User Guide

Fog Polygon Volumes

Instructions

The FogPolygonVolumes3 code sample requires hardware support for vs.1.1 and ps.2.0. If hardware supports ps.3.0, the code sample uses a code path that takes advantage of ps.3.0 features and requires fewer passes than the ps.2.0 path.

A technique using off screen render target textures is used to render an undulating volume of fog on the floor of the tomb scene. The fog volume is an ordinary polygon mesh, and it is easily controlled and animated. Figure 1 shows an example of how the code sample should look when it starts up. The appearance of the fog is a function of the thickness through the fog that you are seeing at each pixel. The scale factor for converting thickness to color can be controlled with the **Fog Color Scale** slider in the controls window.

Table 1 lists the controls used for this code sample.

Table 1. List of Control Keys

| Key	Description
H key	Toggles the Control window on and off
F1	Lists additional keyboard controls
W, A, S, D	First-person shooter type controls to fly around the scene
Q	Move camera Up
E	Move camera Down
Left-Drag	Point camera as you look around the scene
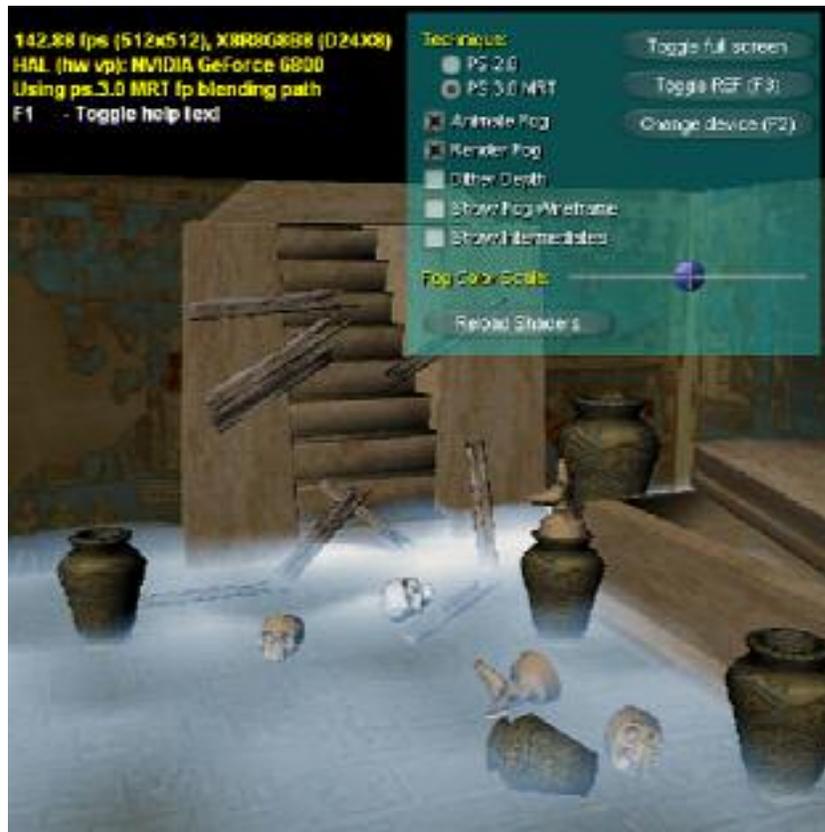
Figure 1. Fog Polygon Volume Effect

Controls Dialog:

❑ **Technique**
Selects whether to use the ps.2.0 or ps.3.0 code path

❑ **Show Fog Wireframe**
In wireframe mode, the depth buffer is not used, so the fog volume object is visible through the walls of the tomb scene.

❑ **Render Fog**
This checkbox toggles both the animation and render-to-texture operations used to render the volume fog. In a Debug build of the code sample , the procedural animation of the fog volume can be a significant bottleneck in the code sample 's performance.

❑ **Dither Depth**
Controls whether or not to dither the depth information used to compute the fog thickness at each pixel. Chances are, you will not be able to notice the visual difference between the two states in this scene, but without dithering, performance may be faster.

❑ **Show Intermediates**
Toggles the display of the off screen render target textures used to compute the appearance of the volume fog objects. With the ps.2.0 path, these targets are 32bpp ordinary textures. With the ps.3.0 path, some of these are floating point (fp16) render target textures which appear much darker.

With this display, the upper-left texture is rendered to contain the depth to the nearest solid object in the scene. The upper-right texture contains the sum of depths to all front faces of the fog polygon object or to the nearest solid object, whichever is closer to the camera. In the ps.3.0 mode, this texture contains the sum of all front and back face depths. In the ps.2.0 mode, the lower-left texture contains the sum of depths to all back faces of the fog polygon object or to the nearest solid object.

❑ **Reload Shaders** – Shaders for this code sample live in SDK\MEDIA\Programs\D3D9_FogPolygonVolumes3. These shaders can be edited in an external editor as the code sample is running, and then reloaded into the code sample using this button.

Note:	You can fly into solid objects and into the fog volume itself. As you do this, one single well-thought-out rendering path properly accounts for all camera positions and all cases of the fog volume object intersecting itself and the solid objects in the scene. No special code or data is required to handle the intersection cases, so the entire scene is trivial to animate. The visible fog object thickness is converted to color using a simple color ramp texture. The visible thickness of the volume at each pixel is scaled and used as a texture coordinate to access the color ramp.
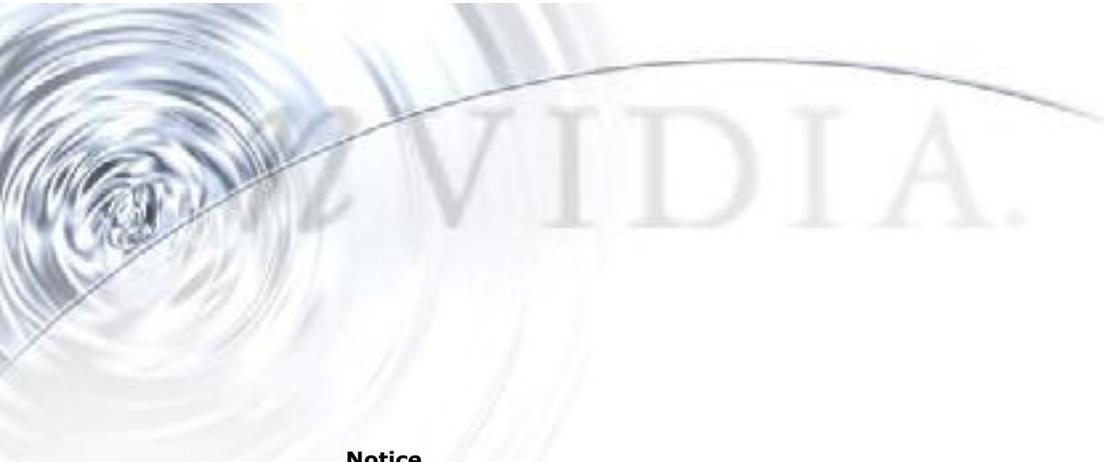
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