dictionary file (.vdb) using the information stored in the Setup block as soon as you open and close the Setup block dialog via **OK**, or open the Read, Write, Upload or Download block dialog and click the **Fill Variable Selector** button on the Variables page.

If you have a model that was saved with RTI Bypass Blockset 3.4 and want to use it with RTI Bypass Blockset 2.5 or earlier, the model's data dictionary file required for blockset version 2.5 or earlier (file name extension .dd) is created as soon as you update the A2L files in the Setup block or open the Read, Write, Upload or Download block and click the **Fill Variable Selector** button on the Variables page. The data dictionary file created under RTI Bypass Blockset 3.4 (*.vdb) remains on disk.

To make the RTI Bypass Blockset able to recreate the data dictionary, the database files specified in the Setup block must be accessible at the specified location and must be unchanged.

- *Working with models from RTI Bypass Blockset 2.6 up to and including RTI Bypass Blockset 3.3*

If you have a Simulink model built with RTI Bypass Blockset 2.6 up to RTI Bypass Blockset 3.3 and open it with RTI Bypass Blockset 3.4, the old data dictionary file is replaced by a new data dictionary file. However, the new data dictionary file cannot be used in earlier RTI Bypass Blockset versions. If you want to reuse the model with RTI Bypass Blockset 2.6 up to RTI Bypass Blockset 3.3, you have to create a suitable database in the earlier RTI Bypass Blockset version by reimporting the database files (A2L files) specified in the Setup block.

RTI CAN MultiMessage Blockset

Where to go from here

Information in this section

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| <i>New Features of the RTI CAN MultiMessage Blockset 4.1</i> | 133 |
| <i>Migrating to RTI CAN MultiMessage Blockset 4.1</i> | 135 |

New Features of the RTI CAN MultiMessage Blockset 4.1

Support of AUTOSAR System Template 4.2.1

The RTI CAN MultiMessage Blockset now supports the AUTOSAR System Template based on AUTOSAR Release 4.2.1 for describing CAN networks.

Refer to *General Settings Page (RTICANMM MainBlock)* ([📖 RTI CAN MultiMessage Blockset Reference](#)).

New supported platform

The RTI CAN MultiMessage Blockset supports the MicroAutoBox II DS1514 variants.

CAN partial networking The blockset supports CAN partial networking for the MicroAutoBox II DS1514 variants. Refer to *Partial Networking Page (RTICANMM ControllerSetup)* ([📖 RTI CAN MultiMessage Blockset Reference](#)).

CAN FD support The blockset supports working with CAN FD messages for the MicroAutoBox II DS1514 variants, if MicroAutoBox II is equipped with DS4342 CAN FD Interface Modules. Refer to *Basics on Working with CAN FD* ([📖 RTI CAN MultiMessage Blockset Reference](#)).

CAN partial networking on CAN FD channels

The RTI CAN MultiMessage Blockset now supports CAN partial networking on DS4342 CAN channels. This means that you can use CAN partial networking wake-up messages to wake up dSPACE real-time hardware equipped with DS4342 CAN FD Interface Modules after its CAN transceiver is switched to sleep mode or was powered down.

Refer to *Partial Networking Page (RTICANMM ControllerSetup)* ([📖 RTI CAN MultiMessage Blockset Reference](#)).

Transceiver type support for CAN FD

The RTI CAN MultiMessage Blockset now also supports the ISO11898-5 and ISO11898-6 transceiver types for using the CAN FD protocol.

Refer to *Setup Page (RTICANMM ControllerSetup)* ([📖 RTI CAN MultiMessage Blockset Reference](#)).

J1939 containers

When working with a J1939-compliant DBC file, the RTI CAN MultiMessage Blockset distinguishes between container messages and instance messages. There is one container for each PGN, receiving all the messages with its PGN in general. However, several messages with the same PGN might be defined.

With older versions of the RTI CAN MultiMessage Blockset, the message with the shortest name was always used as the container message for the PGN. As of RTI CAN MultiMessage Blockset 4.1, there is an alternative container type: The blockset can create additional messages used as container messages. If you select to work with additional messages, a new container message named `CONT_<shortest_message_name>` is created for each PGN during database import.

Refer to *General Settings Page (RTICANMM MainBlock)* ([📖 RTI CAN MultiMessage Blockset Reference](#)).

Modified multiprocessor support

There are some changes in working with submodels in multiprocessor models containing blocks from the RTI CAN MultiMessage Blockset.

With older versions of the RTI CAN MultiMessage Blockset, the `RTICANMM GeneralSetup` block was automatically copied from the multiprocessor model to the submodels. As a result, the submodels were stored in the working folder of the multiprocessor model, and all generated files from all the submodels were stored in the same destination folder.

As of RTI CAN MultiMessage Blockset 4.1, the `RTICANMM GeneralSetup` block is no longer copied automatically from the

multiprocessor model to the submodels. Instead, you must manually add an RTICANMM GeneralSetup block to each submodel and configure it. Hence, the submodels must no longer be stored in the working folder of the multiprocessor model, and a separate destination folder for generated files can be specified for each RTICANMM GeneralSetup block.

Migrating to RTI CAN MultiMessage Blockset 4.1

Working with models from earlier RTI CAN MultiMessage Blockset versions

To reuse a model created with an earlier RTI CAN MultiMessage Blockset version, you must update the S-functions for all the RTICANMM blocks and save the model before modifying the CAN configuration.

To create new S-functions for all the RTICANMM blocks in your model in one step, you can perform one of the following actions after opening the model:

- In the MATLAB Command Window, enter `rtimmsu_update('System', gcs)`.
For further information on the command and its options, enter `help rtimmsu_update` in the MATLAB Command Window.
- Select the Create S-Function for all CAN Blocks command from the Options menu of the RTICANMM GeneralSetup block.

