

SimMechanics Release Notes

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Summary by Version

This table provides quick access to what's new in each version. For clarification, see "About Release Notes" on page 1.

Version (Release)	New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Latest Version V2.4 (R2006a)	Yes Details	Yes Summary	Bug Reports at Web site	Printable Release Notes: PDF V2.4 product documentation
V2.3 (R14SP3)	Yes Details	No	Bug Reports at Web site	No
V2.2.2 (R14SP2)	Yes Details	No	Bug Reports at Web site	No
V2.2.1 (R14SP1)	Yes Details	No	Fixed bugs at Web site	No
V2.2 (R14)	Yes Details	Yes Summary	Fixed bugs at Web site	No
V2.1.1 (R13SP1)	No	No	Yes Details	No
V2.1 (R13+)	Yes Details	No	Fixed bugs at Web site	No
V2.0.1 (R13+)	No	No	Yes Details	No
V2.0 (R13+)	Yes Details	No	Fixed Bugs at Web Site	No

About Release Notes

Use release notes when upgrading to a newer version to learn about new features and changes, and the potential impact on your existing files and practices. Release notes are also beneficial if you use or support multiple versions.

If you are not upgrading from the most recent previous version, review release notes for all interim versions, not just for the version you are installing. For example, when upgrading from V1.0 to V1.2, review the New Features and Changes, Version Compatibility Considerations, and Bug Reports for V1.1 and V1.2.

New Features and Changes

These include

- New functionality
- Changes to existing functionality
- Changes to system requirements (complete system requirements for the current version are at the MathWorks Web site)
- Any version compatibility considerations associated with each new feature or change

Version Compatibility Considerations

When a new feature or change introduces a known incompatibility between versions, its description includes a **Compatibility Considerations** subsection that details the impact. For a list of all new features and changes that have compatibility impact, see the “Compatibility Summary for SimMechanics” on page 27.

Compatibility issues that become known after the product has been released are added to Bug Reports at the MathWorks Web site. Because bug fixes can sometimes result in incompatibilities, also review fixed bugs in Bug Reports for any compatibility impact.

Fixed Bugs and Known Problems

MathWorks Bug Reports is a user-searchable database of known problems, workarounds, and fixes. The MathWorks updates the Bug Reports database as new problems and resolutions become known, so check it as needed for the latest information.

Access Bug Reports at the MathWorks Web site using your MathWorks Account. If you are not logged in to your MathWorks Account when you link

to Bug Reports, you are prompted to log in or create an account. You then can view bug fixes and known problems for R14SP2 and more recent releases.

The Bug Reports database was introduced for R14SP2 and does not include information for prior releases. You can access a list of bug fixes made in prior versions via the links in the summary table.

Related Documentation at Web Site

Printable Release Notes (PDF). You can print release notes from the PDF version, located at the MathWorks Web site. The PDF version does not support links to other documents or to the Web site, such as to Bug Reports. Use the browser-based version of release notes for access to all information.

Product Documentation. At the MathWorks Web site, you can access complete product documentation for the current version and some previous versions, as noted in the summary table.

Version 2.4 (R2006a) SimMechanics

This table summarizes what's new in V2.4 (R2006a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes	Yes—Details labeled as Compatibility Considerations , below. See also Summary.	Bug Reports at Web site	Printable Release Notes: PDF V2.4 product documentation

New features and changes introduced in this version are described here.

- “New Block Dialogs and the Simulink Model Explorer” on page 4
- “Joint Spring & Damper Adds Extra Simulink State When Connected to a Revolute” on page 5
- “Improved CAD Translation” on page 5
- “SolidWorks CAD Translator” on page 5

New Block Dialogs and the Simulink Model Explorer

Most of the SimMechanics block dialogs have been upgraded and are now compatible with the Simulink® Model Explorer. See the Simulink documentation for more about Model Explorer.

Block Dialogs Not Rendered in Model Explorer

Model Explorer cannot render the dialogs of these blocks:

- Shared Environment
- Point-Curve Constraint

Joint Spring & Damper Adds Extra Simulink State When Connected to a Revolute

In the new version of SimMechanics, each Joint Spring & Damper block connected to a revolute primitive adds a Simulink state to your model. These states are in addition to other normal Simulink states, such as those associated with Integrator and Transfer Fcn blocks. See the Simulink documentation for more about Simulink model states.

