

Simulink[®] 3D Animation[™] Release Notes

How to Contact The MathWorks



www.mathworks.com Web
comp.soft-sys.matlab Newsgroup
www.mathworks.com/contact_TS.html Technical Support



suggest@mathworks.com Product enhancement suggestions
bugs@mathworks.com Bug reports
doc@mathworks.com Documentation error reports
service@mathworks.com Order status, license renewals, passcodes
info@mathworks.com Sales, pricing, and general information



508-647-7000 (Phone)



508-647-7001 (Fax)



The MathWorks, Inc.
3 Apple Hill Drive
Natick, MA 01760-2098

For contact information about worldwide offices, see the MathWorks Web site.

Simulink® 3D Animation™ Release Notes

© COPYRIGHT 2002–2009 by HUMUSOFT s.r.o. and The MathWorks, Inc.

The software described in this document is furnished under a license agreement. The software may be used or copied only under the terms of the license agreement. No part of this manual may be photocopied or reproduced in any form without prior written consent from The MathWorks, Inc.

FEDERAL ACQUISITION: This provision applies to all acquisitions of the Program and Documentation by, for, or through the federal government of the United States. By accepting delivery of the Program or Documentation, the government hereby agrees that this software or documentation qualifies as commercial computer software or commercial computer software documentation as such terms are used or defined in FAR 12.212, DFARS Part 227.72, and DFARS 252.227-7014. Accordingly, the terms and conditions of this Agreement and only those rights specified in this Agreement, shall pertain to and govern the use, modification, reproduction, release, performance, display, and disclosure of the Program and Documentation by the federal government (or other entity acquiring for or through the federal government) and shall supersede any conflicting contractual terms or conditions. If this License fails to meet the government's needs or is inconsistent in any respect with federal procurement law, the government agrees to return the Program and Documentation, unused, to The MathWorks, Inc.

Trademarks

MATLAB and Simulink are registered trademarks of The MathWorks, Inc. See www.mathworks.com/trademarks for a list of additional trademarks. Other product or brand names may be trademarks or registered trademarks of their respective holders.

Patents

The MathWorks products are protected by one or more U.S. patents. Please see www.mathworks.com/patents for more information.

Summary by Version	1
Version 5.1 (R2009b) Simulink® 3D Animation	4
Version 5.0 (R2009a) Simulink® 3D Animation	7
Version 4.8 (R2008b) Virtual Reality Toolbox	10
Version 4.7 (R2008a) Virtual Reality Toolbox	11
Version 4.6 (R2007b) Virtual Reality Toolbox	13
Version 4.5 (R2007a) Virtual Reality Toolbox	15
Version 4.4 (R2006b) Virtual Reality Toolbox	16
Version 4.3 (R2006a) Virtual Reality Toolbox	18
Version 4.2.1 (R14SP3) Virtual Reality Toolbox	19
Version 4.2 (R14SP2+) Virtual Reality Toolbox	20
Version 4.1 (R14SP2) Virtual Reality Toolbox	22
Version 4.0.1 (R14SP1) Virtual Reality Toolbox	23
Version 4.0 (R14) Virtual Reality Toolbox	24
Version 3.1 (R13SP1) Virtual Reality Toolbox	37
Version 3.0 (R13) Virtual Reality Toolbox	41

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	Related Documentation at Web Site
Latest Version V5.1 (R2009b)	Yes Details	Yes Summary	Bug Reports Includes fixes	Printable Release Notes: PDF Current product documentation
V5.0 (R2009a)	Yes Details	None	Bug Reports Includes fixes	No
V4.8 (R2008b)	Yes Details	None	Bug Reports Includes fixes	No
V4.7 (R2008a)	Yes Details	None	Bug Reports Includes fixes	No
V4.6 (R2007b)	Yes Details	None	Bug Reports Includes fixes	No
V4.5 (R2007a)	Yes Details	No	Bug Reports Includes fixes	No
V4.4 (R2006b)	Yes Details	Yes Summary	Bug Reports Includes fixes	No
V4.3 (R2006a)	Yes Details	No	Bug Reports Includes fixes	No
V4.2.1 (R14SP3)	No	No	Bug Reports Includes fixes	No
V4.2 (R14SP2+)	Yes Details	No	Known problems	No
V4.1 (R14SP2)	Yes Details	No	Fixed bugs	No

Version (Release)	New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
V4.0.1 (R14SP1)	No	Yes Summary	Fixed bugs	No
V4.0 (R14)	Yes Details	No	Fixed bugs	No
V3.1 (R13SP1)	Yes Details	No	Known problems	No
V3.0 (R13)	Yes Details	Yes Summary	No bug fixes	No

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

The 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.

Version 5.1 (R2009b) Simulink 3D Animation

This table summarizes what is new in Version 5.1 (R2009b).

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	Yes Summary	Bug Reports Includes fixes	Printable Release Notes: PDF Current product documentation

- “Alternate Mode of Virtual Scene Viewer Now Default” on page 4
- “Support on the 64-Bit Intel Macintosh Platform” on page 5
- “VRML Files Recognized in MATLAB Current Folder Browser” on page 5
- “New Object vr.figure” on page 5
- “Changed vr.canvas Units Property Default” on page 6
- “Improved Performance of Orbisnap in Remote Configuration” on page 6

Alternate Mode of Virtual Scene Viewer Now Default

The alternate mode of virtual scene viewer introduced in Version 5.0 (R2009a) is now the default viewer for all supported platforms (except for Linux® platforms). Using `vrsetpref` to set the `DefaultViewer` property to 'internal' enables this version of the virtual scene viewer.

