

Making 3D Work: A Classification of Visual Depth Cues, 3D Display Technologies and Their Applications

TOMAS MUSIL

M. MEHRABI, E. M. PEEK, B. C. WUENSCH, AND C. LUTTEROTH, "MAKING 3D WORK: A CLASSIFICATION OF VISUAL DEPTH CUES, 3D DISPLAY TECHNOLOGIES AND THEIR APPLICATIONS," IN PROCEEDINGS OF THE FOURTEENTH AUSTRALASIAN USER INTERFACE CONFERENCE - VOLUME 139, DARLINGHURST, AUSTRALIA, AUSTRALIA, 2013, PP. 91–100.

Overview

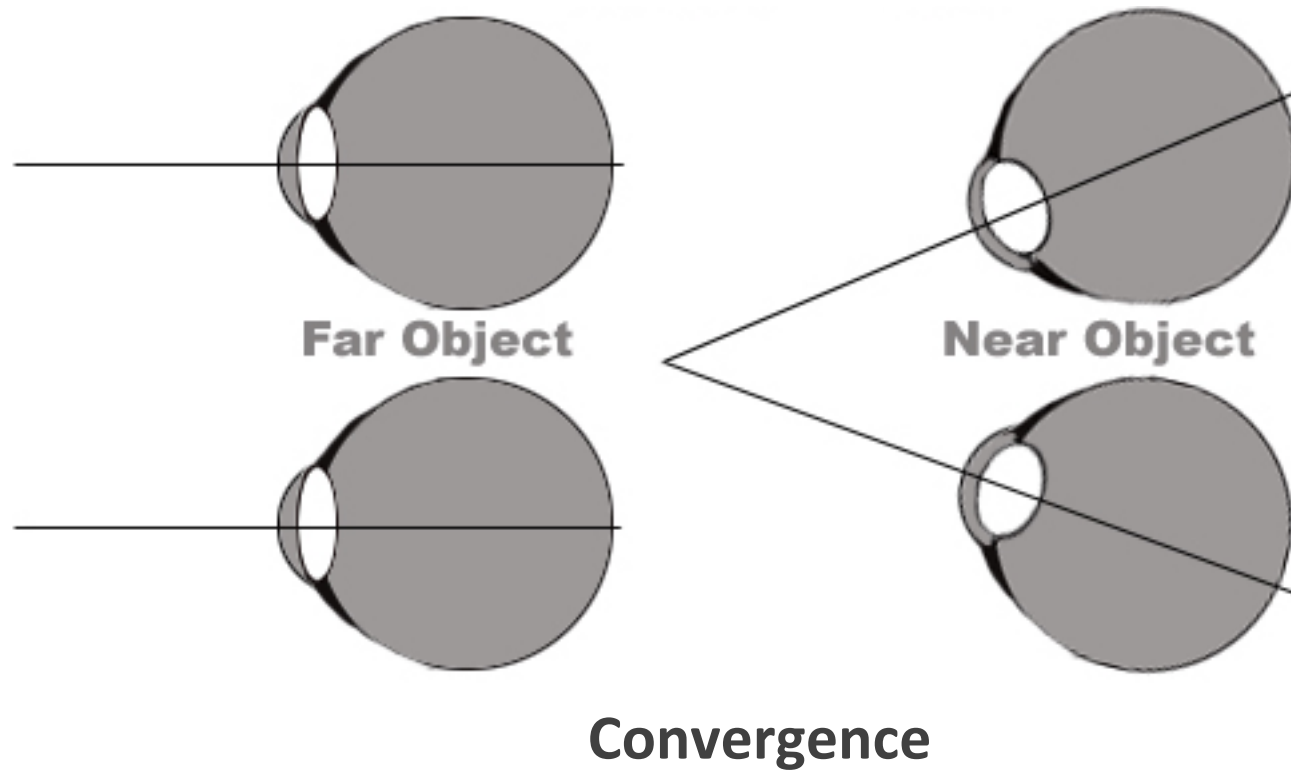
1. Depth Cues
2. 3D Display Technologies
3. Applications of 3D Display Technologies

Overview

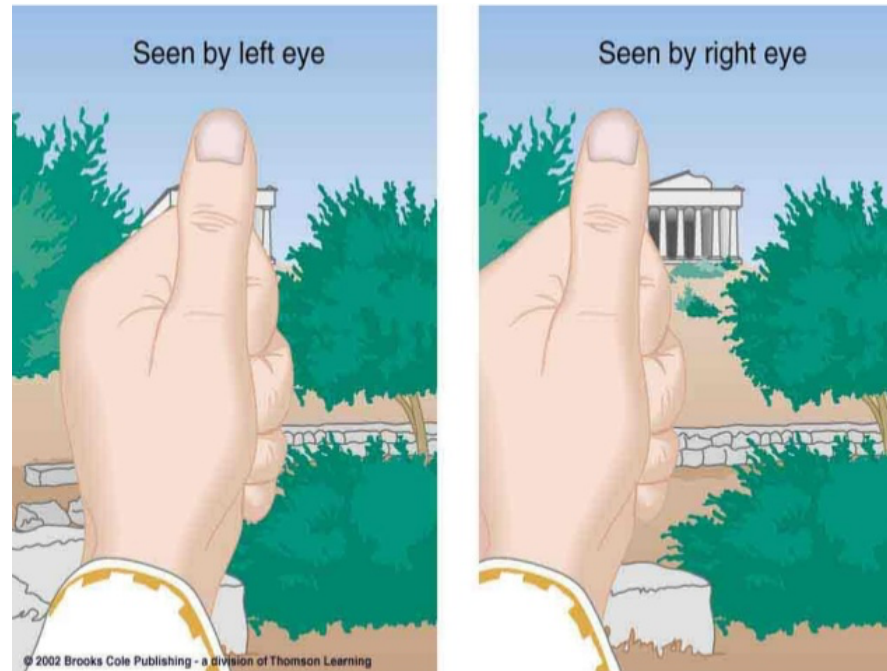
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Physiological Depth Cues

