

Chapter 10

Rendering and Special Effects

One of the best parts about working with 3D Studio VIZ is reaching a point at which your still renderings and animations begin to take shape. Until recently, however, most



renderings contained the standard sky background and lighting setup that is used for every exterior architecture shot, or they contained the same reflection map that is used for shiny chrome. With VIZ R3, you can take your renderings to a new level with a feature called Rendering Effects. In the past, this functionality was only available in 3D Studio MAX as part of the Video Post feature. With VIZ R3, you're now able to achieve the same style of glows, lens flares, and focal effects that used to be reserved for animators in the entertainment business. In addition, VIZ users often underutilize many of the standard tools, such as fog and motion blur, because of a lack of understanding.

This chapter takes you deep inside Rendering Effects to help you achieve higher-quality renderings. We will also revisit some of VIZ's older, but still useful, features. In all, this chapter covers

- Camera settings and effects
- Lens flares and glows
- Motion blurring
- Environmental effects

Let's start by taking a look at cameras and camera terminology.

Camera Settings and Effects

VIZ's virtual cameras present you with a host of possibilities for stretching to your virtual world's needs. You need only tap into the potential of the camera and light objects to achieve great renderings and animations.

Virtually all VIZ's settings and properties for cameras relate to the 3D environment on your monitor, not outside your window. For instance, there is no concept of an f-stop in VIZ. However, you can easily duplicate the effect of stopping down a camera using the Depth of Field Parameters rollout in the Rendering Effects window.



Note

Depth of Field, as a Rendering Effect, is part of the Bonus Tool installation in VIZ R3. If you want to use the new Depth of Field feature in Rendering Effects, you need to install VIZ with the Bonus Tool option selected.

To help you make the transition from using real cameras to VIZ cameras, this chapter seeks to clarify many of the issues and techniques associated with VIZ cameras and lights as they relate to their real-world counterparts. It also explores the many

possibilities that exist when you fully exploit the potential of these features. The section first looks at real-world camera terminology and how, or if, the features can be duplicated within the virtual world of VIZ.

Real-World Cameras

If you look at any camera book, whether on shooting weddings or snapping off shots of nature, you find certain common concepts and terms. This section explains what those are and tries to closely map this real-world terminology with features in VIZ cameras. Some you can duplicate easily, others are not as straightforward, still others you cannot duplicate at all without the help of a plug-in. If you've never taken a photography class, this section still has relevance. It's not uncommon to discover great techniques in the digital realm while studying real life.

Film-Based Cameras

Film-based cameras record imagery based on a film's exposure to light. The exposed film is then developed and processed. Film-based cameras rely much more heavily on light for proper exposure than a video camera does. Several factors play into what is the best kind of imagery you can take with a film-based camera, many of which you'll explore later. For now, consider the two predominant types of film-based cameras used today: still image cameras and motion picture cameras.

Still Image Cameras

Perhaps the most common form of camera is a still image, or still frame, camera—from disposable cameras that you pick up from the drug store to professional-grade 35mm cameras. The way they work is simple. You first load a film that reacts to light. When you're ready to take a picture, you press a button on the camera. This opens a shutter that exposes the film to a certain amount of light for a certain amount of time. We all know what happens when you reach the end of the film. Either you take the film to your local developer to be processed onto paper or, if you're a savvy photographer, you do it yourself. Whatever the case, the result is a piece of paper with an image on it.

Duplicating a still camera in VIZ is, by far, the easiest thing to do. However, the simulation of such effects as film grain and overexposure is really controlled through the effects in Rendering Effects.

Motion Picture Cameras

Acting along the same principles as a still image camera, motion picture cameras capture action through a series of still images called *frames*. Frames in motion pictures are the exact equivalent to frames in VIZ.

For the most part, you shoot motion picture films using a wider image aspect ratio than that of video. For instance, your television has an aspect ratio of 4:3 (or 1.33 to 1) meaning that it's not totally square but close to it. However, you should shoot most films at an aspect ratio of 1.85:1 or 2.35:1. This produces an image that is much wider than it is tall. In VIZ, you can control the aspect ratio through the Render Scene dialog box (more on this later). Although custom Image Aspect Ratios (IAR) are configurable, there are several pre-configured preferences that enable you to quickly set up your rendering output so that it matches film aspect ratios.

You can also achieve other common motion picture effects, such as anamorphic flare effects and distortions, using Rendering Effects.

Video-Based Cameras

Video cameras work off of the same principle as film cameras with respect to capturing a series of frames through a lens. However, the way the image itself is processed is quite different. The image, after it passes through the lens, is converted to an electronic signal, and then it is processed internally to either a magnetic source, such as a tape, or a digital storage device, such as a small hard drive.

Next to still imagery, video cameras are the easiest to simulate in VIZ, because there's virtually no difference in the recorded video versus what you see on the television monitor. Granted, the quality of the videotape itself plays a factor, but, by and large, the image looks similar. You can easily fine-tune VIZ for output to video. In the Rendering Preferences tab, you can set up your video color checking (a process for finding colors unsuitable for television) as well as the field order (that is, how the television updates the screen line-by-line). Even safe frames were originally designed for video—although they're just as useful, if not more so, for film.



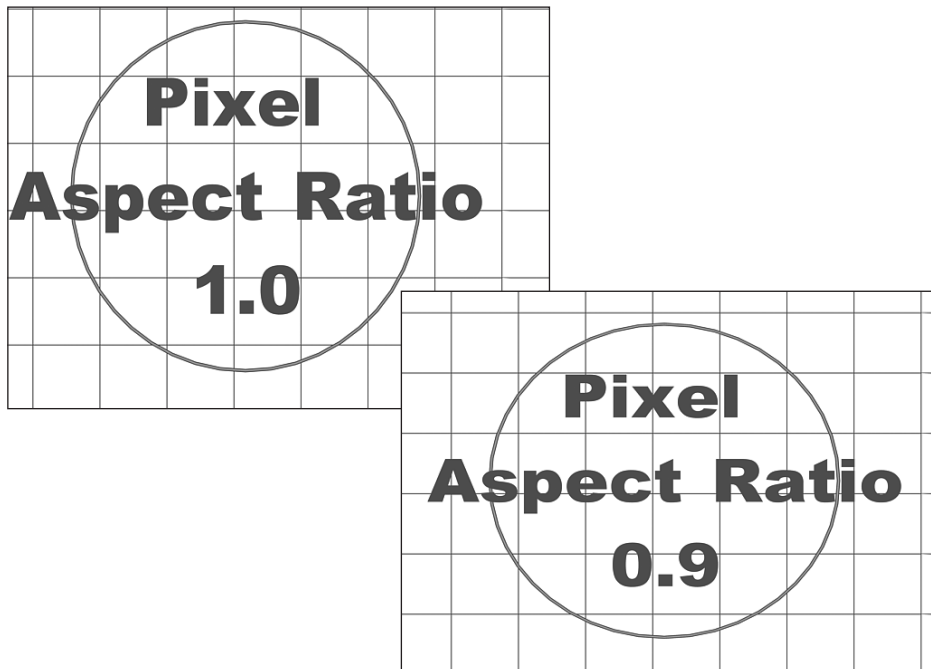
Note

If you're not familiar with safe frames, the concept is easy to understand. You can view broadcast images on all sorts of televisions and monitors. Depending on the manufacturer and quality of the viewing device, the viewable, or safe, area can differ. Most consumer-grade televisions tend to crop off as much as an inch of the outer portion of the outer image, because of their design. To prevent you, as an animator, from designing your scene in this non-safe area, you can use the Safe Frames feature in VIZ.

A Note About Aspect Ratios

Notice that the Render Scene dialog box has options for rendering to fields, but more important are the Rendering Resolution and Pixel Aspect Ratio settings. Typically, video rendering output resolution hovers right around 720×480. This might vary depending on the type of device you're outputting to, but they're all close. With the Pixel Aspect Ratio setting, you can control how square the pixels are.

For a simple test, render an image out at 720×486 using the Preset button and the default image aspect ratio. Clone that Virtual Frame Buffer(VFB). Next, render out to the same resolution, but this time change the Pixel Aspect Ratio setting to 1.0. See how the original image appears squashed, whereas the more recent rendering looks fine. That's because at a ratio of 1.0, the rendered pixel is exactly square—just like your monitor. If you output the first image to a television monitor, it would look fine because your television “dots” are higher than they are wide. Therefore, your television takes a squashed image from a computer and expands it somewhat vertically. Figures 10.1 and 10.2 demonstrate two different versions of pixel aspect ratios.



Figures 10.1 & 10.2 The same scene rendered at different pixel aspect ratios. Figure 10.1 (left) represents what a rendering would look like at a typical aspect ratio used for non-video output. Figure 10.2 is the same scene with a 0.9 aspect ratio, more common for video output. The shortening along the Y axis is necessary to compensate for video monitor pixels not being square.

Film Versus Video Playback Speeds

National Television Standards Committee (NTSC)-standard video images are captured at 30 frames per second (fps), whereas film is recorded and played back at a slower rate of 24fps. The 30fps rate typically results in video images that have crisp and lively characteristics. This is not to say that film imagery does not contain those characteristics, it's just easy to discern the difference between the two.

Try a test. Watch a TV sitcom, which was more than likely filmed using a video camera. Next, go down to your video store and pick up the latest movie (or have a little fun and actually go to a cinema). See the difference? You have to watch closely, but the differences are there. Perhaps the most obvious is the film grain, but even the motion appears to be less “hectic” in a film versus a videotaped image. This motion-related difference is a direct result of recording and playback speeds. Even a 6fps difference adds up to 360 frames in just one minute—12 seconds of imagery that's either there or not, depending on which format you're watching. In other words, video at 30fps offers an additional 25 percent more data in the same time. At 60 fields per second (two fields are rendered for every frame), video offers 150 percent more data. This means that field-rendered video has a fluid movement, whereas film might appear to have a slight strobing, or flickering, effect.

Fortunately, in VIZ, it is easy to duplicate the effect of film or video playback by setting up the Time Configuration dialog box. The default playback rate is 30fps, but you can switch between the different rates at any time. Don't worry, your total animation length might change, but that's normal. VIZ is simply adjusting itself to the number of frames necessary to play the animation in your file at the specified frame rate. To test this, try this simple example. With NTSC selected, type in 1800 for Length, and then click Film for playback rate. Notice that the playback length jumps down to 1440 frames.

Lens Types

Photographers have all sorts of options when it comes to lens varieties. From a normal lens to a fisheye, the type of subject and the desired effect usually dictate a photographer's choice of lens. A camera lens is constructed of several “elements” (concave or convex pieces of glass) within the lens's encasement. The placement and arrangement of the elements, along with the length of the lens piece, produce the different photographic effects.

Normal Lens

A *normal* lens provides photographers with the most flexibility, photographically speaking. The lens is capable of focusing to many different lengths, and it's usually composed of six elements, although some have eight.

All VIZ's cameras use normal lenses. Therefore, you can safely assume that you're most closely matching your rendered image to what a camera with a normal lens would see in real life. However, VIZ cameras don't automatically focus to a specific focal length. This is controlled using the Depth of Field Parameters rollout (more on this later). Along those lines is the number of lens reflections that you see with a normal lens. As mentioned before, a normal lens contains six or eight elements. Therefore, you need to have the same number of lens reflections in your scene if you encounter any flares.

All the other lens types discussed are modifications of the normal VIZ lens through proper post-processing effects, using Flare and Focus. Figure 10.3 shows a rendered image using a normal camera lens with a slight amount of depth-of-field blur applied.

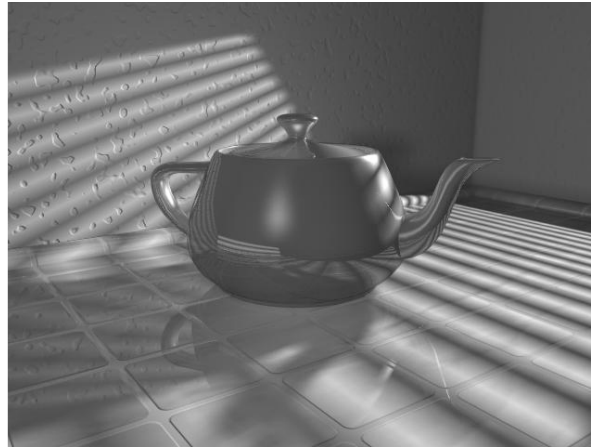


Figure 10.3 A rendering that shows what a scene looks like if shot through a normal lens.

Wide-Angle Lens

A *wide-angle* lens enables the camera to fit more in a frame than a normal lens. However, this usually comes at a price of focal length. To simulate a wide-angle lens, simply adjust the VIZ camera so it views more of the scene. Adjust the field of view (FOV), and then use the Depth of Field effect in Rendering Effects to shorten the focal distance of the rendered image. Wide-angle lenses vary in the number of elements they use, but most use about nine. A rendered example of a scene shot with a wide-angle lens is shown in Figure 10.4.



Figure 10.4 A wide-angle lens was used to shoot the same scene that you saw in Figure 10.3, and from the same position. Notice the amount of blurring that now occurs both in the foreground and behind the subject. You can simulate the effect of a wide-angle lens' focal length using the Depth of Field effect in Rendering Effects.

Telephoto

A telephoto lens enables the camera to move closer to a subject through the use of a longer lens encasement and special elements. Essentially, you can move closer to a subject while keeping the same focal length. This typically has the effect of making the subject appear to be completely in focus, and everything else goes rapidly out of focus as it exits the maximum focal range of the lens.

