



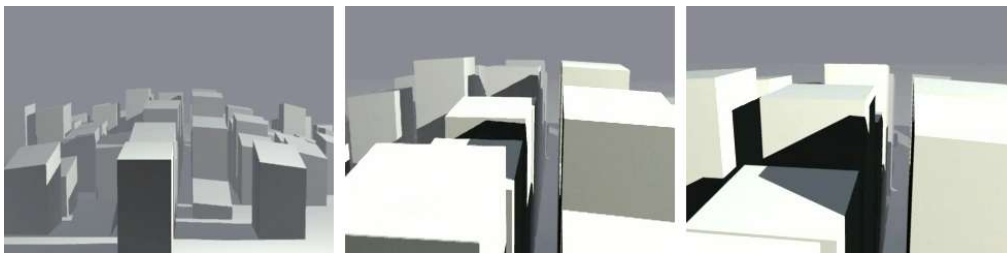
## **Realistic renders? I haven't got the foggiest idea...**

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LightWave has a great renderer for realistic imagery, and I'm sure most users will agree that nothing says 'realistic' in an environment more than a bit of good old atmosphere!

To create atmosphere in renders, a little density to the air can be added with LightWave's range of volumetric tools – *Volumetric light* will let us create the effect of light emanating through air that contains smoke, particles of dust and more. *Hypervoxels* can create the effect of clouds, smoke and areas of dense volumetric matter in the air. *Ground Fog* is a handy tool that paints an infinite plane of horizontal mist across the ground.

However for most virtual worlds, *Fog* often is a common tool to use. A little fog on distant mountains, or through your urban jungle will add to the realism of your 3D scene.



This document will show you the basics of *fog*, then a quick tip on how to modify standard fog settings to allow you to fly the camera towards the fog and not just 'through' it.

## **Fog is not real fog**

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Don't make the mistake of believing that fog creates realistic, thick fog in a 3D world. Fog is simply an effect applied to items when rendering – Its not a true volumetric effect, but its fast and effective nonetheless!

It fades the rendered items out to a *fog color* dependent upon the distance from the camera. It won't actually create a fog in the air between objects, and this can be slightly confusing at first, specially for new users expecting fog to engulf their environments with thick pea soup.

**TIP:** For a thick volumetric fog, you can use the *Ground Fog* volumetric tool. For a faster (and nicer) ground fog, check out the free plugin *hd\_groundfog* from Happy Digital ([www.happy-digital.com](http://www.happy-digital.com))

If you want your fog to appear solid, make sure your backdrop color is the same as the fog color (or activate the fog option 'Use Backdrop Color' (explained later))

**TIP:** Fog works on rendered objects, but you can also fade lens flares into fog by activating the lens flare option *Fade in Fog*. This is ideal when rendering tail lights of vehicles, lamps in a foggy street scene, etc.

## Swimming in Pea soup

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Because fog is based on distance from the camera, it tends to create the effect of the camera moving through fog as items fade in and out. This makes it ideal for underwater environments, extremely dark rooms and other places where there is a limited visual distance in front of the camera.

**TIP:** You can tell LightWave how much fog will affect an object by selecting the object, opening its *properties* panel and going to the *Render tab*. In here, you can specify if the object is never affected by fog, or lessen the affect of the fog on the object by setting a percentage value.

This is a handy option for background environments created with geometry such as a skybox or skysphere, where you do not want the sky to fade away into the fog.

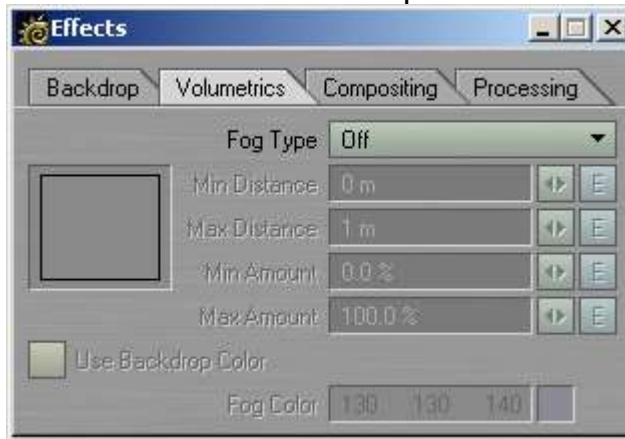
However there are some other ways to use fog, and you can create the effect of a solid bank of fog that the camera travels towards – We'll look at this shortly.

