

Mixed Reality

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With material from Sebastian Friston and Simon Julier

Outline

1. Mixed Reality
2. Displays for Mixed Reality

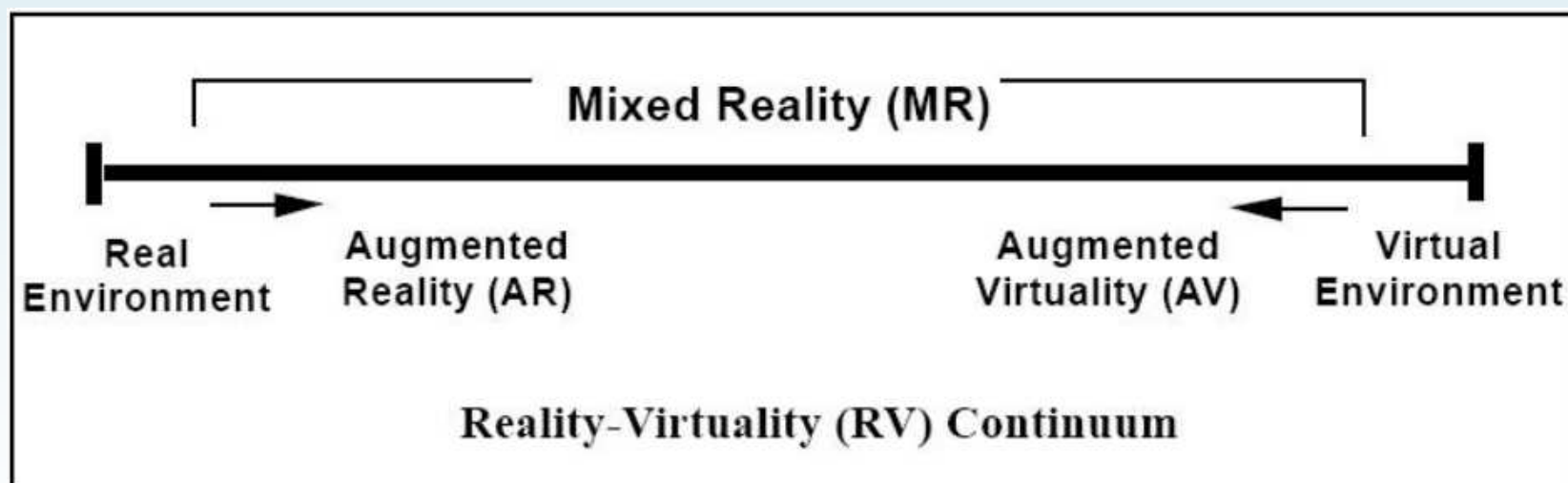
Outline

- 1. Mixed Reality**
2. Displays for Mixed Reality

- VR is about *Presence*
- VR is about perceiving *a simulate world*



The Mixed Reality Continuum



P. Milgram and A. F. Kishino (1994). "Taxonomy of Mixed Reality Visual Displays"

The Mixed Reality Continuum



http://blogs.intel.com/evangelists/files/2016/04/SSG_16_07_Duffy-Realities_v2.png

