Simulink® Verification and Validation™ Release Notes

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Simulink® Verification and Validation™ Release Notes

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Contents

Summary by Version

This table provides quick access to what's new in each version. For clarification, see "Using Release Notes" on page 2.

Version (Release)	New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Latest Version V3.2 (R2011b)	Yes Details	Yes Summary	Bug Reports Includes fixes
V3.1 (R2011a)	Yes Details	No	Bug Reports Includes fixes
V3.0.1 (R2010bSP1)	No	No	Bug Reports Includes fixes
V3.0 (R2010b)	Yes Details	Yes Summary	Bug Reports Includes fixes
V2.7 (R2010a)	Yes Details	Yes Summary	Bug Reports Includes fixes
V2.6.1 (R2009bSP1)	No	No	Bug Reports Includes fixes
V2.6 (R2009b)	Yes Details	Yes Summary	Bug Reports Includes fixes
V2.5 (R2009a)	Yes Details	No	Bug Reports Includes fixes
V2.4 (R2008b)	Yes Details	No	Bug Reports Includes fixes
V2.3.1 (R2008a+)	No	No	Bug Reports Includes fixes
V2.3 (R2008a)	Yes Details	No	Bug Reports Includes fixes
V2.2.1 (R2007b+)	No	No	Bug Reports Includes fixes
V2.2 (R2007b)	Yes Details	No	Bug Reports Includes fixes

Version (Release)	New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
V2.1.1 (R2007a+)	No	No	Bug Reports Includes fixes
V2.1 (R2007a)	No	No	Bug Reports Includes fixes
V2.0 (R2006b)	Yes Details	No	Bug Reports Includes fixes
V1.1.2 (R2006a)	No	No	Bug Reports at Web site

Using Release Notes

Use release notes when upgrading to a newer version to learn about:

- New features
- Changes
- Potential impact on your existing files and practices

Review the release notes for other MathWorks® products required for this product (for example, MATLAB® or Simulink®). Determine if enhancements, bugs, or compatibility considerations in other products impact you.

If you are upgrading from a software version other than the most recent one, review the current release notes and all interim versions. For example, when you upgrade from V1.0 to V1.2, review the release notes for V1.1 and V1.2.

What Is in the Release Notes

New Features and Changes

- New functionality
- Changes to existing functionality

Version Compatibility Considerations

When a new feature or change introduces a reported incompatibility between versions, the **Compatibility Considerations** subsection explains the impact.

Compatibility issues reported after the product release appear under Bug Reports at the MathWorks Web site. Bug fixes can sometimes result in incompatibilities, so review the fixed bugs in Bug Reports for any compatibility impact.

Fixed Bugs and Known Problems

MathWorks offers a user-searchable Bug Reports database so you can view Bug Reports. The development team updates this database at release time and as more information becomes available. Bug Reports include provisions for any known workarounds or file replacements. Information is available for bugs existing in or fixed in Release 14SP2 or later. Information is not available for all bugs in earlier releases.

Access Bug Reports using your MathWorks Account.

Documentation on the MathWorks Web Site

Related documentation is available on `mathworks.com` for the latest release and for previous releases:

- Latest product documentation
- Archived documentation

Version 3.2 (R2011b) Simulink Verification and Validation Software

This table summarizes what's new in Version 3.2 (R2011b):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	Yes Summary	Bug Reports Includes fixes

New features and changes introduced in this version are:

- "Condition and MCDC Coverage for If Block Conditions" on page 4
- "Capability to Store Requirements Information Outside the Model File" on page 5
- "Selection-Based Linking for Custom Requirements Documents" on page 6
- "Include Requirements Document Data in the Report" on page 6
- "Microsoft® Excel Support for Consistency Checking of Simulink References in Requirements Documents" on page 7
- "Requirements Report Default File Names Based on Model Names" on page 7
- "Changed Format for slvnvruntest and slvnvruncgvtest Output" on page 7
- "Conversion of Error and Warning Message Identifiers" on page 8
- "API for Creating Procedural-Based Model Advisor Configurations" on page 9
- "New Model Advisor Checks" on page 9
- "Check Input Parameters in Model Advisor Report" on page 10

Condition and MCDC Coverage for If Block Conditions

The If block now receives condition and MCDC coverage on any `if` conditions or `elseif` conditions that contain logical expressions with multiple conditions. Previously, the If block only received decision coverage.

The If block receives coverage as follows:

- The software measures decision coverage for the `if` condition and all `elseif` conditions.

- If the `if` condition or any of the `elseif` conditions contain a logical expression with multiple conditions, such as `u1 & u2 & u3`, the software also measures condition and MCDC coverage for each condition in the expression, for example, `u1`, `u2`, and `u3` .

Capability to Store Requirements Information Outside the Model File

The Requirements Management Interface (RMI) now provides an option to store requirements links information in an external file. The default name for this file is *model_name*`.req`. External storage allows you to:

- Associate information about links to external requirements documents without modifying the timestamp and version of your model (`.mdl`) file.

- Use different sets of requirements links with the same model by loading links from different files.

To enable external storage of requirements links, in the Requirements Settings dialog box, on the **Storage** tab, select **Store externally (in a separate .req file)**. After setting this option, all models for which you create new requirements links will use external storage.

The RMI provides several new functions that allow you to manage the links in external files:

- `rmidata.map` — Update link information in an external file.

- `rmidata.default` — Set the option for storing requirements link information (`'internal'` or `'external'`).

- `rmidata.export` — Move link information for a model to an external file.

Selection-Based Linking for Custom Requirements Documents

If you link to requirements in custom requirements documents, you can now define link type properties that provide selection-based linking capabilities for these documents. Selection-based linking will be available when you:

- Right-click a model object and select Requirements in the context menu.

- Select **Requirements > Edit/Add Links** and create new requirements using the Requirements dialog box.

For more information, see "Custom Types of Requirements Documents".