## Using Fog in LightWave

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So, how do you actually set up fog in LightWave? Setting up fog in LightWave is incredibly simple. The keyboard shortcut is *CTRL F6*, or you can access the volumetrics tab via the

## Scene > Effects : Volumetrics panel.



Fog consists of 7 options, which are all fairly straightforward.

### Fog Type:

This option both activates the fog, and also sets the effect of the *fog falloff* – the way that fog fades into its thickest setting based on its distance to the camera. The small box on the left of the fog settings will show a graph of the fog effect for you when you select the type.

Most users tend to use the first option, *Linear*, which makes the fog fade smoothly from the min to the max amount. This type of fog is great for simple distance effects where there is a smooth fade effect required. (such as a dark room, etc)

*Nonlinear1* makes the fog fade faster, then quickly thicken into the max amount near the end. *Nonlinear2* is similar to *Nonlinear1*, except that the fog becomes thicker much faster. Both the *Nonlinear* effects are reminiscent of thick pea soup-style fog and create a more realistic fog effect than linear.



### Min Distance, Max Distance:

*"I ain't got the foggiest"*

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These two values are the start and end of the fog 'fade' effect. That is, the fog starts its 'fade' when it reaches the *Min Distance*, and will be at its maximum when it reaches the *Max Distance*.

### **Min Amount, Max Amount:**

These two values are the minimum and maximum amounts of 'fog' that affect the render. Note that *Min Amount* exists *before, and up to* the *Min Distance* – So if you do not want any fog in front of the camera, be sure to set this value to 0%. A common misconception is that the fog starts at the *Min Distance* – This is not the case. The *Min Distance* is where the *fade starts*.

### **Use Backdrop Color, Fog Color:**

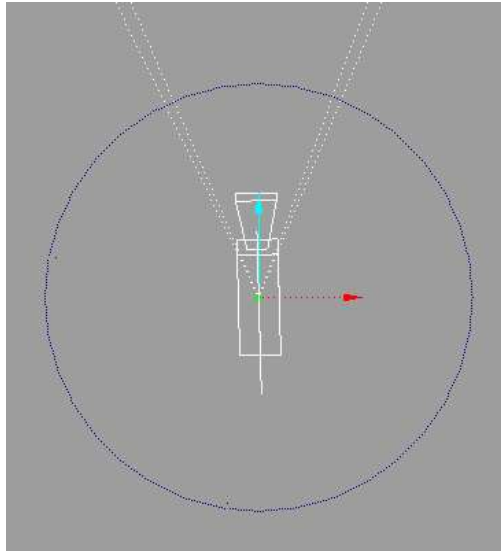
If you want the fog to blend into the background color, then check the *Use Backdrop Color* check box – Otherwise the fog will be the color specified below this check box, which may look odd if you have a Grey fog and black sky appear between the items in the scene! (Like I said previously, Fog is not a true volumetric fog)

**TIP:** *Use Backdrop Color* will let you use fog for a variety of other effects, from blending a ground-plane into a background image (for example, blending a desert into a background photo) to simulating animated atmospherics such as rain or mist by using an animated backdrop such as a procedural texture. Like most LW tools, thinking outside the square and using tools for other purposes can create some surprising results!

### **Where is my fog?**

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If you are not quite sure where your fog will start to fade, or where it will be at its thickest, then switch to one of the orthographic views (ie. top, left, right, bottom). If you have fog in your scene, LightWave will display dotted *fog circles* in these views that appear around the camera.



### **Circles? What circles?**

If you don't see any *circles* then check that the *Show Fog Circles* option is active in the *Display Options* panel (*d* is the keyboard shortcut for this panel). Once visible, These circles will update in real time if you tweak your min and max distance values.

If you still do not see any circles, you have the Fog set up, the *Show Fog Circles* option is active, and you are in an orthographic view, try zooming into and out of the viewport with your camera centered to make sure it is simply not just a case of the circles being extremely tiny or massively huge and just not easily seen.

### **Do I have to make test renders?**

You can check out your fog settings in real time by selecting the option *OpenGL fog* in the *Display Options* panel.

