



Liberty3D UberCam

For NewTek's LightWave3D

Version 1.9

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Thank you for purchasing UberCam 1.9!

(Win32Bit, Win64Bit, MacUB Intel 32 Bit / Intel 64 Bit)

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Special Thanks: NewTek, The Liberty3D.com Citizens and the supporters of
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Chapter 1 Liberty3D UberCam v1.9

Liberty3D UberCam is a plug-in for NewTek's LightWave3D that enhances the LightWave platform with additional camera capabilities.

About Liberty3D UberCam

Liberty3D UberCam requires at least NewTek's LightWave v9.3.1 in order to run. As of version 1.9 there are 16 additional camera types included in the UberCam package. In addition to the controls included in the new cameras, the standard position and orientation of the existing cameras will affect the Linear and Non-Linear UberCam types as well. Although the cameras will function as described in LightWave 9.3.1 and above, we recommend upgrading to LightWave 10.1 and above in order to take advantage of additional capabilities. In the future, support for LightWave 9.x may need to be removed in order to advance this product.

Installation

Liberty3D UberCam is installed just like any other plug-in for LightWave. To install UberCam, simply place the appropriate version of the plug-in into a folder named "Liberty3D" or something similar in your LightWave3D plug-ins folder. Then, run layout and add the plug-in from this directory location. This is by selecting add-plugin in the Utilities menu bar selection in the menu bar system, or by pressing add plug-in in the edit plug-ins dialog box. In order to correctly recognize all the camera types we recommend un-installing the old plug-in first, then re-adding the new plug-in. This will recount the plug-in types included in the package.

Key Activation

When you purchased UberCam from www.liberty3d.com you should have been emailed back a Key number after you entered your DongleID into the store section field on check out.

If you didn't do this you need to contact us and provide your DongleID (aka hardware lock) number to us as well as your receipt. This will help us to get the key back to you faster. You will then be emailed a key. We pride ourselves on our fast customer service and will have your key back to you very shortly but it is not an automated process as of this release, so please be patient as we get your key to you.

This key is then entered into a dialog box that pops up when you first try to access the property panel for UberCam inside of the camera properties panel.

Simply paste the number or enter it in manually and hit "OK". You will get a message stating the key is accepted or not. The box, depending on which OS type of LightWave you are running will either go away on its own or not. If it doesn't, just close it by using the "X" button.

You should now be able to access the properties of the camera.

If you have any problems with your key, please contact us immediately via email. Email: kat@liberty3d.com

Changed from v1.0 to v1.5

- Liberty3D UberCam v1.5 was changed to be compatible with LightWave v9.3.1., 9.5, 9.6 and now LightWave3D 10.0 Previous versions of UberCam required LightWave v9.6.
- The Liberty3D SuperPano Camera and the Liberty3D Overscan Camera was added in UberCam v1.5.
- Some camera names were adjusted for clarity.
- This document was added.
- The Liberty3D Performance Camera was included as a separate optional camera plug-in package in order to judge the performance hit from various camera choices.

Changed from v1.5 to v1.9

- The Spherical Camera , the Radial Shift Camera, and the DPI Camera were added as new camera types.
- The Spherical Camera and the Perspective Camera No DOF no MB was made free of any licence protection code. That way you can try out these two cameras as a sample of the whole camera collection. The Liberty3D performance measurement camera was included also in order for you to check your performance changes on your own scenes and object files.
- The one point poly and two point poly problem with multi-up and stereo camera combinations has been fixed by using a workaround for a LightWave 3D rendering bug.
- There was an error in calculating the zoom factor in a rendered sequence if the zoom factor was enveloped. This has been fixed.
- The PPC build type was removed from the Mac UB build in order to reduce the size of the plugin.

- This document was updated, although we were too lazy to update the screen captures for the dialog boxes.

Why does the camera view not show what I expect?

The OpenGL view ports are hardware accelerated assuming that a linear transform can be used, like that used in an Orthographic camera or Perspective camera. In this, a straight line in the scene will always end up as a straight line in the view port image. This can be done only for the Linear camera types in UberCam. For all other cameras we recommend using a visualization plug-in such as F-Prime from [Worley Labs](#). LightWave 3D version 10 VPR support is limited at this time and may not perform as expected. This may change in future releases of LightWave 3D.

Chapter 2 Linear Cameras

There are 3 linear cameras in the Liberty3D UberCam v1.9 package.

What is a Linear Camera?

A linear camera is a camera type that can be calculated using a 3D linear transform matrix. In this camera type, a straight line in the scene will always result in a straight line in the rendered image.

Liberty3D Perspective Camera

This camera operates identically to the perspective camera that is the default camera in LightWave 3D 9.6 and 10. but has been optimized for speed.

Liberty3D No DoF Camera

This camera operates identically to the perspective camera that is the default camera in LightWave 9.6 and 10, but assumes that there is no Depth of Field being used. By knowing this, the calculations that the Depth of Field rely on can be skipped as they are not used, adding further speed to the final render.