For further information, refer to *Limitations with RTICANMM* ([RTI CAN MultiMessage Blockset Reference](#)).

Compiler messages when using code generated by an RTI CAN MultiMessage Blockset version < 4.0

If you use code that was generated by an RTI CAN MultiMessage Blockset version < 4.0, several compiler warning messages containing the phrase <<argument of type "can_tp1_canChannel *" is incompatible with parameter of type "DsTCanCh">> will appear during the build process of your simulation model due to a modified data type. These warnings can be ignored and will disappear after you regenerate the RTICANMM code by using the current blockset version.

Using existing checksum algorithms

Checksum algorithms originally developed for an application containing CAN messages cannot be reused for applications containing CAN FD messages, because CAN FD includes new message types and longer data fields. Existing checksum algorithms can still be used for applications that just contain classic CAN

messages. For CAN FD applications, you must adapt the checksum algorithms.

RTI Electric Motor Control Blockset

Features of RTI Electric Motor Control Blockset 1.1

New blocks

The RTI Electric Motor Control Blockset provides new blocks:

- `EMC_RESOLVER_BLx` to use a resolver as an input sensor for motor control.
- `EMC_ENCODER_POS_SET_BLx` to reset the position value of the encoder interface.

For further information, refer to  *RTI Electric Motor Control Blockset Reference*.

RTI Ethernet Blockset

New Features of the RTI Ethernet Blockset 1.2

Link status information

You can now specify the number of Ethernet connectors that are provided by the connected hardware. The width of the Link Status output depends on the specified number. You can therefore get the status information for each Ethernet connector and not only for the first connector of your hardware. For further information, refer to *ETHERNET_SETUP_BLx* ([📖 RTI Ethernet Blockset Reference](#)).

Gateway address

You can now specify a gateway address. For further information, refer to *ETHERNET_SETUP_BLx* ([📖 RTI Ethernet Blockset Reference](#)).

Socket binding

For the TCP/IP and UDP/IP communication, you can now bind a socket to a specific IP address. For further information, refer to *ETHERNET_TCP_SETUP_BLx* ([📖 RTI Ethernet Blockset Reference](#)) and *ETHERNET_UDP_SETUP_BLx* ([📖 RTI Ethernet Blockset Reference](#)).

ARP support

For some network configurations, the setup blocks for the TCP/IP and UDP/IP communication automatically execute ARP (Address Resolution Protocol) requests in the initialization phase of your application to reduce the time for finding the MAC address of the related server IP address. For further information, refer to *ETHERNET_TCP_SETUP_BLx* ([📖 RTI Ethernet Blockset Reference](#)) and *ETHERNET_UDP_SETUP_BLx* ([📖 RTI Ethernet Blockset Reference](#)).

Information on dropped receive frames

The number of dropped frames is now also available for TCP/IP communication. The RX Dropped Frames output of the `ETHERNET_TCP_SETUP_BLx` block can be used to detect an overflow of the socket receive queue. For further information, refer to `ETHERNET_TCP_SETUP_BLx` ([RTI Ethernet Blockset Reference](#)).

RTI Ethernet (UDP) Blockset

New Features of the RTI Ethernet (UDP) Blockset 1.4

Higher data rate of 1 GBit/s

The RTI Ethernet (UDP) Blockset now supports the data rate of 1 GBit/s provided by the ETH Type 1 interface of MicroAutoBox II.

For further information, refer to *Overview of the RTI Ethernet (UDP) Blockset* ([📖 RTI Ethernet \(UDP\) Blockset Reference](#)).

RTI FPGA Programming Blockset

Where to go from here

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| <i>New Features of the RTI FPGA Programming Blockset 2.9</i> | 143 |
| <i>Migrating to RTI FPGA Programming Blockset 2.9</i> | 146 |

New Features of the RTI FPGA Programming Blockset 2.9

Extended Xilinx® support

The RTI FPGA Programming Blockset now supports the following products and versions of the Xilinx design tools.

| Platform | Xilinx Design Tools Version ¹⁾ | Operating System | MATLAB Version |
|---|--|--|--|
| <ul style="list-style-type: none"> ■ Modular system (DS5203) ■ MicroAutoBox II 1401/1511/1512 ■ MicroAutoBox II 1401/1512/1513 | ISE 14.7 ²⁾ (32-bit version) | <ul style="list-style-type: none"> ■ Windows 7 Business, Ultimate, and Enterprise SP1 (32-bit version and 64-bit version) | 32-bit and 64-bit versions of: <ul style="list-style-type: none"> ■ MATLAB R2013b |
| <ul style="list-style-type: none"> ■ SCALEXIO (DS2655) | ISE 14.7 ²⁾ (64-bit version) | <ul style="list-style-type: none"> ■ Windows 7 Business, Ultimate, and Enterprise SP1 (64-bit version) | 64-bit versions of: <ul style="list-style-type: none"> ■ MATLAB R2013b |

| Platform | Xilinx Design Tools Version ¹⁾ | Operating System | MATLAB Version |
|---|---|---|---|
| <ul style="list-style-type: none"> ■ MicroAutoBox II 1401/1511/1514 ■ MicroAutoBox II 1401/1513/1514 ■ MicroLabBox | Vivado 2014.4 (32-bit version) | <ul style="list-style-type: none"> ■ Windows 7 Business, Ultimate, and Enterprise SP1 (32-bit version) | 32-bit versions of: <ul style="list-style-type: none"> ■ MATLAB R2013b ■ MATLAB R2014a ■ MATLAB R2014b |
| | Vivado 2014.4 (64-bit version) | <ul style="list-style-type: none"> ■ Windows 7 Business, Ultimate, and Enterprise SP1 (64-bit version) | 64-bit versions of: <ul style="list-style-type: none"> ■ MATLAB R2013b ■ MATLAB R2014a ■ MATLAB R2014b |

¹⁾ Note that due to the introduction of the Vivado[®] software, Xilinx[®] no longer supports the Xilinx System Generator for DSP in combination with the ISE Design Suite after MathWorks[®] MATLAB[®] and Simulink[®] Release R2013b.

