
Using the Real World Navigation™ Suite for LightWave 3D



Infinite Pictures, Inc.

33 Northwest First Avenue
Portland, OR 97209

Phone 1-503-221-2449
Fax 1-503-221-2172
Web <http://www.smoothmove.com>

For Technical Support

E-mail support@smoothmove.com

For Sales and Product Information

Phone 1-800-990-2449 (sales only, please)
E-mail sales@smoothmove.com
Fax 1-503-221-2172

Contents

Software License and Limited Warranty	ii
Notices and Trademarks	v
Overview	1
Creating a SmoothMove Panorama	1
Bringing the Panorama to Life	2
Viewing and Interacting with a Panorama	2
How the Real World Navigation Suite Works	3
Visit Our Web Site!	4
Installation	5
System Requirements	5
Installing the Real World Navigation Suite	5
Tutorial	7
Load a Scene	7
Configure the Camera for Panorama Reading	8
Apply the Camera Motion Control	10
Configure the Animation Path	12
Render and View the Panorama	13
What Next?	15
Using the SmoothMove Viewer	17
Hotspots	19
Creating Avatars	23
Including Panoramas in Web Pages	25
Advanced Topics	27
Rendering Multiple SmoothMove Panoramas	27
Compressing SmoothMove Panoramas	31
Troubleshooting	35
Index	37

Software License and Limited Warranty

Please read this section carefully before installing Infinite Pictures™ software. This agreement licenses the software to you. It also contains warranty and liability disclaimers. By selecting the “I AGREE” button during installation, you are accepting the software and agreeing to become bound by the terms of this agreement. If you do not wish to do so, select the “I DON'T AGREE” button and delete all files in your possession relating to this product.

1. Definitions

(a.) “Infinite Pictures software” means the software programs included in this product, and all related updates supplied by Infinite Pictures.

(b.) “Infinite Pictures product” means the Infinite Pictures software and the supporting documentation, files and multimedia content (such as panorama files), and all related updates supplied by Infinite Pictures.

2. License. This agreement allows you to:

(a.) Use the Infinite Pictures software on a single computer.

(b.) Make one copy of Infinite Pictures software in machine-readable form solely for backup purposes. On any such copy you must reproduce all copyright notices and any other proprietary legends found in the original copy of the Infinite Pictures software.

(c.) Certain Infinite Pictures software is licensed with additional rights as set forth in the Supplemental Rights Addendum that may be included elsewhere in this Infinite Pictures product.

3. Supplementary Licenses

Certain rights are not granted under this agreement, but may be available under a separate agreement. If you would like to enter into a Site or Network License, or if you would like to sell files generated by the Infinite Pictures product, please contact sales@smoothmove.com or call the Infinite Pictures sales department at 1-800-990-2449.

4. Restrictions

You may not make or distribute copies of the Infinite Pictures product, or electronically transfer the Infinite Pictures software from one computer to another or over a network. You may not decompile, reverse engineer, disassemble, or otherwise reduce the Infinite Pictures software to a human-perceived form. You may not modify, rent, resell for profit, distribute or create derivative works based upon the Infinite Pictures software or any part thereof. You will not export or reexport, directly or indirectly, the Infinite Pictures product into any country prohibited by the United States Export Administration Act and the regulations thereunder.

5. Ownership

The foregoing license gives you limited rights to use the Infinite Pictures software. Although you own the disk on which the Infinite Pictures software is recorded, you do not become the owner of, and Infinite Pictures retains title to, the Infinite Pictures product, and all copies thereof. All rights not specifically granted in this agreement, including Federal and International Copyrights, are reserved by Infinite Pictures.

6. Limited Warranties

(a.) Infinite Pictures warrants that, for a period of ninety (90) days from the date of delivery (as evidenced by a copy of your receipt): (i) when used with a recommended hardware configuration, the Infinite Pictures software will perform in substantial conformance with the documentation supplied as part of the Infinite Pictures product; and (ii) that the media on which the Infinite Pictures software is furnished will be free from defects in materials and workmanship under normal use. EXCEPT AS SET FORTH IN THE FOREGOING LIMITED WARRANTY, INFINITE PICTURES DISCLAIMS ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT. IF APPLICABLE LAW IMPLIES ANY WARRANTIES WITH RESPECT TO THE INFINITE PICTURES PRODUCT, ALL SUCH WARRANTIES ARE LIMITED IN DURATION TO NINETY (90) DAYS FROM THE DATE OF DELIVERY. No oral or written information or advice given by Infinite Pictures, its dealers, distributors, agents or employees shall create a warranty or in any way increase the scope of this warranty.

(b.) SOME STATES DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER LEGAL RIGHTS WHICH VARY FROM STATE TO STATE.

7. Exclusive Remedy

Your exclusive remedy under Section 6 is to return the Infinite Pictures software to the place you acquired it, with a copy of your receipt and a description of the problem. Infinite Pictures will use reasonable commercial efforts to supply you with a replacement copy of the Infinite Pictures software that substantially conforms to the documentation, provide a replacement for the defective media, or refund to you your purchase price for the Infinite Pictures software, at its option. Infinite Pictures shall have no responsibility with respect to Infinite Pictures software that has been altered in any way, if the media has been damaged by accident, abuse or misapplication, or if the nonconformance arises out of use of the Infinite Pictures software in conjunction with software not supplied by Infinite Pictures.

8. Limitations of Damages

(a.) INFINITE PICTURES SHALL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING DAMAGES FOR LOSS OF BUSINESS, LOSS OF PROFITS, OR THE LIKE), WHETHER BASED ON BREACH OF CONTRACT, TORT, (INCLUDING NEGLIGENCE), PRODUCT LIABILITY OR OTHERWISE, EVEN IF INFINITE PICTURES OR ITS REPRESENTATIVES HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES AND EVEN IF A REMEDY SET FORTH HEREIN IS FOUND TO HAVE FAILED OF ITS ESSENTIAL PURPOSE.

(b.) Infinite Pictures' total liability to you for actual damages for any cause whatsoever will be limited to the greater of \$500 or the amount paid by you for the Infinite Pictures software that caused such damages.

(c.) SOME STATES DO NOT ALLOW THE LIMITATION OR EXCLUSION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

9. Basis of Bargain

The limited warranty, exclusive remedies and limited liability set forth above are fundamental elements of the basis of the bargain between Infinite Pictures and you. Infinite Pictures would not be able to provide the Infinite Pictures software on an economic basis without such limitations.

10. General

This agreement shall be governed by the internal laws of the State of Oregon. This agreement contains the complete agreement between the parties with respect to the subject matter hereof, and supersedes all prior or contemporaneous agreements or understandings, whether oral or written. All questions concerning this agreement shall be directed to: Infinite Pictures, Inc., 33 Northwest First Avenue, Suite 1, Portland, Oregon 97209, attention: Chief Financial Officer.

This is an agreement between you, the end user, and Infinite Pictures™, Inc. By using this software, you are agreeing to become bound by the terms of this agreement.