Liberty3D No DoF No MB Camera

This camera operates identically to the perspective camera that is the default camera in LightWave 9.6 and 10, but assumes that there is no Depth of Field or Motion Blur being used. By knowing this, the calculations that the Depth of Field rely on as well as the Motion Blur calculations can be skipped as they are not used, adding further speed to the final render.

Chapter 3 Non-linear Cameras

There are 8 non-linear cameras in the Liberty3D UberCam v1.9 package. These are the Stereo Camera, the Skybox Camera, the FishEye Camera, the Cylinder Camera, the Panoramic Camera, the SuperPano Camera, the Spherical Camera, and the

What is a non-linear camera?

A linear camera is a camera type that CANNOT ALWAYS be calculated using a 3d linear transform matrix. In this camera type, a straight line in the scene will NOT ALWAYS result in a straight line in the rendered image.

Liberty3D Stereo Camera

To make use of the camera in your scene you will need to change the width of the camera resolution to twice that of the resolution you wish to have a single Eye frame size at. For example - If you want to output in HDTV format which is 1920x1080, you will need to render your scene at 3840x1080. This will give you a horizontally wide image twice that of 1920 pixels (assuming square pixels).

This will give you 1920 pixels per eye when recombined to produce the stereoscopic image.

Our Camera Renders both eyes at the same time which is, as far as we know a capability unique to LightWave 3D and this plug-in. The advantages to this are obvious. You no longer need to render a scene twice, once per eye in order to get the images you are looking for. This

is why our camera renders the images side by side horizontally. This is very advantageous when working with modern compositing packages like Eyeon Fusion 6.1 or higher as it has a stereo image combing function that specifically can make use of horizontally stacked images and combine them to produce the stereoscopic image result at what is more or less a push of a button. There are other advantages such as scene file management complexity being reduced, render times over the network are reduced on multiple fronts as well.

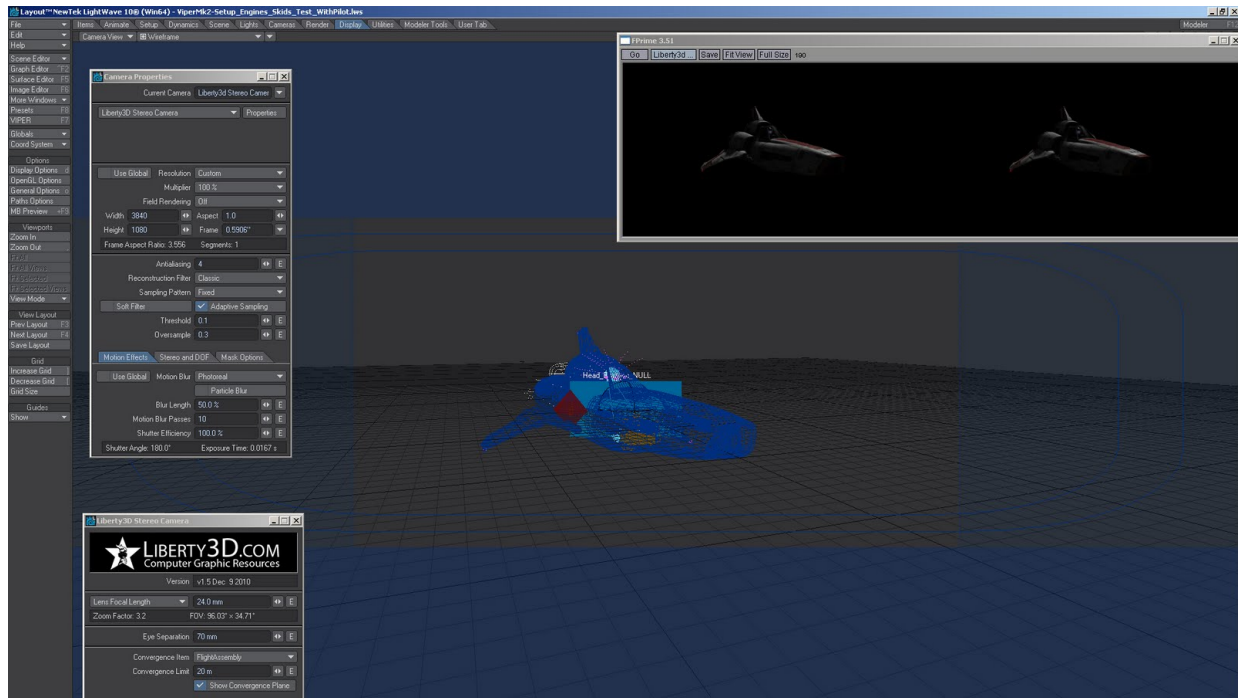
While this plug-in is not yet performance tuned, in most scenes it will very closely perform to that of traditional LightWave Stereoscopic rendering operations. We aim to actually go faster than rendering using the built-in stereoscopic rendering function in LightWave 9.6 and even LightWave 10.

