

Virtual Reality: A new facility at UWA

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Details

- Funded by an EIF grant to the National Geosequestration Laboratory (NGL), in support of visualisation in Geophysics (CI Prof Lumley)
- 3x3 tile of 1920x1080 pixel panels, so approximately 6000x3000 pixels.
- Capable of stereoscopic output at that resolution.
- Includes tracking system for viewers head and two input devices.
- Follows previous presentations on the Oculus Rift and iDome.
Alternative means to achieve immersion.

Presentation

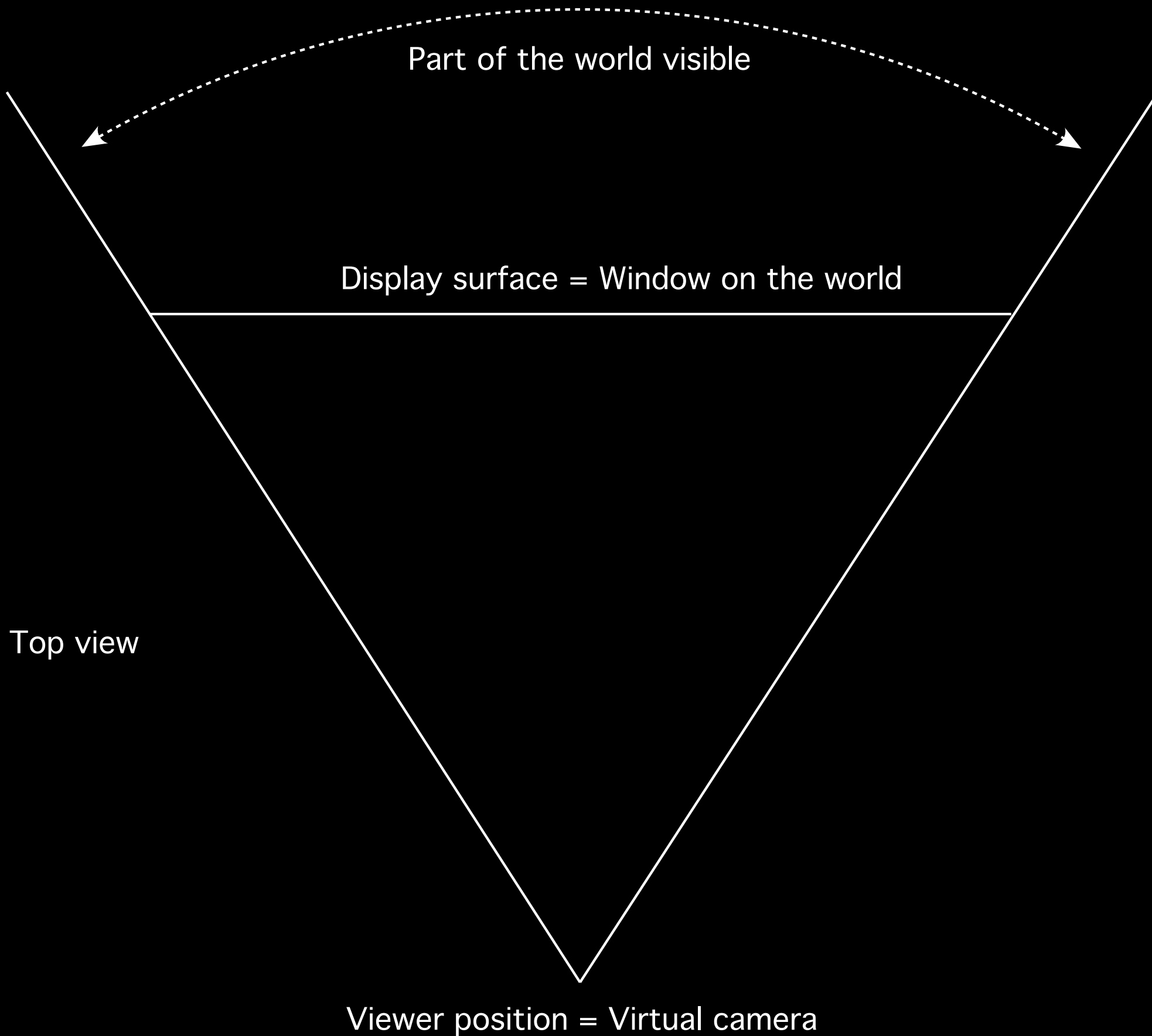
- Will show some general content first
 - high resolution images
 - stereoscopic images
 - 3D models at scale and resolution
 - stereoscopic movies
 - 3D models without head tracking
- Two head tracked and game controller examples. Both based upon the Unity3D game engine.
 - Reconstructed indigenous rock shelters
Courtesy CRAR+M (Centre for Rock Art Research and Management)
 - Beacon Island

Why head tracking?

- Stereoscopic viewing is only strictly correct from one view position. Typically designed for the centre of the screen and some distance back.
- Away from that position depth is distorted.
 - Moving left and right introduces a shear.
 - Moving forward and back scales depth.
- We are insensitive to this for monoscopic images, they are on a canvas so clearly 2D.
- We quickly adapt to the distortion when watching a stereoscopic movie, sitting still.
- Weird distortion effects without head tracking and one moves around ... see demonstration later.

Correct way of thinking

- Any digital image of a virtual world should be created by imagining looking through a window on the world.
- The window is the display frame.
- The intended viewer is at the location of virtual camera through which the world is being viewed.
- If the viewer moves with respect to the display frame then the rendered image should change.
- Parts of the world that are visible change depending on the position of the viewer.
- Obviously not possible for images or movies, but possible for realtime generated content.



Parts of the world visible from
viewer position 1 but not position 2

Parts of the world visible from
viewer position 2 but not position 1