IF YOU DO NOT AGREE TO THE TERMS OF THIS AGREEMENT, DO NOT USE THIS SOFTWARE. PROMPTLY DESTROY IT COMPLETELY.

Notices and Trademarks

Publication Notice

We have done our best to ensure that the material found in this manual is both useful and accurate. However, please be aware that errors may exist in this manual, and neither the authors nor Infinite Pictures, Inc., make any guarantees concerning the accuracy or possible uses of the information found here.

Copyright Notice

Copyright © 1995-1997 by Infinite Pictures, Inc. All rights reserved. No portion of the contents of this publication may be reproduced or transmitted in any form or by any means without the express written permission of Infinite Pictures, Inc.

Technical Support

Infinite Pictures offers on-line support for 90 days from the date that you register your Real World Navigation™ product. During this 90-day period, our Technical Support staff will respond to your E-mail requests at no additional charge. To register for technical support during this 90-day period, simply E-mail, fax, or send in your registration card, which is included with your software documentation.

To receive technical support, send E-mail to support@smoothmove.com. Be sure to include the following information:

- Your name
- Product name and version
- Product registration number
- Description of your computer and operating system
- Description of your problem or question

After the initial 90-day period, we encourage you to upgrade to an **Annual Technical Support and Maintenance Agreement (ATSMA)**. The annual agreement includes the following:

- One year of E-mail technical support immediately following your initial 90-day period
- Free updates of purchased products as they ship
- Special discounts on product upgrades
- Special prices on other promotions during the year

To purchase an ATSMA, please call Infinite Pictures at 1-800-990-2449 or send E-mail to support@smoothmove.com.

For more information about technical support from Infinite Pictures, visit our Web site at <http://www.smoothmove.com>. There, you'll find a list of FAQs that address some of the most common technical questions about Real World Navigation products, along with other hints to help you along.

Trademark Acknowledgments

Real World Navigation, Infinite Pictures, and SmoothMove are trademarks of Infinite Pictures, Inc. LightWave is trademark of NewTek, Inc. Director is a trademark of Macromedia. Pentium is a registered trademark of Intel Corporation. Microsoft and Windows are registered trademarks of Microsoft Corporation. All other brand or product names are trademarks or registered trademarks of their respective owners.

Overview

Welcome to the Real World Navigation™ Suite for LightWave 3D. With the Real World Navigation Suite, you can create and view 360-degree spherical panoramas with a click of the camera. The Real World Navigation Suite fits comfortably into the LightWave 3D environment.

The Real World Navigation Suite for LightWave 3D is easy to install and easy to use. The Real World Navigation Suite installation program takes care of nearly all the details.

Creating a SmoothMove Panorama

It's easy to create and save SmoothMove™ panoramas — 360-degree interactive views — from your existing 3D models in LightWave 3D. All you need to do is load your 3D model, place the panoramic camera, and click the button to render the complete panorama. This manual provides a tutorial that shows how to do this.

You can also use two other tools from the Real World Navigation Tools and Design Series products to create SmoothMove panoramas:

- The CG Seamer lets you build panoramas from the output of just about any computer graphics (CG) rendering software. The CG Seamer is available as part of the Real World Navigation Tools and Design Series standalone products.

- With the Photo Seamer, you can create a panorama by seaming together a set of three fisheye photographic images. The Photo Seamer is available as part of the Real World Navigation Design Series standalone product.

Bringing the Panorama to Life

The Real World Navigation Suite gives you a new level of interactivity, visual richness, and depth of content. You can use hotspot linking to make your panorama images come alive. With the Hotspot Editor, you can “annotate” a panorama by associating regions of the panorama image with user-initiated audio and video clips, application launching, World Wide Web sites, or other actions. What’s more, you can use the Avatar Editor to create avatars — interactive animations, created from multiple views of an object — that users can activate in your panorama by clicking the mouse within the associated hotspot region.

Viewing and Interacting with a Panorama

Once you’ve created and saved your panorama, you can compress the panorama and then distribute it to your users:

- You may distribute the standalone SmoothMove Viewer for both PC and Macintosh at no additional cost. Make your architectural models come alive for your customers!
- Build an impressive multimedia presentation using industry standard Macromedia Director™. You can add panoramas to presentations, thereby providing the full coupling of interactive space, with text, video, sound and other images.
- Add interest to your Web site by embedding a spherical panorama in your home page. Building a SmoothMove-enabled Web site is as easy as inserting a graphic: all it takes is a single line of HTML code.

SmoothMove panoramas set your Web site apart from more static sites. Users will appreciate the fluid real-time panning and zooming motion and the high-quality graphic images. What’s more, the 360-degree freedom of motion gives you more virtual real estate on the screen.

To view the SmoothMove panoramas on your Web page, users can obtain a free Internet Browser Plug-in from the Infinite Pictures™ Web site (<http://www.smoothmove.com>).

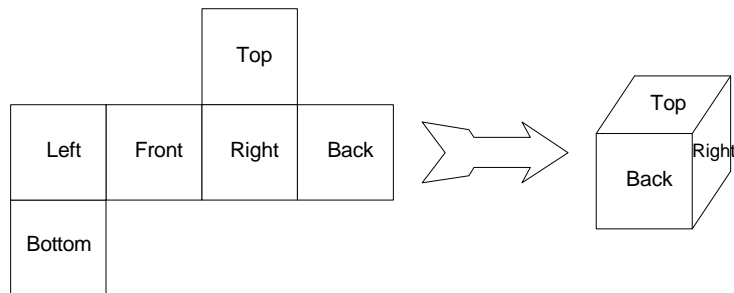
In the tutorial portion of this guide, you'll learn how to use the Real World Navigation plug-in to render content-rich, immersive panoramas — in less than an hour.

How the Real World Navigation Suite Works

The Real World Navigation Suite for LightWave 3D consists of an *animation saver* and two *object motion handlers* for use in LightWave 3D.

- The animation saver collects rendered frames and compiles them into a completed panorama.
- The object motion handlers are used to control camera and object motions during the rendering process.

The Real World Navigation Suite renders six frames of an animation sequence, collecting the images and then compiling the set of frames into a complete panoramic image. The six images correspond to the faces of a cube, as shown below:



Source images

To obtain the six images, the Real World Navigation animation saver renders the panorama as part of an animation, pointing the camera in the appropriate direction for each face. To ensure that the camera is appropriately aimed and positioned for rendering, you apply the camera controller item motion handler to the camera. Similarly, to ensure that all

objects in the scene remain stationary during the rendering process, you apply the object controller item motion handler to keyframed objects.

The animation saver ensures that the images from the frame sequence are collected and seamed into a complete panoramic image. The animation saver also controls compression options and optionally displays the completed panorama at the end of the rendering process.

Visit Our Web Site!

You can find lots of helpful information by visiting our Web site at <http://www.smoothmove.com>. Here are some of the things you'll find there:

- A **Gallery** of panoramas produced by artists from around the world and by other users of Real World Navigation products. In the Gallery, you'll find software and HTML samples that you can download. You can also enter contests and sign up to be a beta tester of Real World Navigation products.
- **Links** to the Web sites of some of our customers, our technology partners, and other exciting sites.
- **Information** about other Real World Navigation products available from Infinite Pictures. You can order and register without leaving our Web site.
- **Downloads** of demonstration versions of many Real World Navigation products, including free viewers and other software.
- **What's New?** — A page with our newest links, information about our partners, samples, and news about Infinite Pictures.
- A **Company Backgrounder** that introduces you to Infinite Pictures, Inc.