²⁾ The DS5203 FPGA Boards, the DS1512 IO Board (MicroAutoBox II), and the DS2655 FPGA Base Board also support the WebPACK Editions of the Xilinx design tools.

General enhancements

Support of new DS5203 FPGA Board variants The RTI FPGA Programming Blockset now provides four new frameworks for the DS5203 (7K325) FPGA Board and DS5203 (7K410) FPGA Board. The blockset provides one framework for boards with onboard I/O and one framework for boards with the DS5203M1 Multi-I/O Module for each new variant.

The new frameworks are named as follows:

- DS5203_XC7K325T
DS5203 (7K325) FPGA Board with onboard I/O
- DS5203_DS5203M1_XC7K325T
DS5203 (7K325) FPGA Board with DS5203M1 Multi-I/O Module
- DS5203_XC7K410T
DS5203 (7K410) FPGA Board with onboard I/O
- DS5203_DS5203M1_XC7K410T
DS5203 (7K410) FPGA Board with DS5203M1 Multi-I/O Module

The new frameworks provide the following features:

- All features of the previous DS5203 FPGA Board frameworks
- Enhanced data format

With the Format setting of the FPGA_XDATA_READ_BLx and FPGA_XDATA_WRITE_BLx blocks, you can now specify whether you want to use the fixed-point data format (signed or unsigned) or the floating-point format (single precision).

The Binary point position setting has therefore been renamed Binary point position (or fraction width) because it either lets you specify the binary point position for fixed-point data or it displays the fraction width used for floating-point data.

Support of new MicroAutoBox variants The RTI FPGA Programming Blockset now provides a framework for the new MicroAutoBox variants with the DS1514 I/O Board (MicroAutoBox II 1401/1511/1514 and MicroAutoBox II 1401/1513/1514). Furthermore the blockset provides two additional blocksets to support MicroAutoBoxes with a installed DS1552B1 Multi-I/O Module.

The new frameworks are named as follows:

■ **FPGA1401Tp1_DS1552B1_XC6SLX150**

Supports MicroAutoBox II 1401/1511/1512 and MicroAutoBox II 1401/1512/1513 with a DS1552B1 Multi-I/O Module.

■ **FPGA1401Tp1_DS1552_XC7K325T**

Supports MicroAutoBox II 1401/1511/1514 and MicroAutoBox II 1401/1513/1514 with a DS1552 Multi-I/O Module.

■ **FPGA1401Tp1_DS1552B1_XC7K325T**

Supports MicroAutoBox II 1401/1511/1514 and MicroAutoBox II 1401/1513/1514 with a DS1552B1 Multi-I/O Module.

The new frameworks provide the following features:

- All features of the previous MicroAutoBox frameworks
- Enhanced input voltage range of ADC (Type A)

The DS1552B1 Multi-I/O Module provides an enhanced input voltage range for the ADC (Type A).

The Data port of the ADC (Type A) function now supports the enhanced input voltage range. The `FPGA_IO_READ_BL` block provides the ADC (Type A) function.

Enhancements to the DS2655 FPGA Base Board framework

The framework for the DS2655 FPGA Base Board provides the following enhancements.

APU bus The new APU Master function lets you use a DS2655 FPGA Base Board as the APU master. The `FPGA_IO_WRITE_BL` block provides the new APU Master function.

The APU Slave function of the `FPGA_IO_READ_BLx` block has a new port. The Sim Angle Range port lets you simulate the angle range of the APU bus.

Processor synchronous data exchange The Buffer Out and Buffer64 Out functions of the FPGA_XDATA_WRITE_BL block have two new ports. The ports Send_Ack and Read_Req let you trigger a processor-synchronous data exchange.

Related topics

Basics

- *Migrating to RTI FPGA Programming Blockset 2.9* on page 146

Migrating to RTI FPGA Programming Blockset 2.9

Objective

There are different ways to migrate an existing model, depending on the blockset version used.

Migrating from RTI FPGA Programming Blockset 1.0 to 2.9

Because the RTI FPGA Programming Blockset 1.0 (released with dSPACE Release 6.4) was not fully implemented, a model that you implemented with it must be migrated manually. You must replace each block of the RTI FPGA Programming Blockset by a new one to make the model compatible with the current dSPACE RTI environment for modeling, building and executing.



The update function of the script interface does not support RTI FPGA Programming Blockset 1.0.

Migrating from RTI FPGA Programming Blockset 1.1 and higher to 2.9

If you have implemented your FPGA application using RTI FPGA Programming Blockset Version 1.1 and later, and want to use it with RTI FPGA Programming Blockset 2.8, you must update the FPGA framework. You can use the script interface for this, refer to *Updating the FPGA framework using the script interface* on page 146.

You also have to update the framework if you have updated from MATLAB R2008b or earlier to MATLAB R2011b or later.

Updating the FPGA framework using the script interface



It is recommended to back up your model before starting migration.

The script interface provides the `FPGAFrameworkUpdate` method to update a framework. You can decide whether to set the block parameters to their initial values or leave them unchanged.

To update the FPGA framework without changing the values of the block parameters

```
rtifpga_scriptinterface('FPGAFrameworkUpdate',
    <SimulinkHandle>)
```

The script handles all the subsystems in the model/subsystem which is specified by the Simulink handle. The parameters of the blocks are unchanged after updating to the current framework version.