To simulate a telephoto lens in VIZ, set a shorter focal range using the Depth of Field effect. That way, objects rapidly blur as they move outside of that range. Telephoto lenses usually have about five elements. Figure 10.5 was rendered with a VIZ “telephoto lens.” Notice how blurry the scene is behind the teapot’s spout. In this case, a FOV of approximately 15 degrees was used.



Note

Focal range is the area in which subjects appear to be in focus as measured in distance from the subject.

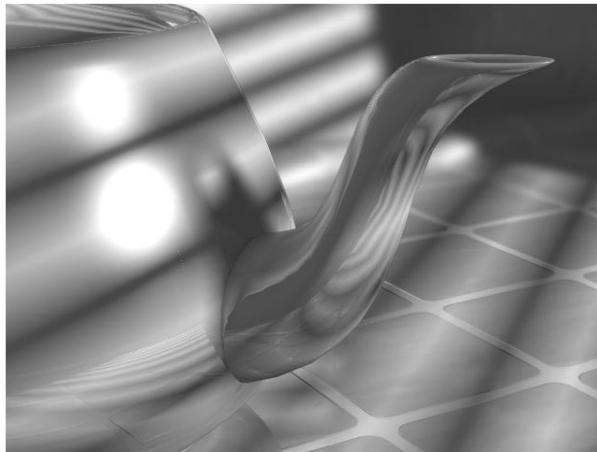


Figure 10.5 A rendered image shot through a telephoto lens. The blur in the background was created with the Depth of Field effect.

F-Stops

An *f-stop* is a calibrated number that refers to a small device called the *aperture*, which performs the same function for the lens as your iris does for your eye. By altering the diameter of the aperture, you can control both the amount of light and the depth of field in your photographed image. The effect of reducing the aperture's opening is commonly called "stopping down" the lens.

Typically, you would use the *f-stop* for situations in which you had either too much light or not enough. You would correct it by either increasing or decreasing the *f-stop*. However, because VIZ is capable of adjusting its light sources individually or globally, there's no need to simulate this effect through an *f-stop* parameter. In VIZ, you can account for light by manipulating the light sources rather than an *f-stop*.

On the other hand, altering the depth of field is definitely within the realm of VIZ's capabilities. This can be easily simulated using the Depth of Field effect found in Rendering Effects. Although there is no direct correlation to the camera's *f-stop* and the depth of field value within MAX, you can alter the parameters adjusting both Focal Range and Focal Limit within the Depth of Field effect itself. See the Focal Effects section later in this chapter for more information on how to set up the depth of field. Figure 10.6 demonstrates the effect of changing the focal settings to simulate stopping down a lens.

**Note**

Depth of field is how animators refer to the closest and furthest areas in which objects in your scene can be rendered “in focus.”

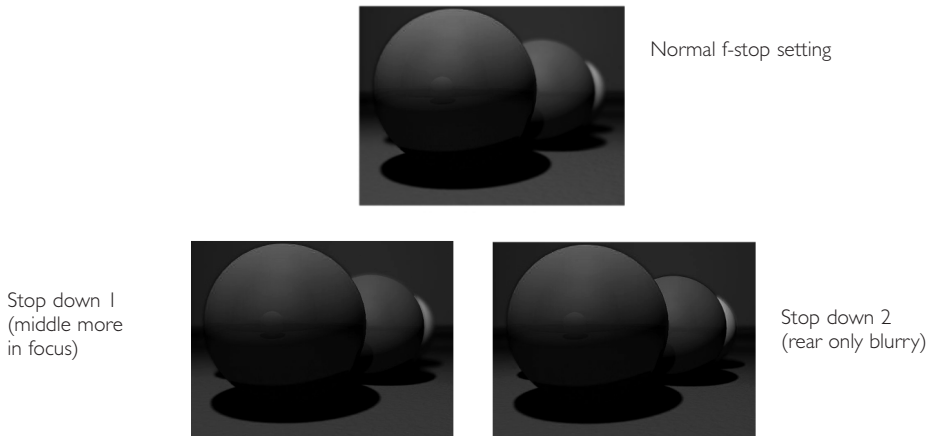


Figure 10.6 These three images represent the effect of stopping down a lens. The upper image simulates a wide aperture setting. Both the lower right and lower left images use smaller aperture settings to increase the depth of field.

Film Speed

Film speeds designate a particular film’s sensitivity to light. The faster the film speed, the more sensitive the film is to light. In most parts of the world, the International Standard Organization (ISO) number is used to designate film speed; however, the DIN and GOST systems are still used in some parts of the world. For instance, if you go to the store, you typically see film speeds ranging from ISO100 to ISO400 for most consumer-grade film. However, some film can go as low as ISO 25 and as high as ISO 6400.

Slower film speeds are normally best for still life images or for images in which there is enough light. Faster film speeds are typically used for darker scenes or for scenes in which fast action needs to be captured.

As with f-stops, VIZ has no direct correlation to film speed. If you’re trying to match or simulate film speeds within VIZ, consider two things:

- Higher film speeds tend to be less “contrasty” than slower film speeds.
- Higher film speeds are typically grainier—especially when blown up—than slower film speeds.

Fortunately, VIZ is capable of reproducing both of these effects easily through Rendering Effects. You can use the Brightness and Contrast effect to alter both the brightness and contrast of the image or animation. For images that appear to be taken at a slower film speed, increase the contrast. You might also need to decrease the brightness slightly. The reverse is true for simulating higher film speeds.

To add film grain, you just need a 2D image effect plug-in, which simulates this. VIZ R3 eliminates the need for a third-party film grain effect by implanting its own in Rendering Effects. In Rendering Effects, you can add the Film Grain effect to the queue to obtain the desired effect. Figure 10.7 demonstrates the use of both the Brightness and Contrast setting and the Film Grain plug-in to simulate film speeds. In Exercise 10.1, you can see how to add film grain to a rendering to make it blend better with a photographed background.

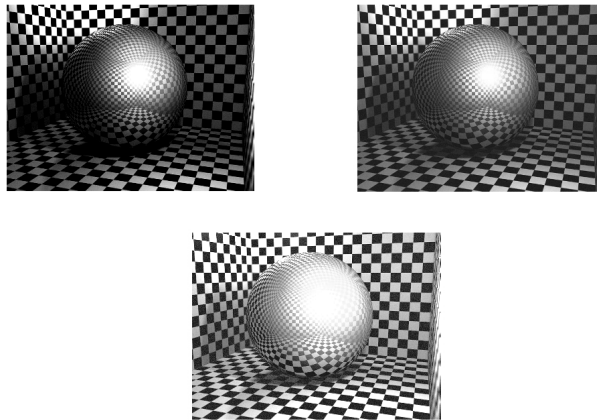


Figure 10.7 Using Focus, Brightness and Contrast, and Film Grain effects, you can simulate different film speeds. This is the same scene with different settings. The top left image is a representation of a “low film speed,” such as ISO 100. The top right image simulates a speed around ISO 400, and the lower image simulates a speed of about ISO 1000.

Exercise 10.1 Adding Film Grain to a Rendering

1. Open Rendering1.max from the Inside 3D Studio VIZ CD-ROM.
2. From the Rendering pull-down menu, select Render, and then click the Render button in the Render Design dialog box. Notice how the trolley blends fairly well but doesn't match the graininess of the background photograph.
3. Click the Clone VFB button in the Rendered window. (It looks like two people standing together.)

4. From the Rendering pull-down menu, select Effects, click the Add button, and choose Film Grain. Select the Interactive check box.
5. In the Film Grain Parameters rollout, set the Amount to 0.3 and check Ignore Background. VIZ updates the rendering.
6. Open the cloned VFB window. Notice the effect grain has on just the virtual streetcar, and compare it to the original rendering.
7. You can make adjustments to the Film Grain effect, and see the results instantly without having to re-render the image because the Interactive check box is selected. (See Figure 10.8.)

There are a couple of things you should note here. First of all, the Film Grain effect is a general-purpose effect. As you can see, it's pretty useful for creating a standard grain, much like a Photoshop filter. For more specialized Film Grain effects, you might have to use an application like Photoshop. The other item is the real-time adjustment of the effect in the rendered view. This is a useful feature given that you often only have to adjust the effect and not the rendering. By making the effect separate, you can always edit Rendering Effects independent of the rendered image.

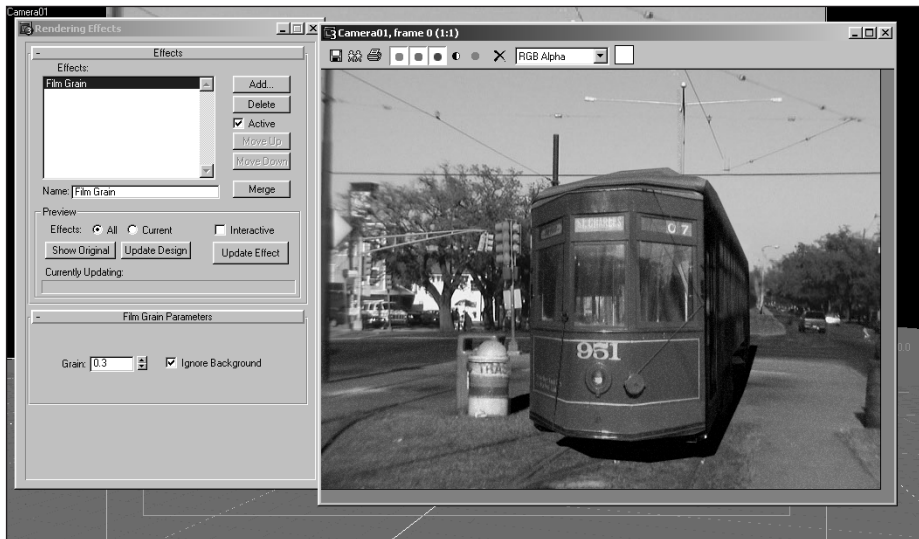


Figure 10.8 By adding Film Grain effects to your rendered images, you can easily blend foreground renderings with actual background photographs.

Lens Attachments

Lens attachments in real life can add effects to the photographed image that would not normally be there. For instance, a photographer can add a soft-focus attachment to diffuse the light in a photographed image, thereby softening the lines of the image.

The easiest way to mimic this effect with VIZ is to use the Rendering Effects features. Unlike a real camera, however, VIZ doesn't constrain you by what you can physically clip onto it, so just about anything is possible. The Lens Hoods and Soft-Focus Aperture Disk sections discuss reproducing the effects of two common lens attachments.

Lens Hoods

Photographers typically use lens hoods to shield the lens from intensely bright light sources, such as the sun or bright studio lights. With VIZ, you basically have a lens hood on your camera at all times. Add lens reflections, glows, and flares in the Lens Effects Parameters rollout in the Rendering Effects dialog. In the section entitled “Glows and Lens Flares,” later in this chapter, you'll see how to add these effects—essentially removing the lens hood.

Soft-Focus Aperture Disk

The soft-focus aperture disk lens attachment gives halos to intensely bright areas of an image. Using it in conjunction with a soft-focus attachment, you can softly defocus your image and place halos surrounding the bright areas for dramatic effects. VIZ provides for this functionality through the Glow and Depth of Field effects.

Composition

Computer animators who don't come from an art background are often never taught the proper way to compose a scene. Scene composition is, perhaps, the most critical aspect of computer imagery—much as it is in real-life photography. There are several factors to consider. Lighting, camera angle, and FOV all play some role in your composition. If your shot involves motion, you must consider other factors. For instance, your composition might look good at frame 0 but completely off by the end of the sequence. Fortunately, VIZ enables you to adjust over time all the variables that you need to use for composition.

A Starting Point

In the virtual world, however, you are not constrained by real life. This means that rather than having to work with your environment to get the best composition, you make your environment work for you. Although this sounds like a bit of a power trip, it can mean more work for you. In the real world, there are constants; concrete factors that we simply cannot change. For instance, an oak desk will always be an oak desk, and to bring out the characteristics of an oak desk, you'll more than likely need to change the lighting in the room. In a way, this makes setting up a shot somewhat less of a challenge because there is less that you can change, fewer variables that you can tweak, to get the best shot.

In VIZ, everything is a variable; you can alter every aspect of your scene. Take the oak desk, for example. If you didn't like the color or grain of the oak, you could make changes to the material itself and leave the lighting alone. In this case, you're altering the material of the object to suit the lighting—not necessarily a real-world adjustment.

Many novice designers get into tweaking everything over and over again thinking that it's the only way to achieve the best rendered image. If you're just starting out with VIZ, stick to what you know at first. If you're experienced with setting up studio lights, set up lights in VIZ as you would in real life. Tweak the lights just the way you want them and then start working with the rest of your scene. After you've become a seasoned VIZ user, you'll begin to feel more comfortable with adjusting several parameters at the same time. (Although it's not uncommon for veteran users to stick to adjusting just a few items at a time.)

If you have no experience doing anything, start with an area of VIZ that you feel comfortable with first. For instance, most beginners tend to pick up camera placement first, mainly because it's something that you can see without having to render. Lighting is, by far, the most difficult concept to grasp and master in VIZ, so it's not advisable to begin by learning lights. However, if you're interested in learning more about lighting design, refer to Chapter 6, "Lighting Design."