Defining Mixed Reality



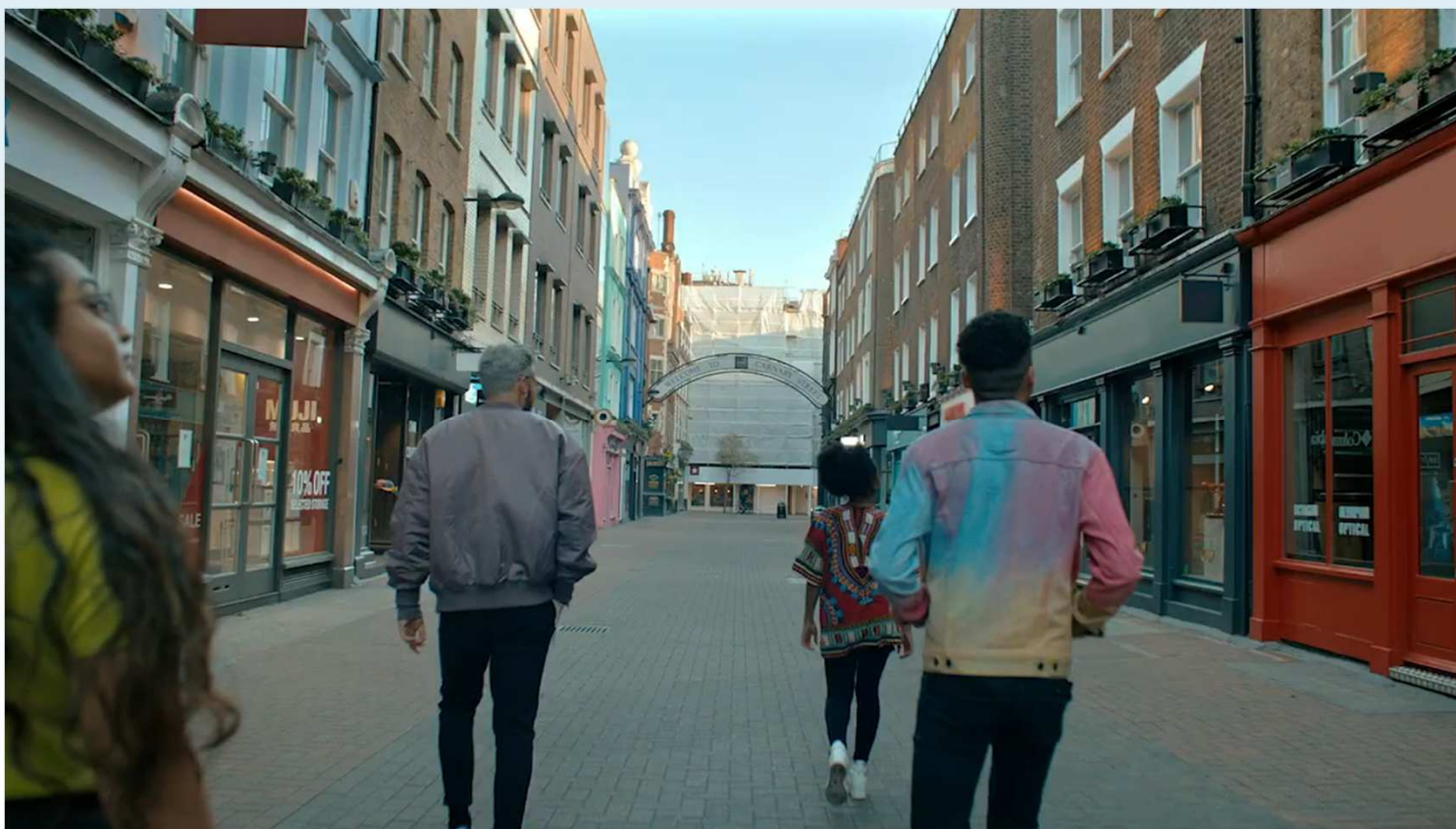
Defining Mixed Reality

- MR systems *combine* virtual objects with the real world
 - VR is usually transporting you to a new place
 - MR is altering the space around you
- Immersion & presence need reformulating
 - Place illusion isn't "necessary"
 - Plausibility illusion depends on specific objects

Where is MR Used?

- Social media
- Games
- Advertising
- Retail
- Entertainment (Film + TV)
- Industrial applications

Snapchat



<https://press.snap.com/city-painter>, Team Snap (8/10/2020)