Physiological Depth Cues

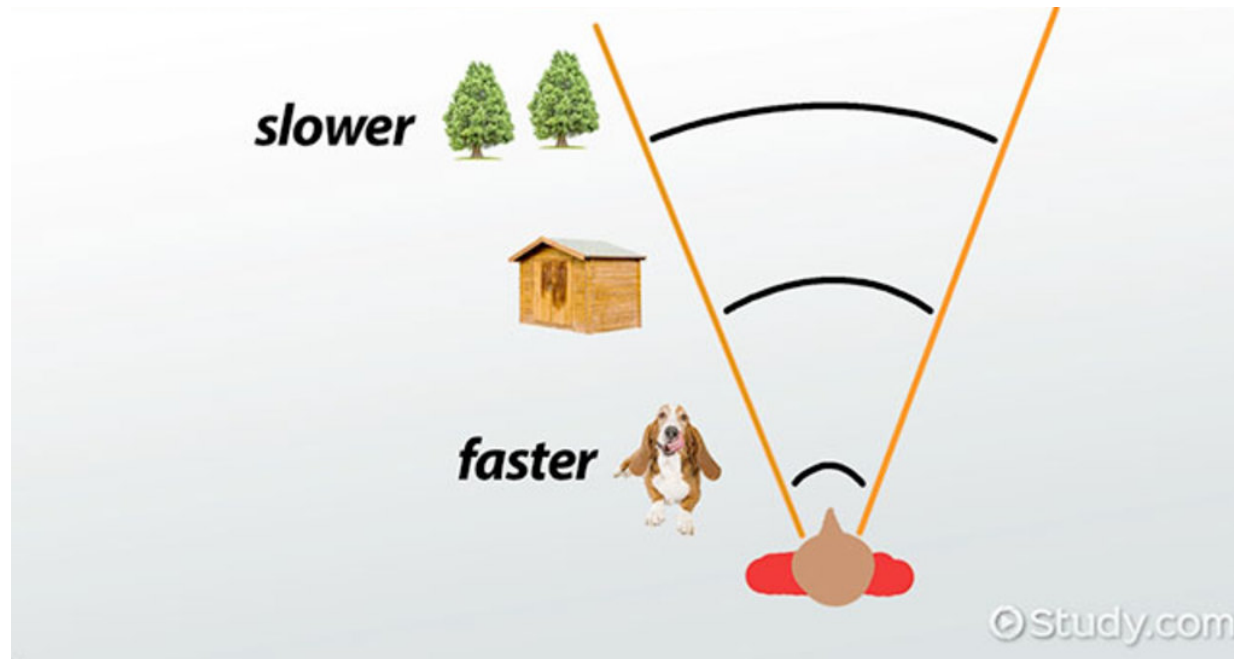


Physiological Depth Cues



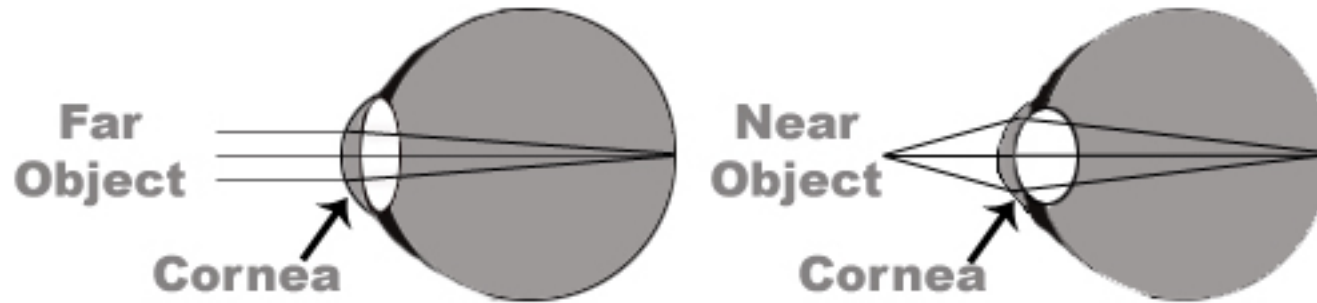
Binocular Parallax

Physiological Depth Cues



Monocular Movement (Motion) Parallax

Physiological Depth Cues



Accommodation

Physiological Depth Cues



Depth from Defocus

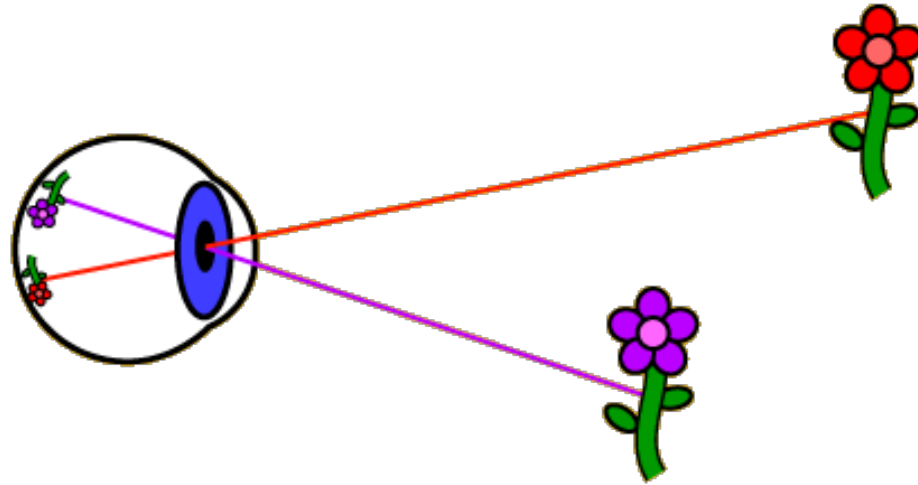
Psychological Depth Cues

Psychological Depth Cues



Overlapping (Occlusion)