Proper Point of View

Point of view (POV) is the point from which the camera views a scene. Camera placement, whether real or virtual, can produce radically different results. When establishing POV, you must think about several things:

- What's the intended subject?
- Are there any items in the scene that you could use to enhance the subject?
- Are there any items in the camera frame that could "steal the spotlight" from the intended subject?
- If outdoors, where is the light coming from? If indoors, is the lighting good enough or can you alter the position or intensity of lights?

Ask yourself all these questions before determining your POV. Establishing a POV is far easier when working in virtual space, because you can move or alter anything. This is not the case in the real world; however, you can learn a great deal from traditional photography. For instance, sometimes it might be useful to try slightly different POVs and instead of altering the geometry, use focal effects to accentuate the subject.

Remember that POV can easily enhance or ruin your imagery in VIZ. Thankfully the camera effects that are available in VIZ make it extremely easy to set up proper POV. Figure 10.9 demonstrates a good POV to capture the size of the cathedral.



Figure 10.9 Using a flare and a dramatic camera angle for a proper POV of the cathedral.

A Feel for FOV

Although POV determines the perspective from which you view your subject, FOV determines how much you actually see of your subject and what's around it. Much like POV, FOV can enhance or ruin your scene if you capture too much or too little in the frame.

You can easily test if your FOV is too narrow or too wide by asking people to view your image or animation. Ask them what they saw. If they didn't notice your intended subject first, then you probably need to alter your FOV (and possibly your POV).

With VIZ, you control the FOV through the FOV spinner on the camera or with the FOV button when using a perspective viewport. You can animate the FOV for a camera view just by changing the degrees over time. However, many novices think that altering the FOV means that you're altering the camera's location. This is not the case; you're actually altering the viewing area of the camera itself. Altering FOV in VIZ also alters the focal length of the lens. That's because, in VIZ, both alter the same value. If you want to keep the focal length the same, but have the camera closer to the subject, just use the Dolly button. Keep in mind that the results are different. Figure 10.10 shows how two different FOV settings can produce completely different results from the same camera position.

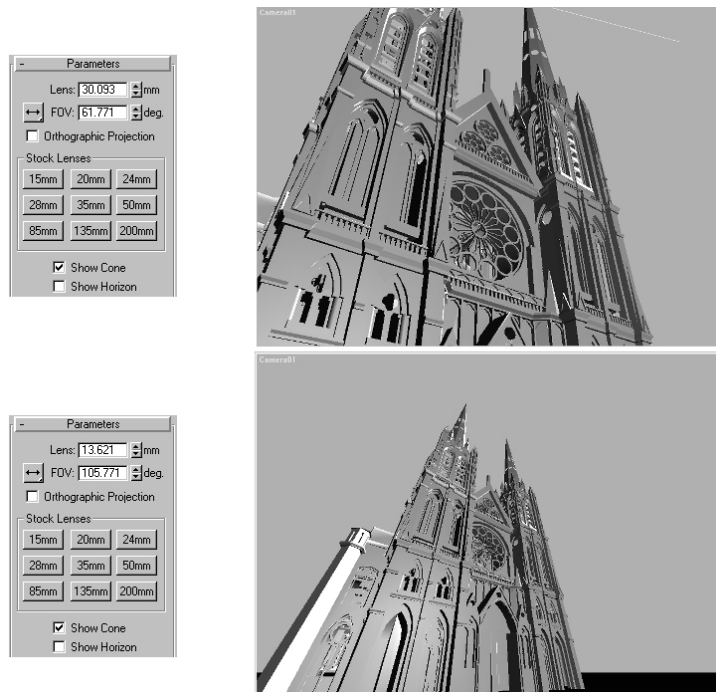


Figure 10.10 *The effect of using two different camera FOV settings on the same scene from the same camera position.*

VIZ Cameras

So far, this chapter has investigated what real cameras are all about. But the question that most often comes up is, “How well can real-world properties be matched up to cameras within VIZ?” Fortunately, you can duplicate most effects. Some are easy and some are not so easy. It’s time to explore some of the key elements necessary for setting up and adjusting your cameras within VIZ.

Using the Right Camera

VIZ has two built-in camera types: Free and Target. The cameras work almost identically; there’s no fundamental difference in how they view your scene. Both have the exact

same controllable settings, and they both behave the same when you adjust their properties over time. The difference lies in how they animate.

Target Cameras

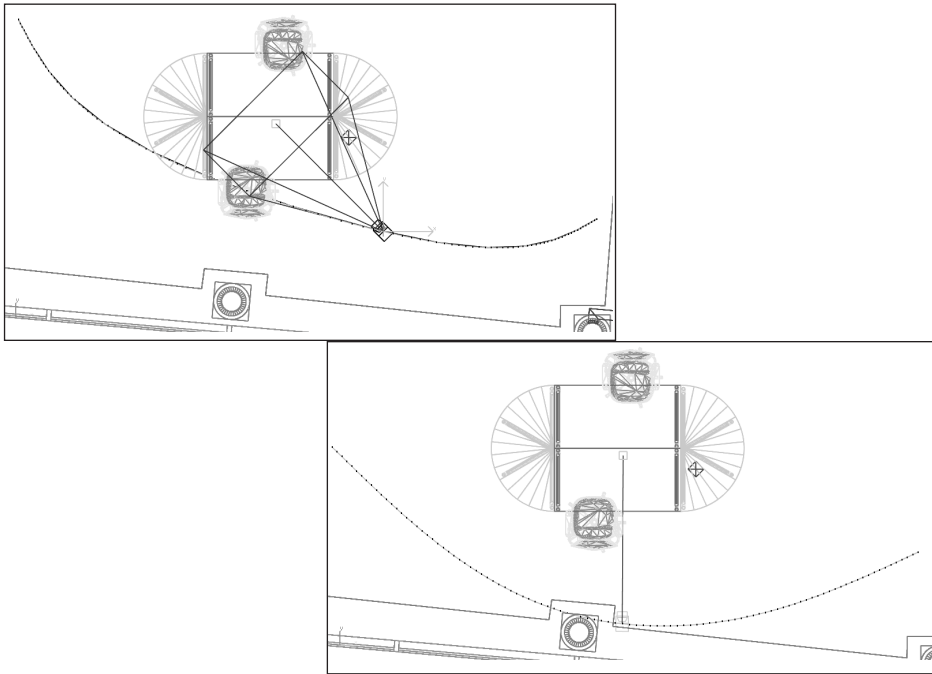
A Target camera is a nontraditional real-world camera, but it is very traditional in the computer world. A Target camera uses a camera object and target object to determine its POV. You can move the camera independent of the target and vice versa. Target cameras are great for imagery that involves one or more of the following:

- A fly-around, fly-by, or fly-over
- A tracking shot
- A still

However, Target cameras have their problems. The most common problem is the *gimbal lock*, or *flip-around*, scenario. Because the camera always maintains its Z-up axis relative to its target, certain problems occur if it is passing close to or directly above the target. Most designers call it the whiplash problem, and it's the telltale sign of a designer who has just started animating. Essentially what happens is that the camera whips around the target object as it passes close by—sometimes in only one to two frames. This situation is completely distracting and unprofessional. Although you can't eliminate the problem of gimbal lock, you can minimize the chances of encountering it.

If your shot involves a fly-by, maintain a safe distance from the target, especially if the camera is above or below the target. Try to remain on the same horizontal plane when the camera is near the target. That way, the camera does not have to rotate along several axes as it passes by the target, just one.

If you absolutely need the shot from above or below the target, keep your camera slightly left or right of the course so that it doesn't pass directly over the target. Otherwise, your camera rotates 180 degrees in about one or two frames. Figures 10.11 and 10.12 show two different possible fly-by paths. The path on the left causes a 180-degree rotation in less than two frames. The right figure's path produces a much smoother fly-by because the path's trajectory arcs away from the camera's target as it moves closer.



Figures 10.11 & Figure 10.12 Two possible animation paths for a camera. Figure 10.11 demonstrates a path that comes too close to the target as the camera passes. Figure 10.12 indicates a more desirable track for the camera to take.

When you track a Target camera, you have to move both the camera and its target. Although this is not a hassle if you're moving in one direction, it can become quite a pain when you try to follow a winding path—say, moving along a windy road that's hugging the cliffs. Although many seasoned animators deal with this nuisance, VIZ incorporates another type of camera that eliminates the target: a Free camera.

Free Cameras

Free cameras more closely represent what a real-world camera is. With Free cameras, you point a camera object at the subject. Rather than moving a target to an object, you use the Move and Rotate transforms to point the camera where you want it to look. For many new users, this might seem like a more natural approach to setting up a camera. Free cameras work well for

- Walkthroughs
- Panning shots
- Path-based animation

The advantage of the Free camera is that it's not constrained by the target's location or the gimbal lock problem. However, this freedom comes at somewhat of a price—free cameras actually take more time to set up. VIZ does have a feature, however, that enables you to align cameras to the normals of an object. This is really the only way to quickly align a Free camera. From this feature, you should do any fine-tuning that needs to be done with Move and Rotate. Understanding Transform Type-In dialog boxes can be handy when making Free camera adjustments.

Here are some steps to remember when aligning your camera to the normals of an object. However, first make sure that the face you want to align to is visible in at least one of the viewports.

1. Select the Free camera.
2. Click and hold on the Align tool in the Main Toolbar tab of the Tab Panel, and wait for the flyout to appear.
3. Choose Align Camera from the Modify pull-down menu.
4. Click and hold on the object (and face) to which you want to align. Much like the Align Normals tool, Align Camera enables you to choose the face that you want to align to specifically by interactively dragging around the selected object.

You can make a Free camera behave like a Target camera by assigning a Look At controller to the Free camera's Transform track. By doing so, you have a tangible target object to work with, but you then are subject to the same problems as a Target camera, mainly the gimbal lock problem.

Matching a Real-World Camera

VIZ's cameras have now been modified to properly mimic their real-world counterparts with respect to camera lens focal length. This means that a shot taken with a 35mm camera now properly matches up when you composite the live imagery with the virtual scene created using a 35mm camera lens.

If you don't have a camera-tracking system at your disposal, you can use VIZ's Camera Match to match up your virtual camera to a photograph. Remember that the Camera Match feature requires that you know the proportions of the subjects taken in the photograph to properly match a virtual camera to the scene. This means that you need to know size and location of the real-world scene. If you don't have this information, Camera Match will most likely produce the wrong result.

Simulating Real-World Effects

You can duplicate many of the effects traditionally created using lens attachments or lens manipulation in VIZ using Rendering Effects processes. Unlike real-world cameras in which image distortion takes place as the light passes through the lens, VIZ first photographs the image, and then distorts it through the use of Rendering Effects.

Using Depth of Field

To simulate anything that incorporates a focal effect, you should use VIZ's Depth of Field effect within Rendering Effects. VIZ focuses all renderings to infinity. Blur and Depth of Field both enable you to add real-life focal effects to your rendered image. You can do a general scene blur, a radial blur, or a blur based on a focal node (an object that you're focusing on). As a rule, almost every scene should have some amount of blur in it because every photographic work we look at has some amount of focal blur associated with it. Using blur in VIZ means that your scenes have an extra sense of photographic realism for which you used to need a plug-in. For more information on using the Depth of Field effect, see the section entitled "Focal Effects" later in this chapter.

As mentioned earlier in this section, one of the easiest techniques to learn first in VIZ is setting up a camera. However, many designers simply don't follow any one technique consistently enough to document. You can follow several guidelines when setting up a camera. By following some sort of guideline, you can develop, or fine-tune, your technique until you're satisfied with one that works consistently for you. Fortunately, most of what you learn in school as a designer applies here. However, it's easy to do much more than the real world allows.

Framing

Framing is the method by which you position and aim your camera so that your subject is within your camera's *viewing plane* or *frame*. When directors want something to be in frame, they are indicating that they want the object to be within an area that the camera sees.

VIZ has some useful tools for determining what's in frame and what's not. With *safe frames* in VIZ, you can size all the safe frame regions to their own independent values. You can also mask out the area outside the outer safe frame, called the Live Area. Figure 10.13 shows the usage of safe frames, combined with safe frame masking at a 35mm 1.33:1 aspect ratio.



Figure 10.13 Using safe frames and safe frame masking for a wide aspect ratio shot. Notice that the scene isn't visible outside of the "Rendered Frame," (outer) safe frame region. The outer frame represents the Live Area, the middle is the Title Safe, and the inner is the Action Safe. Notice that you can also specify an additional User Safe area.

Basic Framing

Simple framing involves positioning and aiming your camera properly so that your subject is in-frame, or at least poised to come in-frame during the animation. When framing your scene in VIZ, you should always use safe frames if you intend to go to video to ensure that you don't lose the outside edges of your image when video monitors crop the broadcast image. If you're not going to video, you can still use safe frames as a guide for making sure the action or subject is in a consistent location for an animation.

For veteran computer animators, using Transform Gizmos to position a camera and its target is second nature. However, VIZ incorporates buttons in the lower right corner of the interface, providing all the necessary commands for controlling a camera. Note that a camera viewport must be active for these buttons to appear. If you're familiar with these buttons, this might be a good time to explore using the new Expert mode for your camera viewport. By using this mode, you can manipulate your camera or target through keyboard alternatives as well as the Transform Type-In dialog box.