A note on frame display: If you need to accurately preview the framing of your scene through the camera view, you can use the Alternative Aspect Display function to do so. You can enable this through the Display Options Panel (press d). As a good starting point, use the width of your resolution for your Stereoscopic target frame resolution. An example of this would be if your target stereoscopic frame resolution (the final combined stereo image) is to be 1920x1080, enter in a value of 1.92.

This will closely match the actual framing but not exactly. It's a good starting point, but even the default of 1.85 works right out of the box. Great stuff!



Liberty3D UberCam 1.5 Stereo Camera Options Panel



An Example of the Liberty3D UberCam 1.5 Stereo Camera with Fprime 3.51. There are additional features and functionality improvements that have been made in UberCam 1.9 to match improvements made to the native Stereo camera system in LightWave3D 10.1.

Liberty3D SkyBox Camera

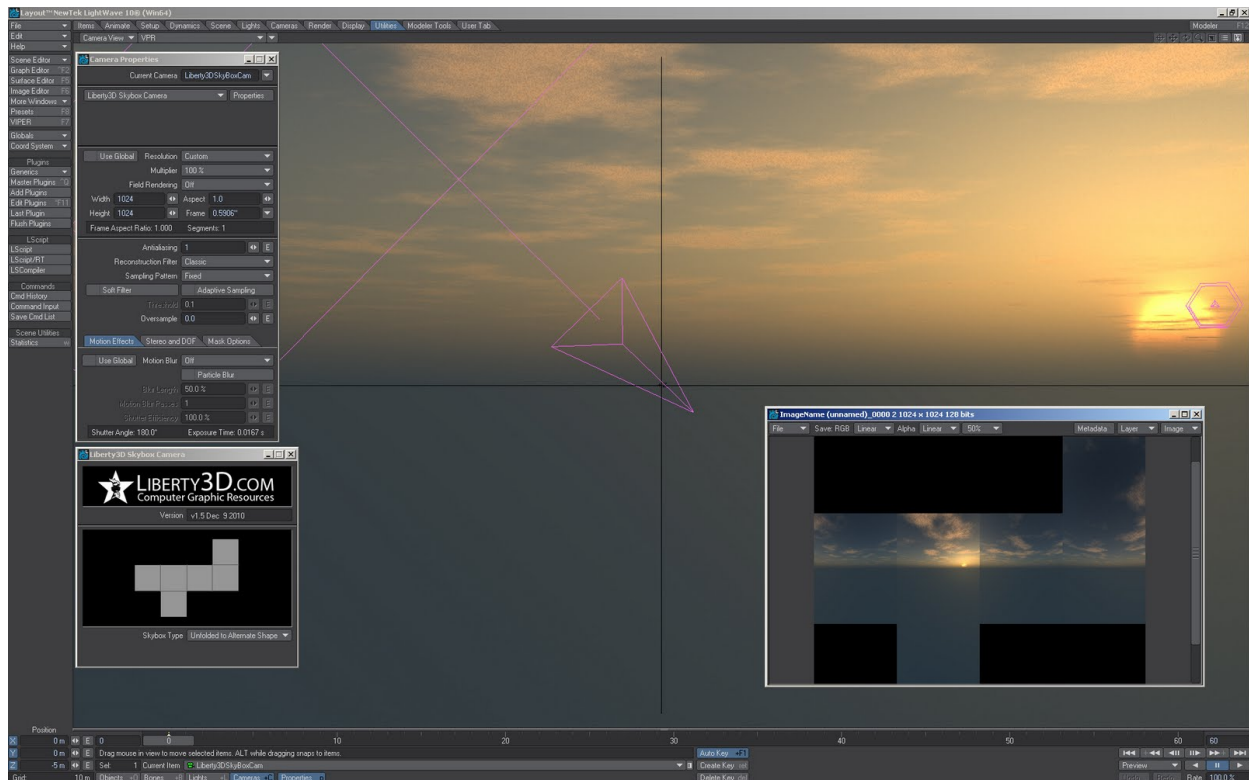
This camera provides a simple way to create cross shaped skybox files, which can then be cut up into individual files as a post-rendering step. Saves time from having to set up and rotate 6 cameras every time a skybox render is required. The forward camera orientation is always rendered in the square that is the intersection square of the cross.

In order to get a near perfect SkyBox Render which can then be split up into separate images for use in a game engine package such as Unity3D or Unreal3D we recommend using a 4:3 resolution. For example, 1000x750 for each SkyBox side to be 250x250 pixels each.



Liberty3D Skybox Camera - Unfolded to Cross Shape





Liberty3D UberCam 1.5 Skybox Camera - Unfolded to Alternate Shape Example Render. The functionality is the same in UberCam 1.9.

