

RFL Pixel Planet (Space-Mode) [See: Phong Shading]

Date: 7/2/26
No. planet-tool

- Shaders-only.
- 2D shaders give pixel coordinates
- Convert coordinates to the 3D location on sphere to find Z components

$$p = \begin{pmatrix} x \\ y \\ \sqrt{1-x^2-y^2} \end{pmatrix}$$

Lookup coordinate on 3D noise (generate height)
- Consider: make 'atlas' of heights for surface-mode

- Map to color palette:
 - grass
 - coast
 - sea
 - clouds (on larger radius)

- Transformation Matrix for cloud rotation

$$p' = \begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos(\theta_x) & -\sin(\theta_x) \\ 0 & \sin(\theta_x) & \cos(\theta_x) \end{bmatrix} \cdot p$$

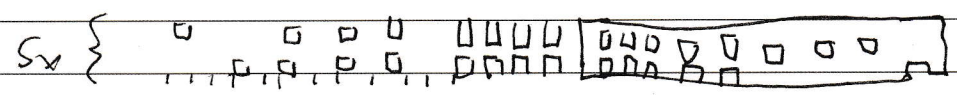
- Offset by cloud lookup by the time to make the clouds shift.

- Take normal of the sphere

- Diffuse portion of Rayleigh (?) / Phong (?)

$$L = \frac{p'}{\|p'\|} \cdot L$$

- Other textures: (see Loren's game again)



32-bit ish

So for gas giants, have heightmaps all be cloud layers, merely, each has an offset and transform in time.

Also: may want to blend $\sin(\theta_y)$ into noise to give banding

Email copy of KRO to Ophelia.