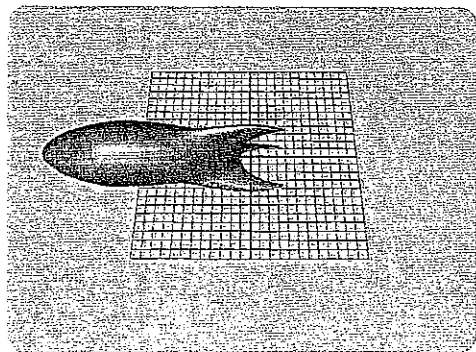
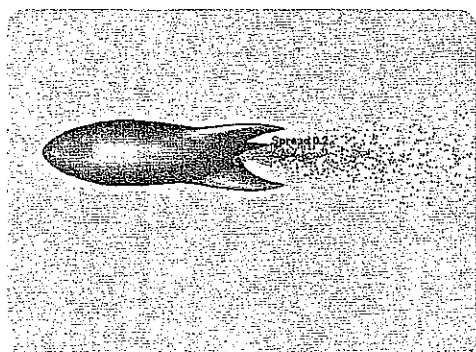


Creating Rocket Exhaust

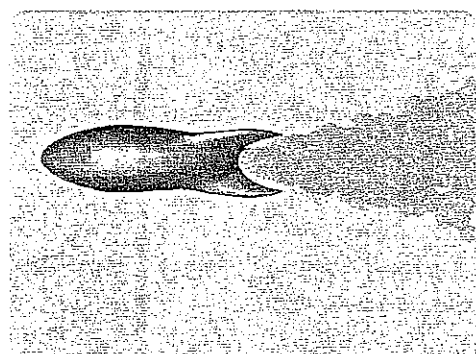
12/04/2012



1 From the companion CD, open the file CH10_RocketStart.mb. We will add an exhaust plume to this rocket using particles. First create an emitter for the particles: choose Particles → Create Emitter.



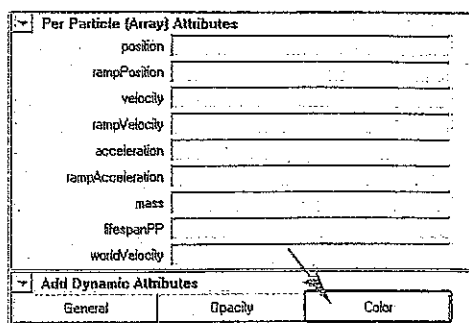
2 Position the emitter at the base of the rocket. In the emitter's Attributes panel, set Emitter Type to Directional, Rate to 250, Spread to 0.2, and Speed to 5.0. If you want, you can adjust these using the manipulator. Scrub the Time Slider to see the particles.



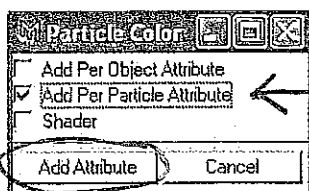
3 Now that we have particles, we need to make them look like smoke. Click the particleShape1 tab

in the Attributes panel. This panel controls the look of the particles. First, in the Render Attributes tab, set Particle Render Type to Cloud. Scrub the Time Slider, and you'll see that the particles are now circular blobs.

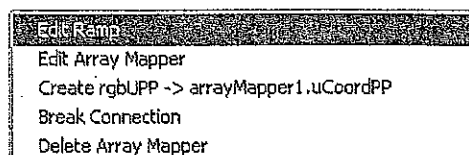
CLOUD



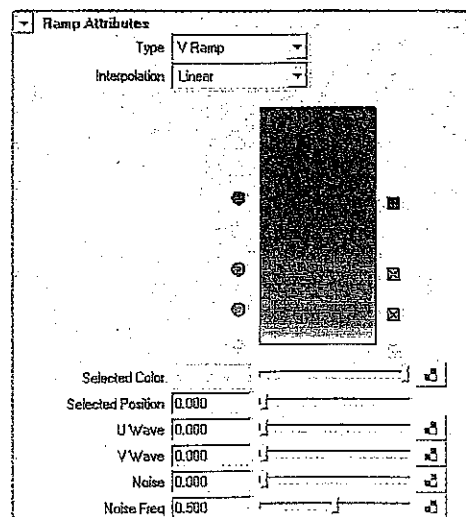
4 We need to add some color to the blobs. Go to the Per Particle (Array) Attributes → Add Dynamic Attributes rollout and click the Color button to open a dialog box.



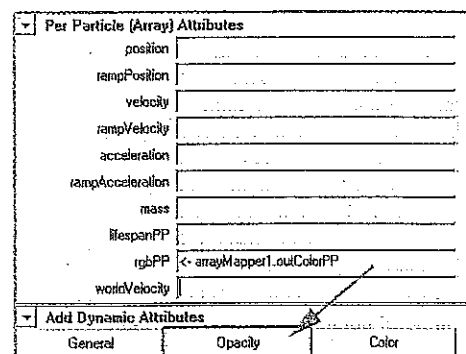
5 We want the color to affect each particle individually, so select Add Per Particle Attribute and click Add Attribute.