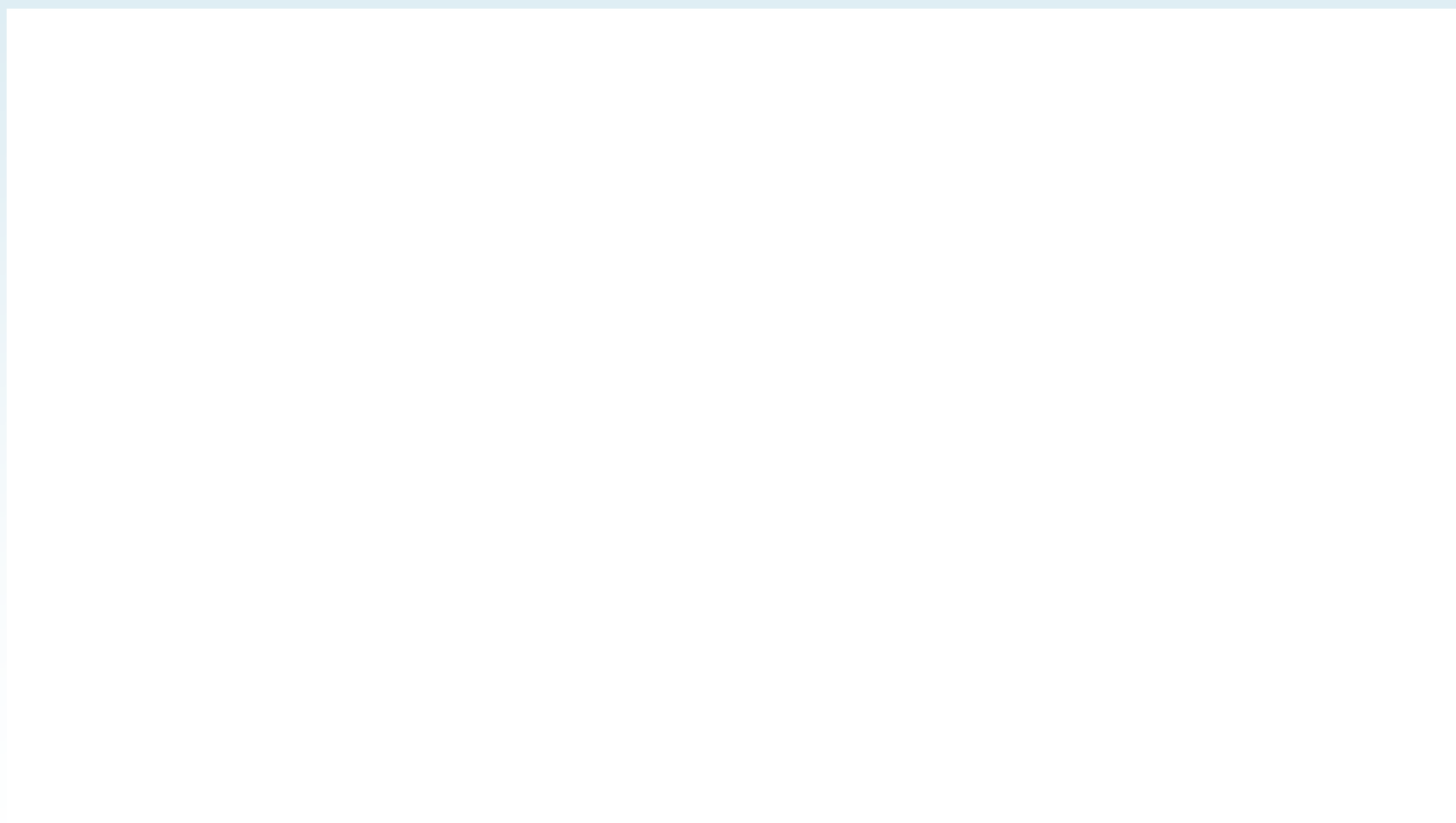
Gaming



N I A N T I C

<https://youtu.be/7ZrmPTPgY3I>, Niantic

Retail



<https://holition.com/work/bourjois-blended-reality-magic-mirror>