Include Requirements Document Data in the Report

The Requirements Management Interface (RMI) can now include details from requirements text in the requirements report, depending on the type of requirements document:

- Microsoft® Word — Include entire paragraph or subsection associated with each linked requirement.

- Microsoft Excel® — If the requirement is a single cell in a workbook, include the content from all the preceding cells in that row as a table. If the requirements are in a cell range, include all the content from the cells in that range as a table.

- IBM® Rational® DOORS® — Include the **Object Text** and **Object Heading** attributes for the linked requirements object, and other attributes as specified by the user.

  You can specify which DOORS attributes to include or omit from the report using the new RptgenRMI.doorsAttribs function.

Before you generate the requirements report, in the Requirements Settings dialog box, on the **Report** tab, select **Include details from linked documents**.

Microsoft Excel Support for Consistency Checking of Simulink References in Requirements Documents

The `rmi` function has a `'checkdoc'` option that checks links from requirements documents to Simulink model objects. This option now checks Microsoft® Excel® requirements documents, in addition to Microsoft Word documents and IBMRationalDOORS databases.

Requirements Report Default File Names Based on Model Names

When the Requirements Management Interface (RMI) generates an HTML report file, it now uses the model name in the file name. The default name for a requirements report is *model_name*_report.html.

Changed Format for slvnvruntest and slvnvruncgvtest Output

The output format for `slvnvruntest` and `slvnvruncgvtest` changed in R2011b. In R2011b, the output argument contains the following data for each test case executed in an array of `Simulink.SimulationOutput` objects:

Field	Description
tout_slvnvruncgvtest	Simulation time
xout_slvnvruncgvtest	State data
yout_slvnvruncgvtest	Output signal data
logsout_slvnvruncgvtest	Signal logging data for: • Signals that are connected to outports • Signals that are configured for logging on the model

Compatibility Considerations

If you have scripts that depend on the output from `slvnvruntest` and `slvnvruncgvtest`, you can temporarily specify the output format.

Use the nonvisible field `outputFormat` in the `runOpts` structure that `slvnvruntestopts` creates as follows:

```
runOpts = slvnvruntestopts;
runOpts.outputFormat = 'TimeSeries';
slvnvruntest(model_name, sldvData, runOpts);
```

or

```
runOpts = slvnvruntestopts;
runOpts.outputFormat = 'StructureWithTime';
slvnvruntest(model_name, data, runOpts);
```

Conversion of Error and Warning Message Identifiers

For R2011b, error and warning message identifiers have changed in Simulink® Verification and Validation™.

Compatibility Considerations

If you have scripts or functions that use message identifiers that changed, you must update the code to use the new identifiers. Typically, message identifiers are used to turn off specific warning messages, or in code that uses a `try/catch` statement and performs an action based on a specific error identifier.

For example, the `SLVNV:simcoverage:InvalidFirstArgument` identifier has changed to `SLVNV:simcoverage:complexityinfo:InvalidFirstArgument`. If your code checks for `SLVNV:simcoverage:InvalidFirstArgument`, you must update it to check for `SLVNV:simcoverage:complexityinfo:InvalidFirstArgument` instead.

To determine the identifier for a warning, run the following command just after you see the warning in the MATLAB command window:

```
[MSG,MSGID] = lastwarn;
```

This command saves the message identifier to the variable `MSGID`.

To determine the identifier for an error that appears at the MATLAB prompt, run the following commands just after you see the error:

```
exception = MException.last;
MSGID = exception.identifier;
```

Note Warning messages indicate a potential issue with your code. While you can turn off a warning, a suggested alternative is to change your code so it runs warning-free.

API for Creating Procedural-Based Model Advisor Configurations

In R2011b, there is a new API you can use to create a procedural-based Model Advisor configuration. A procedural-based configuration allows you to specify the order in which you make changes to your model. You do this by organizing checks into procedures using the procedures API. A check in a procedure does not run until the previous check passes. A procedural-based configuration runs until a check fails, requiring you to modify the model to pass the check and proceed on to the next check. For more information, see "Creating Procedural-Based Model Advisor Configurations".

New Model Advisor Checks

The Simulink Model Advisor includes new modeling standards checks.

ISO 26262 Checks

The Model Advisor **By Task** folder contains a new **Modeling Standards for ISO 26262** check:

• "Check for blocks with inconsistent indexing methods"

IEC 61508 Checks

The Model Advisor **By Task** folder contains a new **Modeling Standards for IEC 61508** check:

• "Check for blocks with inconsistent indexing methods"

DO-178B Checks

The Model Advisor **By Task** folder contains a new **Modeling Standards for DO-178B** check:

• "Check for blocks with inconsistent indexing methods"

Check Input Parameters in Model Advisor Report

In R2011b, the Model Advisor report now displays the check input parameters. For more information, see "Viewing and Saving Model Advisor Reports" in the Simulink documentation.

Version 3.1 (R2011a) Simulink Verification and Validation Software

This table summarizes what's new in Version 3.1 (R2011a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	No	Bug Reports Includes fixes

New features and changes introduced in this version are:

- "New Capability to Filter Model Objects from Coverage Collection" on page 11

- "Improved RMI Support for Reference Blocks" on page 12

- "New Function to Merge Logged Component Data" on page 12

- "New and Enhanced Model Advisor Checks" on page 12

New Capability to Filter Model Objects from Coverage Collection

When you simulate your Simulink model, coverage filtering allows you to filter certain model objects from recording coverage. The objects that you specify to exclude are stored in an external file.

- Individual Simulink blocks that receive coverage

- All blocks of a certain type

- Subsystems and all their contents

- Stateflow® charts, states, transitions, and temporal events

- Individual library-linked blocks or Stateflow charts

- All reference blocks from a specific block library

Improved RMI Support for Reference Blocks

The Requirements Management Interface (RMI) provides improved support
for managing requirements links on reference blocks.

