Subject: Re: [update]: artifacts with volume rendering
Posted by Karl Schultz on Wed, 26 Feb 2003 15:23:43 GMT
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"Sebastian" <s@visita2.die.upm.es> wrote in message
news:Pine.LNX.4.44.0302261420320.2560-100000@visita2.die.upm .es...
> I wrote a litte program that shows the artefacts. I creates a volume, cuts
> of a cube, and renders a short sequence. The artefacts are clearly
> recognizable on the cutting surfaces.

<snip program>

I think that this is simply caused by sampling error. You are doing trilinear interpolation, which means that the "empty" (zero) voxels adjacent to your cut surfaces are going to contribute to the computation of the "pixel" in the final image. The amount of the contribution of the "zero" voxel depends on how the ray passes through the voxels along the cutting edge. And that's why the "aliased" frequency you are seeing in the bands depends on the rotation angle.

I'm not a wizard in this area, but I know that sampling at twice the frequency can remove these aliasing problems. I changed your window size to 100x100 and made the volume 200x200x200 and that made the artifacts disappear or at least become less noticable.

I also think that this exposes a minor flaw with your workaround for lack of bounded cutting planes. If IDLgrVolume had bounded cutting planes, then the interpolator wouldn't use the voxels on the other side of the bounded cutting plane in the interpolation calculation and then you'd probably be OK. As it stands, the interpolator doesn't know that you don't want the zero voxels to contribute to the image at all, and so includes them in the interpolation.

Here's another idea, which I'm sorry that I didn't suggest sooner.

Use two 3D datasets in IDLgrVolume.

The first dataset is your real volume data. The second one is a mask volume. The voxels are 255 where you want voxels in the first dataset to be displayed and 0 where you don't. You would set the VOLUME_SELECT property to 1. This may not help the aliasing problem, but it might be a better way to cut cubes out of your volume - you wouldn't have to damage your original data.

Karl