Simulation

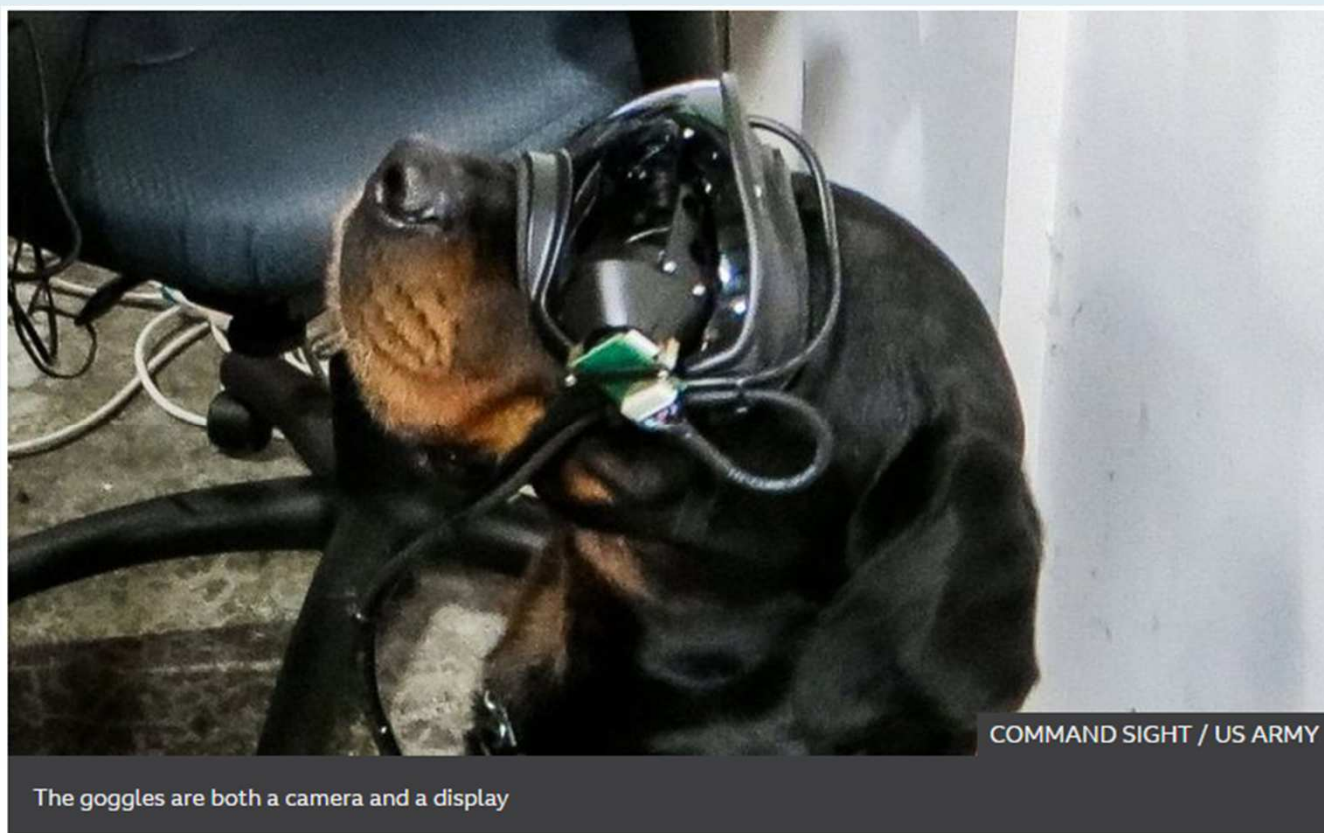


https://youtu.be/tCv0hJGBo_I

Medicine



Combat Dogs?

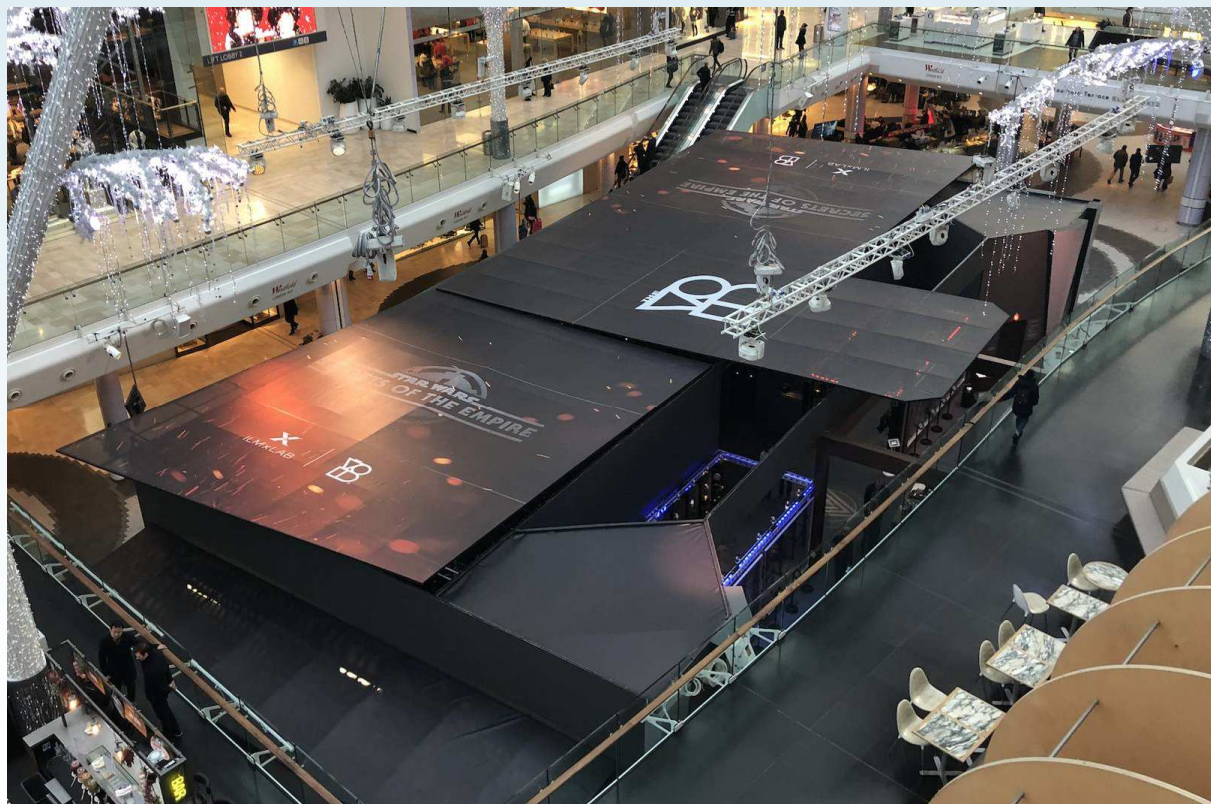
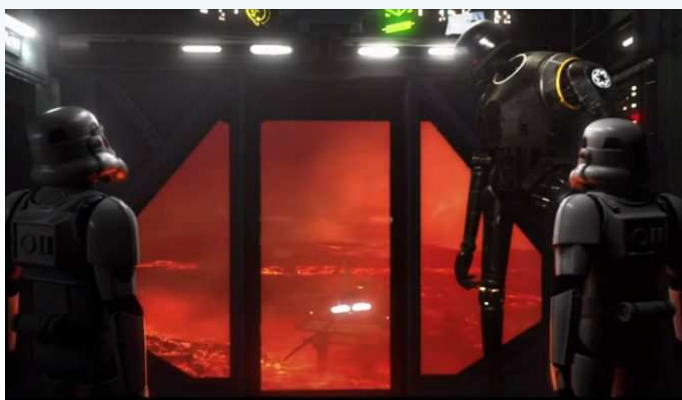