Psychological Depth Cues



$$\text{Distance} \approx \frac{\text{Object Size}}{\text{Retinal Size}}$$

Retinal Image Size

Psychological Depth Cues



Texture Gradient

Psychological Depth Cues



Aerial Perspective

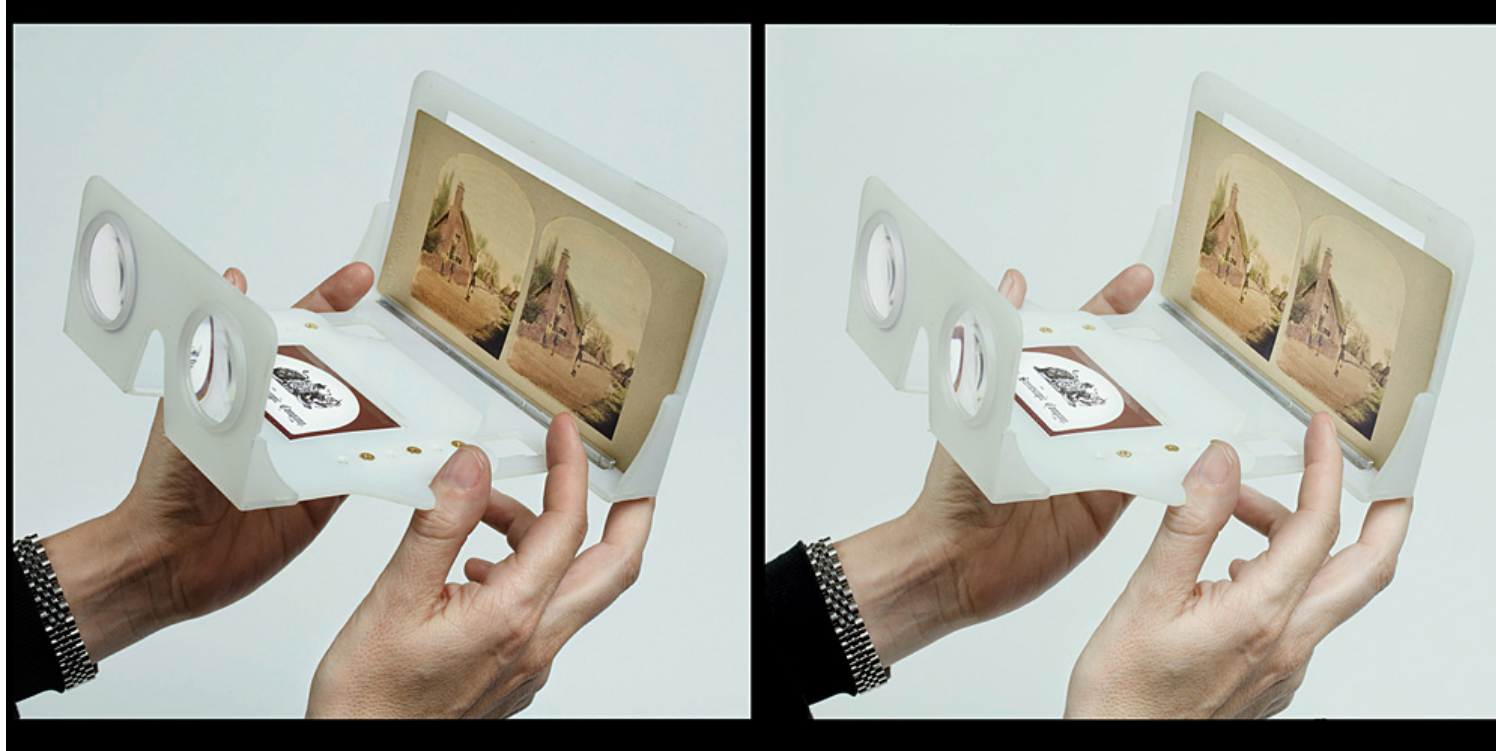
<http://wwwcdn.artistsnetwork.com/wp-content/uploads/2011/07/204-an-aerial-perspective.jpg>

