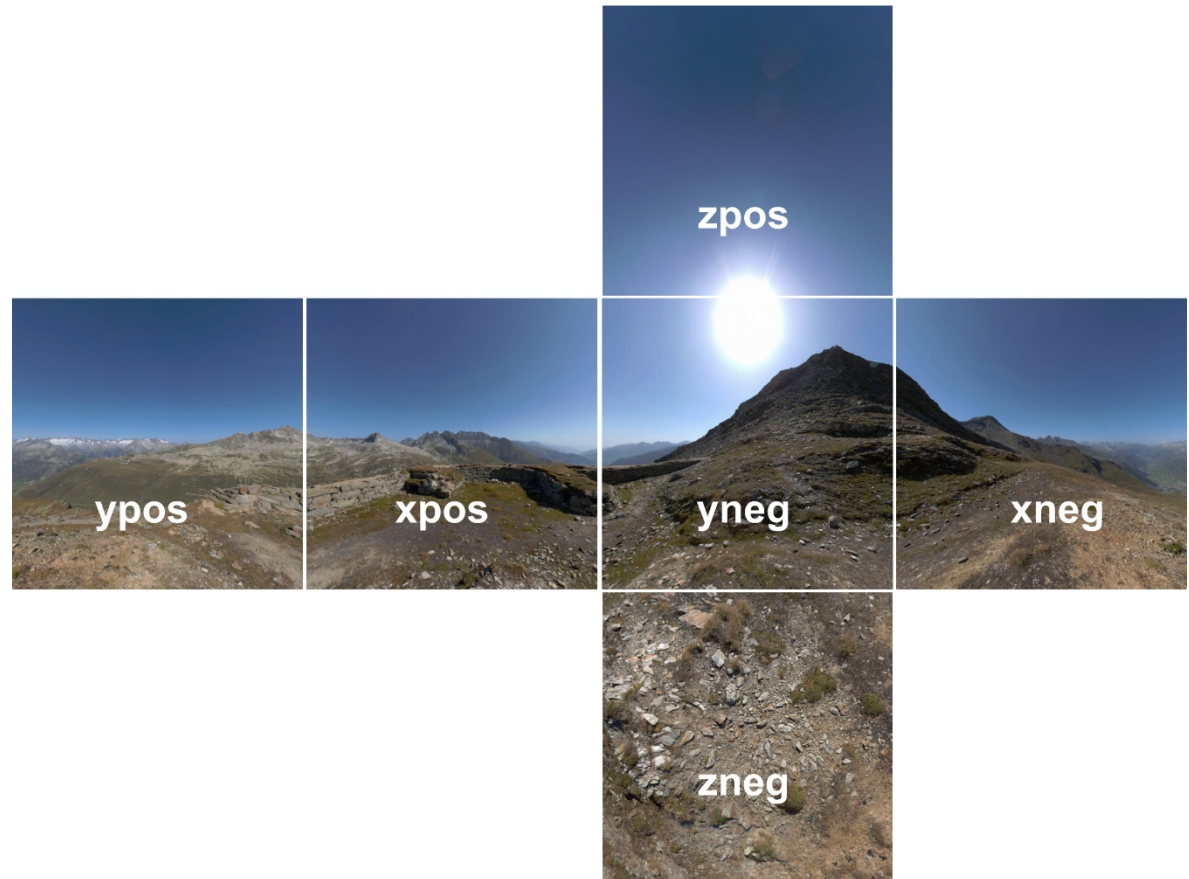


CSE 190: Virtual Reality Technologies

LECTURE #4: THE IDEAL VR DISPLAY

VR Project

This week: skybox



The Ideal VR Display

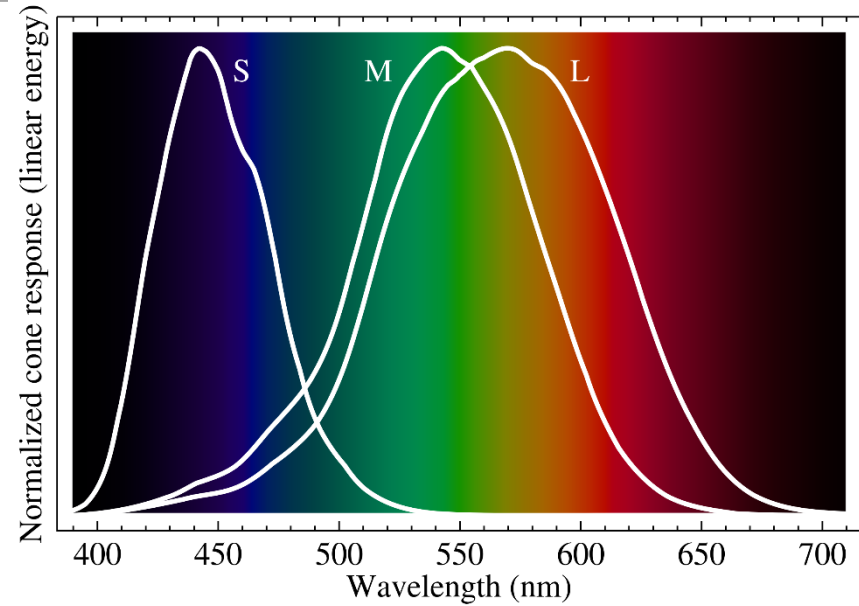
Colors

The human eye distinguish about 10 million colors