<https://www.bbc.co.uk/news/technology-54465361>, 8th October 2020

Augmented Virtuality?: UNC Pit Room



Augmented Virtuality?: The Void



Augmented Virtuality? Dreamwalker

DreamWalker: Substituting Real-World Walking Experiences with a Virtual Reality

Jackie (Junrui) Yang, Christian Holz, Eyal Ofek, Andrew D. Wilson



Augmented Virtuality?: COMP0113 2019



Outline

1. Mixed Reality

2. Displays for Mixed Reality

Visual Display Technologies

- Video See Through
- Optical See Through

Video See Through



UCL's AR Rift



iPad AR

Video See Through



Varjo XR-1

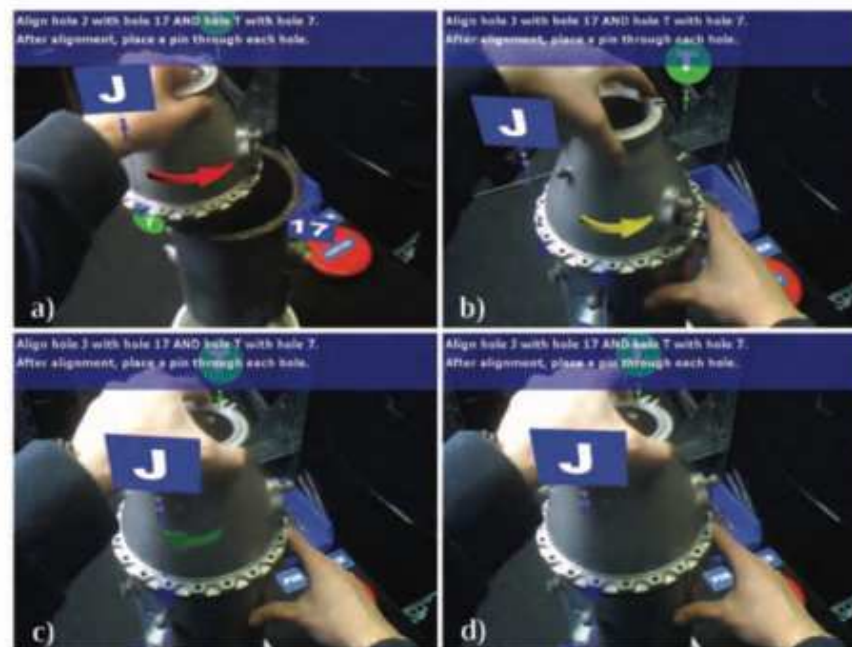


MReal S1 <https://www.canon-its.co.jp/files/user/solution/mr/lp/>
(Japanese only)