- The new **Library Block Requirements** menu option allows you to view
  and navigate to requirements associated only with the library block. These
  links are available to all models that have reference blocks linked to library
  blocks that themselves have requirements links.

- When you create links from reference blocks to requirements, those links
  are only associated with the reference block in the current model. You
  cannot push the requirements links associated with reference blocks back
  to the library.

New Function to Merge Logged Component Data

The slvnvmergedata function allows you to combine logged test cases and
counterexamples into a single structure. You can use logged data created
by running slvnvlogsignals, or by running a Simulink® Design Verifier™
analysis.

New and Enhanced Model Advisor Checks

The Simulink Model Advisor includes new and updated modeling standards
checks.

ISO 26262 Checks

In the Model Advisor **By Task** folder, there is a new **Modeling Standards
for ISO 26262** subfolder.

The subfolder includes the following checks:

- "Display model metrics and complexity report"

- "Check for fully defined interface"

- "Check for unconnected objects"

- "Check for questionable constructs"

- "Check state machine type of Stateflow charts"

- "Check for model objects that do not link to requirements"

- "Display configuration management data"

- "Check usage of Math Operations blocks"

- "Check usage of Stateflow constructs"

- "Check usage of Signal Routing blocks"

- "Check usage of Logic and Bit Operations blocks"

- "Check usage of Ports and Subsystems blocks"

For more information, see the "IEC 61508 and ISO 26262 Checks" in the Simulink Verification and Validation™ documentation.

IEC 61508 Checks

Previously, the **IEC 61508 Checks** included the check:

- **Check usage of Simulink constructs**

This check is replaced by the following new checks:

- "Check usage of Math Operations blocks"

- "Check usage of Signal Routing blocks"

- "Check usage of Logic and Bit Operations blocks"

- "Check usage of Ports and Subsystems blocks"

For more information, see the "IEC 61508 and ISO 26262 Checks" in the Simulink Verification and Validation documentation.

DO-178B Checks

Previously, the **DO-178B Checks** included the following checks:

- **Check for proper usage of For Iterator blocks**

- **Check for proper usage of While Iterator blocks**

- **Check for proper usage of Relational Operator blocks**

- **Check for proper usage of blocks that compute absolute values**

These previously available checks are replaced by the following new checks:

- "Check usage of Math Operations blocks"
- "Check usage of Signal Routing blocks"
- "Check usage of Logic and Bit Operations blocks"
- "Check usage of Ports and Subsystems blocks"

Also available are the new checks:

- "Check for proper usage of lookup table blocks"
- "Check Stateflow charts for uniquely defined data objects"

For more information, see the "DO-178B Checks" in the Simulink Verification and Validation documentation.

If, **Switch**, and **Switch Case** blocks are now searched. See the "Check usage of Port and Subsystems" and "Check usage of Signal Routing blocks" checks for more information.

Version 3.0.1 (R2010bSP1) Simulink Verification and Validation Software

This table summarizes what's new in Version 3.0.1 (R2010bSP1):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
No	No	Bug Reports Includes fixes

Version 3.0 (R2010b) Simulink Verification and Validation Software

This table summarizes what's new in Version 3.0 (R2010b):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	Yes—Details labeled as **Compatibility Considerations**, below. See also Summary.	Bug Reports Includes fixes

New features and changes introduced in this version are:

- "New Functions for Extraction, Signal Logging, Harness Generation, and Test Execution for Model Components" on page 16

- "New rmi Option to Validate Links in External Requirements Documents" on page 18

- "New Capability to Link a Requirement to Multiple Model Objects" on page 18

- "Viewing Requirements Linked to Model Objects" on page 18

- "Model Coverage Support for Multiple Instances of a Referenced Model" on page 19

- "Model Coverage Support for Stateflow Atomic Subcharts" on page 19

- "Checking Systems Programmatically With the Model Advisor" on page 19

- "MathWorks Check IDs for the Model Advisor Updated" on page 20

- "New and Enhanced Model Advisor Checks" on page 21

New Functions for Extraction, Signal Logging, Harness Generation, and Test Execution for Model Components

Several new functions allow you to test the following model components:

- Models referenced from Model blocks
- Atomic subsystems
- Stateflow atomic subcharts

Using these functions, you can create and execute test cases that verify components in order to:

- Debug the component
- Test the robustness of the component
- Achieve 100% model coverage for the component

The new functions perform the following tasks.

Use...	To...
slvnvextract	Extract an atomic subsystem or Stateflow atomic subchart into a new model. This allows you to apply testing and verification techniques that use models or an isolated model component.
slvnvlogsignals	Simulate a Simulink model and log input signals to a model referenced by a Model block. This allows you to capture component inputs when you run a closed-loop system simulation.
slvnvmakeharness	Create a harness model for a component, using logged input signals if specified, or using the default signals. Harness models support graphical editing of input values using Signal Builder blocks.
slvnvmergeharness	Merge test cases and initializations from multiple harness models into a single harness model.
slvnvruntest	Simulate a model, executing the specified test cases to record model coverage and output values.
slvnvruncgvtest	Invoke the Code Generation Verification (CGV) API and execute the specified test cases on the generated code for the model.

New rmi Option to Validate Links in External Requirements Documents

The `rmi` function has a new option, `'checkdoc'`, that allows you to validate links from Microsoft Word or IBM Rational DOORS requirements documents to Simulink models.

`rmi` generates a report of the problems that it detects. The report includes hyperlinks that navigate to the requirements with problems so you can investigate and fix any invalid links.

For more information, see "Checking and Fixing Links in Requirements Documents".

New Capability to Link a Requirement to Multiple Model Objects

The Requirements Management Interface (RMI) allows you to establish links to selected requirements in Microsoft Word, Microsoft Excel, or IBM Rational DOORS. When you create a link to a selected requirement for multiple model objects, the RMI inserts a single navigation control into the requirements document that links to all the selected model objects. When you activate the navigation control, all linked model objects are highlighted.