To reactivate the legacy (former) viewer, use `vrsetpref` to set the `DefaultViewer` property to 'internalv4'.

Note If you are running the Simulink® 3D Animation™ software on a Linux platform, the default viewer continues to be the legacy viewer. The legacy viewer does not support MATLAB figures. If you have a Linux platform and want to access the MATLAB figure capability for the viewer, install the hardware-accelerated OpenGL® rendering engine first. Otherwise, the Simulink 3D Animation software cannot properly display the viewer window. You can then activate the new viewer by typing `vrsetpref('DefaultViewer','internalv5')` in the MATLAB Command Window.

Compatibility Considerations

The alternate mode of virtual scene viewer introduced in Version 5.0 (R2009a) is now the default viewer for all supported platforms (except for Linux platforms). At a minimum, this viewer provides the same functionality as the legacy viewer.

Support on the 64-Bit Intel Macintosh Platform

The Simulink 3D Animation software now supports the 64-bit Intel® Macintosh® platform.

VRML Files Recognized in MATLAB Current Folder Browser

The MATLAB Current Folder browser now supports `.wrl` files. This support enables you to perform standard MATLAB file operations on the `.wrl` file in the Current Folder browser. For example, double-clicking a `.wrl` file in the Current Folder browser now starts the Simulink 3D Animation viewer for that `.wrl` file. In previous releases, double-clicking a `.wrl` file in the current folder browser started the MATLAB editor for that file.

New Object `vr.figure`

This release provides a new object, `vr.figure`. This object creates a new virtual reality figure.

Changed vr.canvas Units Property Default

The `vr.canvas` method `Units` property default is now `'normalized'`. In the previous release, the default was `'pixels'`. The `vrgetpref` function `DefaultCanvasUnits` property controls the default of the `vr.canvas` `Units` property.

Improved Performance of Orbisnap in Remote Configuration

The performance speed of the Simulink 3D Animation Stand-Alone Viewer (Orbisnap) has been improved.

Version 5.0 (R2009a) Simulink 3D Animation

This table summarizes what is new in Version 5.0 (R2009a).

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	None	Bug Reports Includes fixes	No

- “Alternate Mode of Virtual Scene Viewer Integrated with MATLAB Figures” on page 7
- “vrplay Updated” on page 8
- “New Functions” on page 8
- “New Object” on page 8
- “Virtual Scenes Now Open Automatically” on page 8
- “Product Files Moved” on page 8
- “Saving and Restoring the Complete SimState” on page 9

Alternate Mode of Virtual Scene Viewer Integrated with MATLAB Figures

Alternate mode of virtual scene viewer integrated with MATLAB figures, enables you to combine the following in the same figure:

- Virtual scenes and Handle Graphics® objects
- Multiple views of a virtual world
- Views of different virtual worlds

This feature also allows for the docking of these figure windows, each of which can contain different worlds, into split screen MATLAB figure windows.

See in the *Simulink 3D Animation User’s Guide* for details on this alternate viewer mode, including how to activate it (use `vrsetpref` to set the `DefaultViewer` property to `'internalv5'`).

vrplay Updated

The `vrplay` function now contains virtual scene and player controls in a single MATLAB figure window.

New Functions

The Simulink 3D Animation product has the following new functions:

- `vrcadcleanup`

Processes VRML files created by CAD tools for use with Simulink 3D Animation environment. In previous releases, you manually processed these files before using them in the Simulink 3D Animation environment.

- `vrphysmod`

Automatically adds a Simulink 3D Animation scene to SimMechanics™ models created from CAD tools. In previous releases, you manually processed these files before using them in the Simulink 3D Animation environment.

New Object

This release provides a new object, `vr.canvas`. This object allows for the placement of a virtual scene view into a MATLAB figure, with full control of its position and ability to be combined with other Handle Graphics objects into one GUI.

Virtual Scenes Now Open Automatically

The associated virtual scene now opens automatically when you open the model. This behavior occurs even if the Simulink 3D Animation block associated with the virtual scene is in a subsystem of the model. In previous releases, the ability to automatically open virtual scenes did not work for VR Sink blocks in subsystems.

Product Files Moved

The Simulink 3D Animation files have moved from `matlabroot\toolbox\vr` to `matlabroot\toolbox\s13d`.

Saving and Restoring the Complete SimState

Use the new SimState feature to save the complete simulation state. Unlike the final states stored in earlier versions of Simulink, the SimState contains the complete simulation state of the model (including block states that are logged). You can then restore the state at a later time and continue simulation from the exact instant at which you stopped the simulation. See “Saving and Restoring the Simulation State as the SimState” in the *Simulink User’s Guide*.

Version 4.8 (R2008b) Virtual Reality Toolbox

This table summarizes what is new in Version 4.8 (R2008b).

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	None	Bug Reports Includes fixes	No

New features and changes introduced in this version are:

- “New VR Tracer Block” on page 10
- “Updated vrnoded Method” on page 10
- “New vrworld Method” on page 10
- “New Demo” on page 10

New VR Tracer Block

New VR Tracer block enables visualization of trajectories in virtual scenes.

Updated vrnoded Method

The vrnoded method now reflects support for the VRML USE reference.