But not evenly distributed in red, green and blue

32 bits can store 2 billion colors

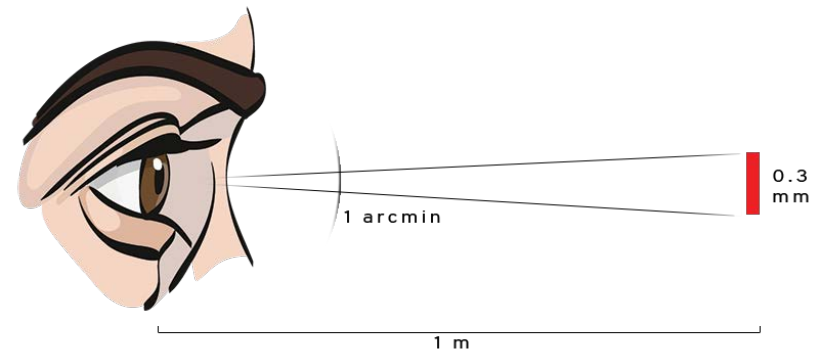
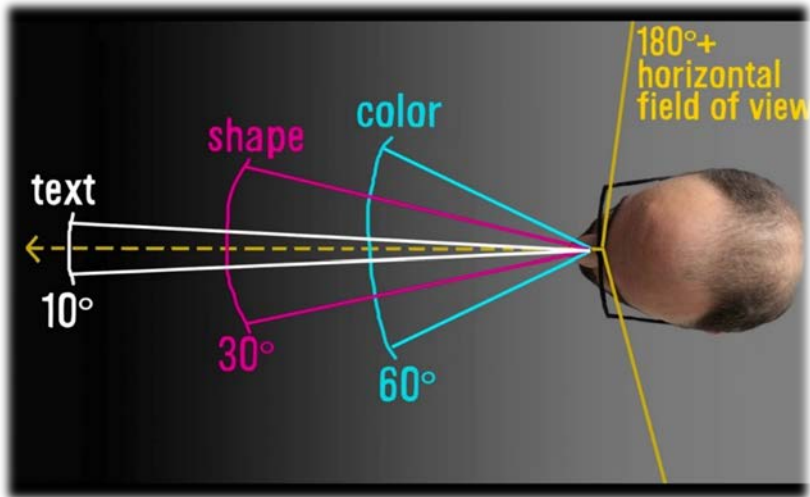
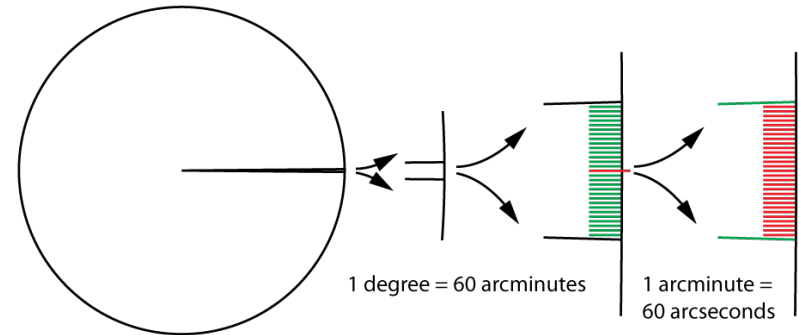
→ 32 bits storage per pixel