Viewing Requirements Linked to Model Objects

If your model, or blocks in your model, has links to requirements in external documents, you can now perform the following tasks without a Simulink Verification and Validation license:

- Highlight objects in a model that have links to requirements

- View information about a requirement

- Navigate from a model object to associated requirements

- Filter requirements highlighting based on keywords

Model Coverage Support for Multiple Instances of a Referenced Model

The Simulink Verification and Validation software records coverage for all instances of a referenced model in Normal simulation mode. The software combines the coverage data from each instance and reports one set of coverage data for the referenced model.

Model Coverage Support for Stateflow Atomic Subcharts

The Simulink Verification and Validation software records coverage for Stateflow atomic subcharts. Atomic subcharts allow you to reuse the same state or subchart across multiple Stateflow charts.

Checking Systems Programmatically With the Model Advisor

Previously, you could check systems programmatically using the `Simulink.ModelAdvisor` class, requiring many steps to check only one system at a time. Now you can check systems using the `ModelAdvisor.run` function. Using this function, you can create a MATLAB file for distribution that specifies a list of checks or a Model Advisor configuration file to run against any number of systems simultaneously.

Additionally, the following functions are available for reviewing results. You can use these functions to determine which checks failed on which systems and archive the results for accessing at a later time.

Use...	To...
`ModelAdvisor.run`	Run Model Advisor checks on systems.
`ModelAdvisor.summaryReport`	Open Model Advisor Command-Line Summary report in a web browser.

Use...	To...
view	View Model Advisor check results for a system in a web browser.
viewReport	View Model Advisor run results for a system in a web browser, the Model Advisor GUI, or the Command Window.

If you have a Parallel Computing Toolbox™ license and a multicore machine, to improve performance, you can run the Model Advisor on multiple systems in parallel.

For details, see the `ModelAdvisor.run` reference page and "Checking Systems with the Model Advisor" in the Simulink Verification and Validation documentation.

MathWorks Check IDs for the Model Advisor Updated

The check IDs for MathWorks checks in the Model Advisor are updated to use a consistent format. To easily determine check IDs, use the:

- Model Advisor context menu to return the check ID to the workspace.
- `ModelAdvisor.lookupCheckID` function to look up the new check ID.

For details, see "Finding Check IDs" in the Simulink Verification and Validation documentation.

Compatibility Consideration

The Model Advisor continues to recognize check IDs that were available prior to R2010b. Using the previous IDs in scripts and functions requires more processing time than if you use the new check IDs. To avoid a performance impact, MathWorks recommends updating scripts and functions to use the new check IDs.

In prior releases, the following `Simulink.ModelAdvisor` methods returned the previous check IDs. In R2010b, the methods return the new check IDs:

```
getCheckAll
```

```
getCheckForGroup
getCheckForTask
getSelectedCheck
verifyCheckRan
```

New and Enhanced Model Advisor Checks

The Simulink Model Advisor includes new and updated verification and validation checks.

MathWorks Automotive Advisory Board Checks

The **MathWorks Automotive Advisory Board** subfolder now includes "Check transition actions in Stateflow charts". Use this check to review your system against MAAB guideline db_0151: State machine patterns for transition actions.

For more information, see "MathWorks Automotive Advisory Board Checks" in the *Simulink Verification and Validation User's Guide*.

Version 2.7 (R2010a) Simulink Verification and Validation Software

This table summarizes what's new in Version 2.7 (R2010a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	Yes—Details labeled as **Compatibility Considerations**, below. See also Summary.	Bug Reports Includes fixes

New features and changes introduced in this version are:

- "Coverage Support for Dead Zone Block" on page 22

- "Coverage Support for the Simulink® Design Verifier Functions in MATLAB Function Blocks" on page 23

- "Coverage Support for Trigger Ports in Model Blocks" on page 23

- "Requirements Support for MuPAD Documents" on page 23

- "Improved Reports About Requirements Links in Models" on page 23

- "New Capability to Tag and Filter Model Requirements" on page 23

- "Improved IBM Rational DOORS Synchronization" on page 24

- "Function rminav Removed" on page 24

- "New and Enhanced Model Advisor Checks" on page 24

- "Modeling Guidelines Documentation Moved into Simulink Documentation" on page 25

Coverage Support for Dead Zone Block

The Simulink Verification and Validation software now records coverage for the Dead Zone block.

Coverage Support for the Simulink Design Verifier Functions in MATLAB Function Blocks

The Simulink Verification and Validation software now records coverage for the following Simulink Design Verifier functions in MATLAB Function blocks:

- `sldv.assume`
- `sldv.condition`
- `sldv.prove`
- `sldv.test`

Coverage Support for Trigger Ports in Model Blocks

The Simulink Verification and Validation software records coverage for a triggered Model block.

Requirements Support for MuPAD Documents

The Requirements Management Interface (RMI) now allows you to create requirements links from Simulink model objects to link targets in MuPAD® notebooks.

Improved Reports About Requirements Links in Models

In the requirements reports, the Requirements Management Interface (RMI) reporting capability includes the following improvements:

- Navigation to Simulink model objects with requirements
- Improved table design in requirements reports to accommodate additional detail about requirements

New Capability to Tag and Filter Model Requirements

The Requirements Management Interface (RMI) now allows filtered highlighting and reporting through the user tag attribute. Use this feature to review links with certain associated user tags. You can configure your settings to automatically apply specified tags when using selection-based linking. Manage these user tags with the new `rmitag` function.

Improved IBM Rational DOORS Synchronization

The Requirements Management Interface (RMI) synchronization of Simulink models with the IBM Rational DOORS software now provides control of change propagation for requirements links created in DOORS or Simulink. You can configure the synchronization to remove outdated links in DOORS whose corresponding links you have already deleted from Simulink. You can also configure the synchronization to remove outdated links in Simulink whose corresponding links you have already deleted from DOORS. When you delete objects with requirements from your Simulink model, you can automatically remove links in DOORS.