Video See Through



Needle-Guided Biopsy (UNC)



Guided maintenance of equipment

Optical See Through



Sony Glasstron (1997)



Nomad Virtual Retinal Display
(2001)

Optical See Through

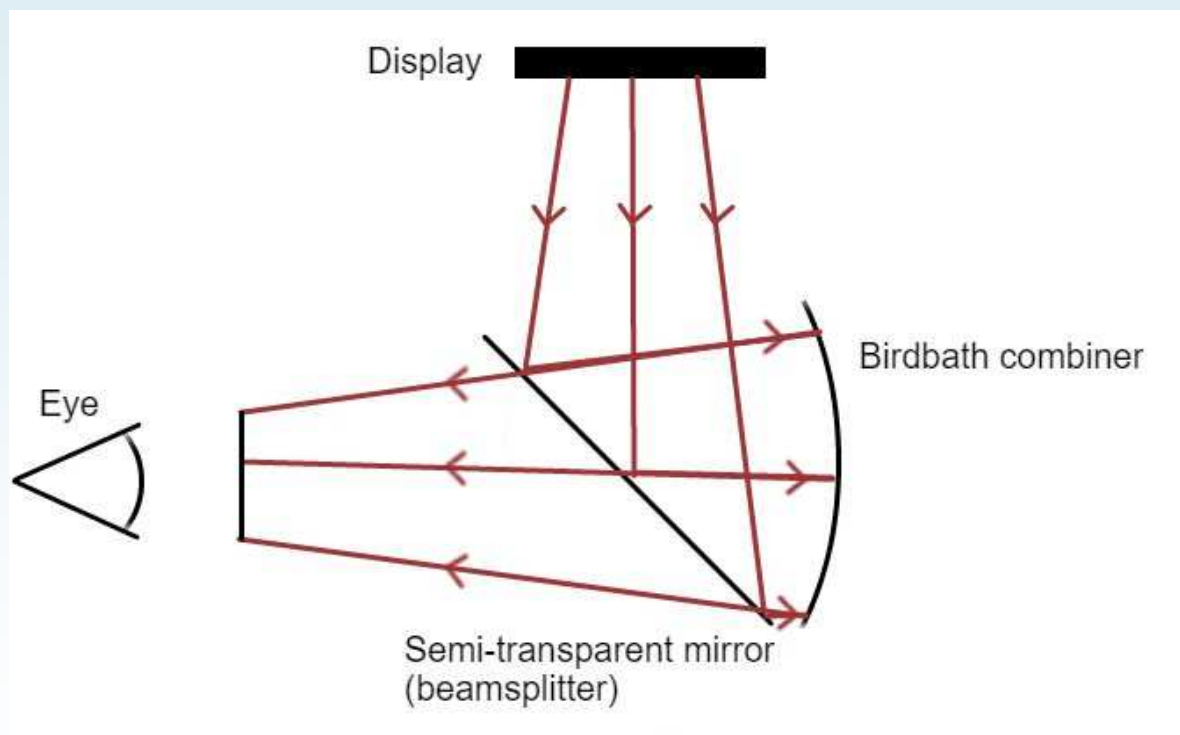


ODG R-9



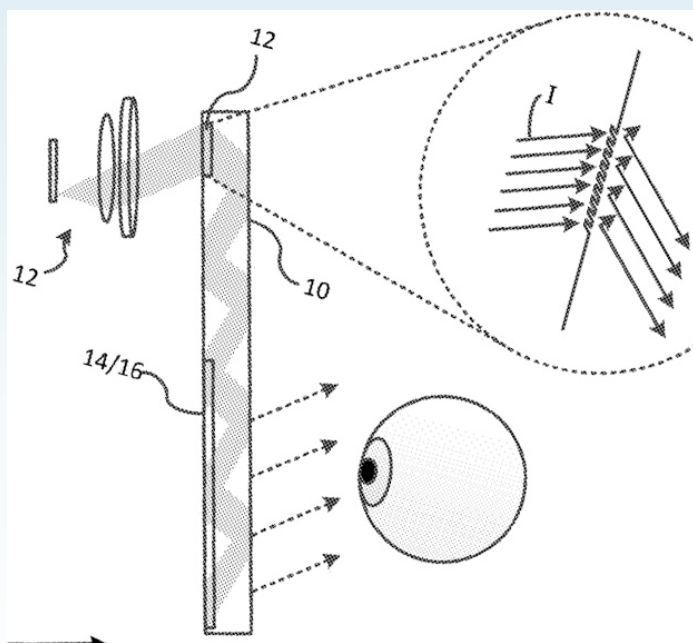
<https://leapmotion.github.io/ProjectNorthStar/mechanical.html>

