INTRODUCTION TO VIRTUAL REALITY

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Learning outcomes – what you will learn

- What Augmented Reality/Virtual Reality is
- History of AR/VR
- Current AR/VR commercial market
- AR/VR in Education
- Human perception side of VR/AR
- AR/VR technology
- 3D user interface guidelines
- How to design good AR/VR experiences
- How to build AR/VR applications
- Important directions for future research in AR/VR

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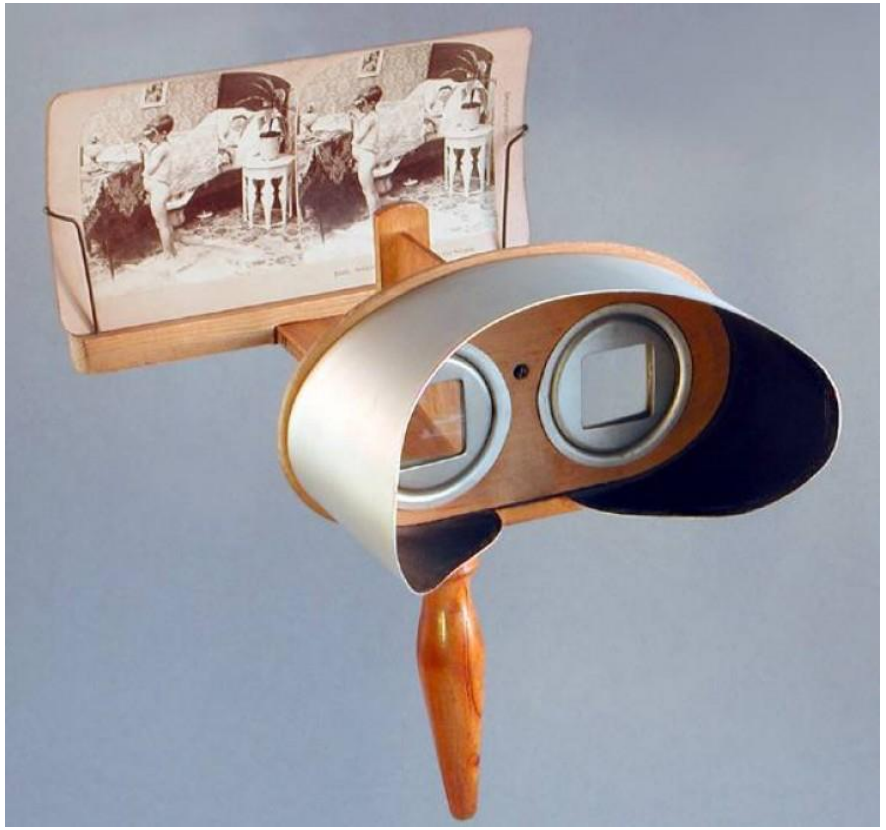
Stereoscope (Charles Wheatstone, 1838)