Function rminav Removed

The Simulink Verification and Validation software no longer supports the rminav function. To view model requirements, open the Model Explorer by selecting **View > Model Explorer** or entering the daexplr command. In the Model Explorer, click the **Highlight items with requirements on model** icon.

Compatibility Consideration

In R2009b, the rminav command opened the Model Explorer.

New and Enhanced Model Advisor Checks

The Simulink Model Advisor includes new and updated verification and validation checks.

DO-178B Checks

The **DO-178B Check** subfolder now includes:

- "Check state machine type of Stateflow charts"

- "Check Stateflow charts for ordering of states and transitions"

- "Check Stateflow debugging settings"

The checks in the **DO-178B Checks** subfolder are reformatted for consistency in the results format.

For more information, see "DO-178B Checks" in the Simulink Verification and Validation documentation.

IEC 61508 Checks

The **IEC 61508 Checks** subfolder now includes "Check state machine type of Stateflow charts".

For more information, see "IEC 61508 and ISO 26262 Checks" in the Simulink Verification and Validation documentation.

MathWorks Automotive Advisory Board Checks

The **MathWorks Automotive Advisory Board** subfolder now includes:

- "Check usage of return values from a graphical function in Stateflow charts"

- "Check for pointers in Stateflow charts"

- "Check for event broadcasts in Stateflow charts"

- "Check for MATLAB expressions in Stateflow charts"

- "Check for bitwise operations in Stateflow charts"

- "Check for comparison operations in Stateflow charts"

- "Check for unary minus operations on unsigned integers in Stateflow charts"

- "Check for equality operations between floating-point expressions in Stateflow charts"

The checks in the **MathWorks Automotive Advisory Board** subfolder are reformatted for consistency in the results format.

For more information, see "MathWorks Automotive Advisory Board Checks".

Modeling Guidelines Documentation Moved into Simulink Documentation

The *Modeling Guidelines for High-Integrity Systems* and *MathWorks Automotive Advisory Board Control Algorithm Modeling Guidelines Using*

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MATLAB, Simulink, and Stateflow documentation is now in the Simulink documentation.

For more information, see *Modeling Guidelines* in the Simulink documentation.

Version 2.6.1 (R2009bSP1) Simulink Verification and Validation Software

This table summarizes what's new in Version 2.6.1 (R2009bSP1):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
No	No	Bug Reports Includes fixes

Version 2.6 (R2009b) Simulink Verification and Validation Software

This table summarizes what's new in Version 2.6 (R2009b):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	Yes—Details labeled as **Compatibility Considerations**, below. See also Summary.	Bug Reports Includes fixes

New features and changes introduced in this version are:

- "New Coverage Reporting for Variable-Size Signals" on page 28

- "Model Coverage for Simulink® Design Verifier Blocks" on page 29

- "Force Block Reduction Off During Simulation" on page 29

- "Improved RMI Highlighting and Reporting" on page 29

- "Create Custom Configurations Using the Model Advisor Configuration Editor" on page 30

- "Licensing Revised for the Model Advisor" on page 30

- "New and Enhanced Model Advisor Checks" on page 31

- "Modeling Guidelines for High-Integrity Systems" on page 32

New Coverage Reporting for Variable-Size Signals

In R2009b, signal sizes in Simulink models can change during execution to facilitate modeling systems with varying environments, resources, and constraints. The Simulink Verification and Validation software can report the minimum, maximum, and allocated space for all variable-size signals in a model, as recorded during simulation.

To enable this feature, in the Coverage Settings dialog box, on the **Coverage** tab, select the **Signal Size** option.

Model Coverage for Simulink Design Verifier Blocks

The Simulink Verification and Validation model coverage tool can collect model coverage data for Simulink Design Verifier blocks. Using this feature during simulation, you can verify Simulink Design Verifier generated test harnesses and user-defined requirements. The model coverage tool collects model coverage data for the following Simulink Design Verifier blocks:

- Proof Assumption

- Proof Objective

- Test Condition

- Test Objective

To enable this feature, in the Coverage Settings dialog box, on the **Coverage** tab, select **Simulink Design Verifier**.

Force Block Reduction Off During Simulation

The Simulink Verification and Validation software can override the value of the Simulink **Block reduction** parameter. When you set this option, the simulation records coverage for all blocks in the model.

To enable this feature, in the Coverage Settings dialog box, on the **Options** tab, select **Force block reduction off**.

Compatibility Considerations

Previously, model coverage ignored the value of the Simulink **Block reduction** parameter, creating incompatibilities between the model coverage data and the generated code coverage data. In R2009b, you can select **Force block reduction off** to override the **Block reduction** parameter and collect coverage for all blocks in the model.

Improved RMI Highlighting and Reporting

The Requirements Management Interface (RMI) has the following improvements to its highlighting and reporting capabilities:

- Differential highlighting of blocks and subsystems to easily locate model objects with requirements links

- Real-time update of highlighted view to reflect the current state of the model requirements links

- Improved requirements report that includes a document summary, and details about signal group requirements and objects with missing requirements

- New interface for modifying settings for the requirements report generation that is available to users who do not have a Simulink® Report Generator™ license

- IBM Rational DOORS module paths stored with the requirements information for easier review. For requirement links created before R2009b, the module path information is still saved only in the DOORS module.

Create Custom Configurations Using the Model Advisor Configuration Editor

The Model Advisor Configuration Editor expedites creating and deploying custom configurations of the Model Advisor. The Configuration Editor assists with:

- Adding MathWorks and custom checks to your custom configuration with drag and drop.

- Creating new folders in your custom configuration from a toolbar icon.

- Deploying custom configurations in a MAT file.