Installation

System Requirements

To use the Real World Navigation Suite for LightWave 3D, your computer must meet these requirements:

- LightWave version 4.0 or newer
- Pentium 90 MHz or faster
- Windows NT 4.0 or Windows 95
- At least 32 MB of RAM
- Graphics card (16-bit display or better preferred)
- A hard disk with at least 20 MB of free space

Installing the Real World Navigation Suite

To install the Real World Navigation Suite for LightWave 3D, perform the following steps:

1. If any Windows applications are running on your computer, close them now.
2. If you are installing from CD ROM, insert the Real World Navigation CD ROM disc into your CD ROM drive.
3. Choose the Run command from the Start Menu.

4. If you are installing from CD ROM, type
`D:\RWN_SUITE_LIGHTWAVE.EXE` (where `D:` is the letter that designates your CD ROM drive) and click OK.

If you are installing software that you downloaded from our Web site, click **Browse** and navigate to the directory where you downloaded the software. Type the filename `RWN_SUITE_LIGHTWAVE.EXE` and click **Open**. Then click OK.

5. The Real World Navigation Installer dialog box appears. Review the instructions, then read and accept the license agreement.
6. While the Installer is installing Real World Navigation on your computer, follow the instructions on your screen.
7. When the Installer asks you where to install the software components, verify that each directory location is correct. **We strongly recommend** that you accept the default directory locations for the Infinite Pictures standalone programs and the Internet browser plug-ins.
8. When installation is complete, the Installer will display a message to indicate that your installation was successful.

If you should encounter any problems during installation, please send E-mail to support@smoothmove.com. Be sure to include your registration information.

Tutorial

In this tutorial, you'll do the following:

- Load an existing scene that contains a simple model
- Configure your camera
- Configure the Motion Graph
- Configure the Animation Path
- Render and view the panorama

In this tutorial, we assume that you are familiar with Microsoft Windows 95 or Windows NT, and that you are somewhat familiar with LightWave 3D and its conventions.

Load a Scene

1. If you haven't already done so, start LightWave 3D.
2. From the **File** menu, select **Load Scene**.
3. In the Load Scene File dialog box, navigate to the directory where you installed the Real World Navigation Suite for LightWave 3D (typically, `C:\PROGRAM FILES\INFINITE PICTURES\REAL WORLD NAVIGATION\SUITE FOR LIGHTWAVE 3D`).
4. In that directory's `TUTORIAL` subdirectory, select the file `TUTORIAL.LWS`.

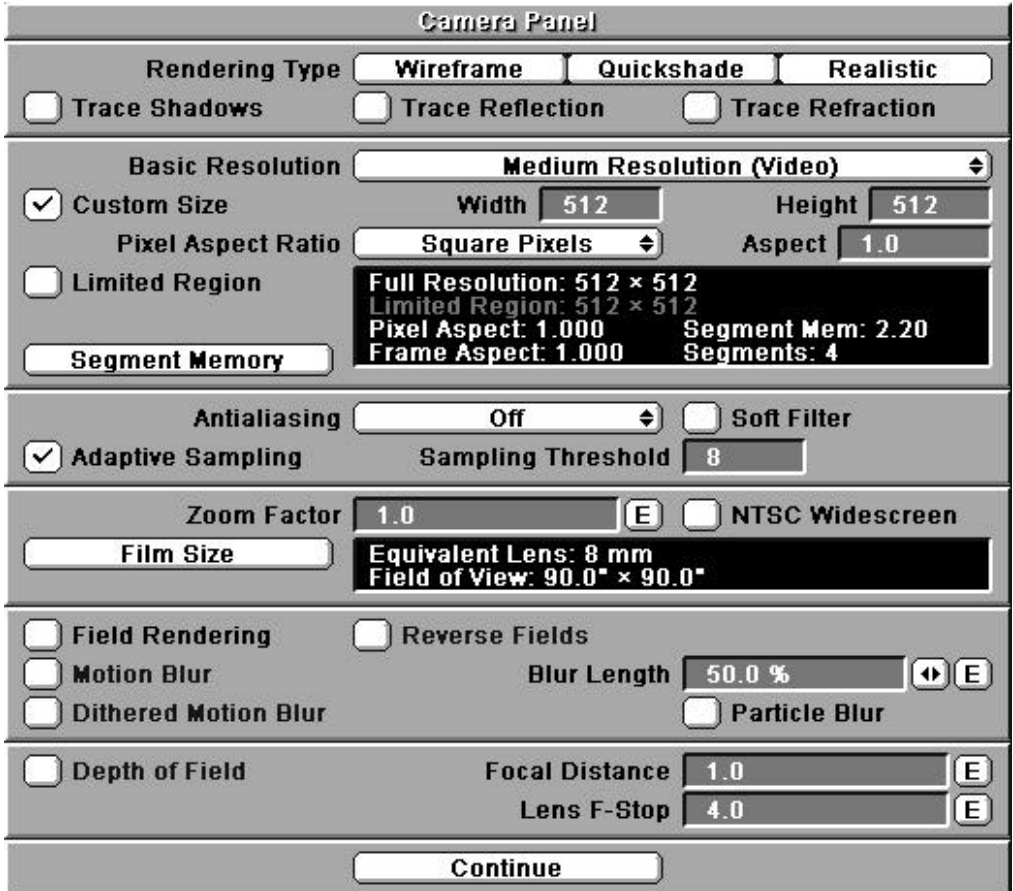
Configure the Camera for Panorama Reading

To render a SmoothMove panorama, it is important that the camera have a 90-degree horizontal and vertical field of view. To obtain the proper field of view, perform these steps:

1. At the top of your LightWave window, click **Camera** to open the Camera panel.
2. In the Camera panel, perform the following actions:
 - a. Click the Custom Size check button.
 - b. Enter any square image size. To do this, make sure that the Width and Height are set to the same value (for example, 512).
 - c. Set the Pixel Aspect Ratio to Square Pixels.
 - d. Set the Zoom Factor to 1.0.
 - e. Press the Tab key. Confirm that the Equivalent Lens is set to 8mm and that the Field of View is 90°.