Composite-Based Framing

Composite framing is similar to simple framing except that you are framing your virtual scene based upon live footage that you want to match. The footage, whether it's moving or not, requires that you make sure your camera's position, in relation to the background image, is similar to that of the real camera used to photograph the real scene. As mentioned earlier, you can use Camera Matching for this particular operation, especially if

precision is needed. Just keep in mind that you need to have the proportions of the photographed scene to be able to match up your virtual scene. Figure 10.14 illustrates using Camera Matching against a background to produce the illusion of a design in its intended space.



Figure 10.14 Camera Matching 3D buildings against an image of a site. Using points measured from the actual site in the photograph, Camera Matching can compute the original camera's perspective and apply those settings to the camera in your scene for accurate compositing.

Shot Angles

Shot angles, much like focal effects, can dramatically change the way the audience perceives your scene. Shot angles are usually set up so that the intended subject, or point of interest, is obvious. With animation, you have the flexibility of moving your camera into position over a series of frames. As a result, the subject gradually comes into frame, not only making the audience aware of what they should be looking at, but also building up an anticipation about what they're about to see.

Traditional Angles

Traditional shot angles include the obvious. You can place the camera head on with the subject or slightly off to exaggerate size or location of the subject in relation to the surroundings. Figure 10.15 shows a typical camera angle of a carrier's flight deck taken from the bow of the ship.



Figure 10.15 A typical camera angle of a carrier's flight deck. The bridge is the intended subject; the cannon on the right is only in the frame for dramatic effect.

Unusual Angles

Sometimes you need to grossly exaggerate your subjects by using intense camera angles and focal length effects. Let's say, for example, you wanted to make a baby appear to be a giant or a short underpass appear to be a tunnel to infinity. Rather than modeling a scene to mimic these effects, you could just use unusual camera angles. Figure 10.16 demonstrates what an unusual camera angle does to a close-up of the ship's bridge.



Figure 10.16 An unusual camera angle makes the ship's bridge appear more dramatic. Using steep camera angles like this almost always produce an exaggerated effect.

Lens Effects

Lens effects refers to a collection of Rendering Effects that simulate light-generated lens flares and glows that occur as a result of viewing a design through a camera's lens. Glows and camera lens flares are often caused by our perception—that is, the way we're viewing a subject. For instance, if you were to look at the sun (don't do this, by the way), you would perceive the sun's rays and an intense glow around it. However, if you were to look at the sun through a camera, you would perceive that the sun had sharper rays along with small disc-like halos, called *lens reflections*. In actuality, the sun looks much different up close and personal. It doesn't appear to be the same when perceived from Earth at all. If you look at the Lens Effects interface in Figure 10.17, you can see how VIZ expects you to control this feature, as a series of effects.

Light emanating from a source and reflecting in the lens elements of a camera causes flares. Flares are actually composed of several elements, one being the lens reflection. The number of reflections is dependent upon the number of elements in the camera lens itself. Other components of a lens flare, such as the star, ring, and rays, are all dependent on the light source's intensity, as well as its location within the frame of the camera. Lens Effects make it easy to duplicate flare effects. The trick is in knowing what type of flare you want or camera effect you're trying to simulate.

Bright light sources illuminating the surface of an object cause glows. Depending on the type of surface and the intensity of the light source, the glow can range in size and shape. Furthermore, atmospheric conditions can affect your perception of a glow. For instance, a chrome bumper on a car can have an intense glowing halo if bright lights illuminate it. That same bumper would appear to be just chrome in a normal or dimmer light situation. Sunlight is an example where we perceive glows differently depending on the atmospheric conditions. For instance, the sun on a hazy day appears to have a large glow around it, whereas on a clear day, its glow is much tighter and intense.

Glows are typically perceived at the source. Lens reflections happen at the camera lens, but a glow occurs at the source object in almost every situation. The Glow feature in Lens Effects accounts for this, but it also enables you to glow the source in a 2D fashion—that is, the glow is not occluded by objects that block the rays caused by the light source.

Glows based on reality rely heavily on the intensity and color of the light source itself. For instance, a bright white light, such as a car's headlight, produces a more intense glow than a cool, blue, backlit sign. In either case, you not only need to alter the color and density of the glow but also its size and softness to achieve the proper glow effect.

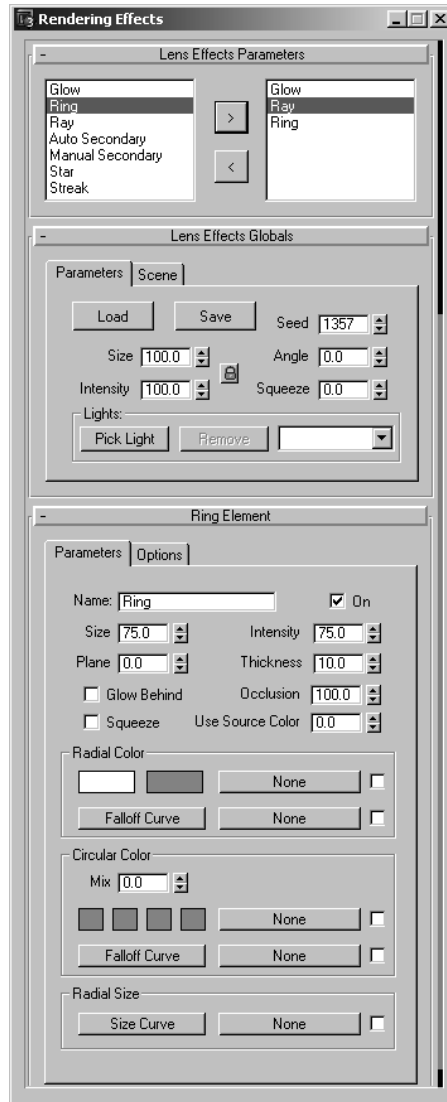


Figure 10.17 In the Lens Effects Parameters rollout you can specify how many features your Lens Effect has, such as glows and lens elements.

There are so many factors that affect how we perceive subjects in real life. In the upcoming sections, you will see how to mimic our real-world perception of glows and flares using the Glow and Flare elements of Lens Effects.

Glow Keying Elements: Sources

The Glow function of Lens Effects is a great way to glow geometry, rather than light sources, which are Flare's specialty. However, the secret to making a glow look correct is by keying off the right elements. VIZ enables you to key your glow off of one of several components (or sources) within a scene. In this section, you'll explore the common elements from which to key, as well as why you would, and should, use them. Figure 10.18 shows the Source Select area of the Glow interface.



Figure 10.18 The Glow element of Lens Effects enables you to key off different sources for the glow.

Glowing Objects

Glow enables you to glow objects based on their object (or *G-Buffer*) ID. The main benefit of glowing objects based on their ID is that you can easily select one of several *whole* objects to glow, essentially enabling you to select the exact objects to glow. Using G-Buffer ID assignments, glows can be occluded by other geometry. The most common problem with Glow using G-Buffer ID assignments is that G-Buffer ID data is not passed behind objects using transparent or semitransparent materials. This means that if your glowing object passes behind a pane of glass, the object renders, but the glow disappears. Fortunately, there are three solutions for this:

- You can use the Raytrace Material or the Raytrace Map in the glass. This enables G-Buffer ID data to pass through.
- Cee-Thru from Ishani, which is freeware, enables glows to pass through translucent materials.
- X-ray, from Digimation, enables G-Buffer ID data to pass through transparent geometry.

Glowing specific objects works for most situations. An example of where you might use an object as your keying source is fluorescent lighting. The light itself is a piece of geometry that prevents you from using the Flare element for two reasons:

- Although Flare has a glow within it, you can only use it to glow light sources.
- The glow effect in Flare is always circular (except for when you're using Squeeze; then it becomes oval in shape). This means that you cannot produce a glow that would adhere to the contours of the neon sign.

Most fluorescent color is constant. If it isn't, then you might consider using a glow based on a Material Effects ID, discussed in the next section.

Glowing Material Effects Channels

Glow also enables you to glow objects through the Material Effects channel. In the Material Editor, you can assign a material or Sub-Object material a specific channel from 0 to 15.

The main benefit of glowing materials over objects is that you don't necessarily have to glow the entire object. Many advanced materials contain several material definitions through, say, a Multi/Sub-Object material. With a glow based on a Material Effects channel, you can pick and choose the elements you want to add the effect to.

Another more hidden benefit of glowing by Material Effects channel is that you can also glow reflections of materials when using the Raytrace material or map. The Raytrace map is capable of transmitting Effects channels in reflections or refractions. As a result, the glow can now occur in areas of your rendering that were previously impossible.

Glowing Unclamped Colors

Unclamped colors represent the pixels in your rendered image that are brighter than pure white. VIZ always renders images at 64 bits but displays them at 24 bits of color. Other information—unclamped color values, Object ID, Material Effects ID, Z-Buffer, and such—might be stored within the image, but VIZ does not display it unless explicitly told to do so. Now, unclamped color values are more used within VIZ thanks to the higher maximum values of the Standard or Raytrace material. The Raytrace material benefits most because VIZ's Glossiness and Specular Level settings are unclamped to values of 200 and unlimited, respectively. Metals and glass are now much more realistic as a result. In addition, as of R3, VIZ's Standard material can have Specular Level values of up to 999. This enables materials not based on the Raytrace material to also glow based on unclamped values. In the next exercise, you'll see how using Glowing unclamped colors affects both glass and metallic objects.

Exercise 10.2 Glowing Chrome and Glass

1. Load Rendering2.max from the Inside 3D Studio VIZ CD-ROM.
2. Click the Rendering menu, select Effects, and open the Lens Effects Parameters rollout and select the Glow feature in the right box.
3. Select the Interactive check box to render the scene and apply the glow to the scene.
4. In the Glow Element rollout's Options tab, set the Source to Unclamped, and the amount to 1.0.
5. Click the Parameters tab, and set the Effect Size to 1.

6. Change the Intensity from 110 to 66.
7. Click the Material Editor button in the Main toolbar.
8. Click the lower left material sample named Glass.
9. Scroll down to the Raytracer Parameters section, and click the Options button.
10. Enable the Global Enable Raytrace check box.
11. Click the Render Scene button in the Main toolbar or click Update Design in the Rendering Effects dialog box to see the rendering with both Raytrace reflections and refractions with glow.

Exercise 10.2 gave you a chance to see how using the Unclamped color setting for glows can enhance renderings with intense specular highlights. It also shows how the Raytrace material is ideal for creating these intense highlights. Figure 10.19 shows the final rendering from the exercise.



Figure 10.19 The final rendering from Exercise 10.2. The specular highlights contain unclamped colors that you can use as sources for glows. This technique gives metals and glasses a more natural look under bright light conditions.

Additional Glowing Source Options

Although not as significant as the major glowing source options (G-Buffer ID, Material Effects ID, and Unclamped colors), the remaining keys (Alpha, Z Hi/Low, and Surface Normals) make adding glow effects to other areas of your scene or geometry painless. In this section, you'll see some brief examples of how you might use these other keying methods.

Alpha

The Alpha parameter enables you to glow the image based on the Alpha Channel information present in the image. In other words, as the Alpha Channel approaches 255—fully opaque—the glow has more of an effect. At a setting of 255, the Alpha source glows with full intensity. Lower Alpha Channel values result in less intense glows.

Z Hi/Low

Z Hi/Low enables you to glow a rendered scene based on Z-depth. Two values, Hi and Low, work together. The difference between them is the area of your rendered scene that is glowed. Z Hi is the maximum distance from the camera, and Z Lo is the distance closest to the camera.

Surface Normals

The Surface Normals option enables you to glow faces of an object in your scene in which normals are within a certain threshold determined by the spinner value. Any face that has a normal between the spinner value and 90 degrees is glowed.

You could effectively use this source option on flat surfaces, such as a cut diamond. As the diamond rotates and the flat surfaces become more perpendicular to the camera, they would glow more.



Note

This section has primarily treated the sources that you can glow as being exclusive. However, with VIZ R3, you can combine any number of these sources to produce glows that are more complex simply by checking any of them.

Glow Effect Restrictions and Controls

Using Glow in a scene enables you to effectively communicate brightness. However, controlling the amount of Glow and where it occurs in the scene is a crucial element. The Glow feature in VIZ enables you to filter the effect of the Glow to specific areas of the

keyed source (see Figure 10.20). Although it isn't essential to constrain the Glow, you'll find that you can enhance the realism of your scene by using the Glow effect in moderation. In this section, you'll have a chance to see how the Glow element enables you to limit the effect and how the limits work.

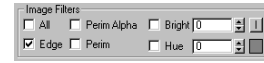


Figure 10.20 The Image Filter group in the Options tab of the Glow Element rollout. Using these settings, you can specify where the Glow effect occurs on your source.

Glowing the Whole Source: The All Filter

When you use the All filter, the Glow element places the glow effect on the entire source, from the center of the source outward. As a result, the size of the effect relates to the Glow's start at the center of the object. This is different from the way other filters, such as Perimeter, work. In Exercise 10.3, you'll use Glow's All filter and do some fine-tuning to better simulate the appearance of fluorescent light tubes in an office or lab environment.

Exercise 10.3 A Glowing Fluorescent Light Fixture

1. Load Rendering3.max from the Inside 3D Studio VIZ CD-ROM.
2. Click the Rendering menu, choose Effects, check Interactive, and then expand the Lens Effects Parameters rollout and select Glow.
3. In the Options tab, set the source to Effects ID 1.
4. Make sure All is selected as the filter. At this point, the glow looks extremely soft. The intensity, color, and size of the glow are wrong. In the next step, you will change the settings to make the tubes appear to be actually glowing.
5. Click the Parameters tab and set the Size of the effect to 1, the Intensity to 90, and the Use Source Color value to 100.