Overview

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Stereoscopic Display

Stereoscopic Display



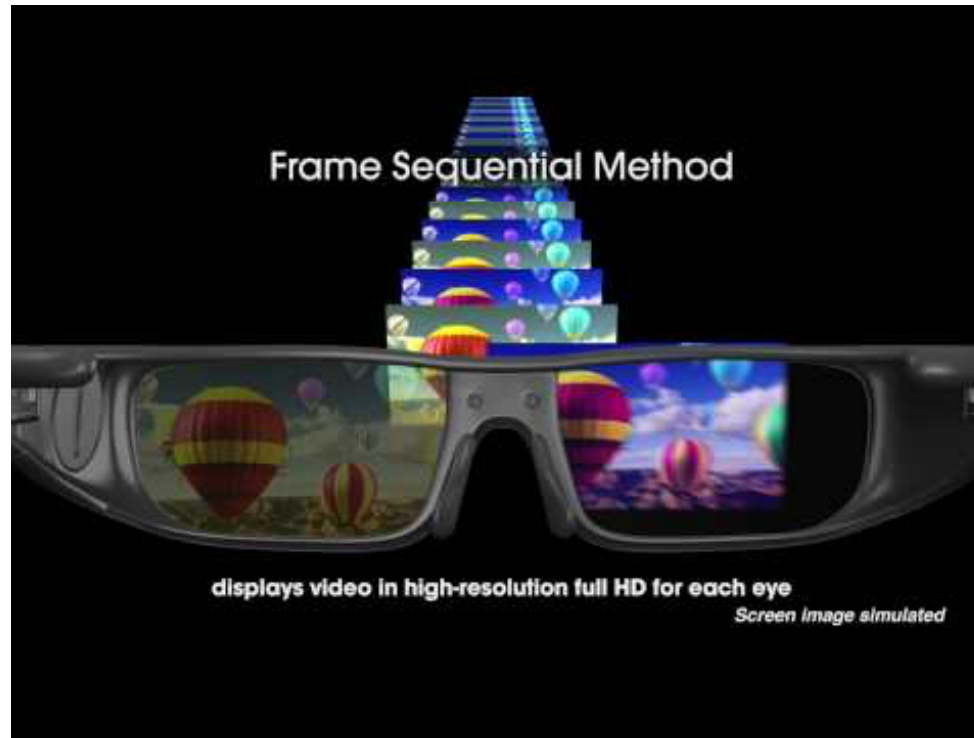
Non-Polarized Displays: Side-by-Side

Stereoscopic Display



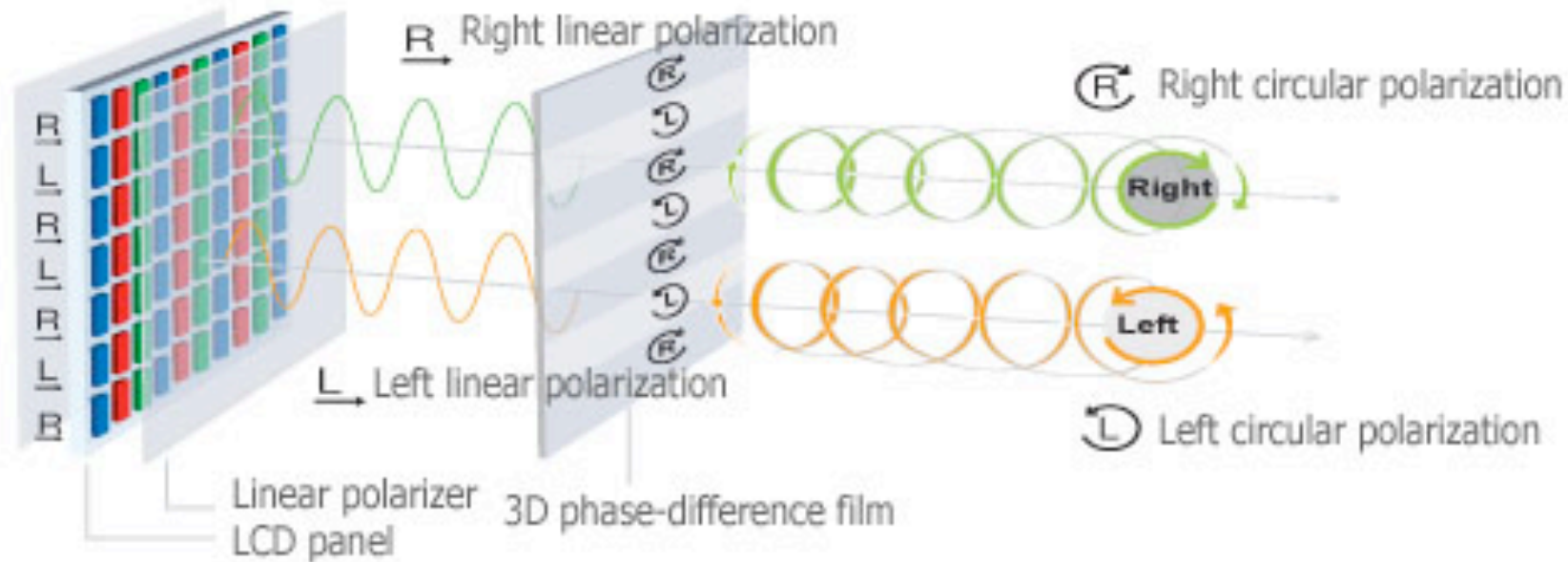
Non-Polarized Displays: Head Mounted Displays

Stereoscopic Display



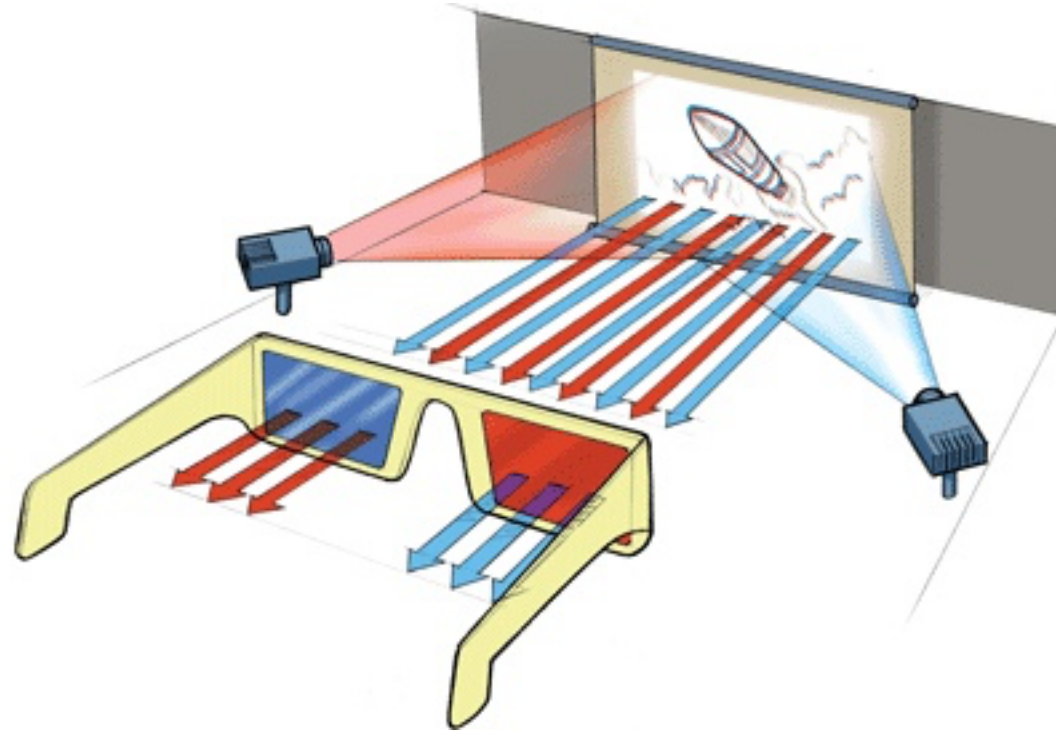
Polarized Displays: Eclipse Method (Active Shutter Glasses)