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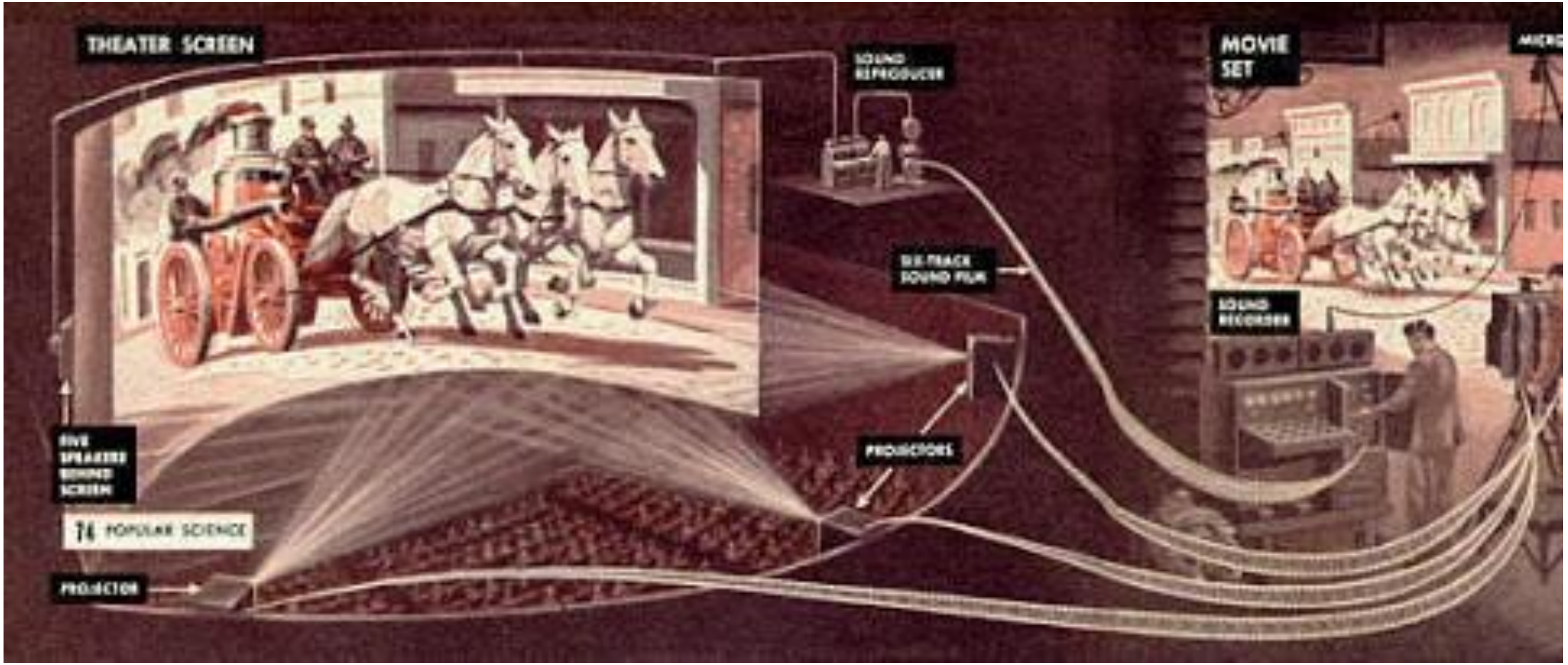
Cinerama (1950s)



Sword of Damocles

First virtual reality head-mounted display (1966)

