Dome Projection using a Vertex Shader

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Dome Projection – Becoming more Common

Only a matter of time until it becomes a routine visualization tool
Programming a Dome display is easier when only a single projector is used.

A fisheye lens distorts the image so that it spreads out across the dome. The trick is pre-distorting the image in the other direction so that it looks correct after being projected.
Dome Distortion

Move the teapot so it surrounds the audience
Dome Projection:

Viewing Volume = (-1,-1) to (1,1)

Edge of the circle represents the edge of the dome projection = your left, right, bottom, top as you are sitting in the theater.
Dome Vertex Shader:

```c
const float PI = 3.14159265;

void main( )
{
    vec4 pos = uModelViewMatrix * aVertex;
    float lenxy = length( pos.xy );

    float phi = atan( lenxy , -pos.z );
    pos.xy = ( phi / (PI/2. ) ) * ( pos.xy / lenxy );

    gl_Position = uProjectionMatrix * pos;
}
```

*Note: (pos.xy / lenxy) = (cos\(\Theta\),sin\(\Theta\))*
Dome:
Flow Visualization in the Dome
Mars Panoram in the Dome
Large Lines and Polygons Need to be Tessellated

Note: This edge does not pass through the flow vectors!

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