New vrworld Method

The vrworld/addexternproto method is new for vrworld. This function enables the addition of an EXTERNPROTO declaration to the virtual world.

New Demo

The vrkoff_spacesmouse demo is new in this release. It illustrates how to use a space mouse compatible device via the MATLAB interface. This demo requires a space mouse or compatible device.

Version 4.7 (R2008a) Virtual Reality Toolbox

This table summarizes what is new in Version 4.7 (R2008a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	None	Bug Reports Includes fixes	No

New features and changes introduced in this version are:

- “VR Sink Block Now Supports Matrix Signals as Input” on page 11
- “New vrworld Object Option” on page 11
- “Enhanced vrplay Shortcut Keys” on page 11
- “New Demos” on page 12

VR Sink Block Now Supports Matrix Signals as Input

The Virtual Reality Toolbox™ product now supports matrix-type data input for the VR Sink block. Previously, only the MATLAB interface supported matrices (MFxx fields). The Simulink interface supported only vectors (SFxx fields). Now, both MATLAB and Simulink interfaces support matrices (MFxx fields).

New vrworld Object Option

The vrworld object has a new option, new. This option enables the creation of a new virtual world object, even if another vrworld object associated with the same VRML file already exists.

Enhanced vrplay Shortcut Keys

The vrplay function shortcut keys have changed as follows:

- The **Page Up** and **Page Down** keys have the same functionality as the **R** (rewind) and **F** (forward) shortcut keys, respectively. These keys perform rewind and forward operations on the animation file you are playing.

- The **p** shortcut key toggles between play and pause behavior.

New Demos

The following demos are new in this release:

- `vrmorph`
- `vr_octavia_video`
- `vrtkoff_trace`

Version 4.6 (R2007b) Virtual Reality Toolbox

This table summarizes what's new in Version 4.6 (R2007b):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	None	Bug Reports Includes fixes	No

New features and changes introduced in this version are

New VR To Video block

New VR To Video block allows RGB video stream output for further 2D video processing.

Joystick and Space Mouse Input Functionality Added to MATLAB Toolbox Interface

New `vrjoystick` and `vrspacemouse` objects can interface with joysticks and space mouse input devices.

Joystick and Space Mouse Input Support Added for Linux

Joystick and space mouse input support is added for both 32-bit and 64-bit Linux operating systems.

New Axes Transformation and Math Functions

New axes transformation and math functions are added to the MATLAB toolbox interface. These are:

- `vrdir2ori` to convert viewpoint direction to orientation.
- `vrori2dir` to convert viewpoint orientation to direction.
- `vrrotmat2vec` to convert rotation from matrix to axis-angle representation.

- `vrrotvec` to calculate a rotation between two vectors.
- `vrrotvec2mat` to convert rotation from axis-angle to matrix representation.

Magellan Space Mouse Block Renamed to Space Mouse Input

The Magellan Space Mouse block is renamed to Space Mouse Input.

Version 4.5 (R2007a) Virtual Reality Toolbox

This table summarizes what's new in Version 4.5 (R2007a):

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

New features and changes introduced in this version are

Full Screen Mode in Virtual Reality Toolbox Viewer and Orbisnap Stand-Alone Viewer

Fullscreen mode, in which the menu bar and toolbar are switched off, is implemented in the Virtual Reality Toolbox viewer and the Orbisnap stand-alone viewer.

Version 4.4 (R2006b) Virtual Reality Toolbox

This table summarizes what's new in Version 4.4 (R2006b):

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

New features and changes introduced in this version are

VR Text Output Block Added

The VR Text Output block allows Simulink signal values to be displayed as text in VRML scenes.

Frames Per Second Added to AVI File Playback Options

It is now possible to specify the frames per second displayed during the playback of AVI files.

New 3Dconnexion Devices

SpacePilot and SpaceBall 5000 have been added to the list of devices supported by Magellan Space Mouse block.

Joystick Input Block

The Joystick Input block joystick yaw and throttle controls have switched behaviors.

Compatibility Considerations

If you have models that contain this block, and you want to use that model in a Virtual Reality Toolbox version later than 4.3, you must reorder the axes. You can do so by placing the Simulink Selector block after the Joystick Input block in the model.

Version 4.3 (R2006a) Virtual Reality Toolbox

This table summarizes what's new in Version 4.3 (R2006a):

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

New features and changes introduced in this version are

New Utilities Library

A new library `Utilities` is added to the Virtual Reality Toolbox block library `vrlib`. This library contains the blocks `Rotation Matrix to VRML Rotation`, `Viewpoint Direction to VRML Orientation`, `Rotation between 2 Vectors`, `Normalize Vector`, and `Cross Product`. See “Block Reference” for details.

VR Animation Playback Controls

A new `vrplay` GUI is added, which allows playback control of VRML animation files

Version 4.2.1 (R14SP3) Virtual Reality Toolbox

This table summarizes what's new in Version 4.2.1 (R14SP3):

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

Version 4.2 (R14SP2+) Virtual Reality Toolbox

This table summarizes what's new in Version 4.2 (R14SP2+):

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

New features and changes introduced in this version are

Virtual Reality Toolbox Support of MATLAB Compiler Product

The Virtual Reality Toolbox product now supports the MATLAB® Compiler™ product. With this capability, you can use the MATLAB Compiler software to take M-files as input and generate redistributable, stand-alone applications that include Virtual Reality Toolbox functionality, including the Virtual Reality Toolbox viewer. The Virtual Reality Toolbox product does not support the MATLAB Compiler product for the HP-UX platform.