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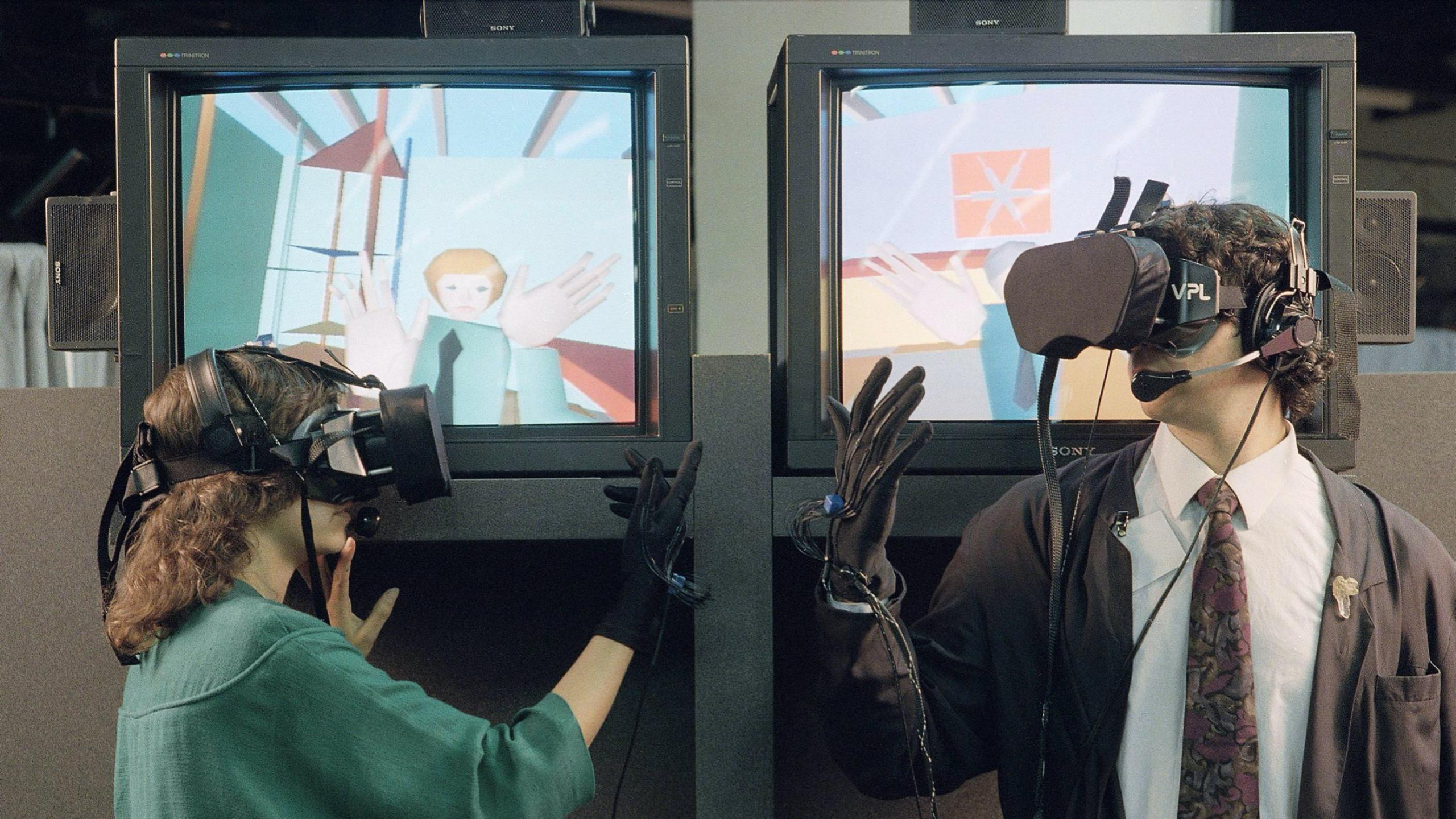
SONY
TRINITRON
SONY
TRINITRON
VPL

VIRTUAL BOY
HIGH RESOLUTION 3-D GRAPHICS
32-BIT RISC PROCESSOR
VIRTUAL BOY
DIGITAL STEREO SOUND
POWER UP!
VIRTUAL BOY SYSTEM
SPECIAL
MAIL-IN OFFER
6 DURACELL BATTERIES
BATTERIES NOT INCLUDED
MARIO'S TENNIS
VIRTUAL BOY
VIRTUAL BOY

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Virtual Reality

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Oculus Rift, 2012

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Typical VR System

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What is VR - definition

Virtual reality (**VR**) - is
a simulated experience that can be like or completely different from the real world.