This new feature does not change the mechanical states of your model, those associated with SimMechanics joint blocks. See the `mech_stateVectorMgr` command reference for more about mechanical states.

Improved CAD Translation

The SimMechanics SolidWorks computer-aided design (CAD) translator and Physical Modeling XML import command have been improved. See “Modeling with Computer-Aided Design” and the `import_physmod` command reference in the “SimMechanics User’s Guide”.

- Mates in a CAD assembly (restrictions on the free motion of CAD parts) are now translated into Joint blocks that reflect a particular combination of joint primitives, such as Prismatic, Revolute, Spherical, Bushing, etc. Previously, all degrees of freedom in a CAD assembly were translated into specially configured Custom Joint blocks. Rigid connections between parts continue to be translated into Welds.
- Blocks in SimMechanics models generated from Physical Modeling XML files are now, by default, labeled with shorter names. You can change the naming convention in the `import_physmod` command options.

SolidWorks CAD Translator

If you remove the CAD translator for SolidWorks and want to reinstall it, you must reboot your system first after uninstalling. Then you can reinstall the translator.

Compatibility Considerations

The SolidWorks CAD platform and the SimMechanics CAD translator for SolidWorks are available only for the Microsoft Windows operating system.

The SimMechanics CAD translator for SolidWorks works with SolidWorks 2004, SolidWorks 2005 SP0 and SP2, and SolidWorks 2006. The translator is no longer compatible with earlier versions of SolidWorks.

An older version of the CAD translator is available via the MathWorks Web site. This version supports SolidWorks 2001Plus and SolidWorks 2003.

Version 2.3 (R14SP3) SimMechanics

This table summarizes what's new in V2.3 (R14SP3):

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

New features and changes introduced in this version are described here.

- “New Shared Environment Block” on page 7
- “Updated Body Spring & Damper Block” on page 7
- “Normalizing Rotations” on page 8
- “New State Vector Commands” on page 8
- “New import_physmod Dialog” on page 8
- “Demos Expanded” on page 8
- “Documentation Enhancements” on page 9

New Shared Environment Block

The new Shared Environment block allows you to link two separate SimMechanics block diagrams with a nonphysical connection. The block enforces the same machine environment settings on both machines but adds no mechanical components (bodies or degrees of freedom) to either. Two machines so connected require exactly one Machine Environment block, rather than two.

See the Shared Environment block reference for further details.

Updated Body Spring & Damper Block

The Body Spring & Damper block no longer contains any degrees of freedom.

Previous versions of the Body Spring & Damper block contained six degrees of freedom (DoFs) represented by a Joint. This Joint had to be taken into account when counting DoFs and loops in your model.

The new Body Spring & Damper block instead uses a Shared Environment block to connect the two sides and contains no DoFs. See their respective block references for more information.

Normalizing Rotations

The Body dialog accepts various rotational forms (Euler angles, rotation matrix, quaternion). SimMechanics now interprets these rotational forms in a slightly different way, so that the standard normalization conditions on rotation matrices and quaternions are consistently enforced. As a result, you might now see slightly different simulation results from earlier versions.

New State Vector Commands

SimMechanics features four new commands that allow you to manipulate the mechanical states of your models. See the command references for more.

- `mech_get_states`
- `mech_runtime_states`
- `mech_set_states`
- `mech_transfer_states`

New `import_physmod` Dialog

The `import_physmod` command generates SimMechanics models from Physical Modeling XML files. In addition to importing Physical Modeling XML through the command line, you can now set up the command through a dialog.

See the `import_physmod` command reference for further information.

Demos Expanded

Two new demos have been added to SimMechanics:

- `mech_flexible_four_bar` models a flexible four bar machine.

- `mech_pole_vault` models a rigid pole vaulter, with a discrete event.

The second demo has an associated MAT-file.

Documentation Enhancements

The SimMechanics User's Guide has been enhanced.

- The review chapter on representing motion has been revised.
- The motion analysis chapter has been revised.
- The computer-aided design (CAD) documentation (also available as a separate book) has been significantly revised. See the CAD chapter.
- A new chapter of case studies, based on the Stewart platform, has been added. The studies apply advanced methods and tasks to this system. SimMechanics includes a related set of demo model and library files.
 - Degrees of freedom, states, closed topology, and constraints
 - Trimming and linearization
 - Designing controllers for the platform
 - Generating code versions of the model
 - Implementing code on dedicated hardware (hardware in the loop)

Version 2.2.2 (R14SP2) SimMechanics

This table summarizes what's new in V2.2.2 (R14SP2):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Bug Reports at Web site	No

New features and changes introduced in this version are described here.