At this point, your glow should be much tighter around the fluorescent tubes. By reducing the size and intensity, you're able to produce some believable effects. Just be careful to use Glow in moderation.

Glowing the Perimeter

Glowing the perimeter, with either Perimeter or Perimeter Alpha, can give your keyed source the appearance of being backlit. This is because the glow effect does not appear on the object itself, but rather along the edges. (See Figure 10.21.)

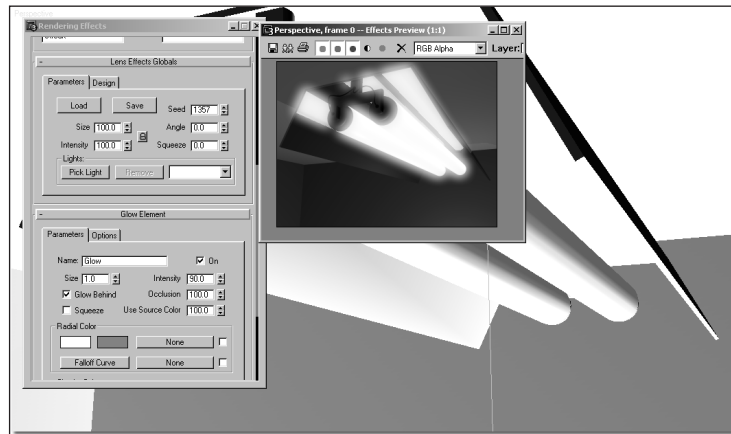


Figure 10.21 The Glow effect works great on light sources because you can control it so that it affects just the bulb objects. Illuminating a scene is only part of the process. For the effect of light to look realistic, light sources must glow to a certain degree.

When using either Perimeter or Perimeter Alpha, the Glow element analyzes the specified source and glows just around the edges of it. Using the Perimeter filter is great for producing backlit signs. You can also use it to create halos around your geometry or materials. However, you should be aware of a few pitfalls when using the perimeter options. The first pitfall can occur easily on scenes without Alpha Channel information. Alpha Channel information is the area of your rendered image that involves transparency.

Perimeter Versus Perimeter Alpha

The difference between the two perimeter options is how they determine where the glow starts. The Perimeter Alpha option essentially uses the Alpha Channel to determine where the glow is going to start. Because the Alpha Channel contains anti-aliasing information, the glow is also anti-aliased around the edges of your source. The rendered result is great. However, there are times when your image does not contain Alpha information or when your image is pure opaque—meaning that it has a pure white Alpha Channel. Therefore, Glow cannot determine where the edges of your source start, resulting in an inaccurate or heavily aliased glow.

This is exactly the purpose of the Perimeter option. Although not as precise as Perimeter Alpha, Perimeter can give you similar results without having to rely on Alpha information. The main problem is that the resultant glow is often not what you desire. So, what do you do in this situation?

There is no perfect way around this problem. You can, however, minimize it by tweaking different variables within Glow to reduce the amount of aliasing around an edge. For instance, you can work with the Falloff curve of the glow to increase or decrease the amount of glow falloff that occurs along the edges. For more information on the Falloff curve, refer to the VIZ Online help.

Working with Backlit Signs

When using either perimeter option for backlit signs, you must take care if you plan to view the sign from different angles, especially in an animation. The primary reason is that the Glow effect does not actually backlight the sign, but rather places a glow around its perimeter. Although this works great for most viewing angles, the more your view changes to where it's looking at the sign's side the more you'll see a problem. The glow effect appears to glow the whole sign from the side.

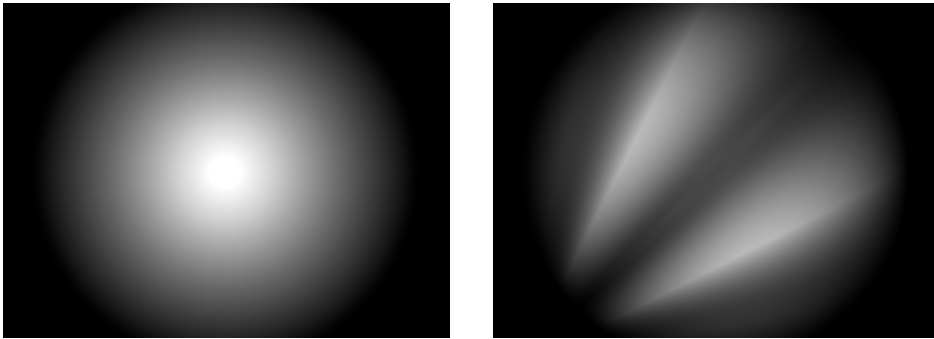
Using Maps and Gradients in Glow

The capability to control Glow through maps is, by far, the most powerful aspect of the Glow feature. In fact, it's what makes the entire Lens Effects feature so useful. With gradients, you can design the most intricate glow effects, which you can use in both still images and animations. However, it takes a bit of practice.

With VIZ R3, controlling colors and transparency, or falloff, has been created in such a way that you can use any map type supported in VIZ. This means that you can use anything from the standard Gradient Ramp map to Noise. However, you can only use these maps to control the Glow effect on a light, not on objects. For glowing light sources, you should try to use the Glow feature in Rendering Effects.

Radial Color and Falloff

Radial color enables you to control the color of the glow around the source—starting at the object, with the left color, to the end of the falloff, which uses the right color. However, that technique only enables you to use two different colors for your glow. If you want to have explicit control over the glow's color, you need to use a map. You can drag any map that VIZ supports right into the slot for the button next to the right color swatch labeled None, and Glow then uses that map's color information rather than the two color swatches. Figures 10.22 and 10.23 show the same light source using the standard color swatches on the left and a Gradient Ramp on the right.



Figures 10.22 & 10.23 These two figures show the same light source with the same Glow effect applied. The difference is that Figure 10.22 is using the standard two colors for the Radial Color, whereas 10.23 is using a Gradient Ramp to define the Radial Color.

To properly control how the Glow effect tapers, you can use a standard linear graph, the Falloff Curve, or a map. The Falloff Curve, as seen in Figure 10.24, is similar to the deformation curves of a Loft compound object. By moving the two points on either side of the graph, you can effectively decide how the Radial Color will fall off—if at all.

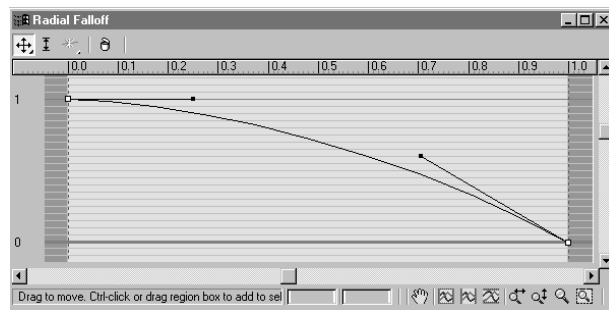
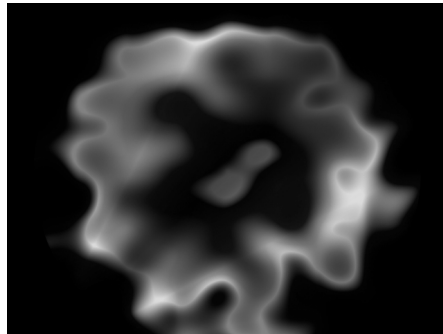
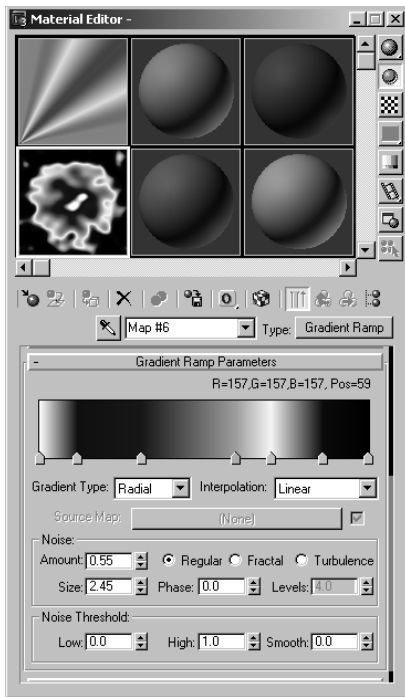


Figure 10.24 The Falloff Curve of the Radial Color in a Glow effect. This control is similar to Loft object deformation features, and you can find it in other Falloff controls throughout the VIZ interface, including other Lens Effects components.

A map uses the grayscale values of the image to control the falloff. Although you can use just about any map to control the falloff, you probably want to stick with a radial gradient as much as possible because that's both how light transmits in VIZ and how the glow effect is applied to a light source. Using other map types as your primary falloff map might yield unpredictable results. Figures 10.25 and 10.26 show how complex a glow can become just by using a radial Gradient Ramp map as your falloff map.



Figures 10.25 & 10.26 A complex glow formed by using two radial gradients, seen in Figure 10.25. The upper gradient is controlling the color, and the lower gradient is controlling the falloff.

Circular Color and Falloff

Much like Radial Color, you can control Circular Color by using static colors or maps, and its Falloff Curve setup is identical to Radial Color's Falloff Curve setup. The primary difference is that the Circular Color works by traversing the edge of the glow clockwise. The four-color swatches represent the 12, 3, 6, and 9 o'clock positions respectively on a glow. The Mix parameter enables you to blend the colors defined in the Radial Color section with the Circular Color. At 50, there's an even mix. At 100, the Circular Color completely obscures the Radial color.

By using a map, you can radically vary the color distribution in the glow. In this case, analyzing the map color vertically produces the Circular Color. The first row of pixels defines the 12 o'clock color, the row of pixels 25 percent of the way down from the top defines the 3 o'clock color, and so on. Results with maps aren't as predictable, but they can produce great halo-type effects. Figure 10.27 shows an effect generated with Circular Color using a Gradient Ramp that is using a radial gradient type.

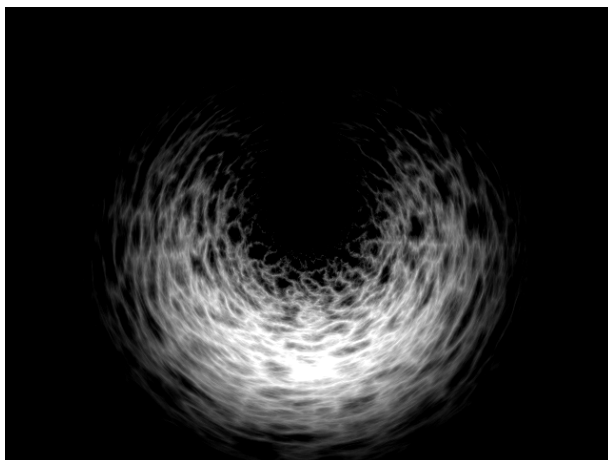


Figure 10.27 A glow effect using a radial Gradient Ramp map to define the Circular Color. Although difficult to see the blending of the colors in black and white, you can see the intensity of the glow is radically affected with just two colors used in the map.

Building a Flare

Creating a Lens Effects-based lens flare for the first time might seem a bit daunting. However, the interface in VIZ R3 is simple enough to make it easy for you to build your own flares.

Much like building a glow, building a lens flare takes practice. VIZ ships with several ready-made lens flares. A good practice is to try building your own lens flare from these. That way, you at least have some sort of starting point. (They're also useful if you need a quick lens flare, and you don't have the time to build one yourself.)

The next exercise deals with using some of Flare's commands to produce a sun-generated lens flare at dawn. You'll use a combination of Flare's effects to produce the overall lens flare. After the exercise, you'll also see what other options you can use to refine the lens flare.

Exercise 10.4 Building a Better Flare

1. Open Rendering4.max from the Inside 3D Studio VIZ CD-ROM.
2. Activate the Environment viewport. On the Rendering menu, choose Effects, and then click Update Design to see a rendering with the flare in its current state.
3. Click the Lens Effects entry in the effect list. Don't turn on Interactive this time because it takes a while to render.

4. In the Lens Effects Globals section, click Pick Light and choose the Omni light named Sun.
5. Click the Glow entry on the right list box, and set Use Source Color to 85 to give the glow an orange look. Then set Size to 100 and clear the Glow Behind check box. Lastly, set the Occlusion value to 0.0.
6. Click Star in the Effects rollout's right list box. In the Glow Element rollout, set Size to 200, Angle to 20, and Qty. to 4. Set the Taper parameter to 0.1 and the Width to 2.0, and then make sure to clear the Glow Behind check box. Select the Interactive check box in the Effects rollout to see the rendering in its current state.
7. The Auto Secondaries need some work. Click the Auto Secondary in the Effects rollout's right list box and set
 - Minimum = 0.2
 - Maximum = 1.0
 - Intensity = 140
 Enable the rendering to update.
8. Click the Ring entry in the Effects rollout's right list box and set
 - Size = 5.0
 - Intensity = 30
 - Thickness = 3
 - Use Source Color = 80
9. Click Update Scene to set what you've done. There are now too many rays. Click the Ray entry in the Effects rollout's right list box, and set the number to 40 in the Parameters tab of the Ray Element section. (It should now look similar to Figure 10.28.)