Stereoscopic Display



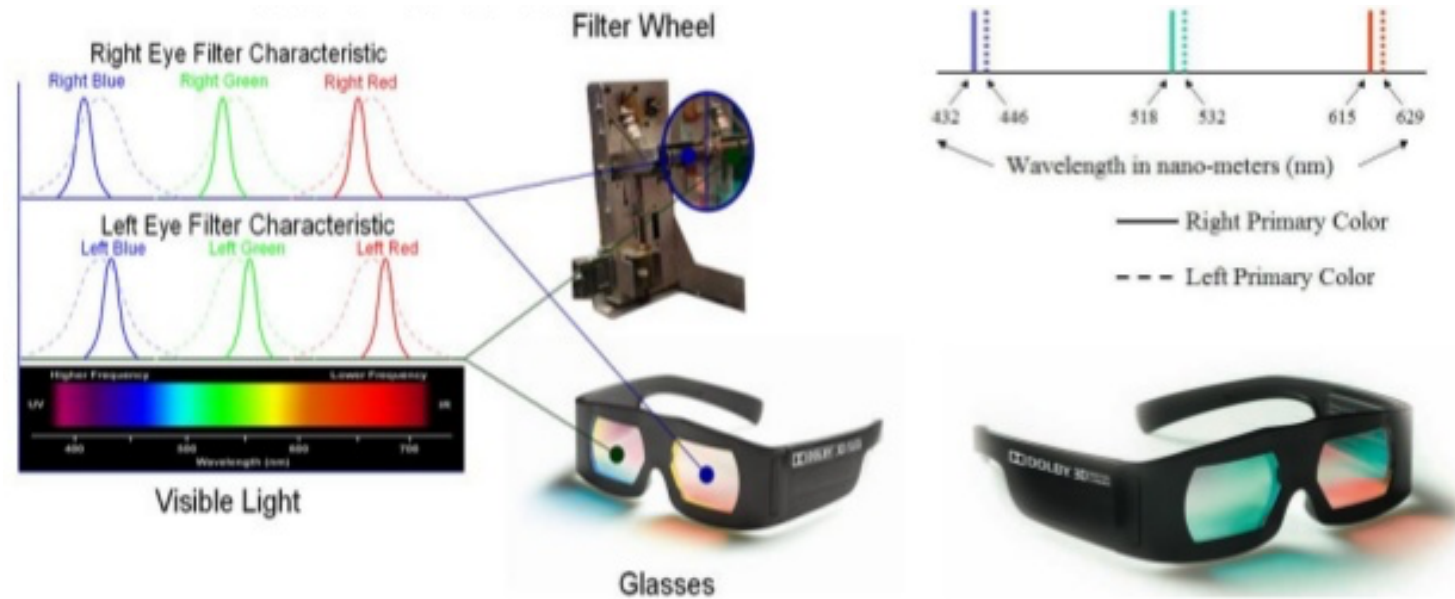
Polarized Displays: Passive Polarized Glasses

Stereoscopic Display



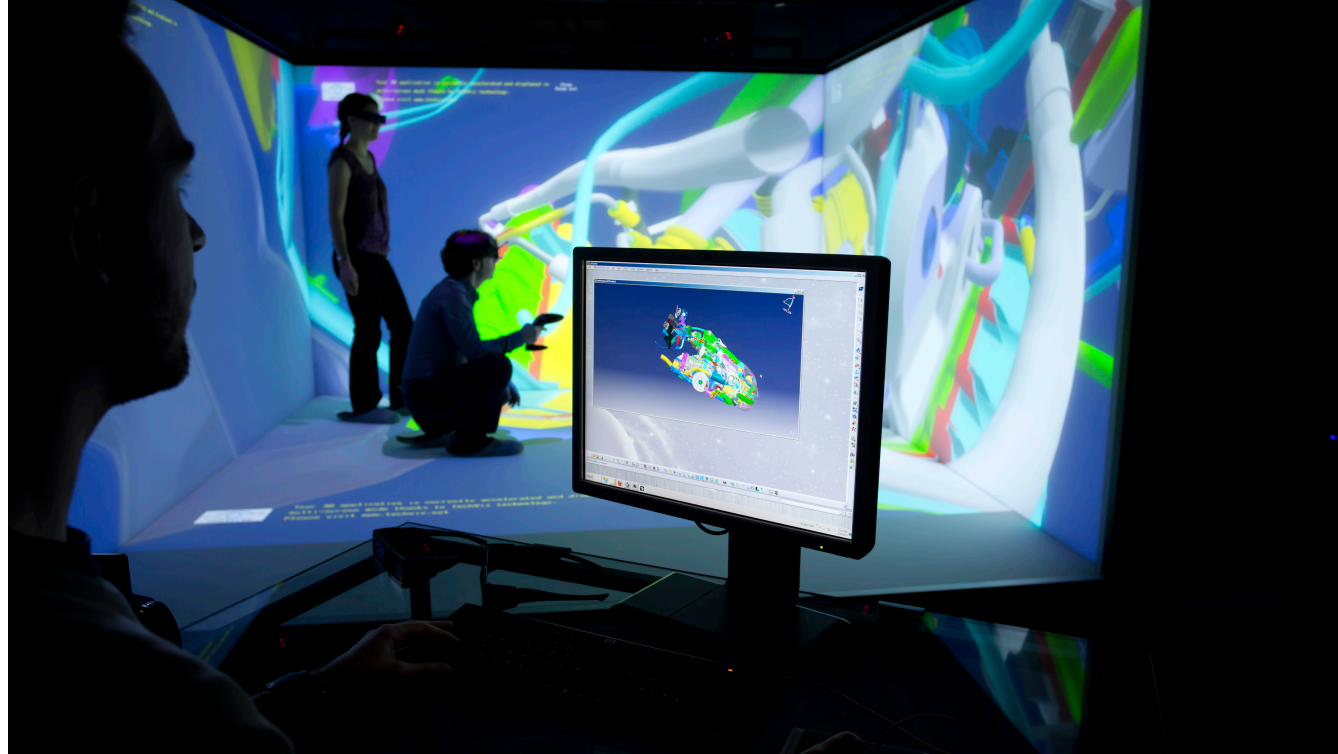
Polarized Displays: Anaglyph

Stereoscopic Display



Polarized Displays: Interference Filter Technology

Stereoscopic Display



Polarized Displays: Fake Space System Display (CAVE)