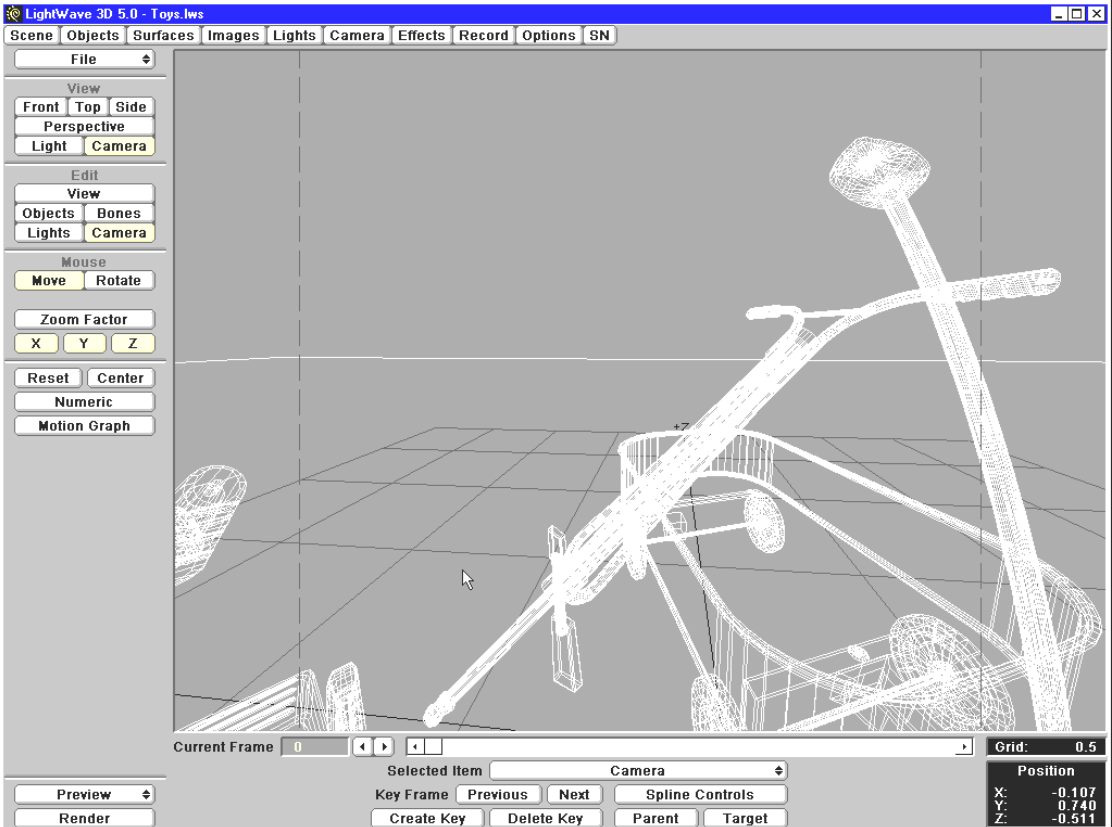
Hint: To speed up rendering, turn Antialiasing **off**. Also, make sure that **Soft Filter** is **not** selected.

3. Verify that your Camera panel looks like this:



4. Click **Continue**.

5. In the Edit menu (in the left margin of the LightWave 3D window), select the menu item **Camera**.
6. Click in the middle of the scene, then use the mouse to position the camera. The direction of the camera will define the directions of the front and top of the panorama.



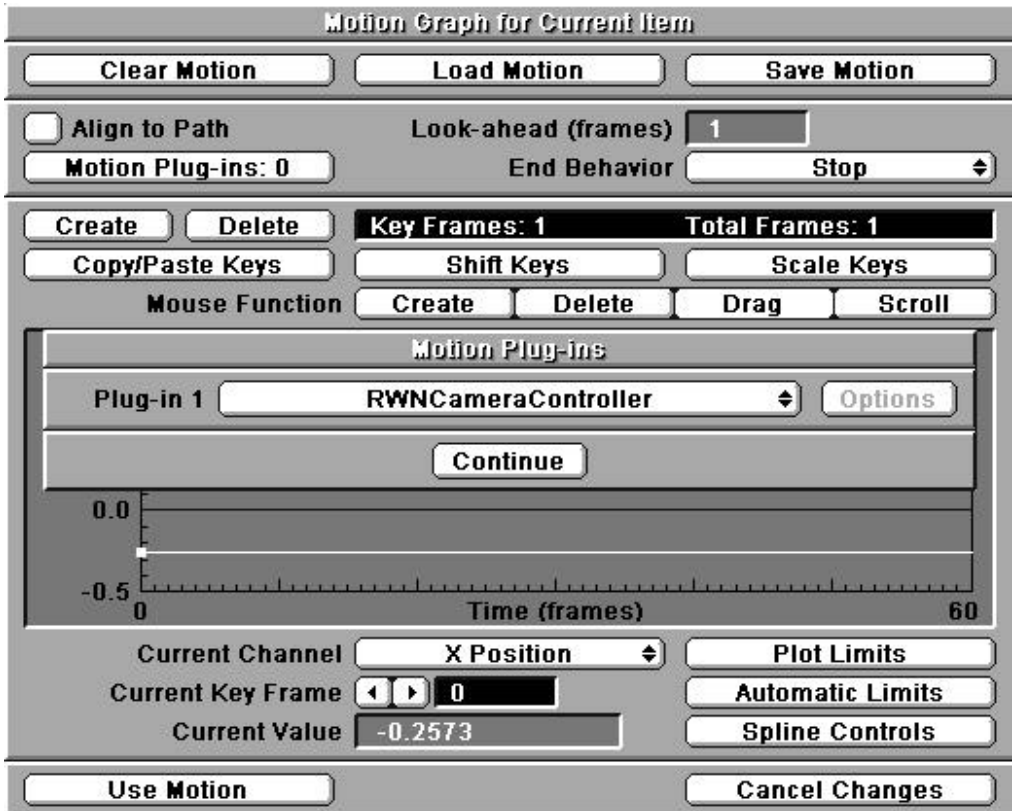
(This image courtesy of NewTek, Inc.)

Apply the Camera Motion Control

The final step in setting up the camera for rendering is to select the camera controller. To select the camera controller:

1. In your scene, make sure that the selected item (near the bottom of the window) is **Camera**.

2. Click the **Motion Graph** button to open the Motion Graph panel.
3. In the Motion Graph panel, click the **Motion Plug-ins** button.
A panel containing a pop-up menu of Plug-Ins will open.
4. In the Motion Plug-ins panel, pull down the Plug-in 1 menu and select **RWNCameraController**.



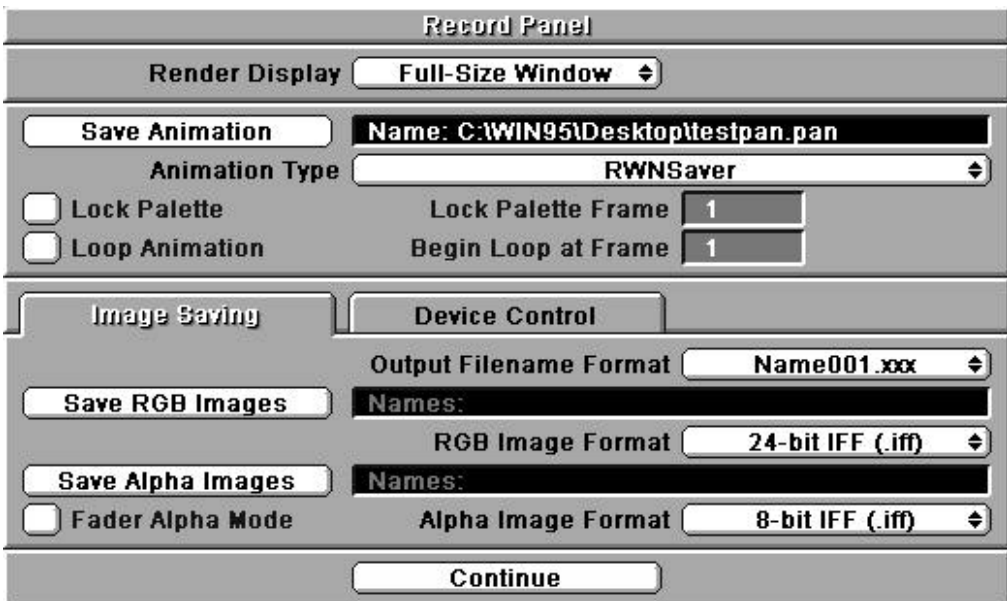
5. Click **Continue** to close the panel.
6. Click **Use Motion** to close the Motion Graph panel.

