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JULY 2016

# Real Applications of Virtual Reality In Higher Education

# Real Applications of Virtual Reality In Higher Education

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# Introduction

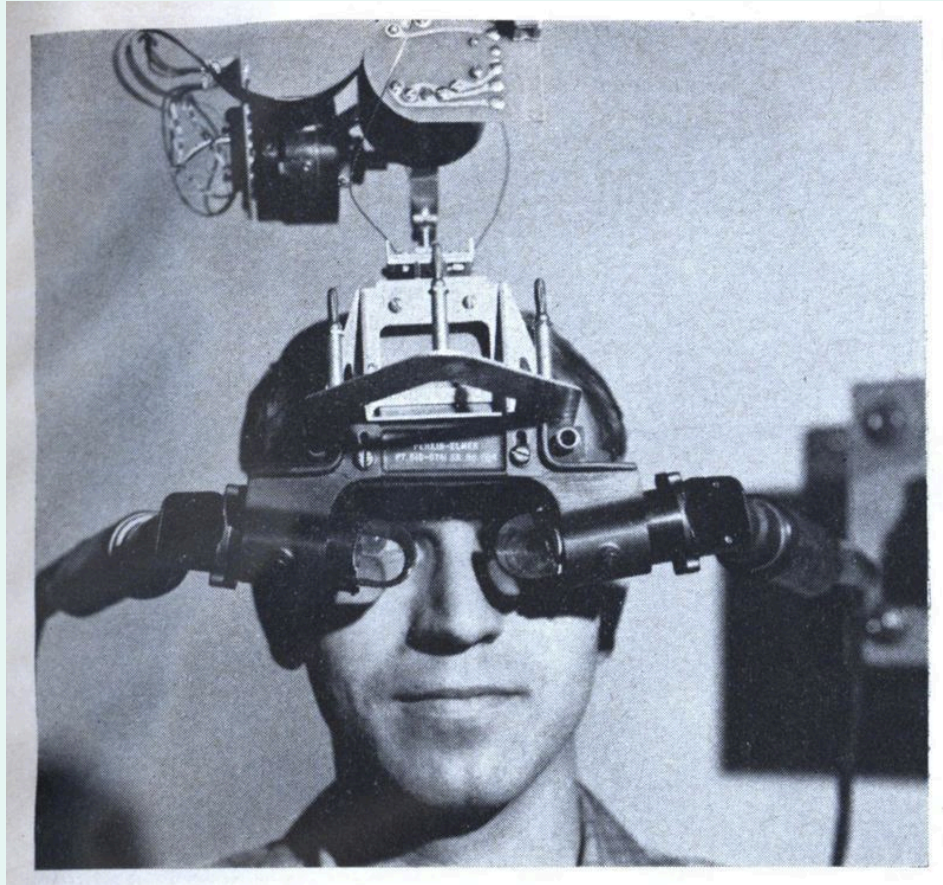
# vir·tu·al re·al·i·ty

'vərCH(əw)əl rē'alədē

*Noun*

technology that replicates an environment that simulates physical presence in places in the real world or imagined worlds and lets the user interact in that world.