Example: The following script updates the FPGA framework for any FPGA subsystem in the processor model called *MyProcModel*. The specified values of the block parameters are not changed.

```
ProcModelHandle = get_param('MyProcModel','handle')
rtifpga_scriptinterface('FPGAFrameworkUpdate',
    ProcModelHandle)
```

To update the FPGA framework and reset the values of the block parameters to their initial values

```
rtifpga_scriptinterface('FPGAFrameworkUpdate',
    <SimulinkHandle>, 'ReInit')
```

The script handles all the subsystems in the model/subsystem which is specified by the Simulink handle. The parameters of the blocks are reset to their initial values after updating to the current framework version.

```
ProcModelHandle = get_param('MyProcModel','handle')
rtifpga_scriptinterface('FPGAFrameworkUpdate',
    ProcModelHandle, 'ReInit')
```

ConfigurationDesk custom functions incompatible with dSPACE Release 2015-A



Relevant for SCALEXIO systems with a DS2655 FPGA Base Board and a DS2655M1 Multi-I/O Module

A custom function generated by using RTI FPGA Programming Blockset 2.5 from dSPACE Release 2013-A and the real-time applications (*.rta) containing the custom function are incompatible with dSPACE Release 2015-A. To produce a usable custom function you have to rebuild the FPGA model by using RTI FPGA Blockset 2.9 from dSPACE Release 2015-A.

RTI LIN MultiMessage Blockset

Where to go from here

Information in this section

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| <i>New Features of the RTI LIN MultiMessage Blockset 2.5</i> | 149 |
| <i>Migrating to RTI LIN MultiMessage Blockset 2.5</i> | 150 |

New Features of the RTI LIN MultiMessage Blockset 2.5

Support of AUTOSAR System Template 4.2.1

The RTI LIN MultiMessage Blockset now also supports the AUTOSAR System Template based on AUTOSAR Release 4.2.1 for describing LIN networks.

Refer to *General Settings Page (RTILINMM MainSetup)* ([📖 RTI LIN MultiMessage Blockset Reference](#)).

Default values for unused bits in a frame

You can define the default values of bits in a frame that do not belong to a signal. You can address each bit via a unique hexadecimal value.

Refer to *Frame Defaults Page (RTILINMM MainSetup)* ([📖 RTI LIN MultiMessage Blockset Reference](#)).

Modified multiprocessor support

There are some changes in working with submodels in multiprocessor models containing blocks from the RTI LIN MultiMessage Blockset.

With older versions of the RTI LIN MultiMessage Blockset, the RTILINMM GeneralSetup block was automatically copied from the multiprocessor model to the submodels. As a result, the submodels

were stored in the working folder of the multiprocessor model, and all generated files from all the submodels were stored in the same destination folder.

As of RTI LIN MultiMessage Blockset 2.5, the RTILINMM GeneralSetup block is no longer copied automatically from the multiprocessor model to the submodels. Instead, you must manually add an RTILINMM GeneralSetup block to each submodel and configure it. Hence, the submodels must no longer be stored in the working folder of the multiprocessor model, and a separate destination folder for generated files can be specified for each RTILINMM GeneralSetup block.

Migrating to RTI LIN MultiMessage Blockset 2.5

Working with models from earlier RTI LIN MultiMessage Blockset versions

To reuse a model created with an earlier RTI LIN MultiMessage Blockset version, you must update the S-functions for all the RTILINMM blocks and save the model before modifying the LIN configuration.

To create new S-functions for all the RTILINMM blocks in your model in one step, you can perform one of the following actions after opening the model:

- In the MATLAB Command Window, enter `rtimmsu_update('System', gcs)`.
For further information on the command and its options, enter `help rtimmsu_update` in the MATLAB Command Window.
- Select the Create S-Function for all LIN Blocks command from the Options menu of the RTILINMM GeneralSetup block.

For further information, refer to *Limitations of RTI LIN MultiMessage Blockset* ([RTI LIN MultiMessage Blockset Reference](#)).

RTI USB Flight Recorder Blockset

New Features of the RTI USB Flight Recorder Blockset 1.2

Enhanced usability

The handling of a USB mass storage device for flight recording has been internally improved. For MicroLabBox and the DS1007 PPC Processor Board, you can use the USB device for flight recording and for loading a real-time application.

For further information, refer to  *RTI USB Flight Recorder Blockset Reference*.

SCALEXIO Firmware

New Features of the SCALEXIO Firmware 3.2

New supported hardware

The SCALEXIO firmware supports the new SCALEXIO hardware boards: DS6101 Multi-I/O Board and DS6201 Digital I/O Board.

Connecting a DS1007 system

You can connect a SCALEXIO system with a PHS-bus-based system with a DS1007 PPC Processor Board via Gigalink.

SystemDesk

Where to go from here

Information in this section

| | |
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| <i>New Features of SystemDesk 4.4</i> | 156 |
| <i>Migrating to SystemDesk 4.4</i> | 157 |

New Features of SystemDesk 4.4

New General Features

SystemDesk 4.4 has the following new general features.

AUTOSAR Releases supported by SystemDesk 4.4

Modeling support of the actual AUTOSAR Release SystemDesk 4.4 now supports the modeling of software and system architectures according to the actual AUTOSAR 4.2.1 Release.

Compatibility to recent AUTOSAR Releases SystemDesk also supports AUTOSAR Releases 4.1.3, 4.1.2, 4.1.1, and 4.0.3 for exchanging AUTOSAR files.

Migrating to SystemDesk 4.4

Migrating to SystemDesk 4.4

SystemDesk 4.4 automatically migrates SystemDesk 4.2 and 4.3 SDP project files upon loading.