AR Optics (ODG R-9, “Birdbath” style)



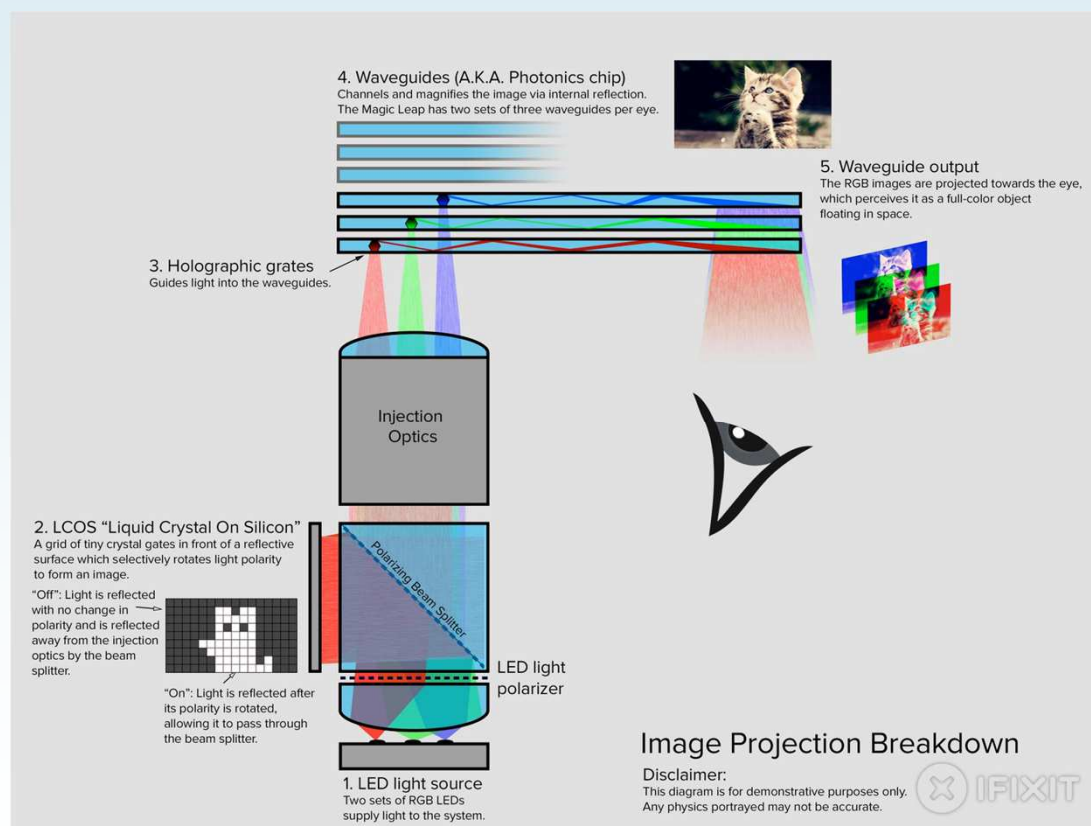
<https://www.altexsoft.com/blog/engineering/augmented-reality-check-get-ready-to-ditch-your-smartphone-for-goggles/>

AR Optics (HoloLens & similar)



<https://www.kgutttag.com/2016/10/27/armr-combiners-part-2-hololens/>

AR Optics (Magic Leap)



<https://www.engadget.com/2018/08/24/magic-leap-teardown-reveals-complexities-mixed-reality/>

Optical AR Images are Transparent



<https://uploadvr.com/hands-on-microsoft-mesh/>

Summary

- Where VR transports you to a virtual environment, MR moderates the real world
- Near eye displays using optical and video methods have very different capabilities
- In the long term, many people think AR/MR will be more prevalent
- Today, many compromises in the devices