## 1968: Philco Headsight





1991: **C**AVE **A**utomatic **V**irtual **E**nvironment

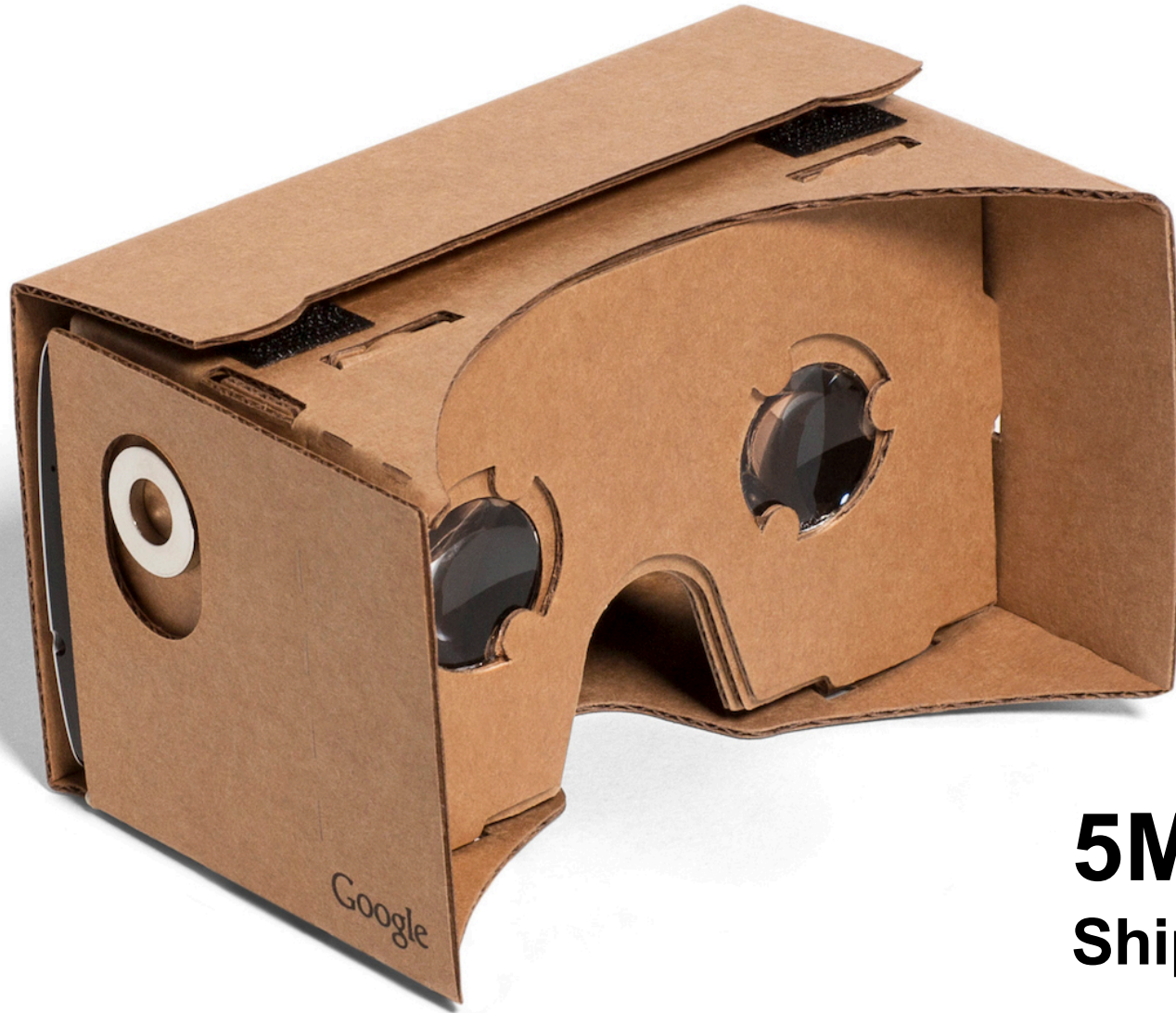




**2013:  
Oculus Rift**

**2016 Launch**





**2014:  
Google  
Cardboard**

**5M+ Units  
Shipped**





Photo Credit: Slash Gear



**2015:  
GearVR**



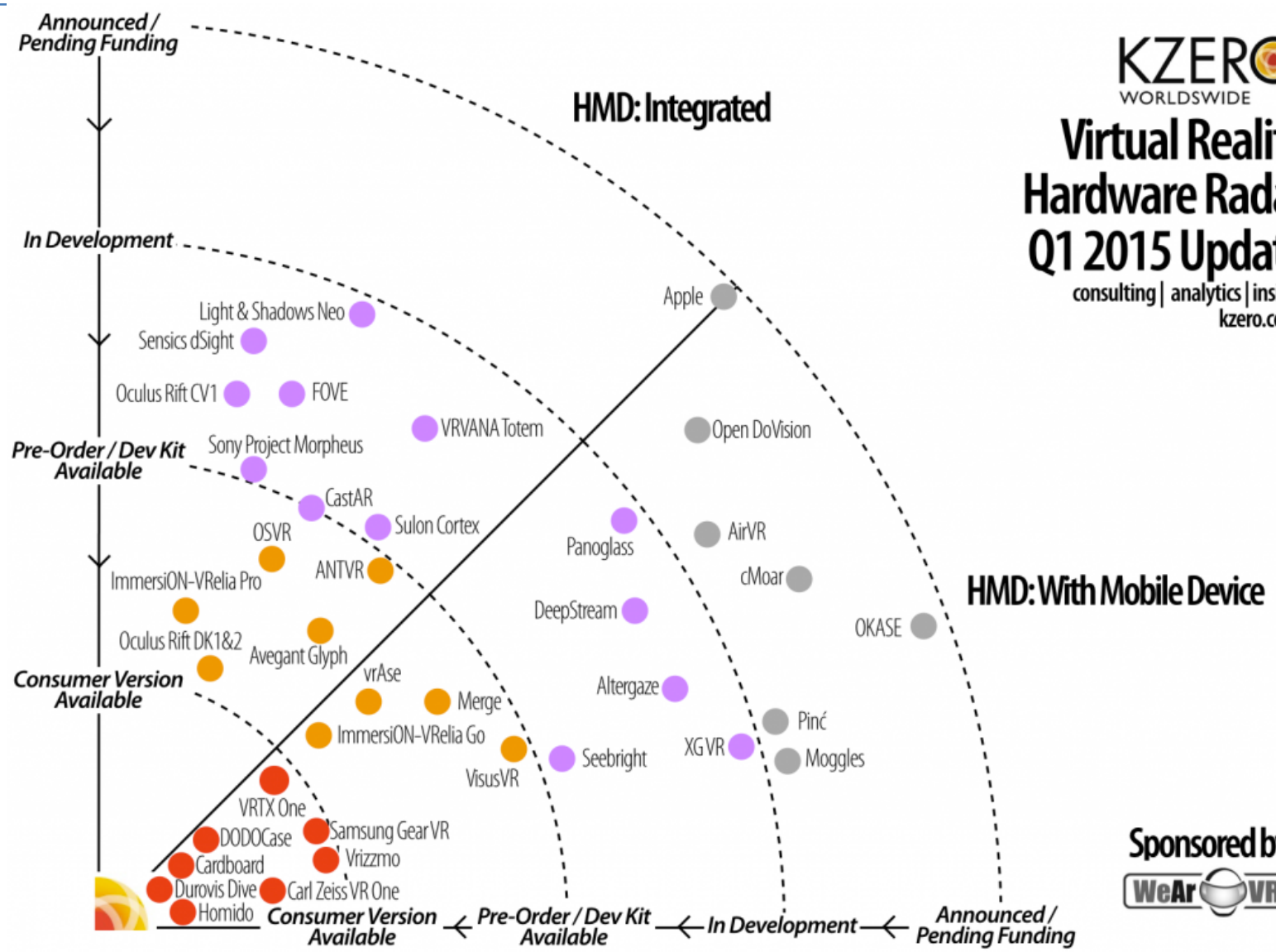


**2015:  
HTC Vive**

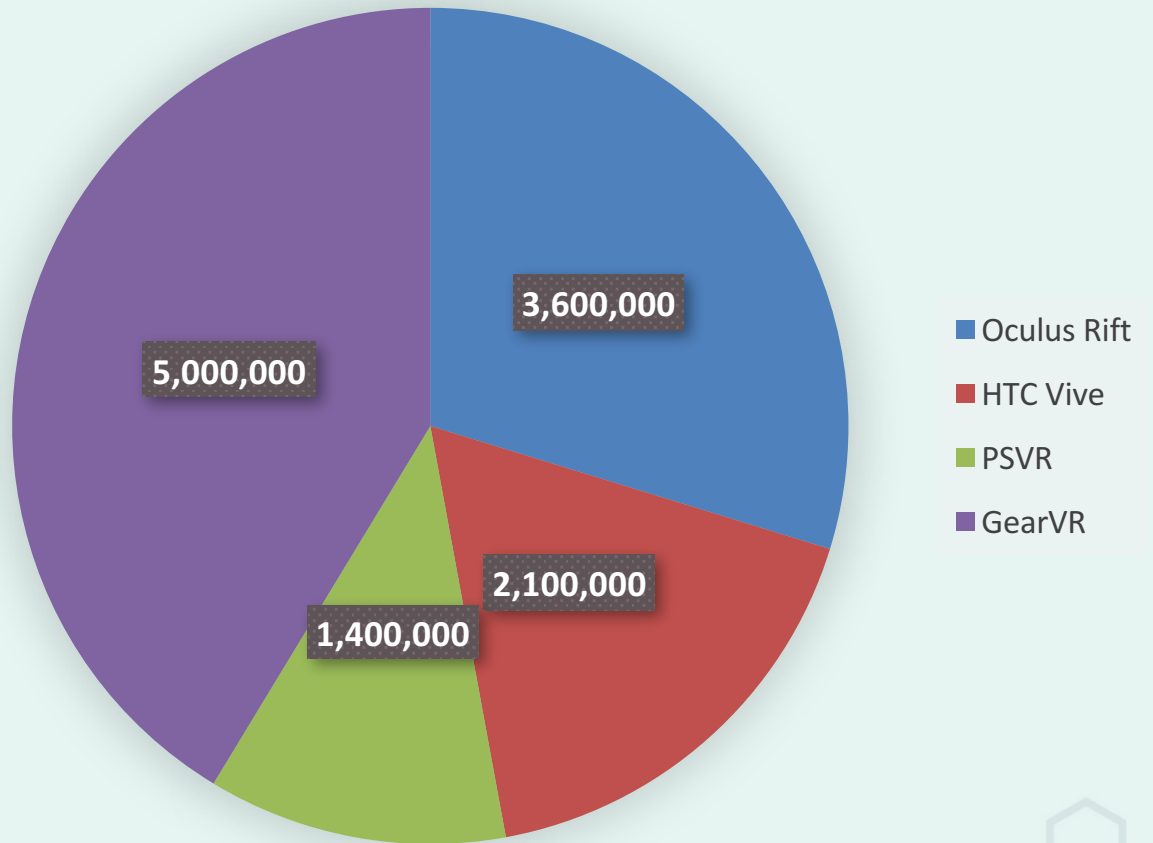


# Virtual Reality Hardware Radar Q1 2015 Update

consulting | analytics | insight  
kzero.co.uk