Virtual Reality Toolbox Viewer

The following changes were made to the viewer:

- The Virtual Reality Toolbox viewer **Recording** menu has changed to support frame captures in addition to animation recording.
- The Virtual Reality Toolbox toolbar now has a camera icon that you can click to capture a frame of the current virtual scene.

Virtual Reality Toolbox Preferences Dialog

The Virtual Reality Toolbox preferences dialog, available through the MATLAB desktop **File** -> **Preferences** dialog, has been updated as follows:

- The **Virtual Reality Figure** pane is now organized by tabs.

- The Virtual Reality Toolbox preferences dialog now provides frame capture preferences. These are available through the **Frame Capture** tab of the **Virtual Reality Figure** pane.

vrsetpref and vrgetpref Changes

The vrfigure set and get functions now include the following properties to support frame capturing:

- CaptureFileFormat
- CaptureFileName

Space Mouse Block Enhancement

The Magellan Space Mouse block now allows you to specify upper and lower position coordinate limits for the mouse. The following parameters were added:

- **Limit position** — Determines whether you can limit the upper and lower positions of the mouse.
- **Lower position limit** — Position coordinates for the lower limit of the mouse.
- **Upper position limit** — Position coordinates for the upper limit of the mouse.

Version 4.1 (R14SP2) Virtual Reality Toolbox

This table summarizes what's new in Version 4.1 (R14SP2):

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

New features and changes introduced in this version are

Virtual Reality Toolbox Stand-Alone Viewer

The Virtual Reality Toolbox product now includes Orbisnap. This is a free, optional, and multiplatform stand-alone VRML viewer that does not require you to have either MATLAB or Virtual Reality Toolbox products. You can use Orbisnap to

- View prerecorded WRL animation files
- Remotely view, from a client machine, a virtual world loaded in a current session of the Virtual Reality Toolbox software
- View and navigate, but not simulate, a VRML world or scene

Virtual Reality Toolbox Viewer

The Virtual Reality Toolbox viewer now allows you to interactively set the `vrfigure` maximum texture size through the **Rendering** menu.

Version 4.0.1 (R14SP1) Virtual Reality Toolbox

This table summarizes what's new in Version 4.0.1 (R14SP1):

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

VR Source block

The VR Source block has been removed from the Virtual Reality Toolbox product.

Compatibility Considerations

If you had models that made use of this block, you will need to remove any references to it before your model will simulate using this release.

Version 4.0 (R14) Virtual Reality Toolbox

This table summarizes what's new in Version 4.0 (R14):

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

New features and changes introduced in this version are

- “Improved Overall Performance” on page 25
- “Tracing and Offline Animation Files” on page 25
- “Improved Virtual Reality Toolbox Viewer” on page 26
- “Double-Clicking VR Sink Blocks Behavior Changed” on page 27
- “Extended Support of Data Types” on page 27
- “Improved Timing Control” on page 28
- “HP-UX Platform Support” on page 28
- “New vrfigure Object Functions” on page 28
- “Joystick Input and Magellan Space Mouse Block Updates” on page 29
- “New and Updated Demos” on page 29
- “Virtual Reality Toolbox Simulink Blocks Updates” on page 29
- “VR Sink and VR Source Block Source File” on page 30
- “MATLAB Interface Updates” on page 30
- “Preferences Changes” on page 30
- “vrworld Object Property Updates” on page 34
- “vrfigure Object Property Updates” on page 35

Improved Overall Performance

Infrastructure changes have improved the overall performance of the Virtual Reality Toolbox software.

Tracing and Offline Animation Files

The Virtual Reality Toolbox product enables you to record animations of virtual scenes that are controlled by the Simulink or MATLAB products. You can then later play back these animations offline (in other words, independent of the MATLAB, Simulink, or Virtual Reality Toolbox). You can save animation data in the following formats:

- **3-D VRML** — The Virtual Reality Toolbox software traces object movements and saves that data into a VRML file using VRML97 timers and position/orientation interpolators. During the simulation, the product creates interpolators and saves key and interpolation data values for all the controlled movable objects in the scene. After the simulation is stopped, the product saves the entire original VRML scene with the added timers/interpolators into a user-specified VRML file.

You can then view these files with the Virtual Reality Toolbox viewer. 3-D VRML files typically use much less disk space than Audio Video Interleave (AVI) files. If you make any navigation movements in the Virtual Reality Toolbox viewer while recording the animation, the Virtual Reality Toolbox software does not save any of these movements.

- **2-D AVI** — The Virtual Reality Toolbox software traces object movements and writes animation data into an Audio Video Interleave (AVI) file using the Virtual Reality Toolbox `vrfigure/capture` method and the MATLAB `avifile` function. Because `avifile` can record the exact 2-D snapshot of each figure window, the recorded 2-D animation reflects exactly what you see in the viewer window. It includes any navigation movements you make during the recording.

This functionality has been integrated into the Virtual Reality Toolbox viewer.

You can also save animation data through the MATLAB interface. This functionality has been integrated into the `vrworld` and `vrfigure` methods. See “MATLAB Interface” in the Virtual Reality Toolbox User’s Guide documentation for procedures on how to save animation data.