Configure the Animation Path

Now that you have properly arranged your scene and camera, it's easy to render a SmoothMove panorama. First, though, you must select the panorama saving options. To do so, perform the following steps:

1. At the top of your LightWave window, click **Record** to open the Record panel.
2. In the Record panel, change the **Animation Type** to **RWNSaver**.
3. Click **Save Animation**.
4. In the Save Animation dialog box, navigate to your TUTORIAL directory (typically, C:\PROGRAM FILES\INFINITE PICTURES\REAL WORLD NAVIGATION\SUITE FOR LIGHTWAVE 3D\TUTORIAL).
5. In the TUTORIAL directory, save the panorama in the file TESTPAN.PAN. Type the filename, then click **Open**.

You must enter the .PAN extension. LightWave 3D doesn't do this for you.



6. Click **Continue** to close the Record panel.

Render and View the Panorama

Now, begin rendering the images and select the panorama parameters.

1. At the lower left of your LightWave 3D window, click **Render** to open the Render Scene panel.
2. In the Render Scene panel, set **First Frame** to **1** and **Last Frame** to **6**. This selects the sequence of six frames to render. (Remember that it takes six frames to render a SmoothMove panorama.)
3. Set the **Frame Step** value to **1**.
4. Set the **Frame Advance** method to **Automatic**.



5. Verify that all information is correct, then click **OK** to start rendering.

6. In the Real World Navigation Plug-in dialog box, enter the size for your panorama image.



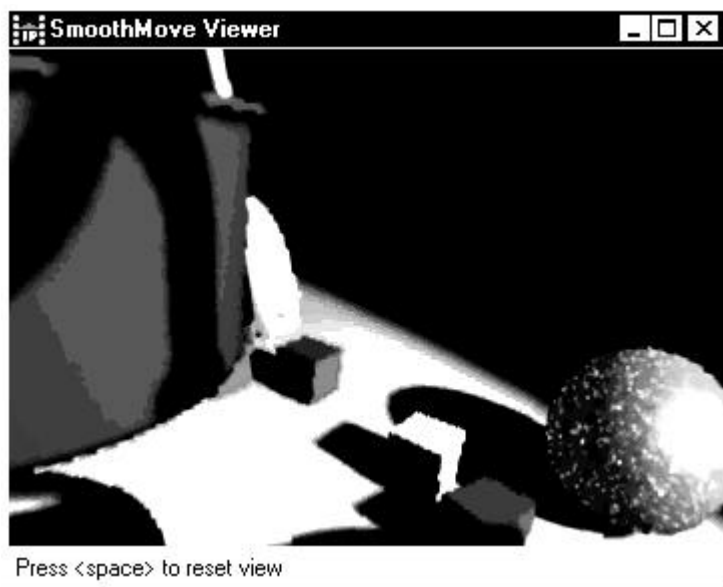
The displayed size of the panorama will be a default size based on your camera settings.

7. If you're interested in examining your current compression options, you can click **Compression**, but don't change any values during this tutorial.
8. Verify that the **Suppress View Window** checkbox is **not** selected. When this box is not selected, the panorama will automatically be displayed when it is complete.
9. Click **OK** to begin rendering.

You'll need to wait patiently while LightWave renders each of the panorama's six frames. This will take anywhere from 2 to 5 minutes, depending on your processor speed, the amount of available memory, and the complexity of the six individual frames.

When all six images are complete, Real World Navigation seams the images and saves the panorama.

10. When the SmoothMove Viewer window appears, you can examine your panorama.
 - To pan, hold down the left mouse button near the center of the window and move the mouse in the direction that you want to pan.
 - To zoom, hold down the Ctrl key and left mouse button simultaneously, and move the mouse up (to zoom in) or down (to zoom out).



11. When you're done, close the SmoothMove Viewer window, then close LightWave.

What Next?

Now that you've created your panorama, you can use other Real World Navigation tools to add spice:

- You can use the HotSpot Editor to associate audio or video clips, Web links, or other actions with regions of the panorama image. For details, see "Hotspots" on page 19 of this guide.

- You can use the Avatar Editor to build Real World Navigation avatars that you can include in your panorama. For details, see “Creating Avatars” on page 23.
- You can incorporate your panorama into World Wide Web pages. For details, see “Including Panoramas in Web Pages” on page 25.

Using the SmoothMove Viewer

You use the SmoothMove Viewer to view and interact with SmoothMove panoramas.

Opening a Panorama

1. To start the SmoothMove Viewer, go to the Start menu and select **Programs > Real World Navigation > SmoothMove Viewer**.
2. In the SmoothMove Viewer window, select **File > Open**.
3. In the dialog box, navigate to the directory that contains the panorama (.PAN) file that you want to view.
4. Select the panorama and click **OK**.
5. When the SmoothMove Viewer window appears, you can examine your panorama.
 - To pan, hold down the left mouse button near the center of the window and move the mouse in the direction that you want to pan.
 - To zoom, hold down the Ctrl key and the left mouse button simultaneously, and move the mouse up (to zoom in) or down (to zoom out).
 - To return the SmoothMove Viewer to its initial view, press the space bar.

Activating Hotspots

When the pointer is inside a defined hotspot, the cursor changes to an arrow. To activate the hotspot, click the left mouse button.

Controlling Real World Navigation Avatars

Some hotspots may activate Real World Navigation avatars.

- To animate a Real World Navigation avatar, click and hold down the left mouse button on the avatar and move the mouse.
- To move an avatar, hold down the Ctrl key and the left mouse button and move the mouse.
- To deactivate an avatar, click the right mouse button in the panorama.

Hotspots

A hotspot associates a region of a panorama image with an action. You can use hotspots to define user-initiated audio or video clips, application launching, World Wide Web sites, or other actions.

Adding Hotspots to Your SmoothMove Panorama

After you have created a SmoothMove panorama, you can add hotspots. To add a hotspot, perform these steps:

1. Start the Hotspot Editor. To do so, go to the Start menu and select **Programs > Real World Navigation > Hotspot Editor**.
2. In the Hotspot Editor window, select **File > Open**.
3. In the dialog box, navigate to the directory that contains the panorama (.PAN) file where you'll be adding hotspots.
4. Select the panorama and click **Open**.