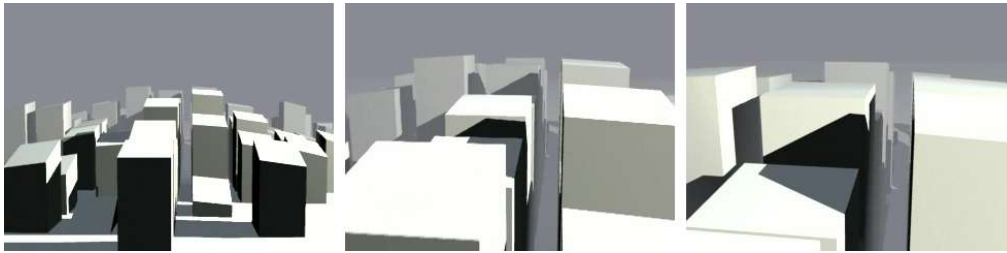
This displays a simple fog effect in the camera view, and can be used to get quick feedback on how your fog settings are going to work in your scene. Though, you will need to do a few test renders later on just to see how the effect will *actually look* in your final render!

### **Tell me this tip – Keep me outside that fog!**

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Have you ever sometimes had the need for an effect where you might want to fly through a scene towards a bank of fog? Standard fog tends to move with the camera, and can appear in some cases to be moving away as the edge of the fog stays at a constant distance in front of the camera. So, can you

make fog 'approachable' in LightWave?



Yes indeed, and its all because of the lovely **E** buttons next to each of the fog settings that allow us to animate our values using the graph editor! If we can dynamically tell the fog to be at the same location in 3D space, we can create the effect of a bank of fog... Heres how!

### **Setting up the edge of the fog**

Start by adding a null into your scene called *fogedge* and positioning it at the edge of where your thick fog should begin. Work out how many meters will be needed to 'fade' your fog into its thickest amount.

Now, click on the **E** next to *Min Distance* and bring up the graph editor. Click on the *Expressions* tab and create a new expression called *Min\_Edge*. Into this, type the following expression:

```
vmag( Camera.wpos(Time)- fogedge.wpos(Time) )
```

Once you've created the expression, make sure you have the channel *Global.MinimumFogDistance* selected and click *Apply* to attach the expression to the fogs *Min Distance*.

### **Hows that expression work?**

This expression will calculate the distance between the camera and the null *fogedge* positions using the *vmag* command.

*vmag* stands for *Vector Magnitude* and returns the length of the distance between the two items in the 3D world. This will be used as the minimum distance to the camera where the fog will begin. As the camera or the null move, the fog will also adjust automatically to keep it at the same position!

You may be wondering what *wpos* means in this expression, and why its used as well? Well, *wpos* is the command to get the 'world position' of an item in 3D space.

If we instead used the more common expression command *Position* (eg. [Camera.Position]) to retrieve the coordinates, then this would still work – Except if one of our items (null or camera) were then parented to another item later on for some reason. The *Position* command would instead return the position *relevant* to the *parent item*, and not where the item is in the 3D world. Animating a parent item would not have any effect on the fog, and our calculations would appear incorrect.

It's a decision that may save you trouble-shooting headaches later on if you decide to make more complex animation rigs for your camera or null.

### **But we're not finished yet...**

Once you're done, then close the graph editor. Now click on the **E** next to *Max Distance*. We need to do this to tell LightWave to create and activate an envelope for the Max Distance value.

Again click on the *Expressions* tab, Select the expression we created before, then click the *Clone* button to copy it – Rename the expression as *Max\_Edge* and add to the end of the expression **+ n** (replacing the **n** with the number of meters for the fog fade to occur over).

For example, if your fade distance was 1.5 meters, the expression would look like this:

```
vmag( Camera.wpos(Time) - fogedge.wpos(Time) ) + 1.5
```

Once finished, make sure you apply the expression to the *Global.MaximumFogDistance* channel and close the graph editor.

We're finished!

### **How does it work?**

What now happens is that the fog fade effect is calculated based on the camera distance to the null – The min and max distances are readjusted to keep the fog at the 'same' location, so the effect is that the camera moves 'towards' the fog, rather than simply move through it.

If you look at the fog circles in an orthographic view, you should see the effect of the expressions when you move the camera.

A cool effect that I'm sure will come in useful!

## **CONCLUSION**

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Obviously this tip is not perfect, but hopefully will inspire you to perhaps experiment more with this idea. One thing you may like to try and create are better expressions that allow you to move the camera into the fog itself after it passes the edge.

The expressions work on distance between the null and the camera, so moving the camera beyond the null location will start to slide the fog away from the camera.

Fog is a great way to add atmosphere and hopefully this tip shows you that with a little experimentation and simple animation you can do some pretty cool looking effects!