For more information, see "Organizing Checks and Folders Using the Model Advisor Configuration Editor" and "How to Deploy Custom Configurations" in the Simulink Verification and Validation documentation.

Licensing Revised for the Model Advisor

Previously, the Model Advisor populated the list of checks and folders based on the licenses available to you. When you ran checks, the software did not require a license checkout. In R2009b, the Model Advisor performs a checkout of the Simulink Verification and Validation license when you run Simulink Verification and Validation checks. For a list of Simulink Verification and

Validation checks, see "Model Advisor Checks" in the Simulink Verification and Validation documentation.

Compatibility Considerations

The Model Advisor performs a checkout of a Simulink Verification and Validation license when you run:

- Checks in the Simulink Verification and Validation folder
- Custom checks

If you do not have a Simulink Verification and Validation license available, when you run the check, you see an error message that the required license is not available.

New and Enhanced Model Advisor Checks

The Simulink Model Advisor includes new and updated verification and validation checks.

DO-178B Checks

The **DO-178B Check** subfolder now includes "Check safety-related diagnostic settings for model initialization".

The checks in the **DO-178B Checks** subfolder are reformatted for a consistent look and feel to the results.

For more information, see "DO-178B Checks" in the *Simulink Verification and Validation User's Guide*.

IEC 61508 Checks

The **IEC 61508 Checks** subfolder now includes "Check for model objects that do not link to requirements".

For more information, see "IEC 61508 and ISO 26262 Checks" in the Simulink Verification and Validation documentation.

Modeling Guidelines for High-Integrity Systems

MathWorks intends this document for engineers developing models and generating code for high-integrity systems using Model-Based Design with MathWorks products. This document describes creating Simulink models that are complete, unambiguous, statistically deterministic, robust, and verifiable. The document focus is on model settings, block usage, and block parameters that impact simulation behavior or code generated by the Real-Time Workshop® Embedded Coder™ product.

These guidelines do not assume that you use a particular safety or certification standard. The guidelines reference some safety standards where applicable, including DO-178B, IEC 61508, and MISRA C®.

You can use the Model Advisor to support adhering to these guidelines. Each guideline lists the checks that are applicable to that guideline.

For more information, see "Modeling Guidelines for High-Integrity Systems" in the Simulink Verification and Validation documentation.

Version 2.5 (R2009a) Simulink Verification and Validation Software

This table summarizes what's new in Version 2.5 (R2009a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	No	Bug Reports Includes fixes

New features and changes introduced in this version are:

- "Recording Coverage for External MATLAB Files" on page 33
- "API for Customizing Model Advisor Results" on page 33
- "New and Enhanced Model Advisor Checks" on page 34
- "MathWorks Automotive Advisory Board Control Algorithm Modeling Guidelines Using MATLAB, Simulink, and Stateflow Included in Help" on page 34

Recording Coverage for External MATLAB Files

MATLAB Function blocks and functions can call external program files. The Model Coverage Tool extends the model coverage capabilities to record coverage for these files. By default, this option is disabled; coverage is not collected for external program files.

Enable this option if you want the software to collect and report coverage for all program files associated with the MATLAB Function blocks. To enable this option, in the Coverage Settings dialog box, select **Coverage for MATLAB files**.

API for Customizing Model Advisor Results

In R2009a, there is a new API to customize the results of the Model Advisor for a common look and feel for all of your customized checks. The API includes templates for you to organize the results in tables or lists. For

more information, see "Customizing the Model Advisor" in the *Simulink Verification and Validation User's Guide.*

New and Enhanced Model Advisor Checks

The Simulink Model Advisor includes new and updated verification and validation checks.

DO-178B Checks

The **DO-178B Check** subcategory includes the following new checks:

- Check for blocks that do not link to requirements

- Check for proper usage of Math blocks

For more information, see "DO-178B Checks" in the Simulink Verification and Validation documentation.

IEC 61508 Checks

The checks in the **IEC 61508 Checks** subfolder are reformatted for a consistent look and feel to the results. For more information, see "IEC 61508 and ISO 26262 Checks" in the Simulink Verification and Validation documentation.

Modeling Standards for MAAB Checks

There is a new **Modeling Standards for MAAB** subfolder in the **By Task** folder of the Model Advisor, which includes subfolders that organize the MAAB checks so you can more easily determine which checks you want to run.

MathWorks Automotive Advisory Board Control Algorithm Modeling Guidelines Using MATLAB, Simulink, and Stateflow Included in Help

The MathWorks Automotive Advisory Board (MAAB) involves major automotive original equipment manufacturers (OEMs) and suppliers in the process of evolving MathWorks controls, simulation, and code generation products, including the Simulink, Stateflow, and Real-Time Workshop products. An important result of the MAAB has been the "MathWorks

Automotive Advisory Board Control Algorithm Modeling Guidelines Using MATLAB, Simulink, and Stateflow." Help for the Simulink Verification and Validation product now includes these guidelines. The MAAB guidelines link to relevant Model Advisor MAAB check help and MAAB check help links to relevant MAAB guidelines.

For more information on the MAAB guidelines, see "MathWorks Automotive Advisory Board Control Algorithm Modeling Guidelines Using MATLAB, Simulink, and Stateflow". For information on the Model Advisor MAAB checks, see "MathWorks Automotive Advisory Board Checks."

Version 2.4 (R2008b) Simulink Verification and Validation Software

This table summarizes what's new in Version 2.4 (R2008b):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	No	Bug Reports Includes fixes

New features and changes introduced in this version are:

- "New and Enhanced Model Advisor Checks" on page 36
- "Improved Selection-Based Linking" on page 38
- "Enhanced Model Coverage Report" on page 38

New and Enhanced Model Advisor Checks

Context-sensitive help is now available for all Model Advisor checks.

DO-178B Checks

The **DO-178B Check** subcategory includes these new and enhanced checks:

- Check safety-related diagnostic settings for saving — This new check helps enforce and document adherence to coding standards for DO-178B, Software Considerations in Airborne Systems and Equipment Certification.