- “Demos Expanded” on page 10
- “Documentation Enhancements” on page 10

Demos Expanded

Two new demos have been added to SimMechanics:

- mech_sticky_box
- mech_sticky_screw

Each demo has an associated MAT-file.

These demos illustrate static friction (stiction) implemented with the Joint Stiction Actuator.

Documentation Enhancements

The online SimMechanics Help has been enhanced with links to four new Web-based AVI animation files (one of them new in this release) that record SimMechanics simulations.

You can access these links most easily by using the Examples index in the Help browser, under **Prerecorded Animations**.

Version 2.2.1 (R14SP1) SimMechanics

This table summarizes what's new in V2.2.1 (R14SP1):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes	No	Fixed bugs at Web site	No

New features and changes introduced in this version are described here.

- “Demos Updated and Expanded” on page 11
- “Documentation Enhancements” on page 11

Demos Updated and Expanded

The demos used in the open-topology Inverse Dynamics case study have been changed:

- mech_dpend_invdyn1
- mech_dpend_invdyn2
- mech_dpend_act (a new demo replacing mech_dpend_stat)

The last, new demo has an associated MAT-file, mech_dpend_act.mat. See “Documentation Enhancements” on page 11.

Two other new SimMechanics demos have been added:

- mech_cambelt models a cam, belt, and pulley system with a Point-Curve Constraint block.
- mech_viscous illustrates how to model a viscous medium with a Joint Spring-Damper block.

Documentation Enhancements

The online SimMechanics Help has been enhanced with additional multimedia support.

- The online Help contains four detailed mechanical drawings for systems modeled in the user's guide: the conveyor, the four bar machine, and the Stewart platform.
- The online Help also contains links to three new Web-based AVI animation files that record SimMechanics simulations.

You can access these features most easily by using the Examples index in the Help browser, under **Mechanical Drawings** and **Prerecorded Animations**, respectively.

The open-topology Inverse Dynamics section of the motion analysis chapter has been enhanced with a new, more complex and more realistic example. The related demos have been changed as well; see "Demos Updated and Expanded" on page 11 previously.

Version 2.2 (R14) SimMechanics

This table summarizes what's new in V2.2 (R14):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes	Yes—Details labeled as Compatibility Considerations , below. See also Summary.	Fixed bugs at Web site	No

New features and changes introduced in this version are described here.

- “Simulation and Visualization Controls Changes” on page 14
- “New Machine Environment Block” on page 14
- “Choosing a Ground Block as Machine Root” on page 15
- “Optional Two-Dimensional Solver” on page 15
- “Optional Gravity Signal” on page 15
- “New SimMechanics Diagnostics Settings” on page 16
- “Restricted Body Coordinate System References” on page 16
- “Minimum Number of Body Coordinate Systems” on page 16
- “Visualization Controls Relocated” on page 17
- “Manual Updating of Body Visualization” on page 17
- “Internal Virtual Reality Visualization No Longer Supported” on page 17
- “Code Generation with Point-Curve Constraint Now Enabled” on page 18
- “Code Generation Improvements” on page 18
- “Additional Simulink Features Now Supported” on page 18
- “SimMechanics Now Supported on HP-UX Platforms” on page 18
- “Demos Updated and Expanded” on page 18

- “Documentation Enhancements” on page 19

Simulation and Visualization Controls Changes

This version of SimMechanics introduces significant changes to how you control simulation, mechanical environment, and visualization in SimMechanics models. These changes, summarized below, include

- “New Machine Environment Block” on page 14
- “Choosing a Ground Block as Machine Root” on page 15
- “Optional Two-Dimensional Solver” on page 15
- “Optional Gravity Signal” on page 15
- “New SimMechanics Diagnostics Settings” on page 16
- “Visualization Controls Relocated” on page 17
- “Manual Updating of Body Visualization” on page 17

The new controls are fully documented in the SimMechanics User’s Guide chapters on running simulations and visualization.

New Machine Environment Block

In the new version of SimMechanics, you configure the mechanical environment for an entire model in the **SimMechanics** node of the **Configuration Parameters** dialog, accessed via the **Simulation** menu. You configure the mechanical environment for each separate machine diagram (one or more per model) via its Machine Environment block. These two dialogs replace the old **Mechanical Environment Settings** dialog.

