

Intermediate Max R3 – First 2000

In this session you will explore methods of improving techniques that appeared in animations on the 1999 First tapes. There were a few recurring issues that affected the quality of last years tapes that are relatively easy to avoid and that will make the final presentation more polished. The topics will range from materials and lighting to animation to special effects.

Color Saturation

A little background first. Images that get translated from the RGB format you see on your computer to the NTSC analog image you see on video playback undergo conversions and filtering to make them compatible with TV. The quality of that conversion can vary depending on the equipment used, but there are several steps you can take to improve the quality of the process.

One of the most noticeable issues in last years tape is that of overly saturated colors in the material editor. When converted to video signals these saturated colors bleed on the videotape and appear as halos around the area of color. This bleeding effect reduces the sharpness of the image and gives a messy appearance to the scene. The effect is most noticeable in the primary and secondary colors (red, green, blue, yellow, cyan, etc) and less noticeable in earth tones or pastel colors.

When you set the diffuse colors of materials in Max R3, you can adjust the saturation in the Color Selector of the Material Editor. The Saturation slider should be set to an amount of 180 or less to be sure to avoid most bleeding when recorded to a video device. See Figure 1.

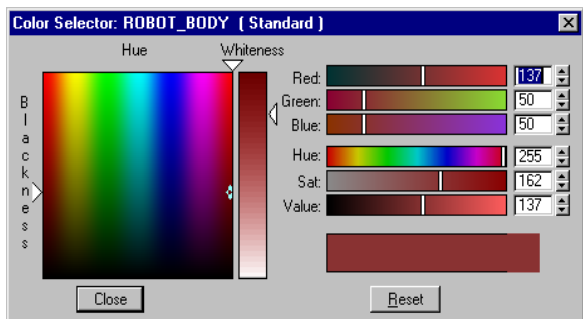


Figure 1: Color saturation 180 or lower to avoid video bleeding

As stated earlier, the effect is different for each recording device, so it is wise to render several tests and view them on a TV monitor before rendering the entire scene to videotape.

Noise maps

Another problem observed on many of last year's entries was texture maps that are too "busy" and have overly contrasting colors. Usually this is a Noise map, Cellular map, or other procedural map applied as color information to objects in the scene. If the same map or a similar map should be used as Bump map in the material then the effect is enhanced. The end effect is that the busy pattern draws the viewers' attention away from the important aspects of a still image. The problem is compounded in animations because when the small pattern is displayed on a monitor the pixels of the monitor first try to show a light pixel, then a dark pixel, and back to a light pixel in rapid succession. This causes the pattern to sparkle and scintillate in the animation and is very distracting to the audience.

Figure 2 shows a typical noisy Bump and color pattern in a still image. Compare it with Figure 3 showing a much lower contrast and larger color pattern with no Bump effect. In Figure 3 the robot and boy take on much more importance and the details and shadows show correctly.