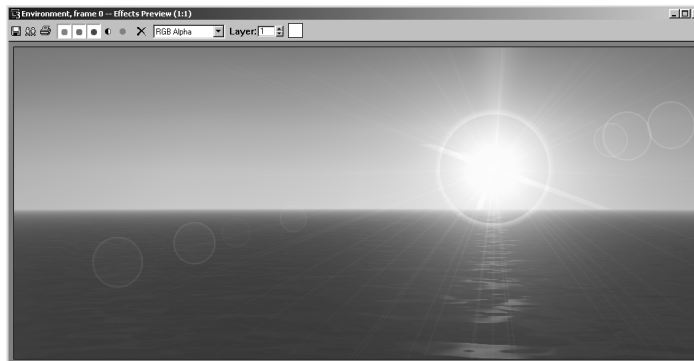


Figure 10.28 The final rendering from Exercise 10.4. This figure shows the use of several Flare settings to create a more realistic flare—even when starting from the default flare.

If you like building from scratch, however, you can follow these quick tips for building a flare that might save you some time:

- **Use the color of your source.** It makes defining a lens flare's color much easier. Rather than having to build a lens flare's color based on your arbitrary gradient settings, Use Source Color uses the hue of the light source and applies it to every color definition of your lens flare's elements. For more control over the mixture of your light source's hue and the hue of your flare's elements, use the Hue spinner for each element.
- **Use Multiple Sources.** In Lens Effects, you can choose to flare as many light sources as you want. Just use the multiple selection commands that you normally use (Shift-click or Ctrl-click) to select as many sources as you want. Flare then flares all the sources with the same settings. This works well for arrays of lights that have the same properties, such as runways.

If you take some time to think about these guidelines when building flares, you'll save yourself a great deal of prep-work, which can eat up costly production time.

Determine the Source

At this point, you've been able to see how lens flares are built and how VIZ expects you to design them. Now that you understand that, let's take a look at the factors you should take into consideration when creating flares in your renderings.

Determining the Flare's source is easy—it's a light. Unlike the Glow effect that glows objects, materials, and a host of other items, Flare is designed to glow and flare just lights. In a way, this makes it easier for you to determine what your flare is going to look like.

The trick is now to make the lens flare look good for the light source. Sometimes it just needs to be simple, such as a dimly lit light bulb. In other cases, it might need to be dramatic, such as an alien sun breaking from around a planet.

Because lens flares incorporate so many factors, they tend to be more artistic than glows or highlights. If you're just starting out building your own lens flares, the best thing to do is observe flares that you see—whether in real life or through various media. Science-fiction movies and television programs are often great sources for ideas. You can also take just about any camera outside on a nice day and point it toward the sun—just be careful not to look right into the sun! You can observe not only the effect the sun's light has on a camera, but also how the flare moves when you move the camera.

Account for the Environment

Much like a glow on an object, the characteristics of a flare depend a great deal on the kind of environment in which the flare's occurring. For instance, in space, a flare might be perfectly crisp because there is no real atmosphere with which to interact. If you're trying to simulate looking at the sun from the surface of Earth, the atmosphere determines your flare's "crispness." By adding a small Blur effect, you can adjust how crisp the flare is. However, let me add a note about using Blur: Using it too much actually makes the whole rendering look blurred, as if you're looking through a lens with some residue on it. Typically, you should use a combination of increasing both Blur and the size of the glow to simulate flares in hazy conditions.

Account for the Camera Type

One other element that most people don't think of is the type of camera that they're using or, more appropriately, trying to simulate. For instance, cameras can have several types of lenses attached to them. Different lenses have different numbers of elements in them. This changes the number of secondary flares. Granted, this could be considered to be a bit nitpicky, but having too many secondary flares can often be distracting, and having too few can often result in all of them going unnoticed.

Lastly, if you are either going to film, or simulating film output, you should use the Squeeze parameter. If you change the rendering aspect ratio of your scene to a film aspect ratio, the flare does not automatically alter itself. To squeeze the flare into a more anamorphic look, use the Squeeze spinner along with the check box for the corresponding Flare element that you want to squeeze. (See Figure 10.29.)

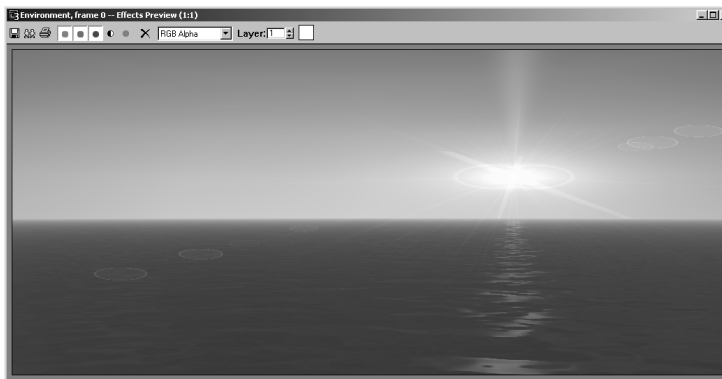


Figure 10.29 If you use the Squeeze check box in each of the Lens Effects elements and then dial in the amount of anamorphic squeeze you want in the rendering, VIZ compresses the rendered effect. Notice that VIZ squashed all the Lens Effects in this shot on the vertical axis. You can achieve this by setting the master Squeeze value to 35.

Motion Blur

One of the most underused effects by the VIZ user is Motion Blur; yet, it adds so much to the motion in your animations, you should make a habit of using it whenever possible. Our eyes' inability to track the motion of an object quick enough as it moves causes motion blur. An easy example is the spinning wheels of a moving car. Can you make out the manufacturer's logo while the car is in motion? By adding subtle hints of blur to your animation, you can increase the realism beyond that of a standard, computer-generated image.

The issue is that VIZ renders every frame perfectly. As a result, objects don't blur. When you view the resultant animation, you can see nearly every frame perfectly. Hence, objects like spinning propellers almost appear to be spinning slowly, because you can see each frame of rotation. To correct this problem, you need to use one of two forms of the Motion Blur tool: Object or Image.

Object Motion Blur

Object Motion Blur happens at the rendered-scene level. After VIZ renders a frame of animation, it analyzes the motion of the objects that it rendered and adds a blur effect based on their movement. It also accounts for the motion of objects that don't occur in the rendered window. This means that VIZ factors objects like cameras into the blur computations. You need to use Object Motion Blur when the camera moves and you want to have your scene blurred as a result.

Image Motion Blur

Image Motion Blur is applied to the object post-rendering, but unlike Object Motion Blur, it doesn't understand camera movement. If your camera isn't moving, then Image Motion Blur usually works best.

Using Motion Blur

To specify if an object in your design will use Motion Blur, you right-click over the object to open the right-click menu. In the Properties item, select the Motion Blur method—Image or Object—in the Object Properties dialog box. In addition, you need to make sure that the Enabled check box is checked.

In addition to turning on Motion Blur in the Object Properties dialog box, you need to enable the Object or Image Motion Blur setting in the Render Design dialog box. By default, these options are on, so you generally won't need to adjust them. However, because Motion Blur can have an impact on your rendering speed, it's often a good idea

to leave Motion Blur off until you're ready to test a blurred rendering, or until you're near the final rendering in your project.

The following are some general guidelines as to which version of Motion Blur you should use:

- If there is camera movement and you want to have the objects blur as a result (such as a fast-panning or shaking camera), use Object Motion Blur.
- If the object is relatively small in the rendered window, Image Motion Blur is much faster.
- Larger objects or objects that take up a sizeable portion of the rendered window often take a while to generate their Motion Blur. Object Motion Blur is faster in this case.
- For groups of objects that should use the same style of blurring, put them on the same layer and blur by layer, rather than object-by-object.

Let's take a look at two instances in which Motion Blur comes in handy. The first is a fly-through of a city scene, and the second is a helicopter blade spinning. In one, you'll use Object Motion Blur and in the other you'll use Image Motion Blur.

Exercise 10.5 Using Object Motion Blur

1. Open Rendering5.max from the Inside 3D Studio VIZ CD-ROM.
2. Click the Layer Properties button, and select layer 0 from the list.
3. Click the Detail button if the Layer details aren't displayed. In the Motion Blur section, select Object, and then click OK.
4. From the Rendering pull-down menu, select Render. Scroll down to the VIZ Default Scanline-A Buffer parameters, and make sure Object Motion Blur is checked.
5. In Object Motion Blur, set
 - Duration = 1.0
 - Samples = 5
 - Subdivisions = 5
6. Move to about frame 50, and then click Render to render the scene. Note that this takes a great deal of time to render so be patient! (See Figure 10.30.)

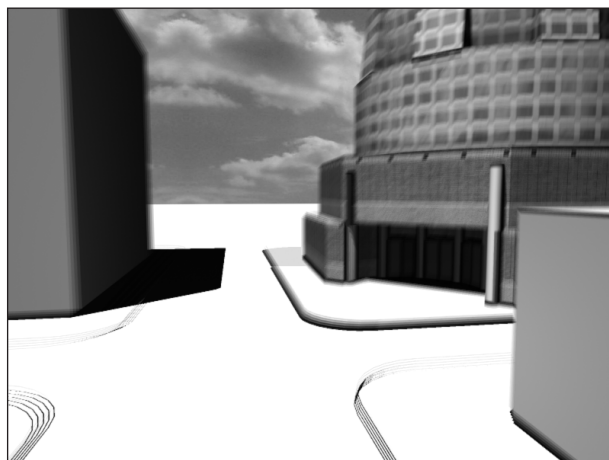


Figure 10.30 When using Object Motion Blur, camera motion, such as this fly-by, is taken into account. Although the objects in the scene aren't moving, the movement of the camera rapidly through the space causes natural blurring effects.

Exercise 10.6 Using Image Motion Blur

1. Open `Rendering6.max` from the Inside 3D Studio VIZ CD-ROM. This is a model of an IK chain from Chapter 9, "Advanced Animation."
2. From the Edit pull-down menu, choose Select All.
3. Right-click over any one of the objects, and choose Properties. In the Motion Blur section, click off the By Layer button.
4. Choose Image Motion Blur. Set the Multiplier to 2.0.
5. From the Rendering pull-down menu, select Render. Scroll down to the VIZ Default Scanline-A Buffer settings and ensure that Image Motion Blur is checked, and then click Render. Enable VIZ to render to an AVI file, and then watch the completed animation. (See Figure 10.31.)

Image Motion Blur is a cheap, yet convincing method for giving the illusion of fast motion. In this example, no camera motion is involved so the effect works flawlessly. Choosing the correct Motion Blur effect is up to you. Also, keep in mind that you can mix and match different kinds of Motion Blur in the same design. In addition, the process of achieving suitable motion blur is mostly trial and error. You'll probably need to render the same animation several times to attain just the right look for your design.

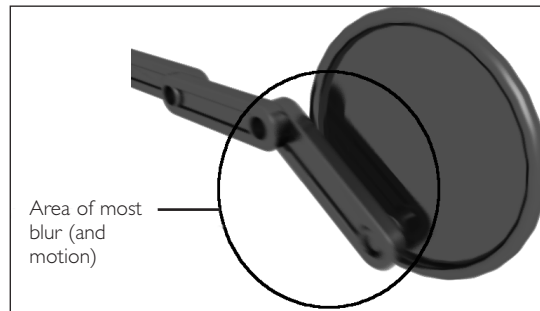


Figure 10.31 Image Motion Blur is much faster than Object Motion Blur, but it doesn't blur with camera movement. However, when the model is already in motion, such as this assembly, camera movement is negligible because the movement of the assembly is already blurring itself.

Focal Effects

If you've ever worked with a real camera before, you know about focus. Even if the only camera you've ever owned had auto-focus, you at least know that someone or something had to focus in order for the photograph to turn out nice and crisp. When you pick up your pictures from the developer, you often see the effects of focus. Some of your pictures are nice and in focus, some are completely out of focus, and others have part of the picture in focus and the rest isn't.

In other software tools and even in early versions of VIZ, focal effects were impossible. Most of the resulting images looked computer-generated for one reason: no focal effects (although lighting often played a part in this, too). If you've ever done a close-up shot of something using VIZ, you've probably noticed that everything is in focus. Although this is nice, it doesn't accurately represent what you see in real life or what a real camera would see.



Note

The Depth of Field effect is a Bonus Tool inside 3D Studio VIZ R3. To install Depth of Field as a Render Effect you have to do a Custom Install and select the Bonus Tools option.

The Depth of Field effect (see Figure 10.32) within Rendering Effects makes it easier for you to simulate camera focal effects by blurring the scene based on scene elements, such as focal points, or the distance from the center of the frame out. In any case, Depth of Field helps add a bit more realism to your rendered scenes.

Depth of Field Terminology

Several terms describe both how a camera focuses and what the resultant effects are. However, traditional labels don't always match up with what programmers call items in their interfaces. In Depth of Field, you must first understand three main terms (with concepts) before diving into the feature.

The next three sections take you through those three elements. Where possible, parallels have been drawn to real-world terminology for those of you who've had some photography experience. Note that there are many things you can do with the Depth of Field effect to simulate focal effects, but the Depth of Field effect doesn't have any equivalents to such items as f-stops or focal length (with respect to focal properties).

Focal Loss

The Depth of Field effect's Focal Loss settings provide for the amount of blur occurring in the scene. The higher the focal loss the blurrier your scene is. The Horiz Focal Loss (for horizontal blur) and Vert Focal Loss (for vertical blur) settings enable you to blur more on one axis than the other. This capability is useful if you're trying to simulate, for example, looking through a pair of glasses and then taking them off. Several animators have actually complained that it's difficult to look at the Depth of Field effect's preview window when they are blurring more on the horizontal axis than the vertical—it looks too much like they're not wearing their corrective lenses!