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Other Definitions

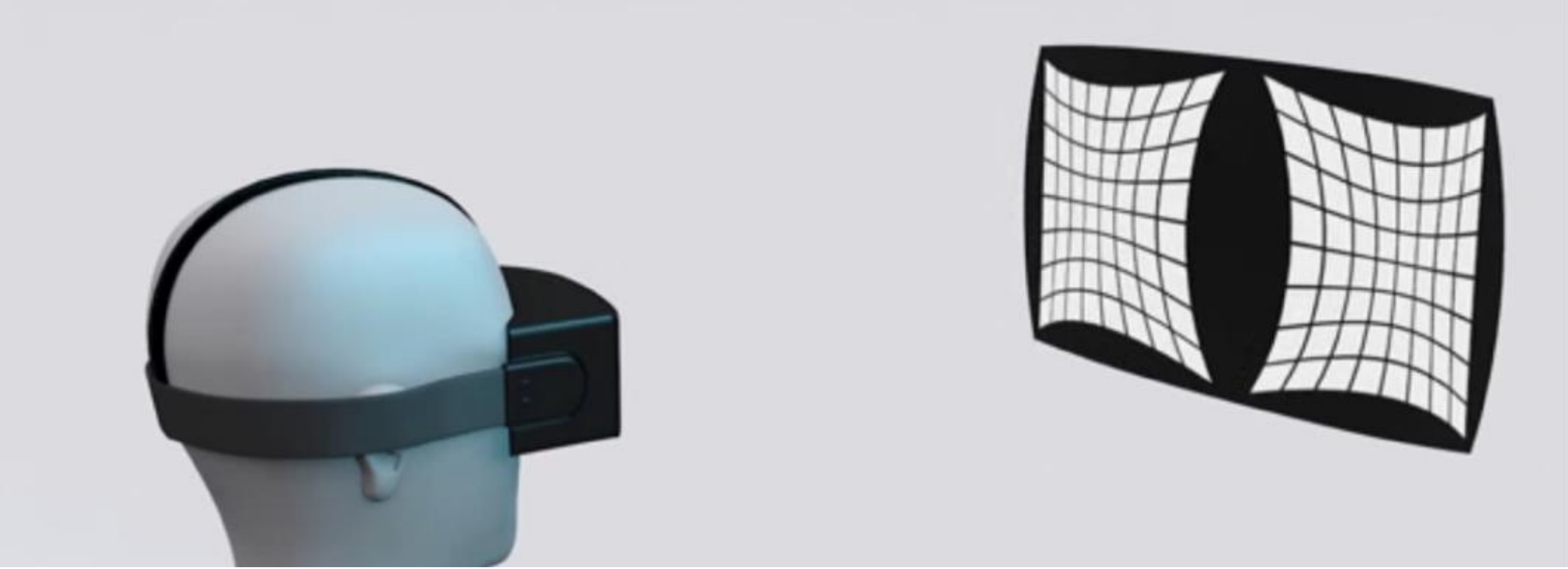
Virtual reality is…

electronic simulations of environments experienced via head-mounted eye goggles and wired clothing enabling the end user to interact in realistic three-dimensional situations.

(Coates, 1992)

an alternate world filled with computer-generated images that respond to human movements. (Greenbaum, 1992)

an interactive, immersive experience generated by a computer (Pimental 1995)



Defining Characteristics

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VR Experience

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Types of VR

VIVE
htc
STEAM VR

DESIGNED AND MADE
IN THAILAND

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CableRobots Simulator

In the Cyberneum at the Tübingen-based Max Planck Campus, people are transported into virtual worlds in order to investigate how our brain processes impressions.

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Augmented Reality

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Augmented Reality Definition

Defining Characteristics [Azuma 97]

- Combines Real and Virtual Images - Both can be seen at the same time
- Interactive in real-time - The virtual content can be interacted with.
- Registered in 3D - Virtual objects appear fixed in space.

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2008 - CNN

A TV first, CNN debuts their newly installed hologram system.

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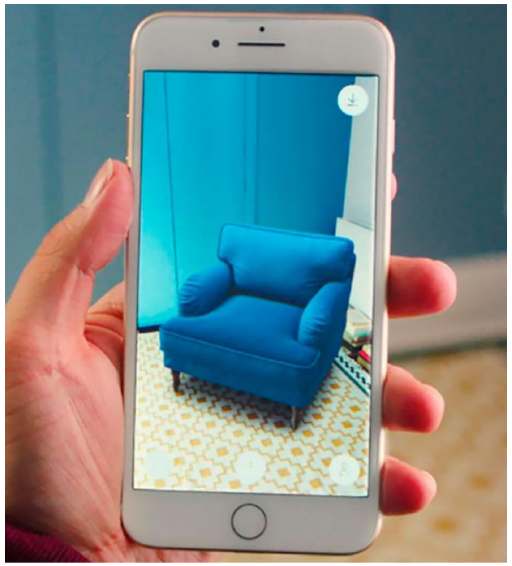

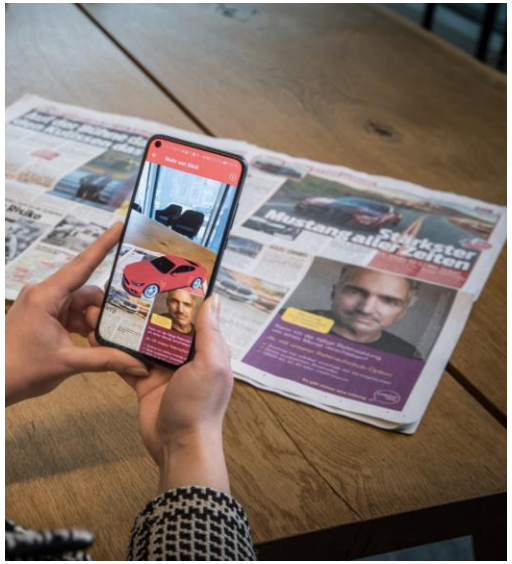

AR examples

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AR Colouring Example - Quiver

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Nintendo Pokemon GO

It is a geolocation-based game from 2016 that allows users to imagine a virtual world that is superimposed on to the real world. They can see Pokemon characters only by looking “through” their smartphone screen.