You must connect exactly one Machine Environment block to each separate machine diagram at one of the machine’s Ground blocks. The new Machine Environment block is located in the Bodies library.

See “Choosing a Ground Block as Machine Root” on page 15.

Compatibility Considerations

Prior to this version, SimMechanics models recorded mechanical environment data in the **Mechanical Environment Settings** dialog. Although you can

no longer access this dialog from the **Simulation** menu, you can continue to run old models as they are. If you want to view these old settings, enter `mech_environment(gcs)` at the command line with your old model open. You cannot change the dialog settings.

If you want to change the settings in old models or build a new SimMechanics model, you must use the new Machine Environment block. Copying this block from the Bodies library into an old model causes the old **Mechanical Environment Settings** data to be copied into the block. You can then reconfigure the new block as you want.

Choosing a Ground Block as Machine Root

The new Ground block has the option of being chosen as the root for a machine's Machine Environment block. In each separate machine diagram (one or more per model), choose one such Ground by selecting **Show Mechanical Environment port** in its dialog. A special port appears on the Ground. Then connect a Machine Environment block to the Ground at this port.

See “New Machine Environment Block” on page 14.

Optional Two-Dimensional Solver

The new Machine Environment block allows you to choose, through its **Machine dimensionality** pull-down menu, a specialized solver for a machine that moves in only two dimensions. SimMechanics detects the dimensionality and automatically adjusts the solver by default. But you can override the default and require SimMechanics to work in either three or two dimensions.

The two-dimensional solver significantly improves simulation performance in two and one dimensions.

Optional Gravity Signal

The new Machine Environment block allows you to input gravity as an external Simulink® signal. In the block dialog, select **Input gravity as signal**. A Simulink inport appears for connecting the Simulink signal line. The gravity must be a three-component vector signal. You choose the units in the **Gravity vector** units pull-down menu of the block dialog. SimMechanics

interprets the vector gravity signal the same way it interprets the static **Gravity vector** field value in the block dialog.

If you choose gravity as a signal, the **Gravity vector** field is ignored.

New SimMechanics Diagnostics Settings

SimMechanics now lets you control diagnostic messages. In the **SimMechanics** node of the **Configuration Parameters** dialog, accessed via the **Simulation** menu, you can select to enable or disable certain warning messages, and whether to mark closed-loop joints cut automatically by SimMechanics.

Restricted Body Coordinate System References

All coordinate system (CS) references in Body blocks from one CS to another CS must now refer to only

- Other CSs on the same Body
- Adjoining CSs (coordinate systems on Bodies directly connected to the referring body)
- World

All other CS references now cause simulation errors.

Compatibility Considerations

Other types of CS references from one Body to another now lead to simulation errors. If any of your old models contain such references, you must update them.

Minimum Number of Body Coordinate Systems

You can no longer eliminate all the non-center-of-gravity (CG) Body coordinate systems (CSs) on a Body block dialog. Besides the undeletable CG CS entry, at least one non-CG CS must remain.

Visualization Controls Relocated

You now enable SimMechanics visualization and animation for an entire model in the **Visualization** area of the **SimMechanics** node of the **Configuration Parameters** dialog, reached via the **Simulation** menu. You now enable or disable visualization for individual machines within a model via the **Visualization** pane of the Machine Environment block dialog. See “New Machine Environment Block” on page 14.

All SimMechanics visualization controls are now located on the MATLAB® Graphics visualization window, in the special **SimMechanics** menu and toolbar.

Manual Updating of Body Visualization

SimMechanics visualization no longer immediately displays a Body newly added to a model. Instead you must update the model by selecting **Update Diagram** from the **Edit** menu.

Internal Virtual Reality Visualization No Longer Supported

SimMechanics no longer includes internally integrated Virtual Reality Toolbox visualization. Models configured to use virtual reality now default to the MATLAB Graphics visualization/animation tool, which is still supported by SimMechanics.

See the virtual reality section of the visualization chapter in the SimMechanics documentation.

Consult the Web product page for more about Virtual Reality Toolbox.

Compatibility Considerations

You can continue to use Virtual Reality Toolbox with SimMechanics by creating your own virtual world for your machine, incorporating into your model a VR Sink block linked to your virtual world, and feeding Body Sensor signals to the VR Sink.

Code Generation with Point-Curve Constraint Now Enabled

The Point-Curve Constraint no longer creates algebraic loops in Simulink. This improvement means that you can now generate code from models containing Point-Curve Constraints.