- Check safety-related diagnostic settings for signal data — This check now checks whether the parameter `SignalRangeChecking` is set to `error`.

- New Action box for the following checks that you can use to automatically fix failures:

  - Check safety-related optimization settings

  - Check safety-related diagnostic settings for solvers

  - Check safety-related code generation settings

  - Check safety-related diagnostic settings for compatibility

- Check safety-related diagnostic settings for bus connectivity

- Check safety-related diagnostic settings for signal connectivity

- Check safety-related diagnostic settings for data store memory

- Check safety-related diagnostic settings for data used for debugging

- Check safety-related diagnostic settings for parameters

- Check safety-related diagnostic settings for signal data

- Check safety-related diagnostic settings that apply to function-call connectivity

- Check safety-related diagnostic settings for model referencing

- Check safety-related model referencing settings

- Check safety-related diagnostic settings for sample time

- Check safety-related diagnostic settings for type conversions

- Check safety-related diagnostic settings for saving

For more information, see "DO-178B Checks" in the Simulink Verification and Validation documentation.

IEC 61508 Checks

The **IEC 61508 Checks** subcategory includes a new check, Check usage of Stateflow, that helps enforce and document compliance with coding standards for functional safety in electrical, electronic, and programmable electronic systems, as the IEC 61508 standard outlines.

For more information, see "IEC 61508 and ISO 26262 Checks" in the Simulink Verification and Validation documentation.

MathWorks Automotive Advisory Board Checks

The **MathWorks Automotive Advisory Board Checks** subcategory includes new checks that have been implemented to support the MathWorks Automotive Advisory Board (MAAB) 2.0 rules:

• Check for difference in font and font sizes

- Check Transition orientations in Flowcharts
- Check for display of non-default block attributes
- Check for proper labeling on Signal lines
- Check for propagated labels on Signal lines
- Check default Transition placement on Stateflow Charts
- Check setting Stateflow Graphical Function return value
- Check for proper use of Switch Blocks
- Check for proper use of Signal Busses and Mux block usage

For more information, see "MathWorks Automotive Advisory Board Checks" in the Simulink Verification and Validation documentation.

Improved Selection-Based Linking

To create links between a model and a Microsoft Word or Microsoft Excel file, you can open the file from within both the model and the requirements document. The Requirements Management Interface (RMI) establishes communication with the appropriate application when you initiate selection-based linking.

For more information, see "Links Between Models and Requirements Documents" in the Simulink Verification and Validation documentation.

Enhanced Model Coverage Report

The Model Coverage report now includes information about:

- Model being analyzed
- Simulation optimization options
- Model coverage options

For more information, see "Creating Requirements Reports" in the Simulink Verification and Validation documentation.

Version 2.3 (R2008a) Simulink Verification and Validation Software

This table summarizes what's new in Version 2.3 (R2008a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	No	Bug Reports Includes fixes

New features and changes introduced in this version are

- "Enhanced Coverage Support for Referenced Models" on page 39
- "New Requirements Submenu in Model Explorer" on page 39
- "Model Advisor Checks for Modeling Standards Enhanced" on page 40
- "API for Customizing Model Advisor Enhanced" on page 40

Enhanced Coverage Support for Referenced Models

The previous release introduced coverage support for referenced models, but only by means of functions that you invoke programmatically. This release includes the following enhancements to coverage support for referenced models:

- Redesigned Coverage Settings dialog box now includes controls that allow you to enable coverage for referenced models graphically.
- New Coverage by Model summary that allows you to navigate easily to coverage reports associated with referenced models in a hierarchy.

New Requirements Submenu in Model Explorer

Full access to the Requirements Management Interface is now available from within the Model Explorer. In this release, a **Requirements** submenu replaces the **Edit requirements** item that appears in Model Explorer context menus. This new submenu provides several options for adding requirements to model elements and specifying link preferences. This same submenu is available by right-clicking objects in a Simulink model or a Stateflow chart.

Model Advisor Checks for Modeling Standards Enhanced

The Simulink Model Advisor has been enhanced with new and updated verification and validation checks.

- In the Task Hierarchy tree, the check category **By Product > Simulink Verification and Validation > Modeling Standards** includes the new subcategory **IEC 61508 Checks**.

- The **IEC 61508 Checks** subcategory includes new checks that help enforce and document adherence to coding standards for functional safety in electrical, electronic, and programmable electronic systems, as the IEC 61508 standard outlines. For descriptions of the IEC 61508 checks, see "Model Advisor Checks" in the Simulink Verification and Validation documentation.

- The IEC 61508 checks also appear under the new category **By Task > Model-Based Design for IEC 61508**.

- Some **MathWorks Automotive Advisory Board Checks** have been updated.

For Information on How To...	See...
Develop models and code that comply with industry standards and guidelines, such as the IEC 61508 standard and MathWorks Automotive Advisory Board (MAAB) guidelines	"Guidelines and Standards" in the Real-Time Workshop Embedded Coder documentation
Use the Model Advisor	"Consulting the Model Advisor" in *Simulink User's Guide*
Customize the Model Advisor with your own tasks and checks	"Customizing the Model Advisor" in the *Simulink Verification and Validation User's Guide*

API for Customizing Model Advisor Enhanced

R2008a provides an enhanced API that allows you to customize the behavior of the Model Advisor for checking and reporting on how well your Simulink

models are optimized for simulation and code generation. The API provides classes and functions for defining custom checks and tasks, and writing your own callback functions. For more information, see "Customizing the Model Advisor" in the *Simulink Verification and Validation User's Guide*.