Any previously defined and saved hotspots appear in red.

Navigating a Panorama in the Hotspot Editor

When the Hotspot Editor window appears, you can navigate the panorama.

- To pan, hold down the left mouse button near the center of the window and move the mouse in the direction that you want to pan.
- To zoom, hold down the Ctrl key and the left mouse button simultaneously, and move the mouse up (to zoom in) or down (to zoom out).

Setting the Panorama's Initial View

To establish the initial view for this panorama in the SmoothMove Viewer, select **File > Set Initial View** while you're in the Hotspot Editor window.

Once you've done this, the current view of this panorama will be displayed whenever it is loaded into the SmoothMove Viewer, or when you press the space bar in the SmoothMove Viewer.

Creating a Hotspot

To create a hotspot in your SmoothMove panorama, perform these steps:

1. Place the cursor at one corner of the desired hotspot region.
2. Press down the right mouse button, drag the cursor to the opposite corner of the desired region, then release the right mouse button.
3. In the Define Hotspot dialog box, provide a description for the new hotspot. Then click **OK**.

Here's a summary of what you can enter in the Hotspot description box. All values except the filenames are optional. You must use lowercase letters for optional values (normal, not **NORMAL**). Default values are shown in **boldface** type.

Type of file	Hotspot description syntax	Explanation
.AVI (video clip)	(full window) FILE .AVI (local window) FILE .AVI	The video file will play in the entire application window. The video file will play only inside the hotspot rectangle.
.AVT (avatar)	(x,y) FILE .AVT For example: (1, 0.5) HELICOPTER .AVT	The avatar will "animate" (spin) at x images/sec in its first dimension and y images/sec in its second dimension. Defaults: (0,0) .

.EXE (application)	(normal) FILE . EXE datafile (minimized) FILE . EXE (maximized)FILE . EXE	Starts the application
.PAN (panorama)	(preserve view) FILE . PAN	The panorama will be displayed with the same view orientation as the current panorama. By default, the panorama comes up facing “north.”
.WAV (video clip)	(repeat) FILE . WAV	By default, the audio file will play once and then stop.
URLs		Any URL hotspots that point to files on the user’s local drive must have the format “file:// <i>pathname</i> ”.

- Any file extension not listed here will be launched using the registered viewer. For example, .DOC files will be opened with Microsoft Word or Wordpad.
- The SmoothMove Viewer does not recognize URLs.
- The SmoothMove Plug-in for Internet Browsers does not recognize .EXE files.

Selecting a Hotspot

To select an existing hotspot, place the cursor anywhere within a hotspot rectangle, and click the right mouse button. The selected hotspot appears outlined in green.

Deleting a Hotspot

To delete a hotspot, perform these steps:

1. Click the right mouse button inside the hotspot.
2. From the right mouse button menu, select **Delete Hotspot**.

You can also press the Delete key or select the menu item **Edit>Delete Hotspot**.

Editing a Hotspot

To edit an existing hotspot, perform these steps:

1. Click the right mouse button inside the hotspot.
2. From the right mouse button menu, select **Edit Hotspot**.
You can also press the Delete key or select the menu item **Edit>Edit Hotspot Description**.
3. In the Edit Hotspot dialog box, make any changes to the action associated with this hotspot.

Testing a Hotspot

To test a single existing hotspot, perform these steps:

1. Click the right mouse button inside the hotspot.
2. From the right mouse button menu, select **Test Hotspot**.
You can also press the Delete key or select the menu item **Edit>Test Hotspot**.

To test all existing hotspots, select the menu item **File>Tour All Hotspots**.

Saving Your Hotspots

After you've defined all of your hotspots, save the panorama file. To do so, perform these steps:

1. Select the menu item **File>Save**.
2. In the dialog box, navigate to the directory where you want to save your panorama.
3. Verify that the panorama file name (**.PAN**) and all other information is correct. Then click **Save**.

Creating Avatars

In this brief tutorial, you'll use the Avatar Editor to transform a sequence of images into an animated avatar object that users can place in their panoramas.

Create Your Avatar

1. From the Start menu, select **Programs > Real World Navigation > Avatar Editor**.
2. In the Avatar Editor window, select **File > Open**.
3. In the dialog box, navigate to the directory `C:\PROGRAM FILES\INFINITE PICTURES\REAL WORLD NAVIGATION\SAMPLES\AVATAR EDITOR`.
4. In that directory, select all eight `AASPINXX.BMP` files and click **Open**.
5. In the Avatar Grid dialog box, accept all default values and click **OK**.
6. Look in your Avatar Editor window: it's a dancing aardvark!
To watch the aardvark play hacky-sack, click the up-arrow and down-arrow buttons. (Aardvark image courtesy of Bill Tillman.)
7. Now, save the aardvark avatar. Select **File>Save As**, then navigate to the `SAMPLES\AVATAR EDITOR` directory (see step 3).

8. In that directory, save the panorama in the file `AARDVARK.AVT`. Type the filename, then click **Open**.

Place the Avatar in Your Panorama

Now, you'll use the Hotspot Editor to place the new avatar in your panorama.

1. From the Start menu, open the Hotspot Editor.
2. In the Hotspot Editor window, select **File > Open**.
3. In the dialog box, navigate to the `SAMPLES\AVATAR EDITOR` directory (see step 3 in the previous section).
4. Select the panorama file `SAMPLEPAN.PAN`, then click **Open**.
5. Use the left mouse button to define the hotspot region that you want to associate with your avatar.
6. When the Define Hotspot dialog box appears, navigate to the `SAMPLES\AVATAR EDITOR` directory and provide `AARDVARK.AVT` as the Hotspot description. Then click **OK**.
7. To activate the avatar, move the mouse cursor inside the hotspot. Then click the right mouse button and select **Test Hotspot**.

Including Panoramas in Web Pages

To insert a GIF or JPG graphic into a Web page, you use a line of HTML that looks like this:

```

```

Inserting a SmoothMove Panorama into a Web page is almost as easy. All you need to do is include the HTML **embed** command with its command-line arguments:

```
<embed src="./graphics/FILENAME.pan" width=WWW height=HHH  
type="application/x-pan">
```

The **embed** command uses the following arguments:

<code>src</code>	This is the filename for the SmoothMove panorama that you're including in the Web page.
<code>width,</code> <code>height</code>	These values set the dimensions of the panorama window.
<code>type</code>	This value should be set to "application/x-pan". This MIME type allows your Web server to display SmoothMove panoramas (.PAN files) correctly, even if the Web server is not configured to your specifications or is outside your control.
<code>pan,</code> <code>tilt,</code> <code>roll</code>	These values specify the initial amount of panning, tilting, and rolling of the viewer.