You are recommended to install the most recent patch for SystemDesk 4.2 or 4.3. Then, save the SDP project files you want to migrate before opening them in SystemDesk 4.4.

VEOS

Where to go from here

Information in this section

| | |
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| <i>New Features of VEOS 3.4</i> | 159 |
| <i>Migrating to VEOS 3.4</i> | 161 |

New Features of VEOS 3.4

Support of model port blocks

Up to and including VEOS 3.3 Up to and including VEOS 3.3, Simulink® models *containing blocks from the dSPACE Model Port Block Library* were not supported. The blocks had to be removed from the model.

External inports and outports of the model were supported only if they were on the highest level of the model hierarchy.


These were limitations of the *dSPACE Target for Offline Simulation*.

As of VEOS 3.4 VEOS 3.4 now supports Simulink® models containing blocks from the dSPACE Model Port Block Library in connection with the new *Model Interface Package for Simulink*. The Model Interface Package for Simulink lets you generate a simulation platform-independent Simulink implementation container (SIC) file from a Simulink® model. The SIC file can be integrated in an offline simulation application for VEOS and/or in a real-time application for SCALEXIO. For details on the Model Interface Package for Simulink,

refer to *Features of the Model Interface Package for Simulink 3.0* on page 117.

To integrate a Simulink® model in an offline simulation application for VEOS, you have to:

1. Generate a Simulink implementation container (SIC) file for that model using the *Model Interface Package for Simulink*.
2. Import the SIC file to the VEOS Player.


For instructions, refer to *How to Import VPUs, V-ECU Implementations, Simulink Implementations, and FMUs* ( *VEOS Player Document*).



The *Model Interface Package for Simulink* is the successor to the *dSPACE Target for Offline Simulation*, which will be delivered for the last time with dSPACE Release 2015-A. For migration aspects, refer to *Migrating to VEOS 3.4* on page 161.

FMI 2.0 support


VEOS now supports the import of Functional Mock-up Units (FMUs) that comply with the Functional Mock-up Interface (FMI) 2.0 standard for Co-Simulation.

For instructions on importing FMU files, refer to *How to Import VPUs, V-ECU Implementations, Simulink Implementations, and FMUs* ( *VEOS Player Document*).

Bypassing V-ECU functions

If a V-ECU implementation contains a Rapid Prototyping Access Module, the *dSPACE Internal Bypassing Service* is integrated in the V-ECU.

This lets you use the *RTI Bypass Blockset* to download new models dynamically into a V-ECU, for example, for implementing an internal bypass.

For details, refer to *Integrating a Simulink Model Dynamically with RTI Bypass Blockset* ( *Virtual Validation Overview*).

Stimulation of V-ECU inports

VEOS 3.4 lets you stimulate a data access point (DAP) of an inport, for example, when the inport is unconnected (open-loop stimulation).

To do so, you can specify the following two new A2L variables:

■ `<DapAccessFunctionName>_TA_Factor`

The value is multiplied with the value of the DAP signal. The default value of the `<DapAccessFunctionName>_TA_Factor` variable is '1'.

For example, to disable the inport, set the `<DapAccessFunctionName>_TA_Factor` value to '0'.

- `<DapAccessFunctionName>_TA_Offset`

The value is added to the DAP signal value. The default value of the `<DapAccessFunctionName>_TA_Offset` variable is '0'.

Refer to *Specific A2L Variables for Simulation* (📖 *VEOS Player Document*).

Migrating to VEOS 3.4

Compatibility overview

The table shows the compatibility between VEOS and OSA files and V-ECU implementations:

| | OSA Files Created with Products of dSPACE Release ... | | | | V-ECU Implementations Created with Products of dSPACE Release ... | | | |
|----------|---|----------------------|----------------------|----------------------|---|----------------------|----------------------|----------------------|
| | 2013-B and Earlier ¹⁾ | 2014-A ²⁾ | 2014-B ³⁾ | 2015-A ⁴⁾ | 2013-B and Earlier ⁵⁾ | 2014-A ⁶⁾ | 2014-B ⁷⁾ | 2015-A ⁸⁾ |
| VEOS 3.2 | — ⁹⁾ | ✓ | — | — | ✓ | ✓ | — | — |
| VEOS 3.3 | — ⁹⁾ | ✓ ¹⁰⁾ | ✓ | — | ✓ | ✓ | ✓ | — |
| VEOS 3.4 | — ⁹⁾ | ✓ ¹⁰⁾ | ✓ ¹¹⁾ | ✓ | ✓ | ✓ | ✓ | ✓ |

¹⁾ OSA file version 3.0

²⁾ OSA file version 3.2

³⁾ OSA file version 3.3

⁴⁾ OSA file version 3.4

⁵⁾ V-ECU implementation version 1.0

⁶⁾ V-ECU implementation version 2.0

⁷⁾ V-ECU implementation version 2.1

⁸⁾ V-ECU implementation version 2.2

⁹⁾ For migration information, refer to the *New Features and Migration* document for dSPACE Release 2014-A. You can download the document from www.dspace.com/go/migration.

¹⁰⁾ An OSA file created with a product of dSPACE Release 2014-A and modified with VEOS 3.3 or later cannot be loaded with VEOS 3.2.

¹¹⁾ An OSA file created with a product of dSPACE Release 2014-B and modified with VEOS 3.4 or later cannot be loaded with VEOS 3.3.


Discontinuation of the dSPACE Target for Offline Simulation and migration

Model Interface Package for Simulink The *dSPACE Target for Offline Simulation* will be delivered for the last time with dSPACE Release 2015-A. To prepare a Simulink® model for offline simulation with VEOS, use the *Model Interface Package for Simulink*, which is introduced with dSPACE Release 2015-A.