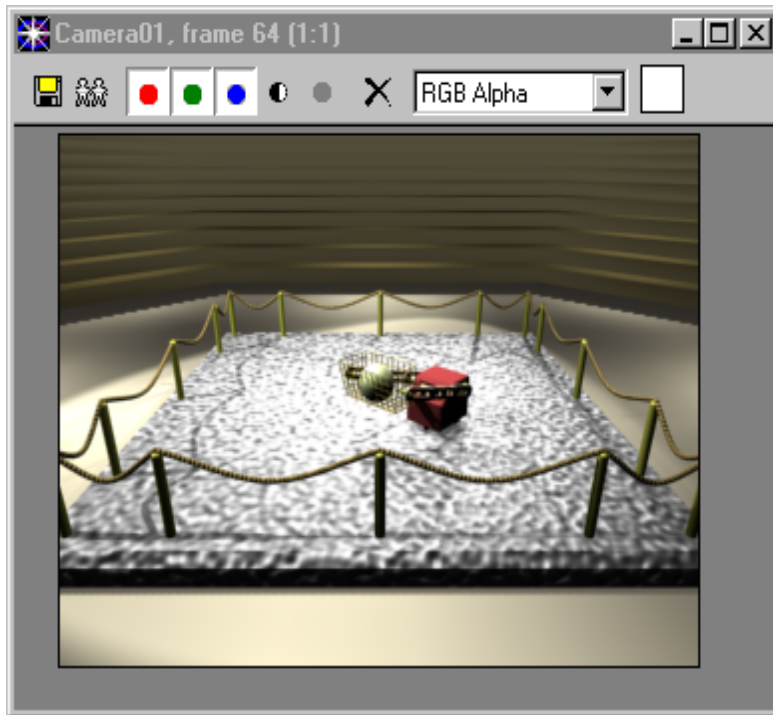


Figure 2: Busy Noise texture map

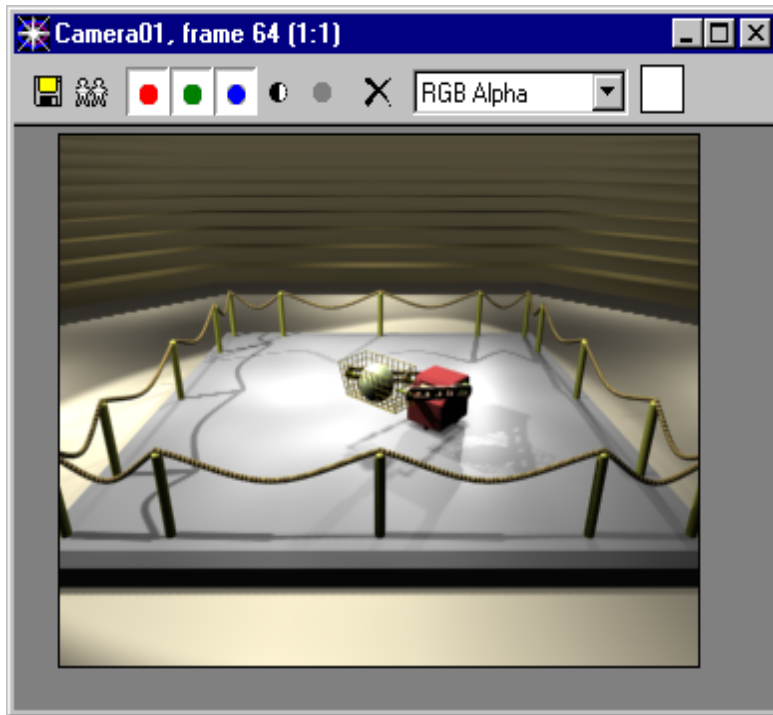


Figure 3: Objects appear clearer, shadows visible

There are, of course, situations when busy texture maps are appropriate but use them sparingly and always test the effect in an animation before committing them to the final presentation.

Lighting

One of the most important aspects of lighting is Attenuation, or the falloff in intensity of a light away from the light source. One way of controlling the Attenuation of Max R3 lights is by using the Far Attenuation Parameters in the Modify panel of a selected light. A light has full intensity from the light source to the Start Attenuation range. The light then dies out linearly between the Start and End ranges. Beyond the End range the light has no effect and will cast no shadows.

Figure 4 and Figure 5 show a scene with only four lights. There are a low intensity Omni light to give an overall illumination to the scene, two Target Spot lights pointing at the arena from behind and from the left front as main lighting, and a Free Direct light from above to give the illusion of many overhead lights. You will learn more about the Direct light later.

In Figure 5 the two Target Spot lights have Far Attenuation set so the lights attenuate quickly from about the center of the arena to just beyond the rail. This adds realism to the scene (all real lights attenuate) and cuts the distracting shadows and lighting that you can see in Figure 6. It also has the added benefit of not calculating shadows beyond the End

range, speeding rendering and saving memory. Most lights in your scene should have Attenuation enabled and adjusted to give you maximum control of your lights.