# Projected 2016 VR Sales: 12.2M Units



Source: Piper Jaffray

# aug·men·ted re·al·i·ty

*Noun*

an enhanced version of reality created by the use of technology to overlay digital information on an image of something being viewed through a device (as a smartphone camera)



**2015:  
Microsoft  
Hololens**

Light  
Augmentation

Full virtual  
environment

AR

Immersion Spectrum

VR

# Field Trips



A student wearing a VR headset is shown in a classroom setting. The student is wearing a blue long-sleeved shirt and has their hands clasped in front of their chest. The background is blurred, showing colorful furniture and classroom equipment. The text "The Jackson School Victoria, Australia" is overlaid on the bottom left of the image.

# The Jackson School Victoria, Australia

Photo Credit: Education Week





**Arlington Science Focus School  
Arlington, VA**

Photo Credit: The Synapse





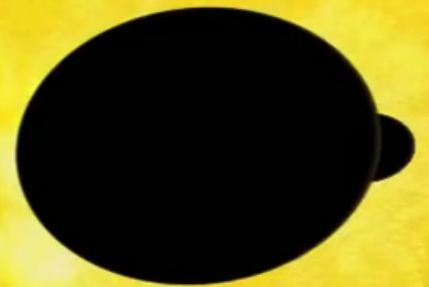
Photo Credit: Mat's Classroom

12,756 KM ACROSS

THE MOON



VENUS  
12,104 KM



WELCOME!

PLEASE SIT BACK  
AND RELAX.