The following HTML example will display the panorama `PDXBREW.PAN`, with the camera slowly panning.

```
<embed src="./graphics/pdxbrew.pan" width=450  
height=250 type="application/x-pan" pan=20>
```

Tutorial Files

You can find sample HTML files in the following directory: `C:\PROGRAM FILES\INFINITE PICTURES\REAL WORLD NAVIGATION\SAMPLES\HTML`

Advanced Topics

Rendering Multiple SmoothMove Panoramas

This section is primarily for more advanced users of LightWave 3D and the Real World Navigation Suite.

Rendering multiple panoramas can be done in several ways. In some cases, there are some very important considerations to make regarding the time based changes in a scene.

The simplest way to render multiple panoramas from a single scene is to set up a scene with no time dependent changes and simply move the camera for each desired panorama.

Setting up a Scene for Panorama Rendering

When arranging a scene for panorama rendering, it is necessary to follow a few guidelines. Because panoramas must be rendered as animation sequences, some time-based effects cannot be used. Lens flares can also be a problem under certain circumstances. This section of the guide lists some exceptions to these rules and methods for handling keyframed motion.

Avoid any time-based changes to the scene other than those which are explained here. Do not use blurs, object or texture metamorphosing, lighting changes, fades, etc. A panorama can be rendered when such effects are in use, but the seams where the source images meet will likely

be visible. For more about this, refer to “How the Real World Navigation Suite Works”, on page 3 of this guide.

Lens flares in LightWave 3D are created as a post-processing effect for each image. Flares are applied only to lights that are visible in a given frame. This can also result in visible image seams in the final panorama. Avoid lens flares that extend beyond the edge of any frame.

Using Time-Dependent Changes in a Scene

It is possible to create multiple panoramas at once by setting up a keyframed motion for the camera and rendering a long sequence of frames. It is also possible to use envelopes in the scene. This can be very useful for overnight rendering of a group of panoramas.

Time-dependent changes such as these should be carefully planned. They should also be arranged with a great deal of care in order to obtain seamless panoramic images. The order of application is important. We recommend that the scene be saved often.

To prepare the scene for time-dependent changes:

1. Open the **Scene** panel.
2. Set the first frame of the scene to zero.
3. Click the **Continue** button to close the Scene panel.

Keyframed motion should be set up **before** applying the motion handler portions of the plug-in to the camera or any scene objects. To set up keyframed motions in the scene:

1. Define keyframes and motions as normal.
It is a good idea to save the scene after this step. That could make it easier to go back and edit the motions.
2. Open the **Scene** panel.
3. Click the **Scale All Keys** button.
The Scale All Keys panel will open.
4. Enter the value 6.0 in the value field labeled **Scale Frames by**.
5. Click the **OK** button to close the Scale All Keys panel.
6. Click the **Continue** button to close the Scene panel.

7. Apply the camera motion controller portion of the plug-in to the camera.

Follow the instructions given in the section “Apply the Camera Motion Control” on page 10 of this guide.

8. Apply the object motion controller portion of the plug-in to any objects with keyframed motion in the scene.

Follow the instructions given in the section “Applying the Camera Motion Control,” but replace

RWNCameraController with **RWNObjectController**.

After you’ve performed these steps, the scene will look the same as it did after step 1, but the motions will be at different frame locations. When stepping through the frames, object locations should change only at six-frame intervals.

Envelopes in the scene should be set up after configuring for keyframed motion. Although envelope use is beyond the scope of this manual, here are some general guidelines to follow:

- Do not use a zoom factor envelope for the camera.
- Turn off spline controls for the envelopes. This will help ensure that envelope values remain constant during any six frame sub-sequence.
- Make sure changes occur only at the boundary of each six-frame sub-sequence. For example, the envelope values should be constant for frames 0–5. The values could then change between frames 5 and 6. The values should then remain constant again between frames 6 and 11.

If the desired time-based changes are arranged appropriately, all of the panoramas should be seamless.

Setting the Save Options

To select the panorama saving options:

1. Open the **Record** panel.
2. Select **RWNSaver** from the **Animation Type** pop-up menu.
3. Click the **Save Animation** button.

A file selection dialog box will open.

4. Browse for the selected file location and enter the desired filename for the panorama.

The filename should end with the `.PAN` file extension. This filename will be augmented with a number for each panorama rendered in a multiple panorama sequence. For example, entering `MYPAN.PAN` for a sequence of two panoramas will result in the files `MYPAN000.PAN` and `MYPAN001.PAN` being created.

5. Click the **Open** button to close the file selection dialog box.
6. Click the **Continue** button to close the Record panel.

Rendering the Panorama

Next, begin rendering the images and select the panorama parameters.

Note: The rendering process cannot be done in batch mode.

1. Click the **Render** button.
2. Select a sequence of some multiple of six frames to render, beginning with a multiple of six (i.e. 0, 6, 12, etc.).

For example, choosing frames 0–11 or frames 6–17 will result in the creation of two panoramas. This is very important. Without at least six frames, panoramas cannot be generated.

3. Select a **Frame Step** of 1.

This is also very important. Without a frame step of 1, the panorama saver will not obtain the appropriate sets of frames.

4. Choose a method of **Frame Advance**.
5. Click the **OK** button to begin rendering.

The Real World Navigation Plug-in dialog box will open.

6. Enter an appropriate size for the panorama image.

The displayed size of the panorama will be a default size based on your camera settings.

7. Select the desired compression settings.

For more information about compression, see the following discussion, “Compressing SmoothMove Panoramas.”

8. The **Suppress View Window** check box will be disabled.

Panoramas are not automatically displayed when rendering a sequence of more than one panorama.

9. Click **OK** to begin rendering.

The individual frames of each panorama will be rendered. When the last image of each six image sub-sequence is complete, the Real World Navigation animation saver will seam the images and save a panorama.

When the panoramas are complete, they can be viewed with any application that is enabled for SmoothMove panoramas. To associate actions with regions of the image, use the HotSpot Editor.

Compressing SmoothMove Panoramas

Why should you compress panoramas?

One very obvious benefit of compression is that your SmoothMove panoramas will take up less disk space. With compression, it takes less time to download a panorama from the Internet. Of course, when you're creating panorama files for distribution, compression is essential.

When is the best time to compress?

Here's an outline that illustrates the "life cycle" of a panorama:

1. Create the panorama from source files (3D models or photographic images).
2. "Annotate" the panorama with hotspots.
3. Edit the panorama. You can touch it up in a painting program or make adjustments to the panorama's orientation.
4. *Compress* the panorama.
5. Distribute the panorama, usually on your Web page or on a CD-ROM.
6. View and use the panorama in the SmoothMove Viewer or in LightWave 3D.

As you can see here, compression generally takes place after you've made all your changes to the panorama, but before you've begun to distribute it widely. Let's take a look at what's actually involved in compressing a panorama.

How to compress your panoramas

Most tools in the Real World Navigation family of products have integrated compression tools. Those that don't, have an external compression program.

For general distribution of images, Infinite Pictures uses JPEG, because the JPEG compressor is portable to Macintosh and other non-Intel architectures.

JPEG

Currently, JPEG is the de facto standard for lossy image compression on the Internet. JPEG provides greater image compression because it does not attempt to decompress images into a perfect copy of the original.