The Model Interface Package for Simulink provides the `dsrt.tlc` system target file, which lets you generate a Simulink

implementation container (SIC) file from a Simulink® model. To integrate the model in an offline simulation application for VEOS, import the SIC file to the VEOS Player.

In connection with the *Model Interface Package for Simulink*, VEOS supports Simulink® models containing blocks from the dSPACE Model Port Block Library. This allows you to use Simulink® models for offline and real-time simulation without modifications.

For details, refer to the  *Model Interface Package for Simulink - Modeling Guide*.


Comparison and working concept differences The list below compares the *Model Interface Package for Simulink* with the *dSPACE Target for Offline Simulation*, and provides working concept differences:

- The *Model Interface Package for Simulink* supports the same Simulink® blocksets as the *dSPACE Target for Offline Simulation*.
- When you use the *Model Interface Package for Simulink*, use Model Port blocks from the *Model Port Block Library* to connect a Simulink® model to other environment models and/or V-ECUs. The *Model Port Block Library* is part of the *Model Interface Package for Simulink*.

This lets you use Simulink® models for offline and real-time simulation without modifications, which is not possible with *dSPACE Target for Offline Simulation*.



Like the *dSPACE Target for Offline Simulation*, the *Model Interface Package for Simulink* also supports connections to other models via external inports and outports, i.e., Simulink Inport and Outport blocks on the highest level of the model hierarchy.

However, the current version of the *Model Interface Package for Simulink* has some limitations concerning data types of the external inports and outports of a Simulink® model. For details, refer to *Limitations of the Model Interface Package for Simulink* ( *Model Interface Package for Simulink - Modeling Guide*).

- Unlike the *dSPACE Target for Offline Simulation*, the *Model Interface Package for Simulink* does not generate an application for a specific simulation platform. Instead, it generates a Simulink implementation container (SIC) file containing code generated for a Simulink® model.

Since the SIC file is independent of the simulation platform, the same SIC file can be integrated in an offline simulation application for VEOS and in a real-time application for SCALEXIO.

You can integrate an SIC file in an offline simulation application with the VEOS Player. For instructions, refer to *How to Import VPUs, V-ECU Implementations, Simulink Implementations, and FMUs* ([📖 VEOS Player Document](#)).

- There are differences in the naming of VPU ports created for the external inports and outports of a Simulink® model. As a consequence, you might have to adapt VEOS Player automation scripts that involve VPU ports and their interconnections.

Compatibility Information

Where to go from here

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Supported MATLAB Releases

Supported MATLAB releases

| MATLAB Release... | ...Is Supported by dSPACE Release 2015-A | | | | | | |
|-------------------|--|--|----------------------------------|----------------|-------------------|----------|--|
| | RCP and HIL Software | | AutomationDesk 5.0 ¹⁾ | TargetLink 4.0 | Model Compare 2.5 | VEOS 3.4 | dSPACE Python Extensions 1.8 ²⁾ |
| | RCP and HIL Software from 32-bit DVD with 32-bit MATLAB versions | RCP and HIL Software from 64-bit DVD with 64-bit MATLAB versions | | | | | |
| R2015a (64-bit) | – | ✓ ³⁾ | ✓ | – | – | ✓ | ✓ |
| R2015a (32-bit) | – | – | – | – | – | – | – |
| R2014b | ✓ ⁴⁾ | ✓ ⁴⁾ | ✓ | ✓ | ✓ | ✓ | ✓ |
| R2014a | ✓ ⁴⁾ | ✓ ⁴⁾ | ✓ | ✓ | ✓ | ✓ | ✓ |
| R2013b | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| R2013a | – | – | – | ✓ | ✓ | – | – |

¹⁾ AutomationDesk's MATLAB Access library requires MATLAB.

²⁾ matlablib2 of dSPACE Python Extensions requires MATLAB.

³⁾ R2015a is not supported by the RTI FPGA Programming Blockset – FPGA Interface.

⁴⁾ R2014a and R2014b are not supported by the RTI FPGA Programming Blockset – FPGA Interface for Xilinx ISE based platforms.

For up-to-date information on additional MATLAB releases that can be used in combination with dSPACE software, refer to <http://www.dspace.com/go/sw3rdparty>.

Operating System

Operating system on host PC

The following operating systems are supported by the dSPACE products on Release 2015-A:

| 32-Bit dSPACE Software | 64-Bit dSPACE Software |
|---|--|
| <ul style="list-style-type: none"> ■ Windows 7 Professional, Ultimate, and Enterprise with Service Pack 1 (32-bit or 64-bit version) Only the listed editions are supported. The Windows 7 Home and Starter editions are not supported. ■ ControlDesk Next Generation can also be installed on the MicroAutoBox Embedded PC, running under Microsoft Windows 7 Ultimate (32-bit version). | <ul style="list-style-type: none"> ■ Windows 7 Professional, Ultimate, and Enterprise with Service Pack 1 (64-bit version) Only the listed editions are supported. The Windows 7 Home and Starter editions are not supported. |
| Notes and Limitations | |
| <ul style="list-style-type: none"> ■ Refer to <i>General Limitations for Windows 7</i> on page 174. ■ Support of 64-bit operating systems: 32-bit dSPACE software supports only the 64-bit version of Windows 7. Other 64-bit operating systems (Windows XP and Windows Vista) are not supported. 32-bit dSPACE software runs under 64-bit Windows operating systems in a WoW64 (Windows-on-Windows 64-bit) subsystem. WoW64 is the x86 emulator of Windows that allows 32-bit Windows-based applications to run seamlessly on 64-bit versions of Windows. This lets you use up to 4 GB of virtual memory for each 32-bit process if the application is prepared for using the large memory area. Otherwise, the virtual address space of a process is limited to 2 GB. Limitations apply when you use 32-bit dSPACE software under a 64-bit Windows operating system. Refer to <i>Limitations for 64-Bit Windows Operating Systems in Combination with 32-Bit dSPACE Software</i> on page 170. | <ul style="list-style-type: none"> ■ Refer to <i>General Limitations for Windows 7</i> on page 174. ■ Only TargetLink, Model Compare, and various products of the RCP and HIL software package are available as 64-bit versions. Limitations apply when you use these 64-bit versions. For details, refer to <i>Products on the 64-Bit dSPACE DVD Set</i> on page 170. |

For some complex tasks of the following products, you are required or recommended to use the 64-bit version of Windows 7 as your operating system:

- Automotive Simulation Models: If you use the models for vehicle dynamics, trailer, truck, and traffic scenario simulations, Windows 7 (64-bit) is recommended.