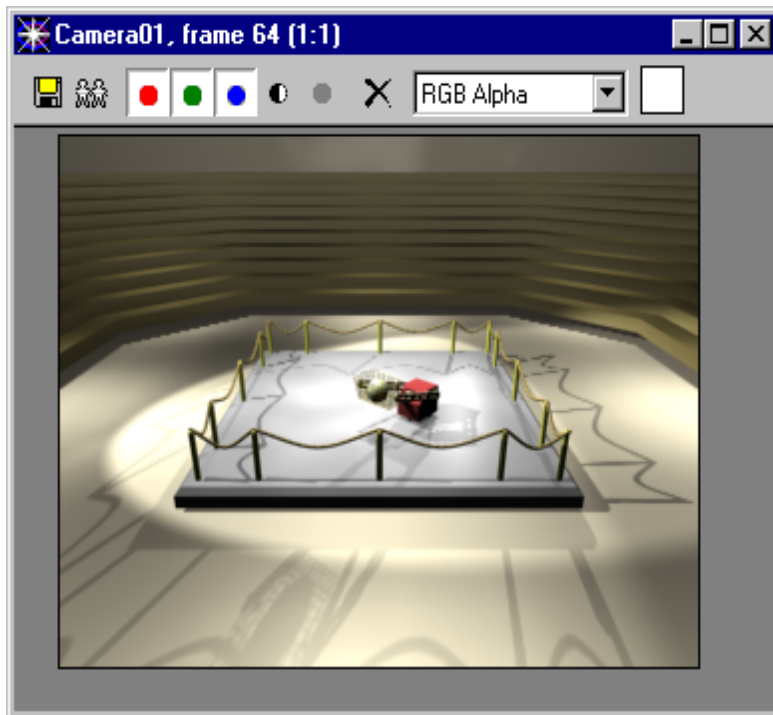


Figure 4: Spot lights with no Attenuation

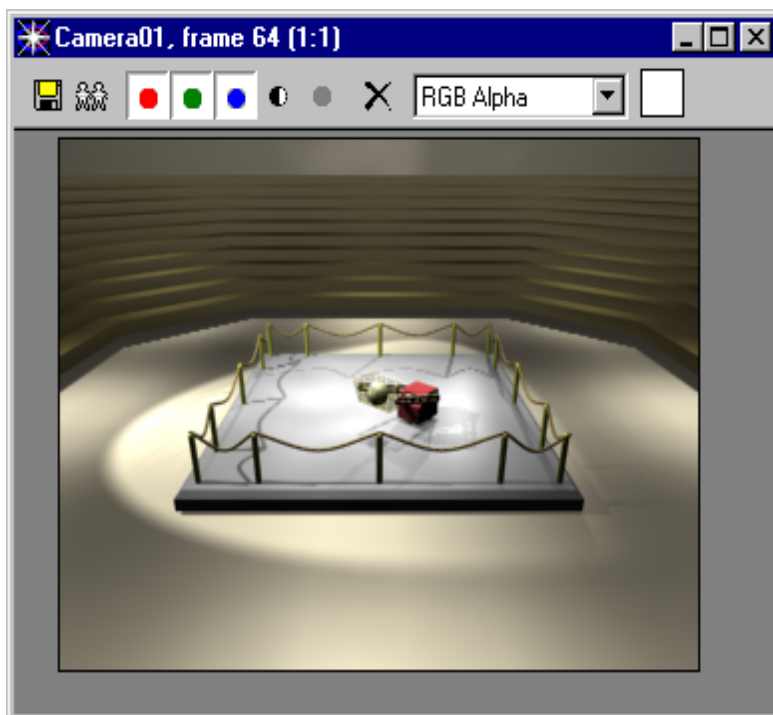


Figure 5: Attenuation added to Spot lights for realism and efficiency

Projector Maps

In Figure 5 there are also pools of light visible across the floor and onto the bleachers. These pools of light come from the single Free Direct light center in the scene just below the rafters. The Free Direct light uses an image of white dots on a black background as a Projector image (see Figure 6). When the map is in a lights Projector slot (see Figure 7) white areas of the map lets light through and black blocks light. Gray in the image lets a percentage of light show through. This is an easy method to create the illusion of many lights in a scene with one light. It is easy to control and adjust.