Code Generation Improvements

The stand-alone SimMechanics library used for code generation is now precompiled for supported platforms using standard targets. This feature significantly speeds up compilation of generated code.

SimMechanics code generation now supports the Real-Time Windows Target.

Additional Simulink Features Now Supported

SimMechanics now supports Model Referencing and S-function target. It also now supports Simulink External mode, but without visualization. See the sections on generating code and SimMechanics limitations in the SimMechanics documentation.

SimMechanics Now Supported on HP-UX Platforms

SimMechanics is now supported on the Hewlett-Packard UNIX (HP-UX) operating system.

Demos Updated and Expanded

All SimMechanics demos have been updated with the new Machine Environment block. New demos have also been added:

- `mech_bouncing_ball` demonstrates how to model impact and collisional forces using a bouncing ball.
- `mech_flyball` models a flyball governor mechanism.
- `mech_rack_pinion` models a driven rack-and-pinion mechanism.
- `mech_rolling_sphere` demonstrates how to model nonholonomic constraints using a sphere rolling on a two-dimensional surface.

- `mech_toroid` illustrates the Point-Curve Constraint with a body sliding on a toroidal curve.

Documentation Enhancements

The SimMechanics User's Guide has been enhanced.

- The review chapter on body motion and coordinate systems is expanded with greater detail and more examples.
- The computer-aided design (CAD) documentation (also available as a separate book) has been significantly revised and expanded. See the CAD chapter.
- The case study sections on trimming and linearization have been revised and expanded, including a new closed-loop linearization example.

You can find a more complex closed-loop linearization example using a Stewart platform model at

www.mathworks.com/company/newsletters/digest/sept02/stewart.html

Version 2.1.1 (R13SP1) SimMechanics

This table summarizes what's new in V2.1.1 (R13SP1):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
No	No	Yes Details below	No

New changes introduced in this version are described here.

- “Model Reinitialization After Simulation Errors” on page 20

Model Reinitialization After Simulation Errors

Restarting a model that had encountered an error during a previous simulation sometimes led SimMechanics to return warnings and zero results. Starting the model a third time reproduced the errors of the first simulation. This bug is now fixed.

Version 2.1 (R13+) SimMechanics

This table summarizes what's new in V2.1 (R13+):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Fixed bugs at Web site	No

New features and changes introduced in this version are described here.

- “Computer-Aided Design Translator for SolidWorks” on page 21
- “import_physmod Command for Generating Models” on page 22
- “Documentation and Examples for CAD Translator” on page 22

Computer-Aided Design Translator for SolidWorks

SimMechanics 2.1 contains a standalone computer-aided design (CAD) translator for the SolidWorks® CAD platform. You install and use the CAD translator with SolidWorks but independently of MATLAB.

The translator converts a SolidWorks CAD machine assembly into an XML file in a special Physical Modeling format. The XML file represents the assembly in a form that you can use with SimMechanics to generate a block diagram model dynamically equivalent to the original CAD assembly. To generate models, use the new `import_physmod` command. See “import_physmod Command for Generating Models” on page 22 below.

Relative to the main directory of your SolidWorks installation, the CAD translator installs to `Applications/TheMathWorks/SimMechanics/`.

Installing

You can obtain the self-extracting executable archive `SimMechanics_Translator_for_SolidWorks.exe` in two ways.

- When you install SimMechanics 2.1, the archive is installed to `toolbox/physmod/import/standalone/solidworks/win32/`, relative to your MATLAB root.
- Alternatively, you can download the archive independently of MATLAB at www.mathworks.com/products/simmechanics/.

Once you have the archive, run it. Click **Setup**.

The setup utility searches your hard drive for the SolidWorks installation location. If you wish to specify the location yourself, you can interrupt the search at any time by pressing the spacebar and then entering a full or partial path to your SolidWorks directory. Once the installer finds SolidWorks, it prompts you to confirm. After you confirm, the installation runs to completion.

A README file, with additional instructions, appears after installation.

Linking to SolidWorks

After you have completed the preceding steps to install the translator, start SolidWorks.

Choose **Add-Ins** from the **Tools** menu. Then select **SimMechanics**.

import_physmod Command for Generating Models

Using the CAD translator (see above), you export a CAD assembly into an XML file in the Physical Modeling format.

