Subject: Re: survey: accelerated 3D volumetric rendering
Posted by Randall Frank on Wed, 28 Feb 2001 05:30:33 GMT
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Rick,
 Ok, I'll bite. I don't want to get into the latter part
of this thread, but I see major speed increases in 3D performance
with GeForce and Quadro cards in HW over SW with a couple of notable
exceptions.

 So, you want to volume render in HW well, you can do 3D
texturing or 2D texturing. With 2D texturing, you can use axis
aligned slices or shear-warp. Actually, many of the 2D texturing
methods can be done in IDL right now (a long time ago, I wrote
a HW volume rendering object in .pro for a demo). Volume
rendering is really a matter of fill rates, so standard PC gaming
HW does a very nice job. See any of the work by Ertl from
IEEE vis (code is available for download). The combination
of 2D texturing and multi-texturing works very well.

Rick Towler wrote:

>
> What are peoples experiences with accelerated 3d volumetric rendering. I am
> sure very high end unix viz workstations have the ability to accelerate
> volumetric rendering but what about lower end hardware. Is this the domain
> of high end video adapters only?
>
> In my case we have a Sun Ultra60 with the Creator3d framebuffer and PC's
> running consumer versions of nvidia's Geforce line. The Creator3d is
> painfully slow rendering anything. The Geforce cards are quite fast with
> your standard polygon rendering but volumetric rendering isn't supported in
> hardware.

The (early) Creator3D was a rasterization only engine. All triangle
transforms and lighting are actually in SW. Thus, the card can be
poor with high polygon counts, but actually works pretty well for
volume rendering applications.

The GeForce 3 (announced this week) does have 3D textures if that is
what you mean by "volumetric rendering". Up to 512^3 in size. However,
the effective framebuffer fill rate of that card has not increased over
the GeForce 2. Thus, it will not really be much faster for volume
rendering until someone writes a renderer using the pixel pipeline to
move "chunks" of the blends into the pixel combiner paths (which
could be done). In the current class of cards, the HP, 3D labs and
ATI cards all have 3D texturing (actually, the nVidia drivers support
it, but it is in SW until the GF3) and there are demos on their sites.

If you are looking at the low end, the ATI card is less than $300.
You can also use the multi-texturing stuff on the GeForce to get a
good approximation of 3D textures (again, see the Ertl papers and
web site) for around $400. Or, wait for the GF3 for around $600.
For many applications, axis aligned planes with 2D texturing will
work. The key to volume performance is fill rate, so it is hard
to beat a VooDoo 5500 or GeForce 2 Ultra today (if used correctly).
Several people around here use the HP fx10 for volume rendering
and like it as well. Finally, the 3D Labs GVX420 and Wildcat
cards work pretty well for volumes.

Bottom line, I would suggest you not get too caught up in
equivocating 3D texturing with volume rendering. This will get
very murky soon with DX8 and cards like the GeForce 3. You can
definitely get good volume rendering in low end PC cards today.
3D textures are available for several PC cards today as well.

Now, how this relates to IDL, short of my initial comments, I am
not sure... and this is all IHMO.

Ref:
 http://wwwvis.informatik.uni-stuttgart.de/eng/research/pub/p ub2000/wgh00-rezk.pdf

Hope it helps.

>
> Does anyone have any experience with this using nvidia's Quadro line or with
> 3dLabs cards? What about other platforms?
>
> fwiw, Sun just released the Expert3d lite which does support accelerated
> volumetric rendering and when bundled runs for $2000. I guess that is low
> end....
>
> -Rick Towler

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rjf.
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