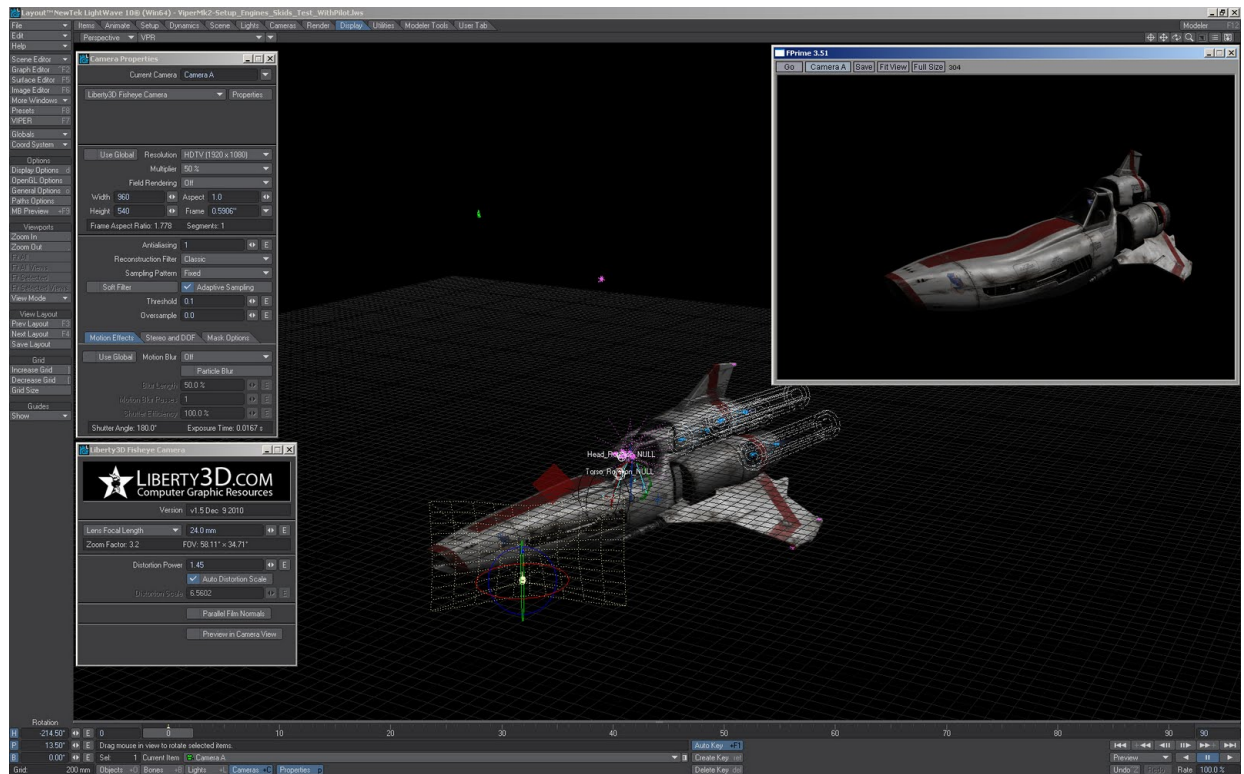
Liberty3D FishEye Camera

This camera presents spherical lens distortion similar to that found in actual lenses. If the Distortion power is set to 1 and the Distortion Scale is set to 1, then the resulting image is identical to the default LightWave Perspective Camera. A distortion Power greater than 1 pincushions the field of view frustum inward. A distortion power less than 1 barrels the field of view frustum outward. That means parallel lines within the scene show up bending in the opposite way in the final render. As the power value increase results in a smaller field of view, a second control called distortion scale is provided to scale back up the field of view frustum without changing the focal length.



A check box control is provided to automatically calculate the appropriate distortion scale in order to perfectly match the selected Focal Length and Zoom Factor.