0%





Photo Credit: Extreme Tech



Google

EXPEDITIONS





Google  
JUMP



# Training





# Archaeology Site Training:



Photo Credit: CallT2

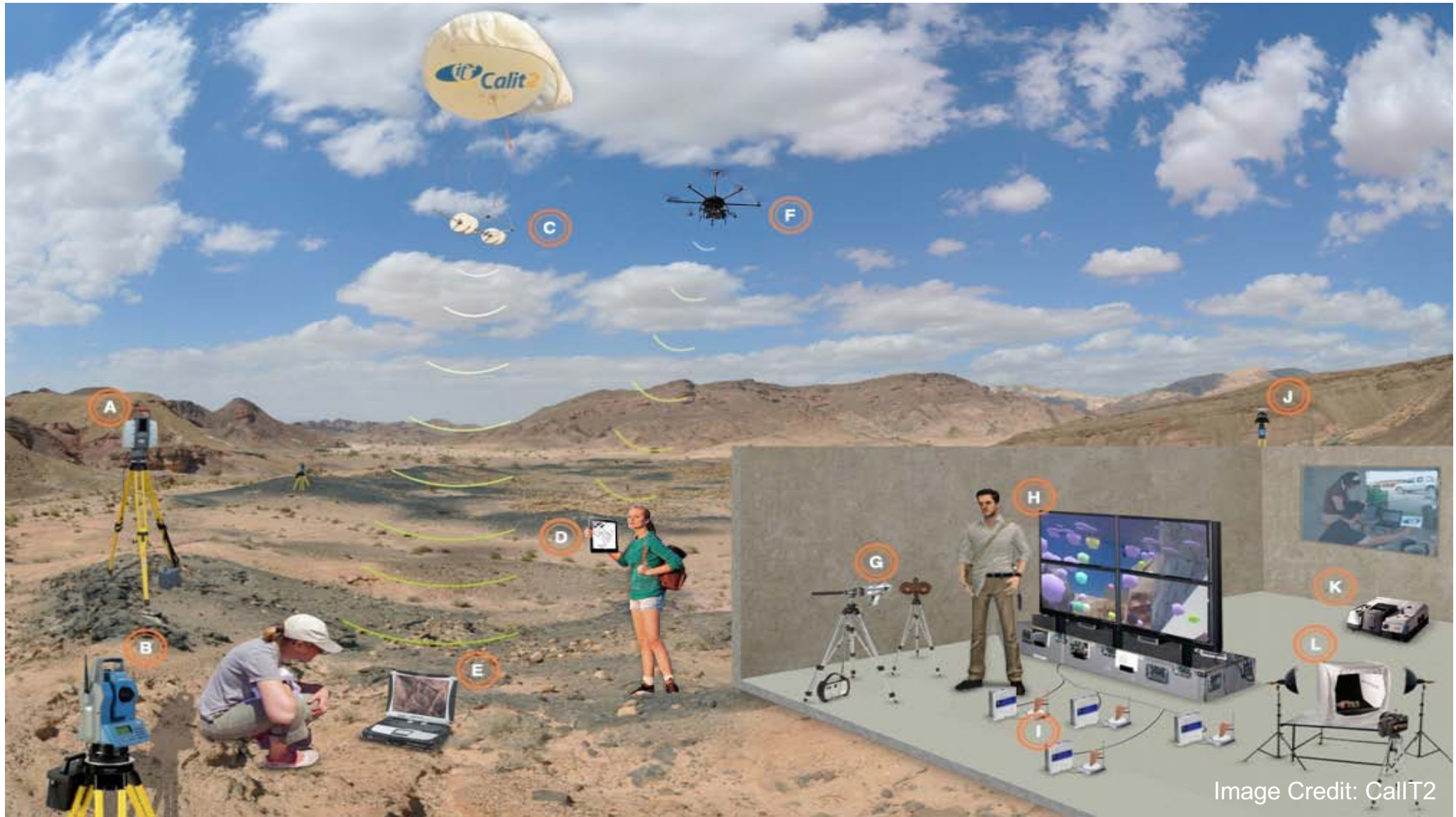


Image Credit: CallT2





# Naval Training Simulation



Photo Credit: Naval Postgraduate School

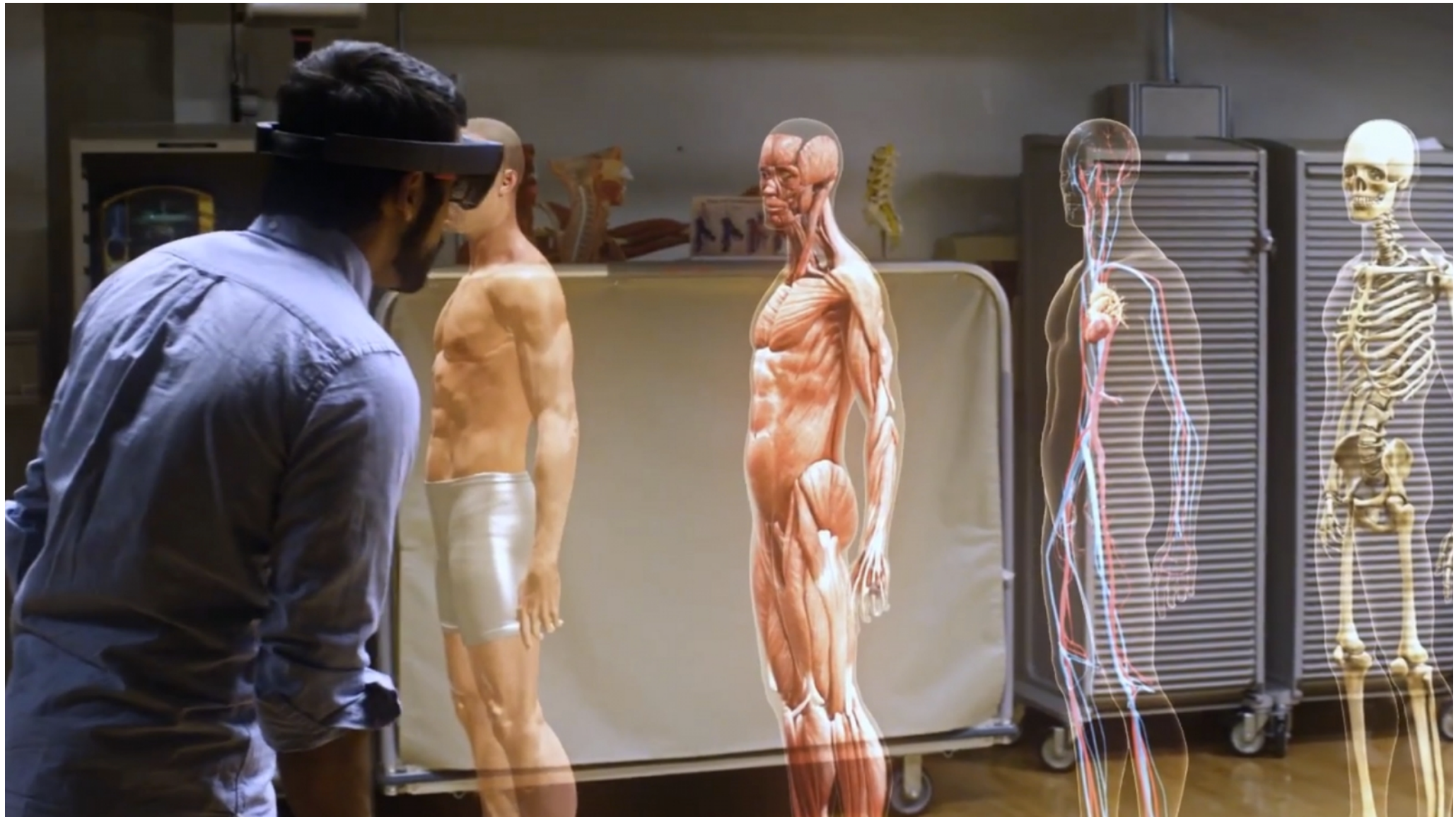


CASE WESTERN RESERVE  
UNIVERSITY EST. 1826

# Medical Education

INTERNET







# Brain Surgery Training



*"In creating a completely artificial world for the patient, we could map certain zones and connections of his brain related to functions that we could not, up to now, easily test on the operating table," Philippe Menei, Neurosurgeon*



Photo Credit: Chu Angers University Hospital

# Recruiting



# YOU VISIT







# Football Recruiting



Photo Credit: Sports Illustrated

# HEADCASE





# Design



# Historical Recreation



missionv.ie







# Architecture Design



Photo Credit: Archinect News



# Distance Learning



# Realtime Lecture In VR





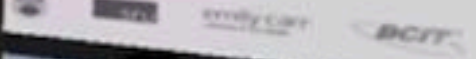
Justin

# Controlling the Controllers

Talk 11  
Part C "Controlling"  
Video Game Law 2014  
UBC Law @ Altac **John**

Jon Festinger O.C.  
Centre for Digital Media  
Festinger Law & Strategy  
<http://videogame.law.ubc.ca>  
@jfestinger  
[jm\\_festinger@thardis.ca](mailto:jm_festinger@thardis.ca)