This XML file represents the assembly in a form that you can use to generate a SimMechanics block diagram model dynamically equivalent to the original CAD assembly. You generate the model from the XML file with the `import_physmod` command.

The generated model contains Bodies and Joints that represent the original parts and degrees of freedom of the assembly. You can edit the generated model to add additional SimMechanics and Simulink blocks.

Documentation and Examples for CAD Translator

The SimMechanics User's Guide has not been updated for this release.

CAD Translator Documentation

Special help files accompany the CAD translator. They include two HTML pages and a special PDF book.

These files are independent of the MATLAB help system. Relative to the main directory of your SolidWorks installation, the special CAD translator documentation installs to Applications/TheMathWorks/SimMechanics/help/.

CAD Translator Examples

Some examples of SolidWorks CAD assemblies are installed to Applications/TheMathWorks/SimMechanics/examples/. One of the examples is a robot arm assembly. The corresponding XML file in Physical Modeling format, robot.xml, is located in the toolbox/physmod/mech/mechdemos directory, relative to your MATLAB root.

Version 2.0.1 (R13+) SimMechanics

This table summarizes what's new in V2.0.1 (R13+):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
No	No	Yes Details below	No

New changes introduced in this version are described here.

Code Compilation with lcc Compiler

Attempting to compile code generated from SimMechanics models using lcc led to errors in Version 2.0. This bug is now fixed.

Version 2.0 (R13+) SimMechanics

This table summarizes what's new in V2.0 (R13+):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Fixed Bugs at Web Site	No

New features and changes introduced in this version are described here.

- “Code Generation with Real-Time Workshop” on page 25
- “Accelerator Mode and Discrete Events” on page 25
- “Expanded Handle Graphics Visualization Features” on page 26
- “Variable Body Mass and Inertia Tensor” on page 26
- “Vectorized Joint Initial Condition Actuation” on page 26
- “Damped Linear Force Element Blocks” on page 26
- “New Mechanical Branching Bar Block” on page 26

Code Generation with Real-Time Workshop

You can now generate stand-alone C code from SimMechanics models using Real-Time Workshop[®]. You can also export it to a PC kernel using xPC Target.

SimMechanics 2.0 requires Real-Time Workshop 5.0.1 or later to generate code for the Rapid Simulation (RSIM) target.

Accelerator Mode and Discrete Events

Accelerator mode now supports discrete events associated with the Joint Stiction Actuator and the Point-Curve Constraint.

Expanded Handle Graphics Visualization Features

The MATLAB Graphics visualization tool of SimMechanics has a large number of new features, including recording and playback of simulation animations.

Variable Body Mass and Inertia Tensor

The Sensors & Actuators library features a new Variable Mass & Inertia Actuator block. This block accepts Simulink signals that vary the mass and/or inertia tensor of the Body block to which it is connected. The block only simulates the changes in the body's mass properties and does not simulate the effect of the thrust forces or torques resulting from the accretion or ejection of mass.

Vectorized Joint Initial Condition Actuation

The Joint Initial Condition Actuator block now lists all the primitives in the Joint block to which it is connected. You can set initial positions/angles and initial velocities separately for each prismatic and revolute primitive.

Damped Linear Force Element Blocks

This release introduces a new block library, Force Elements, with two blocks representing damped linear harmonic oscillator forces. The Body Spring-Damper block simulates a damped spring-like force between two bodies. The Joint Spring-Damper block actuates a joint primitive with a damped spring-like force or torque.

New Mechanical Branching Bar Block

The Utilities library features the new Mechanical Branching Bar block. You can use this block to map multiple sensor and actuator lines to one sensor/actuator port on a Joint, Constraint, or Driver or to one Body coordinate system on a Body.

Compatibility Summary for SimMechanics

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 V2.4 (R2006a)	See the Compatibility Considerations subheading for this new feature or change: <ul style="list-style-type: none"> • “SolidWorks CAD Translator” on page 5
V2.3 (R14SP3)	No
V2.2.2 (R14SP2)	No
V2.2.1 (R14SP1)	No
V2.2 (R14)	See the Compatibility Considerations subheading for this new feature or change: <ul style="list-style-type: none"> • “New Machine Environment Block” on page 14 • “Restricted Body Coordinate System References” on page 16 • “Internal Virtual Reality Visualization No Longer Supported” on page 17
V2.1.1 (R13SP1)	No
V2.1 (R13+)	No
V2.0.1 (R13+)	No
V2.0 (R13+)	No