Autostereoscopic

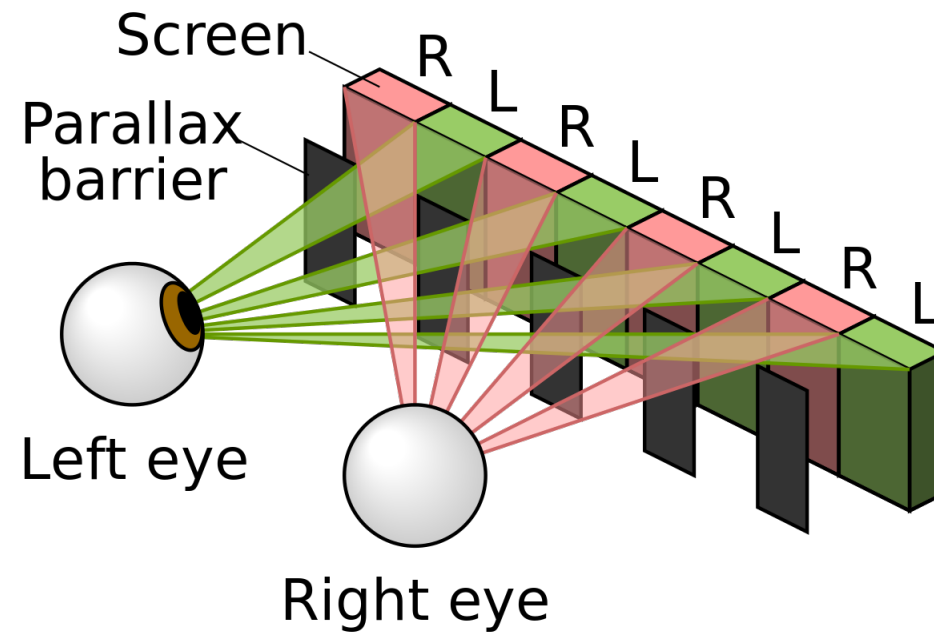
Autostereoscopic



Autostereograms (FreeView)