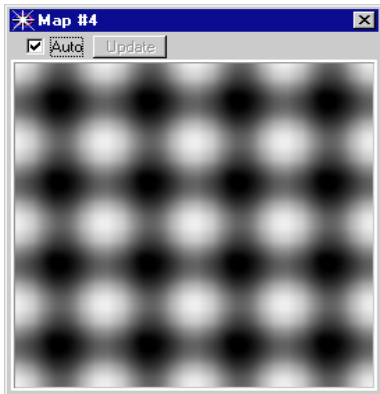


Figure 6: Bitmap used as Projector image in Direct light

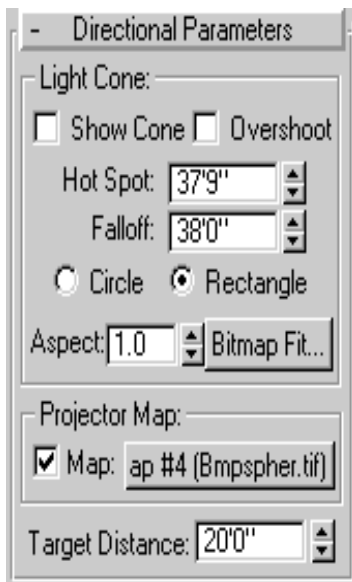


Figure 7: Projector Map area of Direct light

Animation

In a typical First animation you have objects that are picked up by the robot in one place and, perhaps, passed off to another mechanism or robot. In 3DS Max R3 you have the

ability to hierarchically Link one object to another in a Parent-Child relationship. Where the Parent goes the Child must follow, but the Child can have its own independent motion. That works fine if the Child only has one Parent during a scene. If a Child will be passed to another Parent during the course of an animation you must use an Animation Controller called the Link Control. It allows you to transfer control of a Child from one Parent to the next at any designated frame and you can transfer control to as many different parents as you like.

The Link Control is found by selecting the Child object and opening the Motion Panel. You highlight Transform in the Assign Controller rollout and assign a Link Control. Figure 8 shows a scene at the point of transfer of a ball from the basket to Box01 on stage. Before frame 81 the ball is travelling in the basket and after frame 81 the ball is left sitting on top of the Box01. Figure 9 shows the Motion panel with two added Links, one for the basket at frame 0 and one for the Box01 at frame 81.