Version 2.2 (R2007b) Simulink Verification and Validation Software

This table summarizes what's new in Version 2.2 (R2007b):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	No	Bug Reports Includes fixes

New features and changes introduced in this version are

- "Model Coverage Support for Referenced Models" on page 42

- "Model Advisor Checks for Modeling Standards Enhanced" on page 42

- "API for Customizing Model Advisor HTML Reports" on page 43

Model Coverage Support for Referenced Models

This release introduces model coverage support for referenced models that operate in Normal mode. That is, you can now record coverage for Model blocks whose **Simulation mode** parameter specifies Normal. Toward that end, this release provides three new functions:

- cvsimref

- cv.cvdatagroup

- cv.cvtestgroup

For more information, see "Using Model Coverage Commands for Referenced Models" in the *Simulink Verification and Validation User's Guide.*

Model Advisor Checks for Modeling Standards Enhanced

The Simulink Model Advisor has been enhanced with new and updated verification and validation checks.

- In the Task Hierarchy tree, the check category **By Product > Simulink Verification and Validation > Modeling Standards** includes two new subcategories: **DO-178B Checks** and **MathWorks Automotive Advisory Board Checks**.

- The **DO-178B Checks** subcategory includes new checks that help enforce and document adherence to coding standards for DO-178B, Software Considerations in Airborne Systems and Equipment Certification. If a piece of software will be flying on a commercial aircraft, the development and verification process must comply with DO-178B. For descriptions of the DO-178B checks, see "Model Advisor Checks" in the Simulink Verification and Validation documentation.

- The DO-178B checks also appear under the new category **By Task > Safety Critical for DO-178B**.

- Checks listed under **By Product > Simulink Verification and Validation > Modeling Standards** in earlier releases, appear under the new subcategory **MathWorks Automotive Advisory Board Checks**. These checks verify that Simulink block diagrams adhere to style guidelines published by the MathWorks Automotive Advisory Board (MAAB).

- Some **MathWorks Automotive Advisory Board Checks** have been updated. For example, the check for "hd_0001, Prohibited Simulink Sink and Data Store blocks" was modified to allow Data Store Memory, Data Store Read, and Data Store Write blocks and the check for "db_0146, Triggered or enabled subsystems" was modified to include For Iterator, While Iterator, and Case blocks.

For Information on How To...	See...
Use the Model Advisor	"Consulting the Model Advisor" in *Simulink User's Guide*
Customize the Model Advisor with your own tasks and checks	"Customizing the Model Advisor" in the *Simulink Verification and Validation User's Guide*

API for Customizing Model Advisor HTML Reports

This release provides a new API that allows you to customize Model Advisor HTML reports. The API provides classes and methods for formatting custom

HTML reports, making it easier to create, understand, and maintain Model Advisor HTML reports. See "Formatting Model Advisor Results" in the *Simulink Verification and Validation User's Guide.*

Version 2.1 (R2007a) Simulink Verification and Validation Software

This table summarizes what's new in Version 2.1 (R2007a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
No	No	Bug Reports Includes fixes

Version 2.0 (R2006b) Simulink Verification and Validation Software

This table summarizes what's new in Version 2.0 (R2006b):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	No	Bug Reports Includes fixes

New features and changes introduced in this version are

- "Requirement Links Checking" on page 46
- "Modeling Standards Checking" on page 46

Requirement Links Checking

This release introduces Model Advisor tasks for ensuring the consistency and validity of requirement links in a Simulink block diagram. These checks enable you to identify and fix the following situations:

- The requirements document is missing.
- The location (e.g., bookmark, line number, anchor) specified within the requirements document is invalid.
- The description of a selection-based link does not match its requirements document text.
- The requirements document path does not match your preferred path type (i.e., absolute or relative).

See "Consulting the Model Advisor" in *Simulink User's Guide* for more information about using Model Advisor.

Modeling Standards Checking

This release introduces Model Advisor tasks for ensuring that a Simulink block diagram adheres to the style guidelines published by the MathWorks Automotive Advisory Board (MAAB). See "Consulting the Model Advisor"

in *Simulink User's Guide* for more information about using Model Advisor. For information about the MAAB modeling style guidelines, see `http://www.mathworks.com/industries/auto/maab.html`.

Version 1.1.2 (R2006a) Simulink Verification and Validation Software

This table summarizes what's new in Version 1.1.2 (R2006a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
No	No	Bug Reports at Web site

Compatibility Summary for Simulink Verification and Validation Software

This table summarizes new features and changes that might cause incompatibilities when you upgrade from an earlier version, or when you use files on multiple versions. Details are provided in the description of the new feature or change.

Version (Release)	New Features and Changes with Version Compatibility Impact
Latest Version V3.2 (R2011b)	See the **Compatibility Considerations** subheading for this new feature or change: • "Changed Format for slvnvruntest and slvnvruncgvtest Output" on page 7 • "Conversion of Error and Warning Message Identifiers" on page 8
V3.1 (R2011a)	None
V3.0.1 (R2010bSP1)	None
V3.0 (R2010b)	See the **Compatibility Considerations** subheading for this new feature or change: • "MathWorks Check IDs for the Model Advisor Updated" on page 20
V2.7 (R2010a)	See the **Compatibility Considerations** subheading for this new feature or change: • "Function rminav Removed" on page 24
V2.6.1 (R2009bSP1)	None

Version (Release)	New Features and Changes with Version Compatibility Impact
V2.6 (R2009b)	See the **Compatibility Considerations** subheading for each of these new features or changes: • "Force Block Reduction Off During Simulation" on page 29 • "Licensing Revised for the Model Advisor" on page 30
V2.5 (R2009a)	None
V2.4 (R2008b)	None
V2.3 (R2008a)	None
V2.2 (R2007b)	None
V2.1 (R2007a)	None
V2.0 (R2006b)	None
V1.1.2 (R2006a)	None
V1.1.1 (R14SP3)	None
V1.1 (R14SP2+)	None
V1.0.2 (R14SP2)	None
V1.0.1 (R14SP1)	None
V1.0 (R14)	None