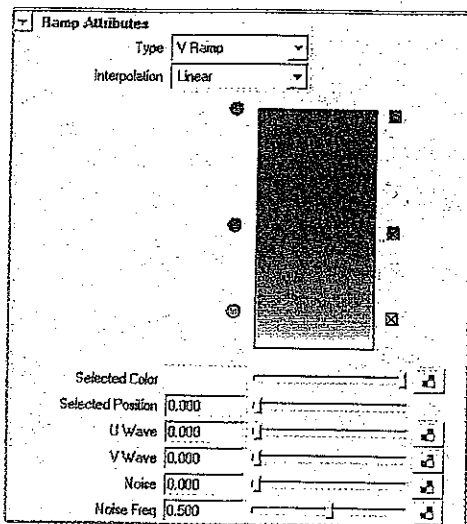
6 This adds an Attribute slot called rgbPP to the Per Particle Attributes rollout. Right-click this slot, and choose Create Ramp. This will add a value into the rgbPP slot. Right-click the slot again, and choose Edit Ramp.



7 We can now create a ramp for the color of the exhaust over the lifetime of a particle. The bottom of the ramp is the color of the particle when the particle is created; the top color is its color when it expires. Create yellow at the start of the ramp, fading to red, and then dark gray at the end.



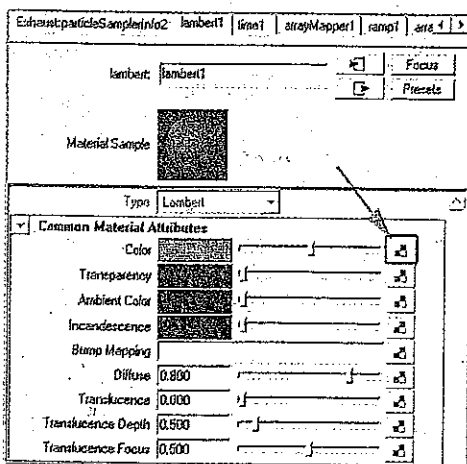
8 We also need to fade the particles to transparent to simulate dissipating smoke. This is done with opacity. Just like with the color, we need to add an opacity slot and create a ramp. Click the Opacity button on the Add Dynamic Attributes rollout, choose Add Per Particle Attribute, click Add Attribute from the dialog box that pops up, right-click the new slot to create a ramp, and then right-click again and choose Edit Ramp.



9 Opacity ramps are limited to grayscale, so create a ramp that starts white and fades to black.



10 If you do a quick render, you'll see that the color is not showing up. This is because we still have to modify the particle system's shader.

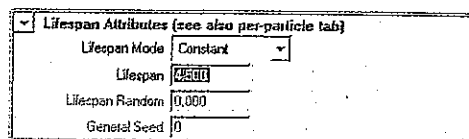


11 Select the particles coming from the emitter. In the particle system's Attributes panel, locate the Lambert tab. Click the

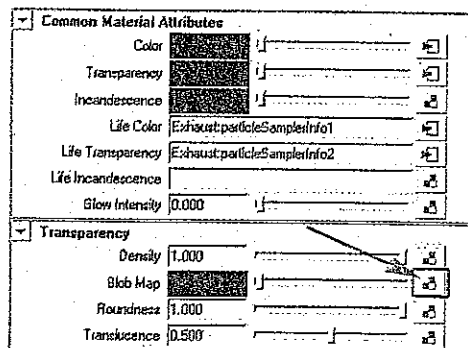
box to the right of the Color attribute to open the Create Render Node window. Choose Utilities → Particle Utilities, and select Particle Sampler. This tells the shader to use the color ramp we just created. Repeat this procedure for the transparency channel.



12 Scrub the Time Slider to see the results. A test render shows the color is correct, but the particles are expiring too soon.



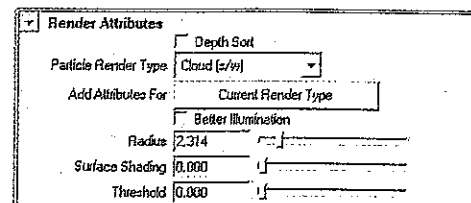
13 To fix this, go back to the particleShape1 tab in the Attributes panel and locate the Lifespan Attributes rollout. Set Lifespan Mode to Constant and increase Lifespan to 4.5.



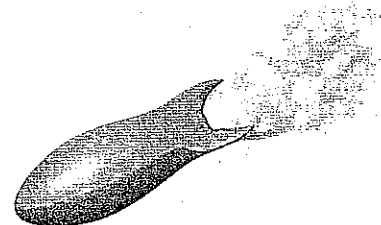
14 Locate the particleCloud1 tab in the Attributes panel. Click the box to the right of the Blob Map attribute to open the Create Render Node window. Choose a cloud texture. While in the ParticleCloud1 tab, adjust Diffuse Coeff to 0.9.



15 A scrub and a quick render shows that we're almost there. The particles are still a little small.



16 Move back to the particleShape1 tab and locate the Render Attributes rollout. Click the Current Render Type button to reveal the attributes for this type of particle. Adjust the particle size to approximately 2.1. You can also play with the Threshold attribute to make the clouds blob together more.



17 That should be it. Do a final render and go back to tweak any colors or other attributes to your liking.