When compressing, you can choose the *compression level*, from 0 to 100. Choosing low numbers yield smaller files, but poorer image quality. Choosing high numbers yields larger files, but higher image quality.

You'll want to experiment, and choose the file size and image quality tradeoff that is appropriate for your application.

With JPEG, we recommend a compression level of 70 for files that will be distributed on the Internet, or 75 for files that will be distributed on CD-ROM.

Indeo

Intel Indeo Video Interactive was designed to compress individual frames for video movies. Indeo works on Intel architectures, and offers state-of-the-art compression. Files are smaller than with almost any other compression algorithm. Indeo does require lots of memory – decompression can require up to 90 MB of RAM. This may present problems in situations such as Web pages, where panoramas are often viewed by users whose computers have limited memory.

As with JPEG, Indeo has a *compression level* that ranges from 0 to 100. We have found that a compression level of 65 typically yields images smaller than 200K (for panoramas of size 2048x1024).

With Indeo, we recommend a compression level of 65 for files that will be distributed on the Internet, or 80 for files that will be distributed on CD-ROM.

Although Indeo is designed to be faster than JPEG, we have found that with typical panorama files (2048x1024 pixels), the memory requirements are so high that the operating system must page to disk. It is not uncommon for Indeo panoramas to take 15-30 seconds to display on machines with less than 32 MB of RAM – with 64 MB, it takes only 3-4 seconds.

Troubleshooting

Here are some tips to make you more successful at rendering and viewing SmoothMove panoramas:

Problem	Solution
Real World Navigation Suite for LightWave 3D does not load.	The Real World Navigation Suite works only on Intel-based computers.
When I render a panorama, LightWave 3D appears to freeze after the final frame.	The animation saver portion of the plug-in is probably seaming the six source images into a panorama. The time necessary for seaming and compressing depends on the image size and processor speed of the computer. It can take a long time on some computers. The seaming and compressing is done when the frame buffer is freed.
The panorama appears to be upside down.	The SmoothMove panorama uses the orientation of the camera to determine a default viewing direction. Be sure that the camera's top is in the direction of the desired panorama's top.
I can't load the tutorial files!	In LightWave 4.0 and 5.0, you cannot load a scene file whose pathname is longer than LightWave's limitation. To shorten the pathname, copy the tutorial directory to a location closer to the root directory. Then load the scene from the new location.

Problem	Solution
The quality of the panoramic image appears to be much lower than expected.	Try using a larger panorama. Image quality also depends on the compression settings. JPEG is a lossy compression scheme.
The panorama looks like the inside of a box.	This is probably due to visibility of the seams. When rendering in wireframe mode, the seams are often visible because of the way LightWave clips its polygons. Other causes might be the use of time based effects that change objects or surfaces between frames of the rendered image sequence.

For current information about the Real World Navigation Suite for LightWave 3D, please visit our Web site at <http://www.smoothmove.com>.

Index

- aardvarks, and hacky-sack 23
- activating hotspots 18
- adding hotspots to a panorama 19
- animating an avatar 18, 23
- animation path, configuring 12
- animation saver 3
- annotating a panorama with hotspots 2
- annual technical support agreement vi
- applications, defining as hotspots 20
- applying the camera motion control 10
- audio clips
 - defining as hotspots 20
- Avatar Editor
 - main discussion 23
- avatars
 - animating 18
 - creating 23
 - defining as hotspots 20
 - main discussion 23
 - moving 18
 - overview 2
 - placing in your panorama 24
- AVI files, defining as hotspots 20
- AVT files, defining as hotspots 20
- bringing a panorama to life
 - overview 2
- camera, configuring for rendering
 - panoramas 8
- CG Seamer
 - overview 1
- compressing panoramas 31
- computer graphics rendering software and SmoothMove panoramas 1
- configuring the animation path 12
- configuring the camera for rendering 8
- controlling avatars 18
- controlling camera motion during rendering 3
- controlling object motion during rendering 3
- creating a hotspot 20
- creating an avatar 23
- creating panoramas, overview 1
- deactivating an avatar 18
- deleting a hotspot 21
- demo versions of products
 - at Infinite Pictures Web site 4
- disk space
 - and compression 31
- editing a hotspot 22
- embed command

for inserting panoramas in Web pages		learning Real World Navigation Suite	
25		7	
EXE files, defining as hotspots	20	LightWave version required for	
frames, sequence of	13	installation	5
gallery of panoramas		linking panoramas together	27
at Infinite Pictures Web site	4	loading the tutorial scene	7
graphics card required for installation		memory required for installation	5
5		Motion Graph panel, example of	10
hacky-sack, and aardvarks	23	moving an avatar	18
hard disk space required for installation		multiple panoramas	
5		rendering	27
hotspot description		object motion handlers	3
what values you can enter	20	on-line technical support	v
hotspot linking		overview	1
overview	2	PAN files, defining as hotspots	20
hotspots		panning	
activating	18	in Hotspot Editor	19
adding to a panorama	19	in SmoothMove Viewer	15, 17
deleting	21	panorama saving options, selecting	12
editing	22	panoramas available online	
main discussion	19	at Infinite Pictures Web site	4
saving	22	panorama's initial view	
selecting	21	setting in Hotspot Editor	20
testing	22	panoramas	
HTML code		and hotspots	19
for inserting panoramas in Web pages		compressing	31
25		defining as hotspots	20
including panoramas in Web pages	25	including in Web pages	25
overview	2	overview	1
Indeo, used for compressing panoramas		panning	15, 17, 19
32		zooming	15, 17, 19
Infinite Pictures product information		panoramas, viewing	13
available at our Web site	4	Photo Seamer	
Infinite Pictures Web site	4	overview	2
initial view		photographic images	
setting in Hotspot Editor	20	and SmoothMove panoramas	2
installation information	5	placing an avatar in your panorama	
interacting with a panorama		24	
overview	2	product overview	1
JPEG, used for compressing panoramas		RAM required for installation	5
32		Real World Navigation Suite product	
		overview	1

rendering a panorama	13	troubleshooting tips	35
rendering a panorama, overview	3	tutorial	7
rendering multiple panoramas	27	tutorial scene, loading	7
saving a hotspot	22	URLs, defining as hotspots	20
saving your panorama	12	video clips	
seaming photographic images		defining as hotspots	20
overview	2	viewing a panorama	
selecting a hotspot	21	overview	2
setting the panorama's initial view	20	viewing panoramas	
SmoothMove panoramas	<i>See</i> panoramas	in SmoothMove Viewer	15, 17
SmoothMove Viewer		warranty information	ii
main discussion	17	WAV files, defining as hotspots	20
overview	2	Web links, defining as hotspots	20
software license	ii	Windows required for installation	5
software maintenance agreement	vi	World Wide Web site	
sound files		Infinite Pictures	4
defining as hotspots	20	World Wide Web URLs	
standalone SmoothMove Viewer	17	defining as hotspots	20
system requirements for installation	5	www.smoothmove.com	
technical support	v	Infinite Pictures Web site	4
testing a hotspot	22	zooming	
trademark information	vi	in Hotspot Editor	19
		in SmoothMove Viewer	15, 17