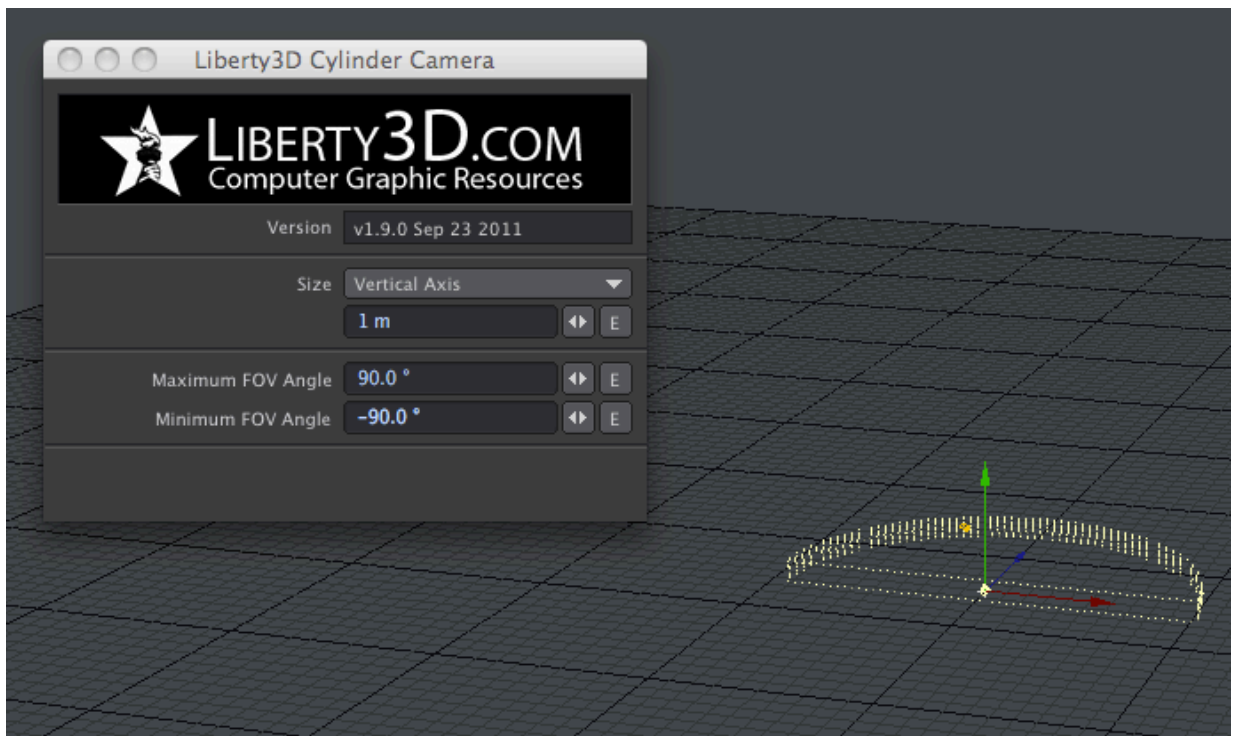
Finally, as there is no way to accurately represent non-linear cameras like this in the camera view, we alternatively draw the camera view rectangles in order to allow you to match camera shots within the camera view.



FishEye Camera in action with Fprime 3.51 being used to view the results.

Liberty3D Cylinder Camera

This camera presents a panoramic view, but with the vertical axis having orthogonal perfectly horizontal direction of views from all points along a vertical axis.



The controls are the length of the imaging axis, the maximum Field of View Angle, and the minimum field of view angle.

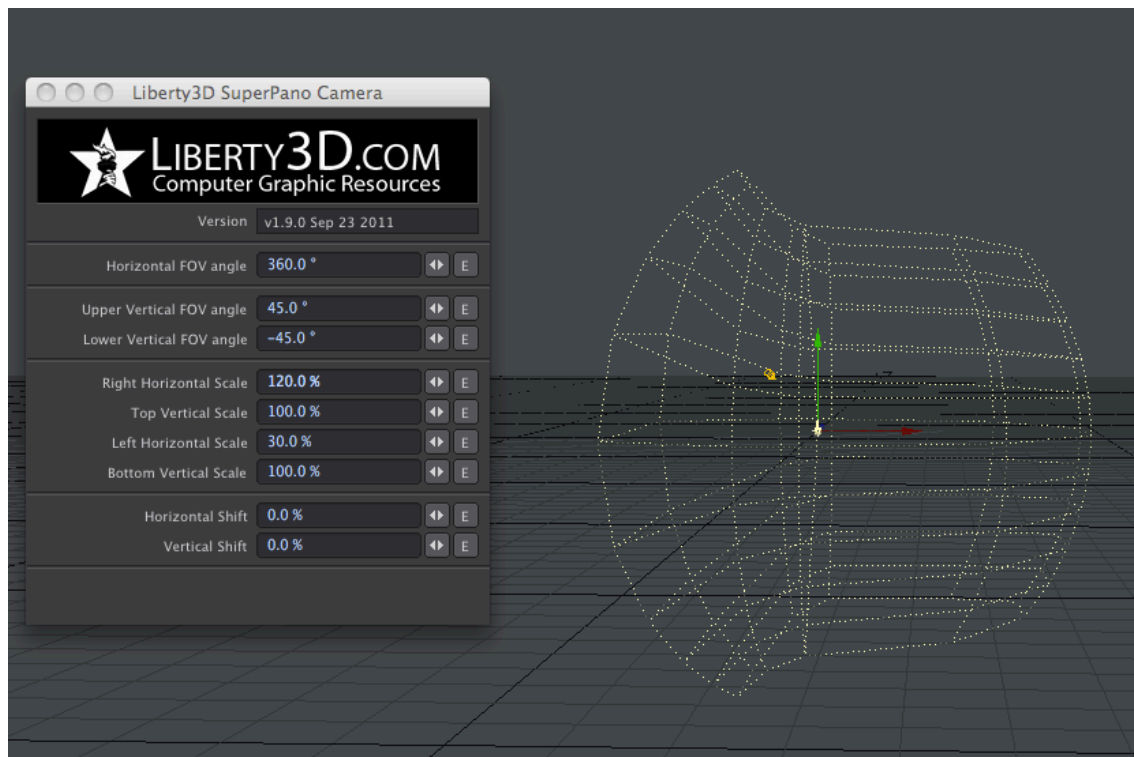
Liberty3D Panoramic Camera

This camera presents a perfectly hemispherical panoramic view presented from spinning around the vertical axis.