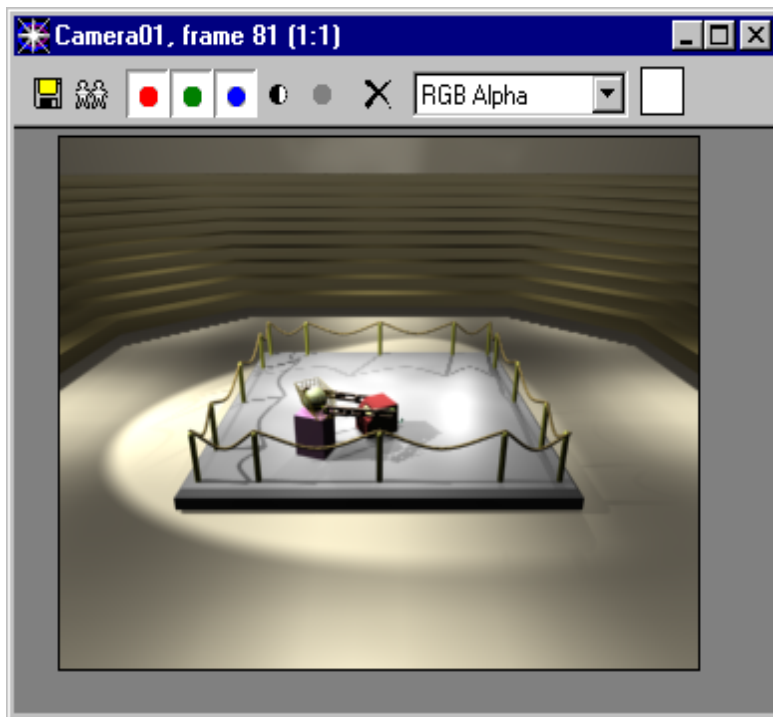


Figure 8: Frame 81, ball linked to basket



Figure 9: Link Parameters dialog in Motion panel

Blurring

Although many scenes in the First animations have fast moving objects, you seldom see Motion Blur added to give the illusion of fast motion. This is one of those components to

a scene that has nothing to do with realism, but is an effect that heightens the sense of realism for the viewer. There are two types of Motion Blur that you might consider for this effect: Object Motion Blur and Image Motion Blur.

Motion Blur is assigned to individual objects in the Properties dialog. If you right-click on a selected object you can choose Properties from the menu. The settings are found in the lower left pane of the Properties dialog as shown in Figure 10.



Figure 10: Object Properties dialog, Motion Blur pane

Object Motion Blur is not a special effect, but a blurring that softens the edges of fast moving objects in the scene. It only works when the object is moving through space, not when a camera is moving past an object.

Image Motion Blur is more of a special effect that causes the whole image to be blurred in the direction of a moving camera. Used sparingly, it can be very effective to convey high-speed movement to the viewer.

There is also Scene Motion Blur that is invoked through Video Post. It, however, tends to add considerably to render times and I don't recommend it for First animations. Use Image Motion Blur instead.

Special Effects

A special effect that seems to be popular in First animations is the act of blowing up objects in a scene. Hopefully explosions are used in context with the storyboard to emphasize a point, ...sometimes, however, it appears to be a gratuitous explosion. In any case, I suspect the SpaceWarp Bomb is often used to explode the objects. This gets the job done, but tends to look unconvincing because the blast particles are much too regular and look like computer generated blast fragments.

For a better blast effect try using Particle System in the Create panel called PArray. Create a PArray object and use the Pick Object button to choose the object you want to explode. Set the Viewport Display to Mesh and Particle Type to Object Fragments. Now when the object explodes it breaks into rough chunks with thickness instead of quad or triangular faces.

You can also use PBomb in conjunction with PArray to give more control to the flight and motion of the blast fragments.

Add a Combustion Atmospheric effect and the blast is complete. See Figure 11 for a Bomb on the left and a PArray on the right.

