Dome Projection using a Vertex Shader

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:

God's-eye View:

As the eye sees it:

From the side:

Dome Vertex Shader:

Note: ( pos.xy / lenxy ) = ( cos \( \Theta \), sin \( \Theta \) )

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;
}
Large Lines and Polygons Need to be Tessellated

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

Note: This edge does pass through the flow vector!

Bounding Box edges were not tessellated.
Curves lines on the monitor produced curved lines on the dome.

Bounding Box edges were tessellated.
Curves lines on the monitor produced straight lines on the dome.