The controls are the horizontal Field of View Angle, the minimum vertical field of view angle, and the maximum vertical field of view angle. The horizontal field of view assumes that half is on either side of the direction the camera is pointing.

Liberty3D SuperPano Camera

This camera presents an imperfect hemispherical panoramic view. In addition to the controls on the panoramic camera, there are additional controls to provide anisotropic scaling and shifting of the final image. These controls were added in order to help match existing panoramic camera footage, where the program that stitched the still pictures together did so in a non-linear fashion.

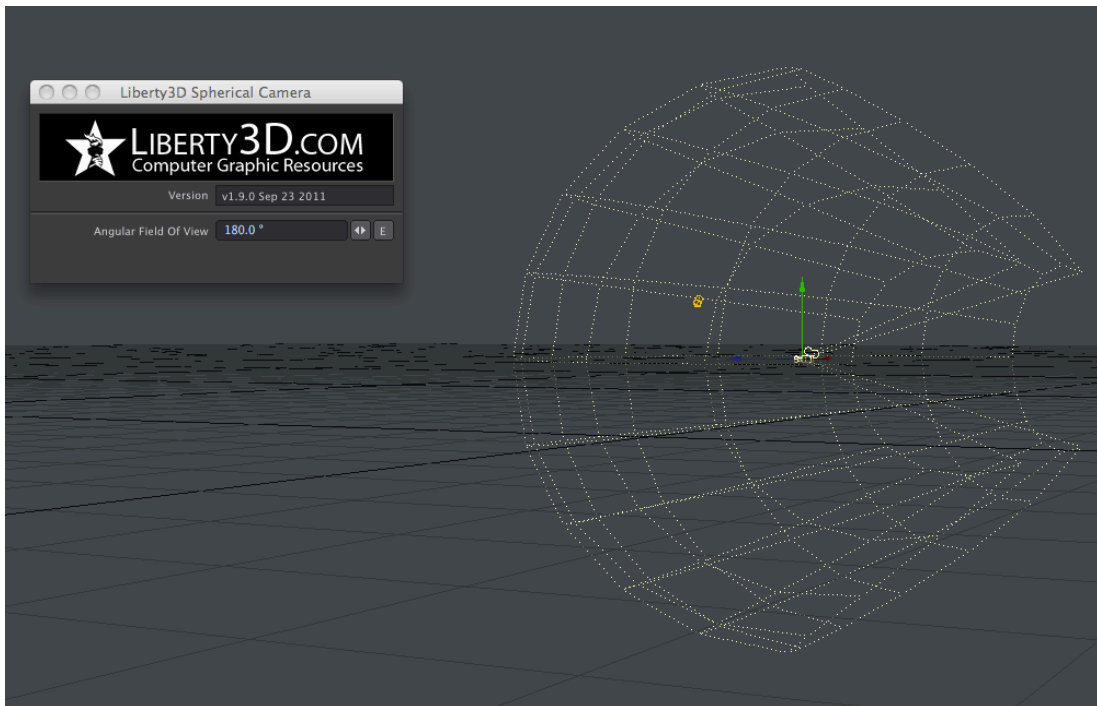


Liberty3D Spherical Camera

In response to several feature requests from our users and a need for this camera on productions such as Iron Sky, we developed this camera with users in mind while keeping its input parameters very simple.

This camera presents a spherical lens view.

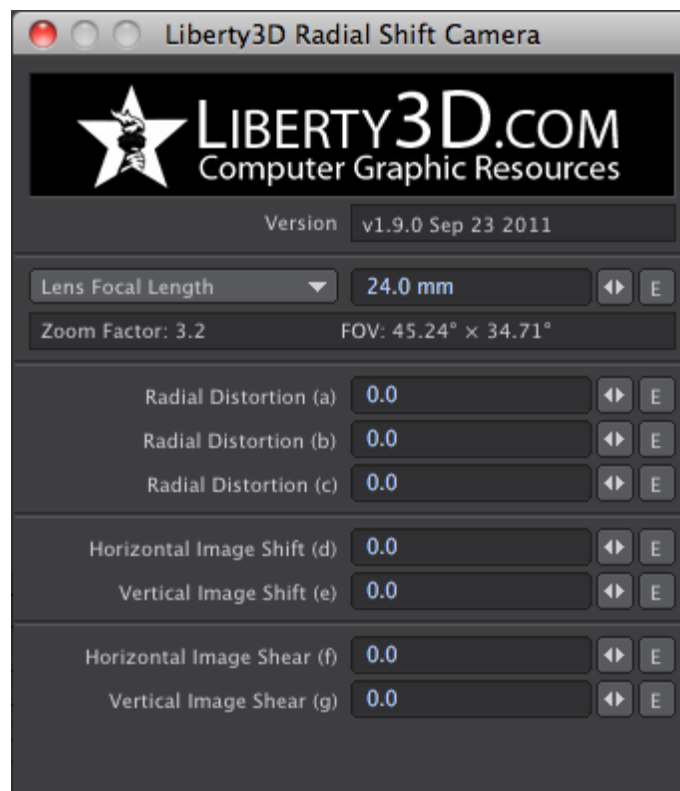
The only control is the maximum embedded angular field of view. If for instance the camera was pointed straight up and the Angular field of view was set to 180 degrees, then the flat horizon would be a circle in the rendered image that just fits inside the bitmap.