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The Weather Channel

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AR vs VR

	Virtual Reality	Augmented Reality
Scene generation	Requires realistic images	Minimal rendering
Display device	Fully impressive, wild field of view	Non immersive, small field of view
Tracking	Low to medium	The highest accuracy possible

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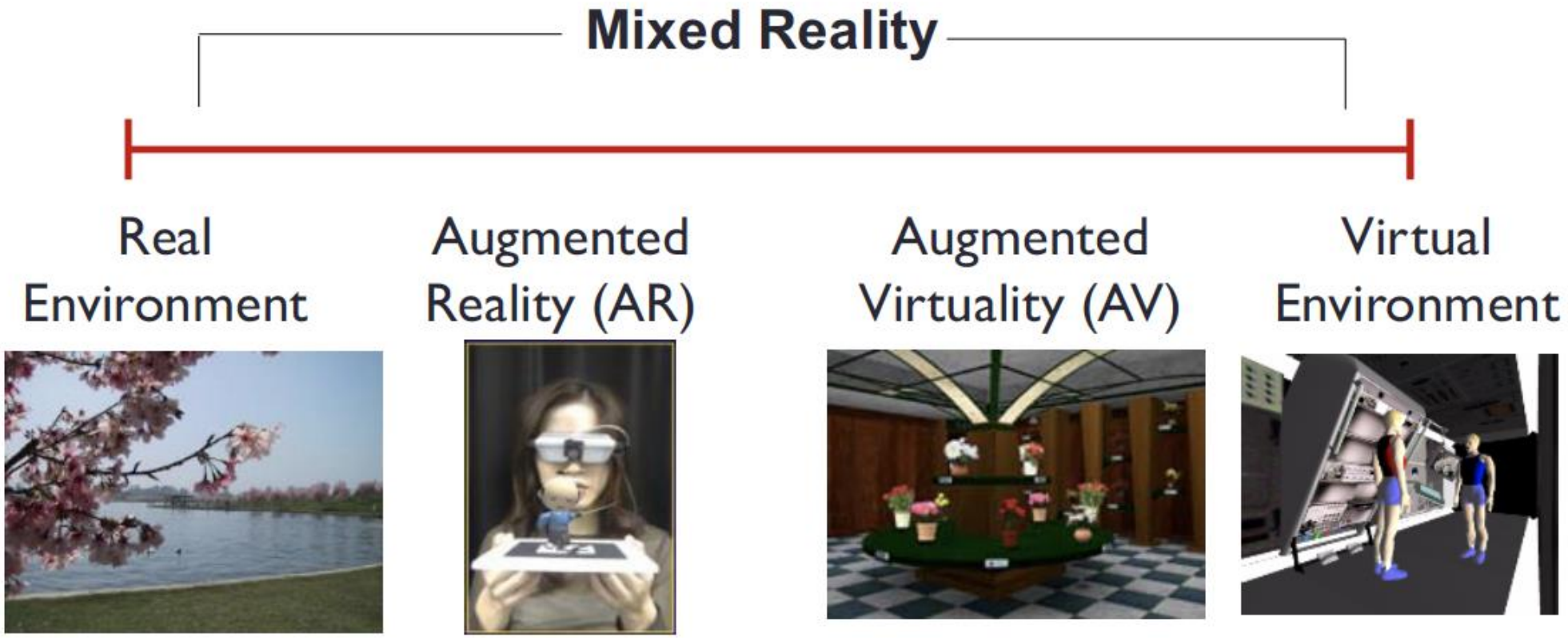
Milgram's Reality-Virtuality continuum



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