Notes when working with animation data:

- If you distribute the resulting VRML animation file, be sure to also distribute all the inlined object and texture files referenced in the original VRML world file.
- While recording 2-D AVI animation data, always ensure that the Virtual Reality Toolbox viewer is the topmost window and fully visible. Graphics acceleration limitations might prevent the proper recording of 2-D animation otherwise.
- For the creation of animation files, timing is an important issue. When you create animation files that are controlled from the Simulink interface, the timing properties that control when the recording is started and stopped, and when each data snapshot (3-D) or animation frame (2-D) is saved, are related to the Simulink time. To better capture the scene dynamics, you might want to change the **Sample time** parameter of the VR Sink block parameter.

When you create animation files that are controlled from the MATLAB interface, you need to programmatically advance the time in the virtual scene.

Improved Virtual Reality Toolbox Viewer

The Virtual Reality Toolbox viewer has been completely updated and improved. In addition to the original Navigation Panel at the bottom of the window, the Virtual Reality Toolbox viewer now has a menu bar and associated toolbar. These additional areas allow you to perform a number of operations on the loaded virtual world, including

- Start the V-Realm Builder editor
- Perform navigation and rendering operations
- Work with, add, and remove viewpoints
- Start and stop model simulation
- Edit VR block parameters
- Record animations of the model simulation. You can later play back the animation files without Virtual Reality Toolbox or other MATLAB product.

In addition, the Virtual Reality Toolbox software has been enhanced for better VRML97 compatibility, including:

- Proper handling of PROTO nodes
- Improved VRMLScript processing
- Improved texture rendering, allowing for resolution to the hardware limit of your video card
- Improved rendering of transparent images

In addition, the Virtual Reality Toolbox viewer keyboard navigation has changed.

Double-Clicking VR Sink Blocks Behavior Changed

The behavior of a VR Sink block when you double-click it has changed as follows:

- 1 The first time you add a VR Sink block to a model, double-clicking that block displays the block parameter dialog for that block.
- 2 After configuration is complete and you make an association with a virtual world, double-clicking the VR Sink block displays the Virtual Reality Toolbox viewer for that model.

To display the block parameter dialog for the VR Sink block in the Virtual Reality Toolbox viewer, select the **Simulation** menu, then **Block Parameters**.

Extended Support of Data Types

The Virtual Reality Toolbox product now supports a number of MATLAB data types. In earlier releases, the MATLAB product only supported a data type of `double`. The Virtual Reality Toolbox product provides an interface between the MATLAB and Simulink environment and VRML scenes. With this interface, you can set and get the VRML scene node field values. The `setfield` and `getfield` vrnode methods have been updated to work with these new data types.

Improved Timing Control

The time in virtual scenes advances independently of MATLAB and Simulink interfaces. As a result, if you define dynamic actions directly in the VRML world, these actions cannot interact appropriately with object actions controlled by Virtual Reality Toolbox through the MATLAB or Simulink interface. To compensate for this, the Virtual Reality Toolbox product now provides two `vrworld` properties, `Time` and `TimeSource`. The `Time` property contains the current time in the virtual world. The `TimeSource` property defines the source of the time for the virtual world. The `TimeSource` property can take the following values:

- `'external'` — This is the default value. This property value specifies that an external source controls the time in a virtual world (in other words, all Virtual Reality Toolbox viewer windows). This external source can be either from the Simulinkinterface, using the simulation time, or from the MATLABinterface, using the `vrworld` method `set(w, 'Time', time_value)`. The `'external'` property value eliminates the unpredictable interferences between the Simulink software and internal virtual world time and ambiguities in interpreting the time in the virtual world.
- `'freerun'` — This property value specifies that the time in virtual worlds advances independently based on the system timer. You can still set the time from which the virtual world clock starts advancing with the `vrworld` method `set(w, 'Time', time_value)`.

HP-UX Platform Support

The Virtual Reality Toolbox product is now supported on Hewlett-Packard™ UNIX® (HP-UX) 11.00.

New `vrfigure` Object Functions

The `vrfigure` object has two new methods:

- `vrgetcf` — Gets the handle for a currently active virtual reality figure. It is most useful to query and set virtual reality figure properties.
- `vrgetcbf` — Gets the current callback virtual reality figure.

Joystick Input and Magellan Space Mouse Block Updates

When you place the Joystick Input and Magellan Space Mouse blocks in disabled subsystems, these blocks no longer require that actual hardware be connected to the computer for the model to run. This allows you to create models with alternative user interfaces, switchable according to the actual hardware configuration.

New and Updated Demos

New and updated demos in Release 14 are listed in the table below. You can open the demos by entering the corresponding model names in the MATLAB Command Window.

Title	Model Name
Portal Crane with Joystick Control	vrcrane_joystick
Portal Crane with Predefined Trajectory	vrcrane_traj
Heat Transfer Visualization with 2-D Animation	vrheat_anim
Vehicle Dynamics Visualization	vr_octavia

Virtual Reality Toolbox Simulink Blocks Updates

The Simulink block library for the Virtual Reality Toolbox product has the following block updates:

- VR Sink blocks now accept all meaningful data types as input. It converts these data types to natural VRML types as necessary. These data types include logical values, many types of signed and unsigned integers, singles, and doubles.
- VR Source blocks now output signals of data types corresponding to the natural VRML data types of the associated fields. These data types include logical values, many types of signed and unsigned integers, singles, and doubles.