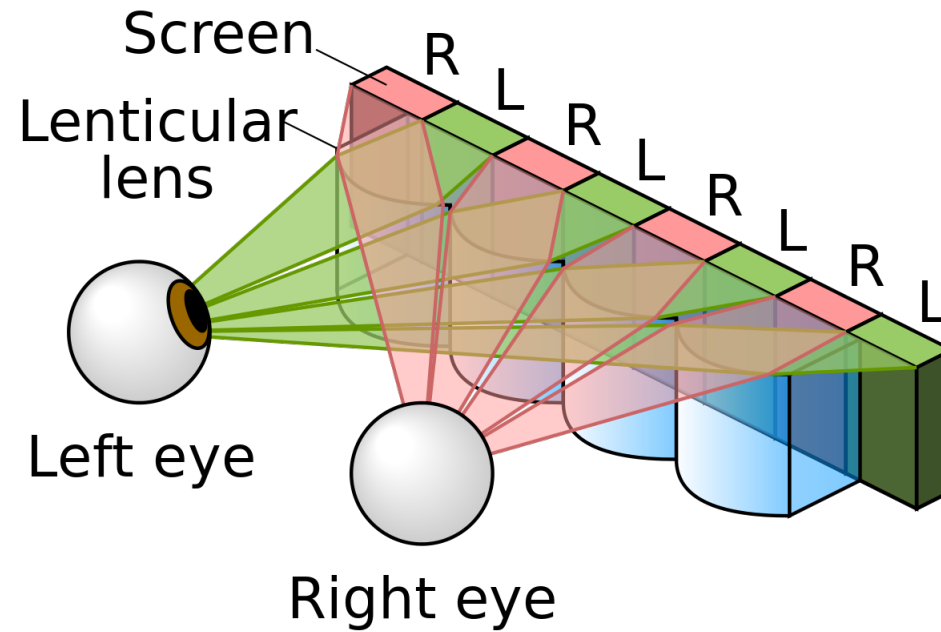


Autostereoscopic



Parallax Barrier

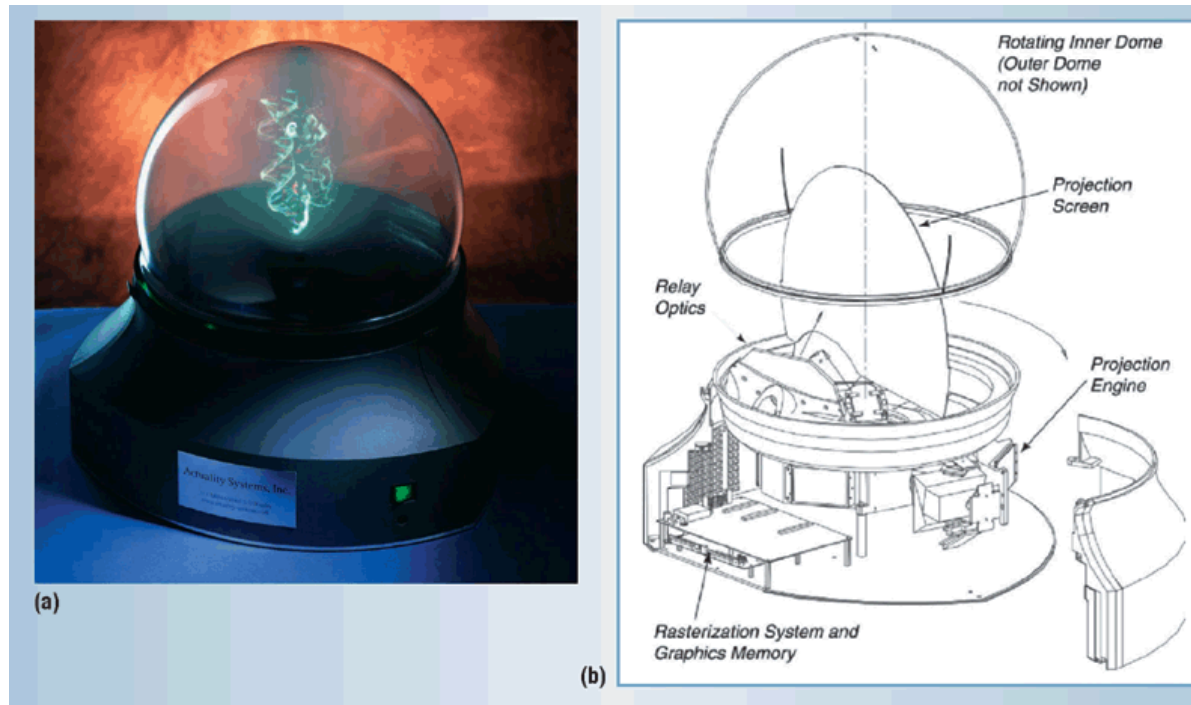
Autostereoscopic



Lenticular Sheets

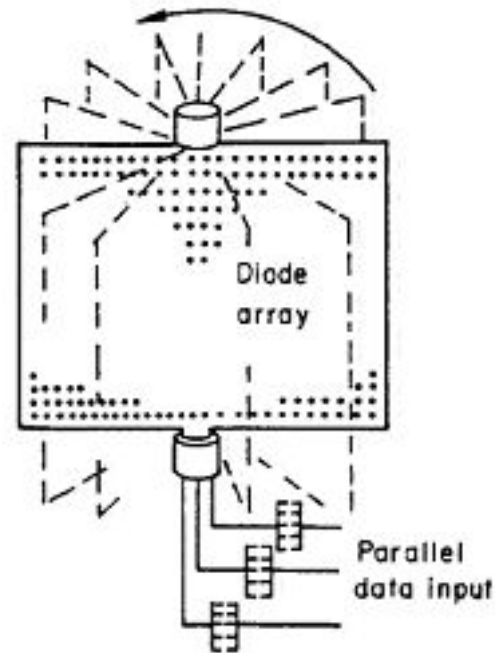
Real 3D Display

Real 3D Display



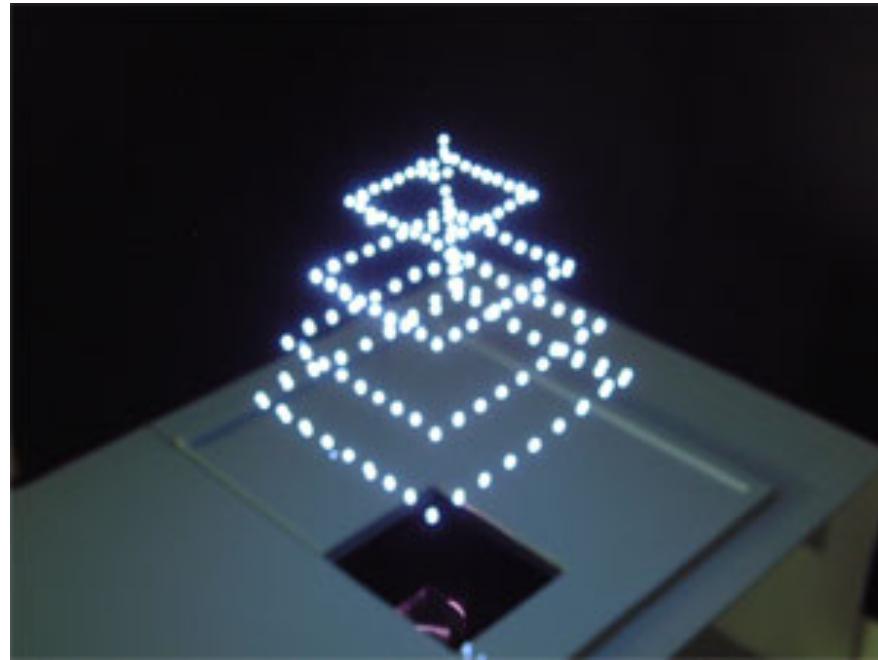
Perspecta Spatial 3D Display

Real 3D Display



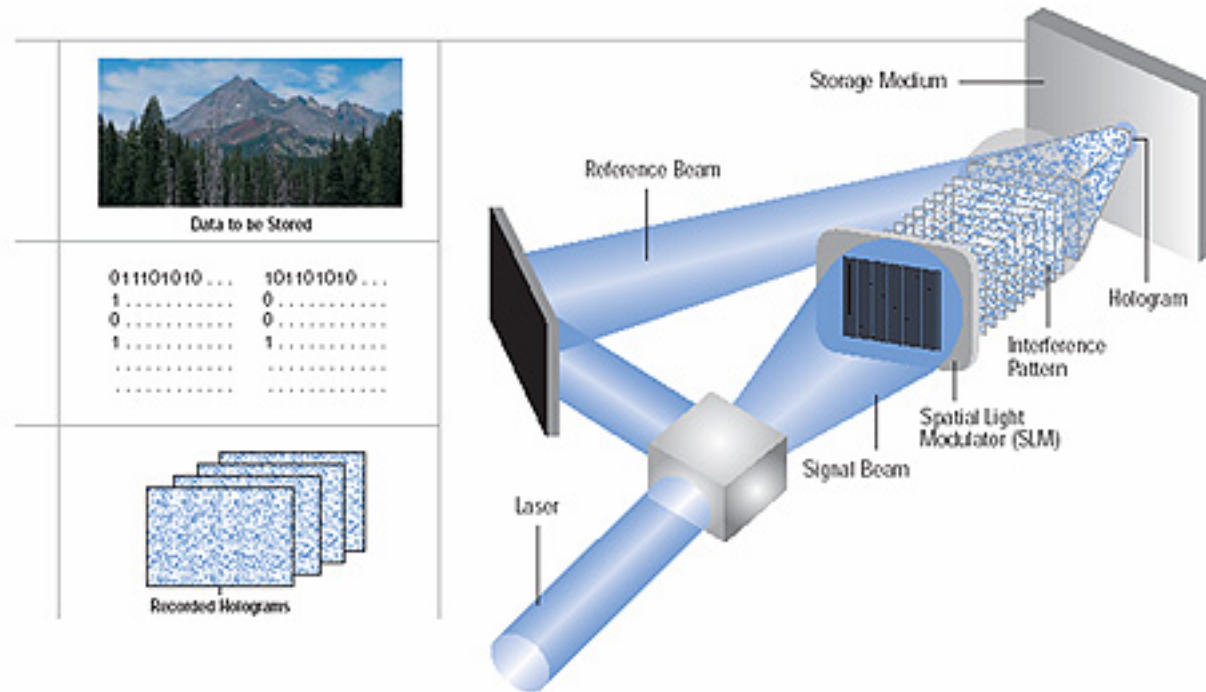
Volumetric display with rotating LED array screen

Real 3D Display



Static Volume Display

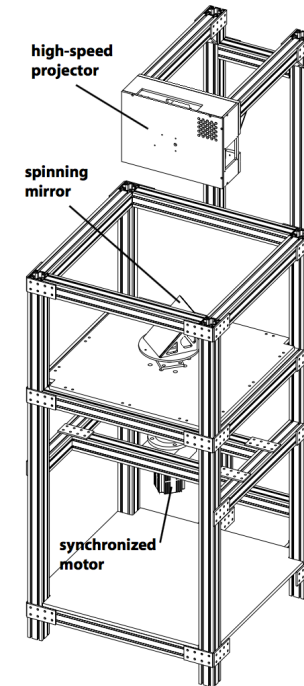
Real 3D Display



Holographic Display

<https://tr2.cbsistatic.com/hub/i/2011/07/27/ba5fd75b-c3a8-11e2-bc00-02911874f8c8/e4afad2630ca6f8513e94dc8465bd253/diagram01.jpg>