The key thing to remember about focal loss is to use it in moderation. The default setting of 10 is usually a good starting point, but you don't want to go much higher. Lower settings—those less than 10—produce much better depth of field effects. The term, *depth of field*, refers to where the camera's focal point is (referred to as a *focal node* in the interface) and on how much or how little the areas in front of and behind the focal point are out of focus. Figures 10.33 and 10.34 show appropriate and inappropriate settings for Horiz Focal Loss and Vert Focal Loss when using a focal point.

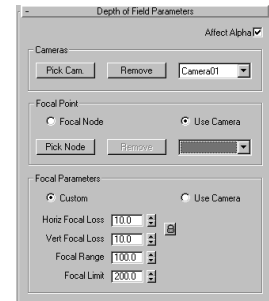


Figure 10.32 The Depth of Field effect's interface. Most of your work is in the Focal Parameters section. To add a more realistic look to your designs, it's often a good idea to add just a bit of focal blur to give your rendering the illusion of being shot through a traditional camera.



Figures 10.33 & 10.34 Figure 10.33 (foreground) shows a proper amount of focal loss for a scene when using a focal point. Figure 10.34 (back) shows the same scene with Focal Loss settings that are too high. Take particular notice of the edges of the table in Figure 10.33. The focal loss is so great that there are obvious artifacts.

Focal Range

Focal range is the distance from the point of interest outward before focal loss begins to take place. It's best thought of as the “hotspot” area for the Depth of Field effect. The closer the Focal Range value is to 0 the less distance there is before the Depth of Field effect begins to blur the scene. However, rather than the distance being projected from the focal point outward in a spherical fashion, it is calculated based on the viewing plane of the camera (the Z axis, or Z-Buffer, of the rendered scene). The viewing plane is the plane that is perpendicular to the viewing axis of the camera. Figure 10.35 shows what a viewing plane would look like.

You might be wondering why the effect uses the camera's viewing plane. Because Depth of Field is a post-process effect—it is applied after the scene is rendered—it relies on the Z-Buffer to perform its operation. The Z-Buffer is an invisible layer of data that accompanies the rendered image to represent a distance from the viewing plane for each point

in the image—in other words, how far away from the camera a rendered portion of the scene is. Because Depth of Field is acting on only a rendered image and does not interact with the 3D objects in your scene, it relies on this Z-Buffer to determine how much to blur any portion of your rendering. The Z-Buffer gives Depth of Field the capability to quickly blur a scene. However, it also means that blur is calculated planar to the camera—which can be a problem when focal loss is set high. At higher focal losses, you’ll see a noticeable “blurred wall,” which is actually your Focal Limit plane. (See Figure 10.35.) This is an undesirable effect for most cases. If you are seeing a “blurred wall,” try reducing the amount of focal loss. At the least, it makes the “wall” less noticeable.

**Tip**

If you are seeing the focal planes in your rendering, try reducing both Focal Loss settings in Depth of Field. Although it does not eliminate the focal plane problem, it minimizes it as much as possible. Figure 10.34 is a good example of too much focal loss.

Focal Limit

The Focal Limit setting, similar to Focal Range, represents the distance between the maximum Focal Range value and the point where the blur reaches its maximum strength. Again, the best way to think of this is as a falloff value of the blur in relation to the hotspot. (However, the blur is actually becoming stronger, not falling off.) You cannot set Focal Limit to be less than or equal to Focal Range. Figure 10.35 shows where the various focal areas might exist in a sample image.

Also, much like the Focal Range setting, Focal Limit is dependent upon the Z-Buffer data of the rendered image. This means that it is subject to the same limitations of having a “planar” look when focusing on a point. Focal Limit should always be a generous number that is higher than the Focal Range, primarily because a quick ramping of no blur to maximum blur is extremely noticeable and distracting.

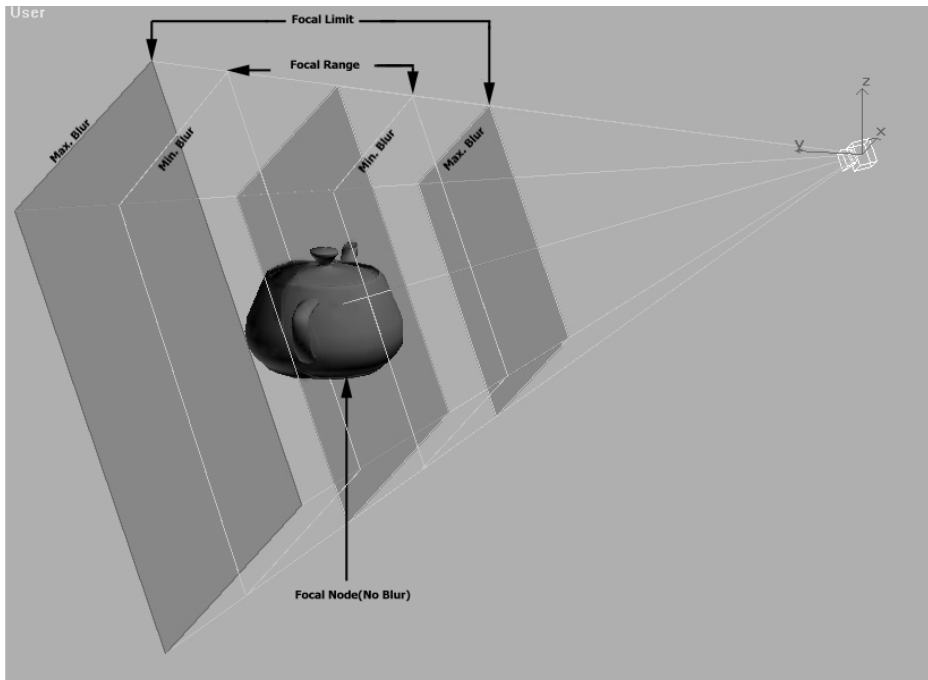


Figure 10.35 A visual representation of the focal areas in the Depth of Field effect. The distance between the focal node and the Focal Range plane contains no blur. The distance between the Focal Range plane and the Focal Limit planes is where the blurring occurs. As you reach the Focal Limit planes, the image blurs to its maximum amount.

Determining the Focal Point

Depending on your scene, you'll probably focus on one or more subjects, especially during the course of an animation. This is when you'll start to use the Depth of Field effect's Focal Node parameters.

Before setting the Focal Node in Depth of Field, however, you must select a *focal point*. A focal point could be anything—a person, an object, the corner of a building—that you want your viewers to concentrate on. After determining what you want to focus on, you need to determine if you're going to animate that focus item over time. If so, there are a few options to consider:

- **You can animate the camera's target location.** If that is the point you focus on, your camera is always focused on its target.
- **You can create a dummy and animate it.** If you're simulating a focal shift for dramatic effects, this is often done without moving the camera or its target. By focusing on the dummy, you need not worry about the camera's target, just where the dummy exists.
- **You can animate the Focal Range and Focal Limit values.** This is perhaps the most tedious way to animate focus. Although feasible, it's not practical because it can be difficult to keyframe, and there's no visual reference of where the focal node is in the viewports.

After you've determined how your focal point is going to behave, you can begin to use the Focal Node Blur parameters.

In VIZ R3, Depth of Field enables you to easily switch between the camera's target and any other object using the Focal Node or Use Camera radio buttons. Normally, you can just set the Use Camera radio button and you're done. There are times, however, where you'll find yourself wanting to focus on other objects in the scene—or at least use those as a reference point for your focal parameters. To use an object as your focal node, just click the Focal Node radio button, click the Pick Node button, and finally choose an object in your scene. You can select anything except cameras. However, you can select other camera's targets. Figure 10.36 shows the Focal Point section of Depth of Field along with some different objects selected in the Focal Node section.

Depth of Field Shift

Enough theory, you're now ready to try some focal effects of your own. In Exercise 10.7 you will use the Depth of Field effect in the Rendering Effects window to replicate a film camera move used to draw the viewer's attention from one specific character or object to another. The method you use here shifts the focus from a distant object to a foreground object, forcing the viewer to see something that might normally be lost in a busy scene. Depth of field changes are an important part of cinematic storytelling and you should consider them in computer animation as well. Pay close attention to focus the next time you go to the cinema or rent a video.

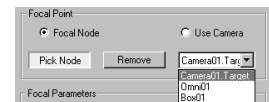


Figure 10.36 The Focal Point settings for the Depth of Field render effect. Here, you can select if you want to use the camera's target or another object in the scene as your focal point.

A Cityscape in Depth of Field

Exercise 10.7 is a night street scene in a cityscape. First, you will direct the viewer's attention to the car by throwing the background and foreground out of focus. Next, you will animate the camera to move a small amount up and to the right, signaling a change. An animated field of view change will fill the display with the new foreground object while keeping the out-of-focus background object large and in the viewer's consciousness. You will use an animated dummy object as the focus node.

Exercise 10.7 Combining a Depth of Field Shift with a Camera Move

1. Open Rendering7.max from the Inside 3D Studio VIZ CD-ROM.
2. In the Rendering pull-down menu, click Rendering Effects.
3. In the Effects rollout, click the Add button, choose Depth of Field from the list, and then check the Interactive check box. Make sure you have the Frame Slider set to frame 0.
4. Select the Focal Node radio button, and click the Pick Node button. Press the H key and select BlurDummy01. All blurring is now determined from the center of the dummy object.
5. In the Focal Parameters section, turn off the Lock button if it's on, and set
Horiz Focal Loss = 18.0
Vert Focal Loss = 9.0
Focal Range = 200
Focal Limit = 1200

The BlurDummy01 focal node is in the middle of the car, and with a Range of 35, the whole car is in focus. A setting of 600 in the Focal Limit softens the edge between in focus and out of focus.



Tip

The blurring effect tends to look more realistic if you unlock Horiz and Vert Focal Loss and adjust the entries to something nearer to the aspect ratio of the rendered image size. Rounding off to a Width:Height ratio of 2:1 is a good starting point.

6. From the Rendering pull-down menu, select Render, and then click the Render button. This renders the design at frame 0. Repeat this process for frames 40 and 140. Notice that the focal shift is moving with the dummy object you selected earlier. (See Figure 10.37.)

**Tip**

Use Depth of Field in VIZ to add impact to the visual quality of your design, but use it only on short sequences and study the test renders carefully to avoid unwanted artifacts, especially when using Depth of Field in conjunction with atmospheric effects. You can try moving the Focal Node in the scene, changing the focal range slightly, or increasing the Focal Loss settings to correct these anomalies. However, be aware that it is difficult to make Depth of Field work with atmospheric effects.

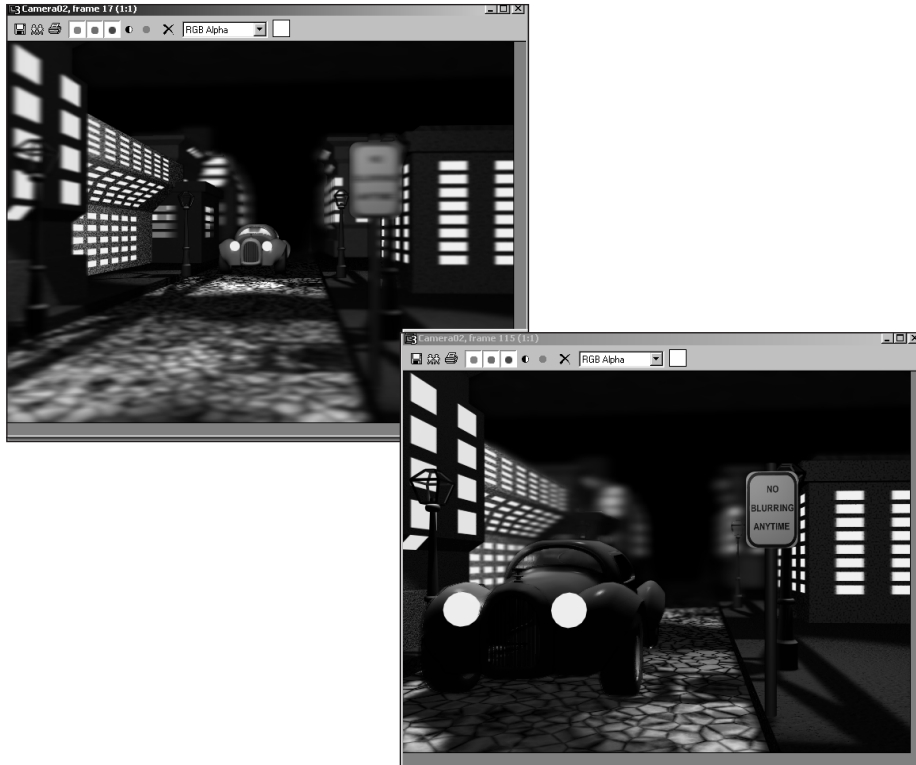


Figure 10.37 Exercise 10.7 demonstrates that all you need to animate the focal shift in a camera is to use a dummy focal node that moves the focal point around. In this exercise, you see that by linking the dummy to the car, the focal point moves with the car without adjusting anything else.

In Exercise 10.7, you set up a Rendering Effects queue using Depth of Field to animate a focal blurring in a scene. You set the Horiz and Vert Focal Loss amounts to something more in line with the rendered output aspect ratio. This keeps the effect from being blurrier at the top and bottom than at the sides.