- Space Mouse Input blocks now support USB devices (such as the SpaceBall input device), and the SpaceTraveler motion controller.
- Joystick Input blocks now support force-feedback devices such as force-feedback joysticks, steering wheels, and haptic devices. To use this functionality, you must install DirectX® Version 8.0 or later.

VR Sink and VR Source Block Source File

The behavior of the VR Sink and VR Source block Source file text field has changed as follows:

- Browsing to a file enters that filename in the text field, with a path relative to the Simulink model location. For example, if the VRML file resides in `<Simulink model location>\vrml\vrbounce.wrl`, the filename that appears in the text field is `vrml\vrbounce.wrl`.
- If a model has a VRML file associated with it, the Virtual Reality Toolbox product searches the path associated with that file. If the product does not find the file on this path, it then searches for the filename using the MATLAB path value.
- If you enter an absolute and fully qualified path for the VRML file, the Virtual Reality Toolbox software searches just that path for the file.

MATLAB Interface Updates

Associated with the support of extended data types, the MATLAB interface `vrsetpref` and `vrgetpref` functions now set and get the following new preferences in addition to earlier preferences.

Preferences Changes

The Virtual Reality Toolbox software lets you specify preference settings so that you can define the default behavior of the Virtual Reality Toolbox software. The preferences functionality has the following changes:

- The ability to set Virtual Reality Toolbox preferences has moved from the VR Sink/Source blocks to the standard MATLAB preference system accessible through the MATLAB main window **File -> Preferences** menu item.

For this release, you can set only the preferences for **HttpPort**, **VrPort**, **Editor**, and **TransportBuffer** preferences using the **MATLAB Preferences** menu. To get or set the full set of preferences, use the functions `vrgetpref` and `vrsetpref`.

- The following preferences have been added to the Virtual Reality Toolbox software. For preferences that begin with the string `DefaultFigure` or `DefaultWorld`, these values are the default values for the corresponding `vrfigure` or `vrworld` property.

Preference	Description
<code>DataTypeBool</code>	Specifies the handling of the VRML Bool data type for <code>vrnode/setfield</code> and <code>vrnode/getfield</code> . Valid values are 'logical' and 'char'. If set to 'logical', the VRML Bool data type is returned as a logical value. If set to 'char', the Bool data type is returned 'on' or 'off'. Default is 'logical'.
<code>DataTypeInt32</code>	Specifies handling of the VRML Int32 data type for <code>vrnode/setfield</code> and <code>vrnode/getfield</code> . Valid values are 'int32' and 'double'. If set to 'int32', the VRML Int32 data type is returned as int32. If set to 'double', the Int32 is returned as 'double'. Default is 'double'.

Preference	Description
DataTypeFloat	Specifies the handling of the VRML float data type for <code>vrnode/setfield</code> and <code>vrnode/getfield</code> . Valid values are 'single' and 'double'. If set to 'single', the VRML Float and Color data types are returned as 'single'. If set to 'double', the Float and Color data types are returned as 'double'. Default is 'double'.
DefaultFigureAntiAliasing	Determines whether antialiasing is used by default for new <code>vrfigure</code> objects. Valid values are 'off' and 'on'.
DefaultFigureDeleteFcn	Specifies the default callback invoked when closing a <code>vrfigure</code> object.
DefaultFigureLighting	Specifies whether the lights are rendered by default for new <code>vrfigure</code> objects. Valid values are 'off' and 'on'.
DefaultFigureMaxTextureSize	Specifies the default maximum pixel size of a texture used in rendering new <code>vrfigure</code> objects. Valid values are 'auto' and $32 \leq x \leq \text{video card limit}$, where x is a power of 2.
DefaultFigureRecord2DCompressMethod	Specifies the default compression method for creating 2-D animation files for new <code>vrfigure</code> objects. Valid values are '', 'auto', 'lossless', and 'codec_code'.

Preference	Description
DefaultFigureRecord2D CompressQuality	Specifies the default quality of 2-D animation file compression for new <code>vrfigure</code> objects. Valid values are 0-100.
DefaultFigureRecord2D FileName	Specifies the default 2-D offline animation file name for new <code>vrfigure</code> objects.
DefaultFigureStatusBar	Specifies whether the status bar appears by default at the bottom of the Virtual Reality Toolbox viewer for new <code>vrfigure</code> objects. Valid values are 'off' and 'on'.
DefaultFigure Transparency	Specifies whether or not transparency information is taken into account when rendering for new <code>vrfigure</code> objects. Valid values are 'off' and 'on'.
DefaultFigureWireframe	Specifies whether objects are drawn as solids or wireframes by default for new <code>vrfigure</code> objects. Valid values are 'off' and 'on'.
DefaultWorldRecord3D FileName	Specifies the default 3-D animation file name for new <code>vrworld</code> objects.
DefaultWorldRecordMode	Specifies the default animation recording mode for new <code>vrworld</code> objects. Valid values are 'manual' and 'scheduled'.
DefaultWorldRecord Interval	Specifies the default start and stop times for scheduled animation recording for new <code>vrworld</code> objects. Valid value is a vector of two doubles.