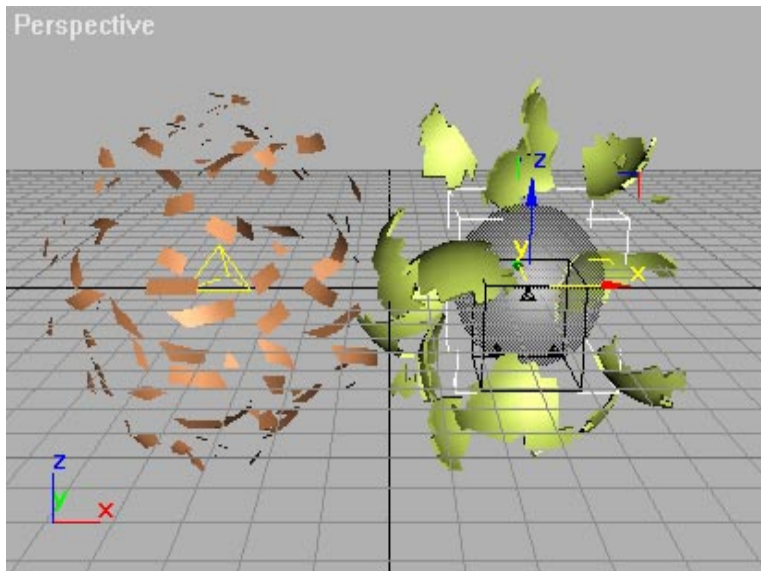


Figure 11: Bomb blast on left, PArray blast on right

PArray blast fragments can be further enhanced by using the POMniflect, SOMniflect, and UOMniflect Particles Only type SpaceWarps. The P, S, U stand for Planer, Spherical, and Universal to signify the general shape of objects they should be applied to. These SpaceWarps cause the blast fragments to deflect of the surface of the object it is applied to. Otherwise the blast fragments will pass through the surface of those objects. Be careful, these Particle Systems and SpaceWarp combinations can slow even the most powerful computers.

Other special effects that can add visual interest to a scene when used at the right times are the Environmental and Light effects like Glow, Highlight, and Star effects, or Blur, Color Balance, and Film Grain effects.

There are two common methods of applying these effects. One is to cue the effect at the object level by using an G-buffer Object Channel number found by right-clicking on a selected object and setting the number in the G-buffer pane of the Properties dialog to something other than 0. See Figure 12.



Figure 12: Object Properties dialog, G-Buffer pane

You can also cue an effect by using the Material Effects Channel in the Material Editor. By setting the Material Effects Channel to something other than 0 the special effect will occur on any part of an object or objects that has that particular material. See Figure 13.



Figure 13: Material Effects Channel in Material Editor

Setting the Object Channel for objects and Material Effects Channel for materials doesn't cause the effect to happen. You must also create an Effect that will occur based on the channel assignment. Both the Object Channel and the Material Channels are specified in the Options tab for the particular effect as accessed through Rendering pull-down menu/Effects. See Figure 14.

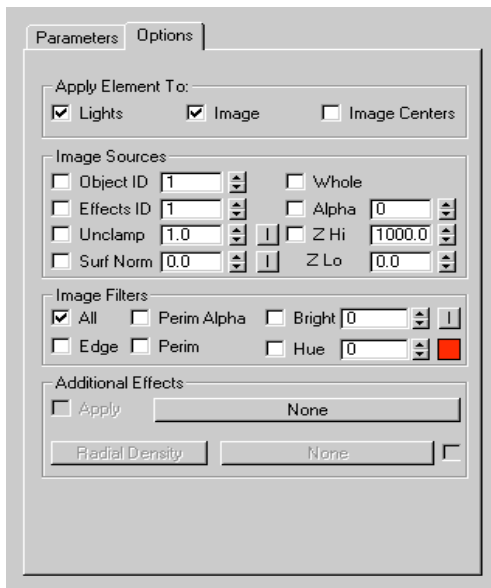


Figure 14: Effect must be set to use Object or Material Channel

Special effect may also be applied directly to lights. Select a light in the scene and, in the Modify panel, add effects in the Atmospheres and Effects rollout. See Figure 15.

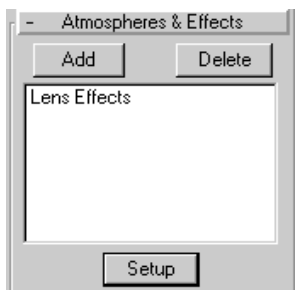


Figure 15: Atmosphere and Effects rollout in Modify panel for lights

Summary

The topics presented here are not complex techniques that require a lot of preparation and knowledge, but are methods that are easy to overlook when you are under at tight deadline. Use the special effects when they make sense to your story, not just because the computer can do it. Most of the topics here can detract considerably from the performance of your system both in display speed and render performance, something you can't afford when time is important. Above all, have fun.