Liberty3D Radial Shift Camera

This camera presents controls to match actual camera bodies and lenses, such as used in panoramic stitching software like hugin or panotools, or in Denis Pontonnier's Radial Shift camera. It uses a 4th order polynomial coefficient values to take into account various lens barrel or pincushion effects, including the difficult to match mustache effect. This can be used so that rendered output files for compositing can be made to match existing footage at render time, rather than going through a distortion matching step during composition.

Although the steps involved in calculating the radial distortion values are fairly complicated, there are databases of existing lenses and camera bodies that have already been determined and published on the Internet. If you have a certain camera and lens combination that you need information about, please refer to either the panotools website, the hugin tool website, or contact us directly here at Liberty3D.com. Chances are that the information regarding the lens and camera combination can be found fairly quickly, or be calculated from a captured still image.



Chapter 4 Multi-up Cameras

There are 4 Multi-up cameras in the Liberty3D UberCam v1.9 package.

What is a Multi-Cam camera?

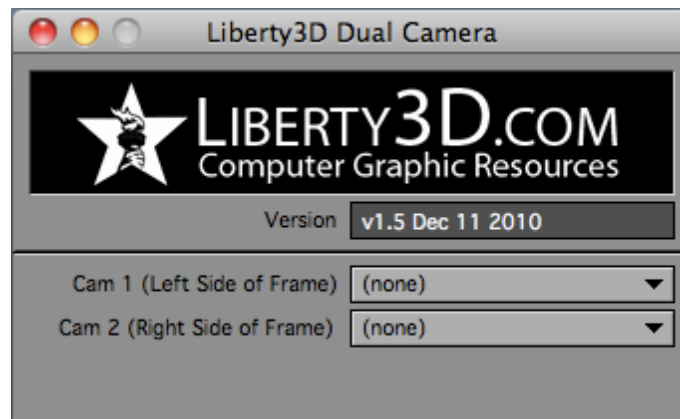
These cameras allow for multiple existing LightWave cameras in a scene to be rendered at the same time. In addition to this there is an OverScan Camera (New in UberCam 1.5) that allows a single existing LightWave camera to be rendered with additional control modifications like OverScan and jitter. Also, there is a DPI camera (New in UberCam 1.9! Ok, it is almost the same as the OverScan Camera but with different controls, but we like to think that it is really useful for people who need to go to print)

This is useful not only in outputting an existing stereoscopic camera rig in side-by-side stacked stereo files but also as a pre-visualization tool, where the scene can be adjusted and viewed from multiple camera locations. The 12Up camera can also be used to create custom skybox camera rigs.

Only one instance of Multi-Cam is allowed in a scene, and it is not permitted to select the Multi-Cam as one of the sub cameras. There is only one instance of an OverScan Camera allowed in a scene, which can then select a multi-up camera.

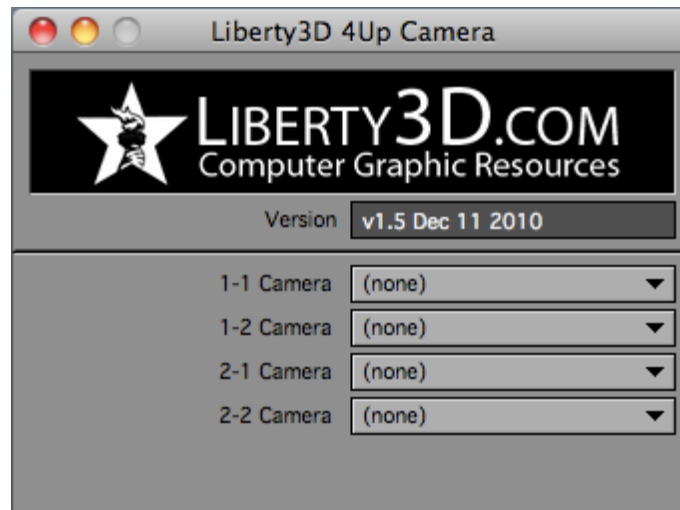
Liberty3D Dual Camera

This camera allows for two existing cameras to be rendered simultaneously side by side on the same render. The main use for this is for custom stereo camera rigs, although this is not the only use for such a camera.