Depth of Field can be a powerful tool for drawing the attention of the viewer to specific objects to enhance a point in the story, but watch out for artifacts created by the blur.

General Blur

3D Studio VIZ does ship with a general image Blur Render Effect that works much like Depth of Field, but without depth calculations. This effect has three separate ways to blur your design. Let's briefly talk about them and how you might use them.

- **Uniform.** This effect essentially blurs the entire rendered image uniformly—that is, in equal amounts on both the X and Y axes of the rendered image. You can use this to soften your rendered image so that its edges aren't as crisp. This is great for giving your renderings a more photographic look.
- **Directional.** This applies the blur along a specific axis. You can have different amounts for X and Y, referred to as U and V respectively, and then rotate the blur so that the image appears smeared in one direction. This is often great for renderings where you need the illusion of motion for the entire image along a specific axis, such as traveling fast along a road.
- **Radial.** This applies a radial blur from a specific center point of your rendering. You can use this effect to soften just the corners of your image, or if you apply a Directional effect, you can give the appearance of the “tunnel effect” where you're focused on a specific point and you are racing toward it.

VIZ's general Blur effect is more powerful than any image processing application's blur effect because of the types of filters you can apply to the blur. For instance, you can isolate the background from the rendered objects to only blur the rendered objects. You can render Blur and choose whether to affect the Alpha (transparency) Channel. Lastly, you can apply the Blur effect in real time. This means that you can adjust the effect and rendered image much more easily than you could if you had to constantly load the finished image in a 2D image processing application.

Smog, Clouds, and Haze

Given that the world around us has imperfections, such as smog and haze, it's often a good idea to add these imperfections to your renderings for added realism. This is especially true if you use a background photograph that contains these real-world anomalies. If the virtual world does not meet the photograph seamlessly, the illusion is lost. This section teaches you how to use fog effects to produce horizon haze, as well as how to use the Combustion effect to produce clouds that render *and* project shadows onto your design.

Hazy or Smoggy Environments

As its name implies, the Fog environmental effect gives your rendering the appearance of having fog in it. Essentially, Fog is just a layer of translucent pixels that are superimposed over the rendered image. The effect is based on the depth of your scene, and it uses the camera's Environmental Range settings to determine where the effect appears in your rendering.

Setting up Fog isn't all that hard. Just add it to your list of Environmental Effects and you're done. Much like Rendering Effects, VIZ layers and renders Environmental Effects from top to bottom. Effects that appear in the bottom of the list are rendered last, usually meaning that they're the most prominent effect in your rendering. After you add Fog, you can adjust its parameters. Because the VIZ Online help covers the Fog parameters in detail, I'm going to jump right to a specific use of Fog: creating the appearance of haze in your rendering, effectively blending the background image with the rendered design at the horizon line.

In the instance of haze or smog, the color of either one is usually reliant upon the environment behind them. Haze is typically a light color that obscures the horizon line, whereas smog is usually darker and can obscure not only the horizon line but also far above or below it. To create the illusion of your design blending in seamlessly with a background image, it's a good idea to take the average color of the background image at the horizon level and use that as your fog color. It also means that your design color near the horizon should be close to the same color as well. Exercise 10.8 demonstrates how to create a hazy horizon line to blend the real and virtual together.

Exercise 10.8 Creating a Hazy Horizon Line

1. Open Rendering8.max from the Inside 3D Studio VIZ CD-ROM.
2. From the Rendering pull-down menu, select Render and render the image.

3. In the rendered image, right-click and hold over the sky near the horizon line. Leave the rendered window up.
4. From the Rendering pull-down menu, select Environment. Click the Add button and choose Fog.
5. In the Fog Parameters rollout, click the color swatch in the Rendering group, and drag to copy the color to the Fog Color swatch.
6. Set the Fog type to Standard, and then, from the Rendering pull-down menu, select Render. Click the Render button to render the scene. The reason for the thick fog is that the camera environmental ranges are set too close.
7. Press the H key and select Camera01 from the list, and then go to the Modify panel.
8. In the Environmental Ranges section, type in 150' for Near and 2000' for Far. Re-render the design. (See Figure 10.38.)

The result is that you have a “blended” horizon line that looks far more realistic than the 1-pixel jump between the sky and the ground that you see in most renderings. Whenever possible, use this technique to help break up the background a bit.

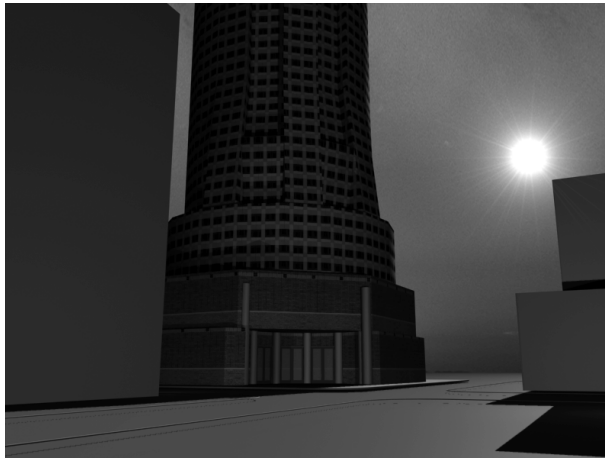


Figure 10.38 Blending the horizon line is an effective way to add realism to your rendering while also making the transition between your background image and rendered design seamless.

Partly Cloudy Environments

If you're planning on rendering a design using a background image with clouds in it, it's often a good idea to give your design the appearance that the clouds are having an effect on the rendered design through shadow casting.

To achieve the effect of having real clouds in your design, you need to use only a single sunlight source that casts environmental shadows. That is, it looks for environmental effects and makes them cast shadows based on their density. The Combustion effect is useful for creating cloud shadows because it has the capability to quickly create irregular cloud shapes and animate their position, really bringing your exterior renderings to life in an animation.

In this next exercise, you'll use the Combustion environmental effect to cast shadows on a design and to generate the illusion that the background cloudy sky is actually part of the design and not just a backdrop.

Exercise 10.9 Creating Partly Cloudy Environments

1. Open Rendering9.max from the Inside 3D Studio VIZ CD-ROM.
2. Press the H key and select Sun01. Then, go to the Modify panel.
3. Open up the Shadow Parameters section and turn on Atmosphere Shadows. Make sure the Opacity and Color Amount values are both set to 100.
4. From the Rendering pull-down menu, select Environment. Click Add, select Combustion, and then click OK.
5. In the Combustion Parameters section, click the Pick Gizmo button, and then press the H key. Select Cloud1, Cloud2, and Cloud3.
6. Render the Design by clicking the Quick Render button in the Main toolbar of VIZ.
7. In the Combustion Parameters section, set the Stretch to 2.0, the Flame Size to 50, and the Density to 7.5.
8. Change the Inner Color swatch to a dark gray by clicking the color swatch and setting it to R92, G92, G92. Change the Outer Color swatch to R193, G193, B193.
9. Render the design. Notice that all the clouds look the same. Although you could create three separate Combustion effects, the best thing to do is alter the Seed value on each of the Sphere Gizmos being used to create the clouds.
10. Press the H key, select Cloud1, and then click Select. In the Modify panel, observe its Seed value.
11. Press the H key again, and this time, select Cloud2. In the Modify panel, change the Seed value to be something different from Cloud1's.
12. Repeat the process for Cloud3, and then render the scene. See how the clouds now all cast different shadows and give everything a more random, natural look. (See Figure 10.39.)

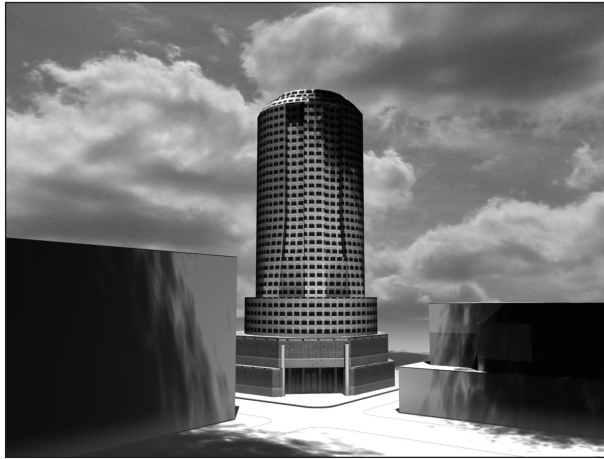


Figure 10.39 New to VIZ R3 is the capability to cast shadows from environmental effects like Combustion. Because Combustion produces great, irregular “puffy” shapes, it’s easy to create shadows from a partly cloudy sky in your design that not only look good, but can animate too.

Inclement Weather and Nighttime

For renderings in which the environmental conditions portrayed are typically darker than a normally lit design, you’ll mostly need to work with light intensity and color to achieve a realistic effect.

For instance, interior fluorescent lighting, when viewed from the outside at night, is perceived as a greenish color. Incandescent lighting is often tinted orange. When rendering exterior designs at night, it’s important to not over light the design so much that the effect of night is lost, but at the same time there should be enough light to be able to distinguish what you are looking at. You can usually do this through a combination of ambient and negative light. For darker corners or areas, just place a negative light in the design with the attenuation turned on. This removes light from just the affected area giving the illusion of a dimly lit area.

Inclement weather presents a different problem. Because there’s no real way to make it “rain” in VIZ, you usually have to just settle for the moment right before or after it rains. If right before, remember that the sky color and light intensity should match the lights in your design. You can easily achieve this just by picking small color samples from the background image just like you did in the haze creation exercise.

If it's just after it rains, you've just created some extra work for yourself. Textures need to be slightly darker than they would be in a normal-weather design. In addition, you need to add some specular highlights to the "wet" surfaces by increasing the Shininess and Specular Level in each of the material properties. (See Figure 10.40.)

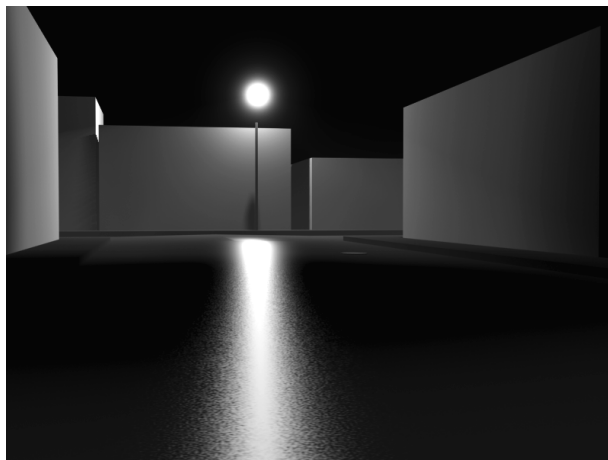


Figure 10.40 This nighttime scene consists of nothing more than a single light that's combining with a slightly higher ambient light intensity. The wet street surface is created from a simple dark gray material with a small Noise map in the Shininess channel to create the effect of an asphalt surface.

In Practice

For many VIZ users, Rendering Effects are a bit of new territory. For years, you've been able to add in lens flares, blurs, or whatever you needed to a still image using paint tools, such as Photoshop. However, with Rendering Effects and the Environment controls in VIZ R3, there's a whole new world of options to explore to make your renderings just a bit more realistic.

Most of the cases described here are just general enough for you to get the idea. Keep in mind, however, that there are some techniques that you can apply to just about any project, regardless of what you're trying to achieve.

- **Depth of Field adds focal effects through blur.** The Focal Loss parameter enables you to add more or less blur to the scene. By unlocking Horiz and Vert Focal Loss, you can blur the rendered image more or less along a specific axis.

- **Use general Blur settings for non-focal point effects.** You can use both Scene Blur and Radial Blur to blur a scene without depending on the Z-Buffer. Scene Blur blurs the entire rendered image, and Radial Blur blurs the scene from the center of the rendered image outward.
- **Depth of Field is based on depth information from the Z-Buffer.** Because of this “feature,” focus begins and ends in focal effects that are based on a planar range rather than a spherical one. At higher focal loss settings, this becomes very noticeable.
- **Use dummy objects when simulating focal shifts.** Rather than using the target of the camera as your focal node, create a dummy object. This enables you to create focal shifts without moving the camera or its target.
- **Know glow and flare causes.** In an effort to produce the best computer-generated flares and glows, it helps to understand that atmospheric effects cause their real-life counterparts.
- **Assign the glow source.** The Glow element gives you many options for choosing sources. The type of scenes and objects with which you’re working often dictate your choice. Object ID is ideal for light-bulb objects or neon tubing. Material ID is ideal when Raytrace reflections or refractions are present in the rendered image.
- **Filter glows.** At times, you’ll need to control where the Glow effect happens on the object. Through options like Perimeter, Perimeter Alpha, and All, you can effectively define where a glow occurs on your selected source.
- **Study sources for glows.** Glows can occur because of many situations, but they are usually the result of various atmospheric conditions. If you’re concerned with how a glow should appear, just observe a real-life situation in which the glow occurs. If you’re not simulating real life, use artistic license coupled with real-life knowledge.
- **Determine sources and camera types for flares.** Because both the atmosphere and the type of camera lens you’re looking through can cause flares, you need to use some of the more advanced features of Flare. Use hue values for taking on the color of the flare source. Soften, when used with Effect Size, is best for simulating hazy conditions. Use Squeeze primarily for film output or for simulating the anamorphic squeeze effect associated with outputting to film.