- ControlDesk Next Generation: If you use the video-capturing device of ControlDesk Next Generation, Windows 7 (64-bit) is recommended.
- ConfigurationDesk (Implementation Version): If you want to use more than 1000 function blocks (or several functions blocks with a total of more than 1000 function ports) in your ConfigurationDesk application, Windows 7 (64-bit) is required.

Allowing communication via additional firewall rules

Additional Windows firewall rules are installed during the installation of various dSPACE software products. For example, one rule allows communication with a dSPACE expansion box such as AutoBox, and another rule allows MotionDesk to receive motion data from a network channel. These example rules are created by the following commands:

- ```
netsh advfirewall firewall add rule name="dSPACE Net Service"
service=any dir=in action=allow profile=any
protocol=icmpv4:0, any description="Allow the dSPACE Net Service to connect to a dSPACE expansion box via network."
```
- ```
netsh advfirewall firewall add rule name="dSPACE MotionDesk"
program="%dSPACE_root%\MotionDesk\Bin\MotionDesk.exe"
dir=in action=allow profile=any description="Allow dSPACE MotionDesk to receive motion data via network."
```

If you are running third-party firewall software on your host PC, ensure that the TCP/IP communication of dSPACE software is not blocked.

Operating system on dSPACE License Server

If you purchased floating network licenses, you have to install and configure one of the networked PCs as the dSPACE License Server. The operating system of the dSPACE License Server must be one of the following:

- Windows XP Professional (32-bit version) with Service Pack 3
- Windows Vista Business, Ultimate, or Enterprise (32-bit or 64-bit version) with the latest Service Pack
- Windows 7 Professional, Ultimate, or Enterprise (32-bit or 64-bit version) with the latest Service Pack
- Windows Server 2003 (32-bit or 64-bit version)

- Windows Server 2008 R2
- Windows Server 2012



The dSPACE License Server does not support non-Windows operating systems.

Run-Time Compatibility of dSPACE Software

Definition

Run-time compatibility means that:

- dSPACE products can be used in parallel after software installation, even if they are installed in different folders.
- dSPACE products without interaction can run independently of each other.

Compatibility of products in dSPACE Release 2015-A

dSPACE recommends using only software products from the same dSPACE Release. This will provide maximum run-time compatibility.

Note that:

- Limitations regarding run-time compatibility in the dSPACE tool chain might occur if products from different dSPACE Releases are mixed.

If dSPACE products interact directly (through automation interfaces) or indirectly (through common file types like A2L), limitations might apply. For minor limitations, refer to the relevant product documentation. The major limitations are described in the following.

In rare cases, an additional patch must be installed for a product to achieve run-time compatibility. For information on the patch and whether a patch is necessary, refer to <http://www.dspace.com/go/CompPatch>.

- RCP and HIL software products (on Release 2015-A) cannot be used in combination with RCP and HIL software products from earlier dSPACE releases.

Major limitations for TargetLink and Model Compare The 64-bit version of TargetLink cannot be used in combination with the 32-bit version of Model Compare and vice versa because you can work only with a bit-compatible MATLAB version (32-bit or 64-bit).

Major limitation for working with a SCALEXIO system The products for working with a SCALEXIO system must be compatible. This is guaranteed only for products delivered with the same dSPACE Release. Contact dSPACE for further information if you have any questions.

Combining dSPACE products from earlier releases

For detailed information and notes on the combined use of different products from and with earlier releases, refer to http://www.dspace.com/go/ds_sw_combi.

Limitations for 64-Bit Windows Operating Systems in Combination with 32-Bit dSPACE Software

Objective

Some additional limitations apply when you use 64-bit versions of Windows 7 in combination with 32-bit dSPACE software.

Limitations of device drivers

Third-party bus interfaces (CAN, LIN, or FlexRay) are supported only if they have 64-bit drivers from the manufacturers.

TargetLink: Limitations of target compilers

For information on support for a specific target compiler, contact the respective compiler manufacturer.

MATLAB

If you install a 32-bit version of MATLAB under Windows 7 (64-bit versions), the MATLAB installation program generates a message that a 64-bit version of MATLAB is available. To install the 32-bit version of MATLAB, click OK.

Products on the 64-Bit dSPACE DVD Set

Objective

The 64-bit dSPACE DVD set contains the same product versions as the 32-bit dSPACE DVD set. However, the 64-bit DVD set contains the 32-bit variants of some products.

When using the 64-bit DVD set, you should note the limitations described below the table.