Liberty3D 4Up Camera

This camera allows for up to four existing cameras to be rendered simultaneously in a 2 by 2 grid on the same render.



Liberty3D 12Up Camera

This camera allows for up to 12 existing cameras to be rendered simultaneously in a 4 by 3 grid on the same render.



Liberty3D OverScan Camera

This camera allows for an existing camera to be rendered with an overscan percentage and / or horizontal and vertical jitter. If the overscan is used in addition to modifying the render resolution of the overscan camera output then the render step can recover the original rendered output in a compositing step from the overscan camera output, but would have additional pixels available if something just out of frame turns out to be needed during composition. In addition the shaky camera type of shot can be applied to existing cameras without complex camera paths by jittering using envelopes. NOTE: If horizontal shredding occurs in the final renders, try using a single thread for the render. This is a known issue that can be corrected for by baking out key frames on the envelopes.



Liberty3D DPI Camera

Yet another feature requested camera that we have included for UberCam 1.9, this camera helps you to do the calculations for making print images, by doing the required calculations and scaling of an existing camera resolution taking into account dots per inch (DPI), image size using either horizontal edge or vertical edge, and edge bleed on all sides. Once the required values are entered, similar to the Overscan Camera, it will calculate the required change to the resolution of this camera in order to make the appropriate rendered bitmap image output. The camera aspect ratios should be set to 1.0 for this to work correctly. Certain bitmap output formats may include an embedded DPI value that may not match, the important thing is that the width and height values in pixels will be correct, and the embedded DPI value can be modified using standard bitmap editing software such as PhotoShop.



Chapter 5 Troubleshooting

The following section covers common questions about Liberty3D UberCam for LightWave. The section also covers a list of known issues.

If you have any questions, suggestions or comments about Liberty3D UberCam for LightWave, e-mail kat@liberty3d.com or

kiko@liberty3d.com

Common Questions

The following table contains answers to some common questions about Liberty3D UberCam for LightWave.

Question	Answer
Are volume purchases available?	Yes, contact kat@liberty3d.com for more information.
Are any other cameras being planned?	All suggestions are welcome, and will be evaluated based on viability and usefulness. We have several new cameras that we want to build and are working on them based on our own production needs and priorities but we are always willing to hear your thoughts and comments. Please send them to us!

Known Issues

Lens Flares do not work in multi-up cameras correctly. Why?

Lens flares and other effects which are the result of a post-render compositing step will not work correctly in a multi-up camera, such as the Stereo Camera. This is because they assume that a linear camera transform is being used in order to determine the location of the lens flare light effect. The current workaround is to use comparable volumetric light effects in order to obtain the desired visual effect. A more efficient solution is being examined for Liberty3D UberCam in the future.

Cameras parented to Other objects or items may not perform correctly.

Some beta testers have reported to us that when certain cameras are parented to other objects or items in the scene, that the camera doesn't perform exactly as expected. One known instance of this is the stereoscopic convergence plane in the StereoCam Camera. If this camera is parented to an object while the convergence plane is being previewed, it will generate the plane at the world axis point instead of in front of the camera at the appropriate convergence distance set in the properties panel for the StereoCam Camera. This issue and others may take place when parenting UberCam cameras to other items in the scene. We are looking into what causes this and will update the package immediately once a solution is found.

Overscan camera with MB and jitter shows horizontal tearing on multi-core machines or with Multi-Threading Enabled in the render globals panel. How do I fix this?

Some beta testers have reported to us that when the overscan camera is used to render a motion blurred scene rendered with a multi-core system using multiple threads, there are horizontal tearing lines in the final image. This can happen when certain motion modifiers or textured motion tools are applied to the jitter envelope itself in the graph editor. Some of these tools such as Noisy Channel are not able to work with the Jitter function www.liberty3d.com without first baking the key frames on the envelope that Noisy Channel creates. Baking the key frames of the envelope will eliminate any issues with shredding of the image during render while using multi-threaded rendering. We recommend you do this anyway if you are going to render your shot over a network as some machines may be different processor types and translate the randomness different than others, giving you undesirable results - however in our testing on mixed machine networks at Declaration Pictures in Vancouver and in use on several productions by our users and beta testers around the world this problem has rarely popped up.

A final note:

Thank you again for purchasing Liberty3D UberCam! We appreciate your support and welcome your ideas on new tools and products. Suggest them by visiting our site and signing up to our forums or send us an email!

Make sure to check out our other great tools like QuadPanels for LightWave Modeler. More tools and video tutorials are always being released and we look forward to seeing your images made with LightWave3D and our products. You can submit them to the gallery area in our forums at Liberty3d.com



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