Spatial Resolution

~150 pixels/degree in center of field of view

Less towards edge



Retina VR Display

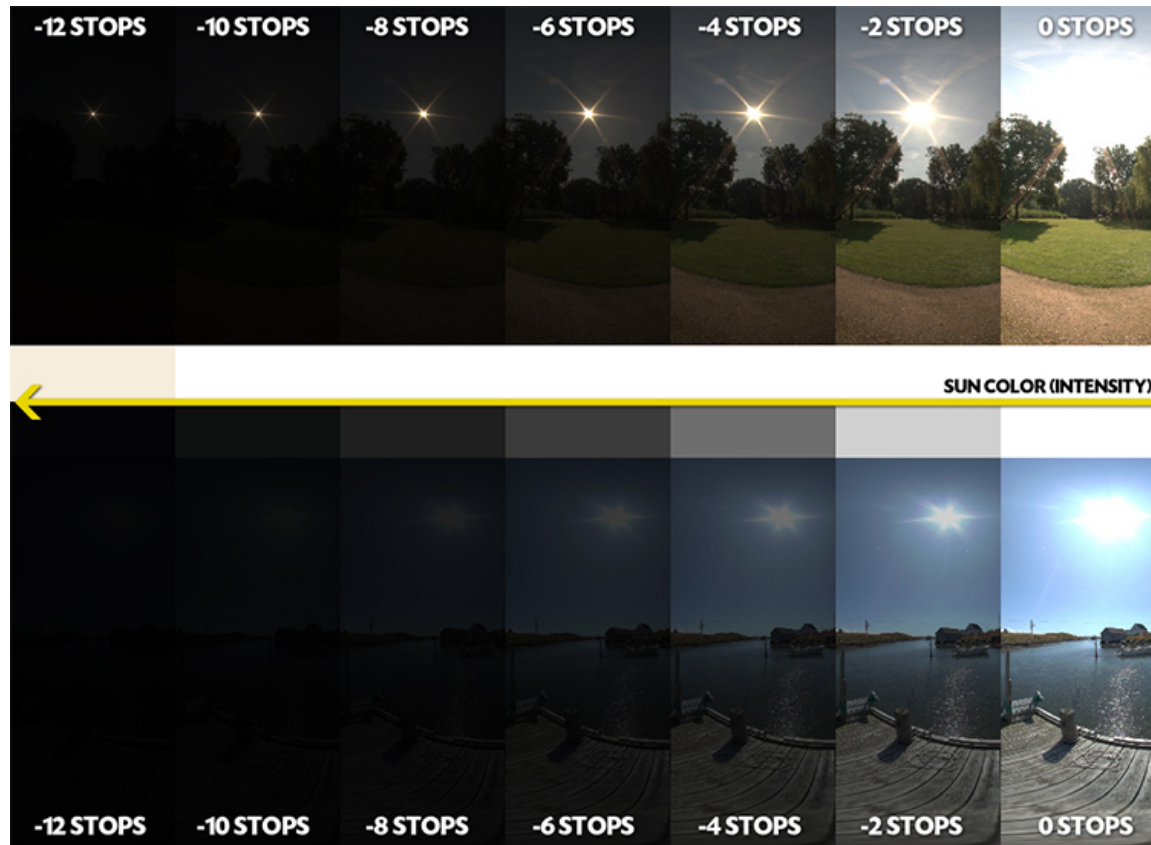
- Resolution per eye:
 - $145^\circ \times 135^\circ$ field of view at 150 pixels/degree resolution
→ 21,750 x 20,250 pixels = 440 Mpixels
- For two eyes (stereoscopic vision):
 - 2 x 440 Mpixels = 880 Mpixels

Temporal Resolution

~60-150 Hz (varies with brightness)



Dynamic Range



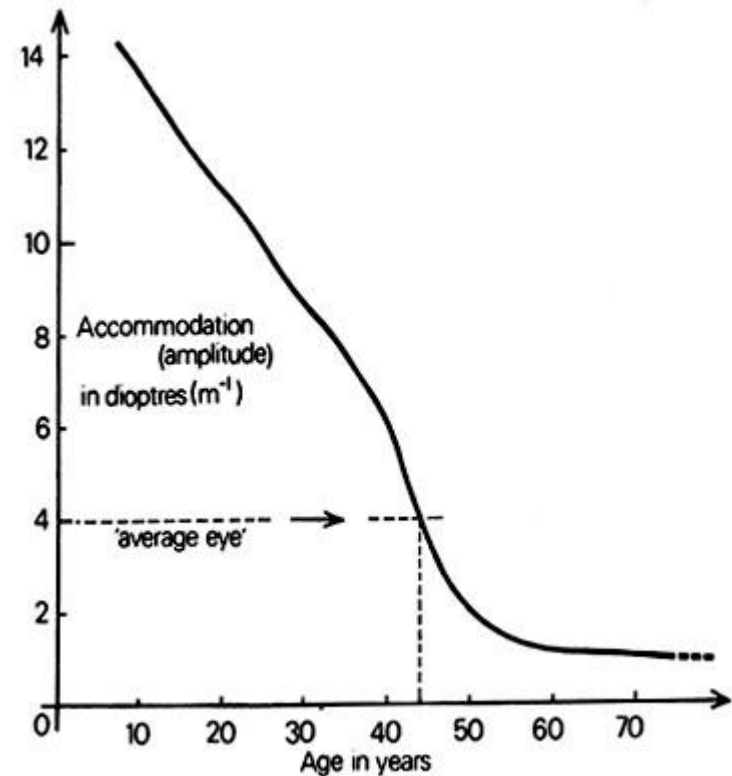
100:1 (retina), 1 billion:1 (with iris)