Products and their MATLAB support

The following table lists in detail all dSPACE products on the 64-bit dSPACE DVD set and their MATLAB support:

- All MATLAB-related dSPACE products which support 64-bit MATLAB versions
- All 32-bit dSPACE products which also support 64-bit MATLAB versions
- All 32-bit dSPACE products that do not relate to MATLAB

| dSPACE Product | | Product Supports 64-bit MATLAB | Product Independent of MATLAB Architecture (32-bit/64-bit) | Product Contained as 32-Bit Variant |
|--------------------------------|--------------------------|--------------------------------|--|-------------------------------------|
| ControlDesk Next Generation | | – | ✓ | ✓ |
| SystemDesk | | – | ✓ | ✓ |
| AutomationDesk | | ✓ | – | ✓ |
| TargetLink | | ✓ | – | – |
| Model Compare | | ✓ | – | – |
| VEOS | | ✓ | – | ✓ |
| Real-Time Testing | | – | – | ✓ |
| Platform API Package | dSPACE Python Extensions | – ¹⁾ | ✓ | ✓ |
| | HIL API .NET MAPort | – | ✓ ²⁾ | ✓ |
| | XIL API .NET MAPort | – ³⁾ | ✓ ³⁾ | ✓ |
| Failure Simulation API Package | XIL API .NET EESPort | – | ✓ | ✓ |

| dSPACE Product | | Product Supports 64-bit MATLAB | Product Independent of MATLAB Architecture (32-bit/64-bit) | Product Contained as 32-Bit Variant |
|------------------------------|-------------------------------------|--------------------------------|--|-------------------------------------|
| RCP and HIL software package | RTI and RTI-MP | ✓ | – | – |
| | RTI Gigalink Blockset | ✓ | – | – |
| | RTI CAN Blockset | ✓ | – | – |
| | RTI CAN MultiMessage Blockset | ✓ | – | – |
| | RTI LIN MultiMessage Blockset | ✓ | – | – |
| | RTI FlexRay Configuration Blockset | ✓ | – | – |
| | RTI FPGA Programming Blockset | ✓ | – | – |
| | RTI Electric Motor Control Blockset | ✓ | – | – |
| | RTI Ethernet Blockset | ✓ | – | – |
| | RTI Ethernet UDP Blockset | ✓ | – | – |
| | RTI XCP on Ethernet Blockset | ✓ | – | – |
| | RTI Watchdog Blockset | ✓ | – | – |
| | RTI RapidPro Control Unit Blockset | ✓ | – | – |
| | RTI Bypass Blockset | ✓ | – | – |
| | RTI USB Flight Recorder Blockset | ✓ | – | – |
| | ConfigurationDesk | ✓ | – | ✓ |
| | FlexRay Configuration Blockset | ✓ | – | – |
| | FlexRay Configuration Tool | – | ✓ | ✓ |
| | ModelDesk | ✓ | – | ✓ |
| | Automotive Simulation Models | ✓ | – | – |
| | MotionDesk | ✓ | – | ✓ |
| | MotionDesk Blockset | ✓ | – | – |
| | Flight Rec Data Merger | – | ✓ | ✓ |

| dSPACE Product | | Product Supports 64-bit MATLAB | Product Independent of MATLAB Architecture (32-bit/64-bit) | Product Contained as 32-Bit Variant |
|----------------|--|--------------------------------|--|-------------------------------------|
| | Further products of RCP and HIL software package | – | ✓ | ✓ |

¹⁾ dSPACE Python Extensions contains the matlplotlib Python library. This library supports remote control and access of 64-bit MATLAB. matlplotlib itself is contained on the 64-bit DVD as 32-bit variant.

²⁾ HIL API .NET MAPort can be used from 32-bit MATLAB via MATLAB Interface for .NET, but cannot be used from 64-bit MATLAB.

³⁾ XIL API .NET MAPort can be used from 32-bit and 64-bit MATLAB via MATLAB Interface for .NET.

For information on the compatibility of dSPACE products with 64-bit MATLAB versions, refer to <http://www.dspace.com/go/matlab64bit>.

Product-specific limitations

Restricted MAT file support The following products only support reading and writing MAT files of file format version 5.0. MAT files of this version can be created in MATLAB by using the `save` command with the option `'-v6'`:

- ModelDesk 4.1 (Maneuver Editor, Road Generator)
- ControlDesk Next Generation (ControlDesk 5.4)

RTI-MP The `rtimpdiag` command is not functional. This command is based on dSPACE HIL API .NET, which does not support 64-bit MATLAB versions.

Parallel installation of 32-bit and 64-bit MATLAB versions On a 64-bit operating system, can you install both a 32-bit and a 64-bit version of a particular MATLAB release, e.g., R2014b. However, MATLAB release versions share the same preference settings folder. This means that you have to set all architecture-dependent settings, such as the MEX compiler settings, each time you switch between different versions of one MATLAB release.

Limitations for the 64-bit version of TargetLink

Importing an A2L file It is not possible to import an A2L file into a 64-bit version of TargetLink. However, you can use a workaround described in *Basics of Importing A2L Files* ([TargetLink Data Dictionary A2L Import and Export](#)).

General Limitations for Windows 7

| | |
|---|--|
| Objective | Some limitations apply when you use Windows 7 in combination with dSPACE software. |
| MATLAB support | For system requirements of MathWorks® software, refer to http://www.mathworks.com/support/sysreq/current_release . |
| Fast user switching not supported | dSPACE software does not support the fast user switching feature of Windows. |
| Closing dSPACE software before PC shutdown | The shutdown procedure of Windows operating systems might cause some required processes to be aborted although they are still being used by dSPACE software. To avoid data loss, it is recommended to terminate the dSPACE software manually before performing a PC shutdown. |
| User Account Control | It is recommended to disable Windows' User Account Control (UAC) during the installation of dSPACE software. If you cannot disable UAC, note the following Windows behavior: If UAC is enabled, the setup programs run with the administrator account instead of the user account. Therefore it is important that the administrator account has access to the required drives, particularly the required network drives. |
| USB devices | The first time dSPACE USB devices using cables with optoisolation are connected to the PC, there might be a message that the device driver software was not installed successfully. The dSPACE device will nevertheless work properly later on. |

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