Real 3D Display



360° Light Field Display

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Applications of 3D Display Technologies

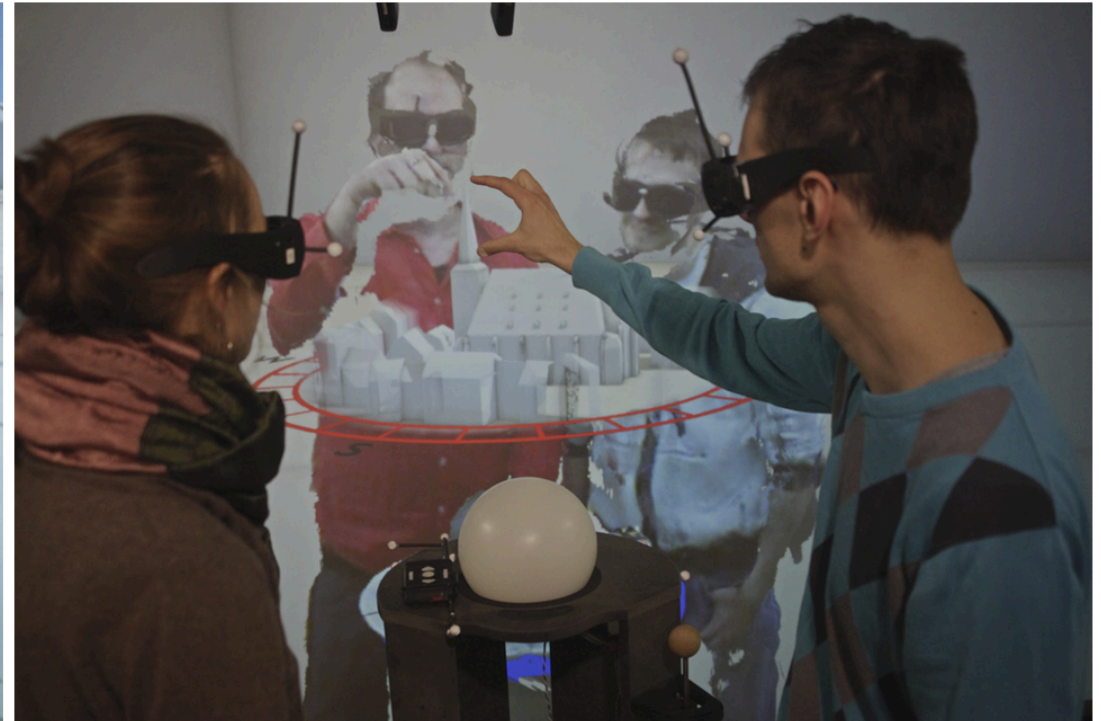
Applications of 3D Display Technologies

- Geospatial Studies
- Discovery of Energy Resources
- Molecular Studies
- Production Design
- Medical Applications
- Simulation and Training
- Entertainment
- Informative Displays

<https://www.youtube.com/watch?v=uQ5wg-U07t8>

<https://www.youtube.com/watch?v=uG4dPb5-jDo>

Applications of 3D Display Technologies



Thanks :)