Preference	Description
DefaultWorldRemoteView	Specifies whether the virtual world is enabled by default for remote viewing for new vrworld objects. Valid values are 'off' and 'on'.
DefaultWorldTimeSource	Specifies the default source of the time for new vrworld objects. Valid values are 'external' and 'freerun'.
TransportTimeout	Amount of time VR server waits for a reply from the client. If there is no response from the client, VR server disconnects from the client.

vrworld Object Property Updates

Associated with the support of animation files, the vrworld object now supports the following new properties:

Property	Description
Record3D	Enables 3D animation recording. Read/write.
Record3DFileName	3D animation file name. The string can contain tokens that are replaced by the corresponding information when the animation recording takes place. Read/write.
Recording	Animation recording toggle. This property acts as the master recording switch. Read/write.
RecordMode	Animation recording mode. Read/write.
RecordInterval	Start and stop times for scheduled animation recording. Corresponds to the virtual world object Time property. Read/write.

Property	Description
Time	Current time in the virtual world. Read/write.
TimeSource	The source of the time for the virtual world. If set to 'external', time in the scene is controlled from the MATLAB interface (by setting the Time property) or the Simulink interface (simulation time), if set to 'freerun', time in the scene advances independently based on the system timer. Read/write.

vrfigure Object Property Updates

The vrfigure object now supports the following new properties:

Property	Description
MaxTextureSize	Sets the maximum pixel size of a texture used in rendering vrfigure objects. The smaller the size, the faster the texture can render. Increasing this value improves image quality but decreases performance. A value of 'auto' sets the maximum possible pixel size. If the value you enter is unsuitable, a warning might trigger. The Virtual Reality Toolbox software then automatically adjusts the property to the next smaller suitable value. Read/write.
NavMode	Specifies navigation mode. Read/write.
NavSpeed	Specifies navigation speed. Read/write.
NavZones	Toggles navigation zones on/off. Read/write.
Record2D	Enables 2-D offline animation file recording. Read/write.
Record2DCompress Method	Specifies the compression method for creating 2-D animation files. The codec_code must be registered in the system. See the MATLAB function documentation for avifile. Read/write.

Property	Description
Record2DCompress Quality	Specifies the quality of 2-D animation file compression. Read/write.
Record2DFileName	Specifies the 2-D offline animation file name. The string can contain tokens that are replaced by the corresponding information when the animation recording takes place. Read/write.
StatusBar	Toggles the status bar at the bottom of the Virtual Reality Toolbox viewer. Read/write.
Toolbar	Toggles the toolbar on the Virtual Reality Toolbox viewer. Read/write.

Version 3.1 (R13SP1) Virtual Reality Toolbox

This table summarizes what's new in Version 3.1 (SP1):

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

New features and changes introduced in this version are

Cross-Platform Support

The Virtual Reality Toolbox product is now supported on the Mac OS® X platform.

Improved Rendering

The overall rendering of virtual worlds for the Virtual Reality Toolbox interface is improved.

Known Problems

Microsoft Internet Explorer 6.0

Microsoft® Internet Explorer® 6.0 might incorrectly interpret system Java™ library paths, preventing Virtual Reality Toolbox components (such as the Virtual Reality Toolbox Viewer) from running. Netscape Navigator® users do not experience this problem.

If you are using Internet Explorer 6.0, you should manually edit the Java library path for Internet Explorer 6.0. Alternatively, you can also use Internet Explorer 5.5 with Virtual Reality Toolbox software.

Editing the Java Library Path

To manually edit the Java library path for Internet Explorer 6.0:

1 Run the `regedit` command.

2 Go to

`HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\JavaVM`

A list of value names and their values appears.

3 Replace each instance of `%systemroot%` with the system root path. For example

`C:\WINNT`

4 Restart the computer.

Patch Required for the MATLAB Product Running Mac OS X 10.2

The Virtual Reality Toolbox product requires the MATLAB product running Mac OS X 10.2.

To install the Virtual Reality Toolbox product on Mac OS X, you must first install a patch available from The MathWorks. To get the patch, go to <ftp://ftp.mathworks.com/pub/tech-support/solutions/s33053>. Refer to this location for any updates. Refer to <http://www.mathworks.com/support> for updated instructions. The instructions for this patch are below.

You should download this patch if you match one of these scenarios:

- You want to install MATLAB Release 13 on a Mac OS X 10.2 system that does not currently have the MATLAB product installed.
- You want to update an installation of the MATLAB product that was installed on a system with the Mac OS X product 10.1.x, but has subsequently been updated to the Mac OS X product 10.2.
- You want to update an installation of the MATLAB product that is installed on a system with Mac OS X 10.1.x.
- You already updated the MATLAB product installed on a system with Mac OS X 10.1.x, as in scenario III above, and have subsequently updated to Mac OS X 10.2.

Depending on which scenario you choose, please follow the directions below.

The first step is to download the MathWorks Jaguar® Updater disk image from <ftp://ftp.mathworks.com/pub/tech-support/solutions/s33053>. This file is named `MathWorks_Jaguar_Updater.dmg`. Place this file on your desktop. Double-click the file to start the Disk Copy utility, which will mount the disk image as a virtual disk named **MathWorks_Jaguar_Updater**. You will use this **MathWorks_Jaguar_Updater** virtual disk in the following installations.

Next, locate your scenario and follow the steps listed for that scenario.

Scenario I. You want to install MATLAB Release 13 on a Mac OS X 10.2 system that does not currently have the MATLAB product installed.