Accommodation Range

Age dependent

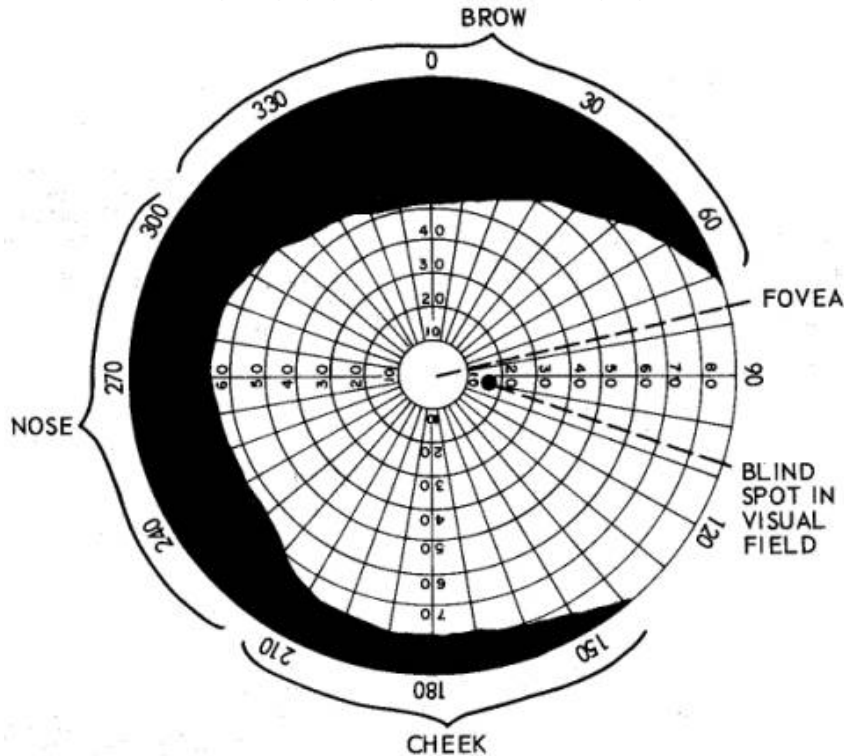
An 'average eye' likes to have things 25 cm away, or farther, for comfortable vision.

Young children can accommodate down to about 7 cm.

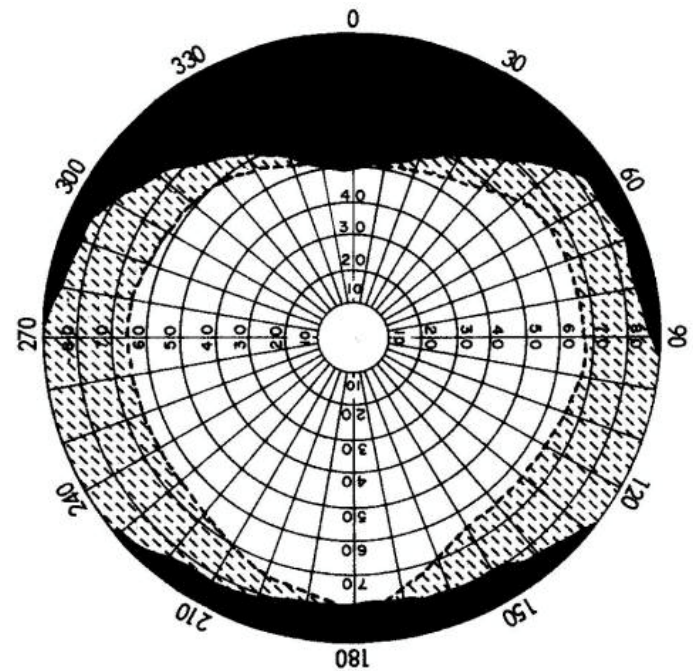


Field of View

Monocular visual field



Binocular visual field



Horizontal field of view: $\sim 145^\circ$ per eye
Vertical field of view: $\sim 135^\circ$