- 1** Insert the MATLAB Release 13 install CD titled **CD 1 of 3** into your CD drive.
- 2** Wait a few moments for Mac OS X to mount the CD. When the **MathWorks_R13_1** volume appears on your desktop, you can proceed.
- 3** Double-click on the **Install for Mac OS X** icon in the **MathWorks_Jaguar_Updater** virtual disk.
- 4** Follow the instructions presented by the installer.
- 5** After the installer finishes, drag the **MathWorks_R13_1** volume to the trash to eject the CD, and repeat steps 1 through 4 with CD 2 of 3 and CD 3 of 3.

Scenario II. You want to update an installation of the MATLAB product that was installed on a system with Mac OS X 10.1.x, but has subsequently been updated to Mac OS X 10.2.

- 1** Double-click on the **XFree86_4.2.0.1-10.2** icon in the **MathWorks_Jaguar_Updater** virtual disk.
- 2** Follow the instructions presented by the XFree86 updater. Accept any default values presented.

- 3** Double-click on the **MATLABR13_Jaguar_patch** icon in the **MathWorks_Jaguar_Updater** virtual disk.
- 4** Follow the instructions presented by the MATLAB updater. When asked to choose the folder where the MATLAB product is installed click **Next** unless the MATLAB product is not installed the default location (/Applications/MATLAB6p5). If the MATLAB product is not installed in the default location, click the **Choose...** button and navigate to the folder where you installed the MATLAB product.

Scenario III. You want to update an installation of the MATLAB product that is installed on a system with Mac OS X 10.1.x.

- 1** Double-click on the **MATLABR13_Jaguar_patch** icon in the **MathWorks_Jaguar_Updater** virtual disk.
- 2** Follow the instructions presented by the MATLAB updater. When asked to choose the folder where the MATLAB product is installed click **Next** unless the MATLAB product is not installed the default location (/Applications/MATLAB6p5). If this is the case, then click the **Choose...** button and navigate to the folder where you installed the MATLAB product.

Scenario IV. You already updated the MATLAB product installed on a system with Mac OS X 10.1.x, as in scenario III above, and have subsequently updated to Mac OS X 10.2.

- 1** Double-click on the **XFree86_4.2.0.1-10.2** icon in the **MathWorks_Jaguar_Updater** virtual disk.
- 2** Follow the instructions presented by the XFree86 updater. Accept any default values presented.

Version 3.0 (R13) Virtual Reality Toolbox

This table summarizes what's new in Version 3.0 (R13):

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

New features and changes introduced in this version are

Cross-Platform Support

Virtual Reality Toolbox software Version 3.0 is supported on both PC and UNIX platforms.

Virtual Reality Toolbox Viewer

Virtual Reality Toolbox software Version 3.0 now contains a VRML viewer. You can use this viewer on all supported operating systems. With the Virtual Reality Toolbox viewer, you can move between predefined viewpoints in a virtual scene. You can also control the navigation method, speed, and rendering of the virtual world. From the MATLAB interface, you can control the Virtual Reality Toolbox viewer better than other VRML-enabled Web browsers.

Improved Performance

The communication between Virtual Reality Toolbox and VRML-enabled Web browsers is improved. You are now able to perform such tasks as controlling multiple objects in a virtual scene or setting multiple field values faster than before.

Improved MATLAB Interface

It is now easier to access and manipulate virtual world objects from the MATLAB command line. You can use dot notation to change object properties. Also, multiple field values are transferred between MATLAB and the Virtual Reality Toolbox server in a form consistent with their VRML representation.

Customized V-Realm Object Libraries

Compatibility Considerations

If you are on a PC platform and you created your own object libraries in V-Realm while using Virtual Reality Toolbox software Version 2.0, deleting the MATLAB product deletes these custom libraries. You need to save these libraries before uninstalling the older version of the MATLAB product:

- 1 Save the contents of the <MATLAB root>\toolbox\vr\vrealm folder to another location on your system.
- 2 Uninstall the older version of the MATLAB product.
- 3 Install MATLAB software Version 6.5 (Release 13).
- 4 Install V-Realm using the command

```
vrinstall -install editor
```

- 5 Save the files from your old vrealm folder into the new vrealm folder.

MATLAB software Version 6.5 should have the same folder structure as your previous version of the MATLAB product. If the folder structure is not identical, search your system for `vrbuild2.ini`. Edit the relative paths within this file to reflect the folder structure of MATLAB software Version 6.5.

After you have moved your files into the new `vrealm` folder and customized your `vrbuild2.ini` file, do not reinstall the V-Realm editor. The command

```
vrinstall -install editor
```

replaces the existing `vrbuild2.ini` file with the default template file.

Simulink 3D Animation Compatibility Summary

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 V5.1 (R2009b)	See the Compatibility Considerations subheading for this change:
V5.0 (R2009a)	None
V4.8 (R2008b)	None
V4.7 (R2008a)	None
V4.6 (R2007b)	None
V4.5 (R2007a)	None
V4.4 (R2006b)	See the Compatibility Considerations subheading for this change:
V4.3 (R2006a)	None
V4.2.1 (R14SP3)	None
V4.2 (R14SP2+)	None

Version (Release)	New Features and Changes with Version Compatibility Impact
V4.1 (R14SP2)	None
V4.0.1 (R14SP1)	<p>See the Compatibility Considerations subheading for this change:</p> <ul style="list-style-type: none"> • “VR Source block” on page 23
V4.0 (R14)	None
V3.1 (R13SP1)	None
V3.0 (R13)	<p>See the Compatibility Considerations subheading for this change:</p> <ul style="list-style-type: none"> • “Customized V-Realm Object Libraries” on page 42