CENTRE FOR DIGITAL MEDIA





# Online Degree Program Offered Over VR

Executive  
Education

Stanford LEAD Certificate  
**L**earn  
**E**ngage  
**A**ccelerate  
**D**isrupt

Raquel Gonzalez-Dalmou  
(mimic)

Daniel Klein

Martha Weeks

Kevin Williams





# Distance Learning for Disaster Recovery



avayalive  
engage





# Improving Online Learning

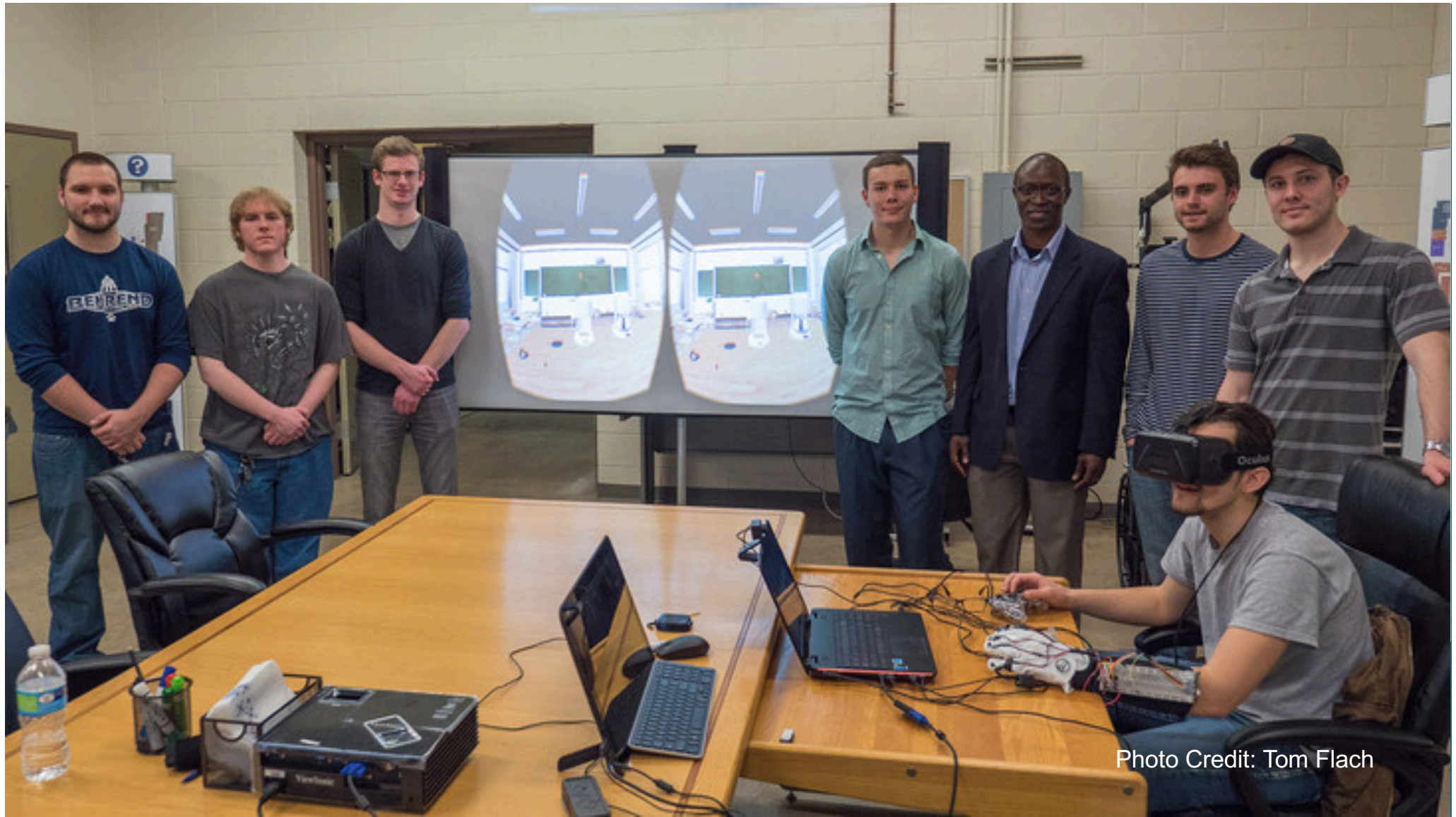


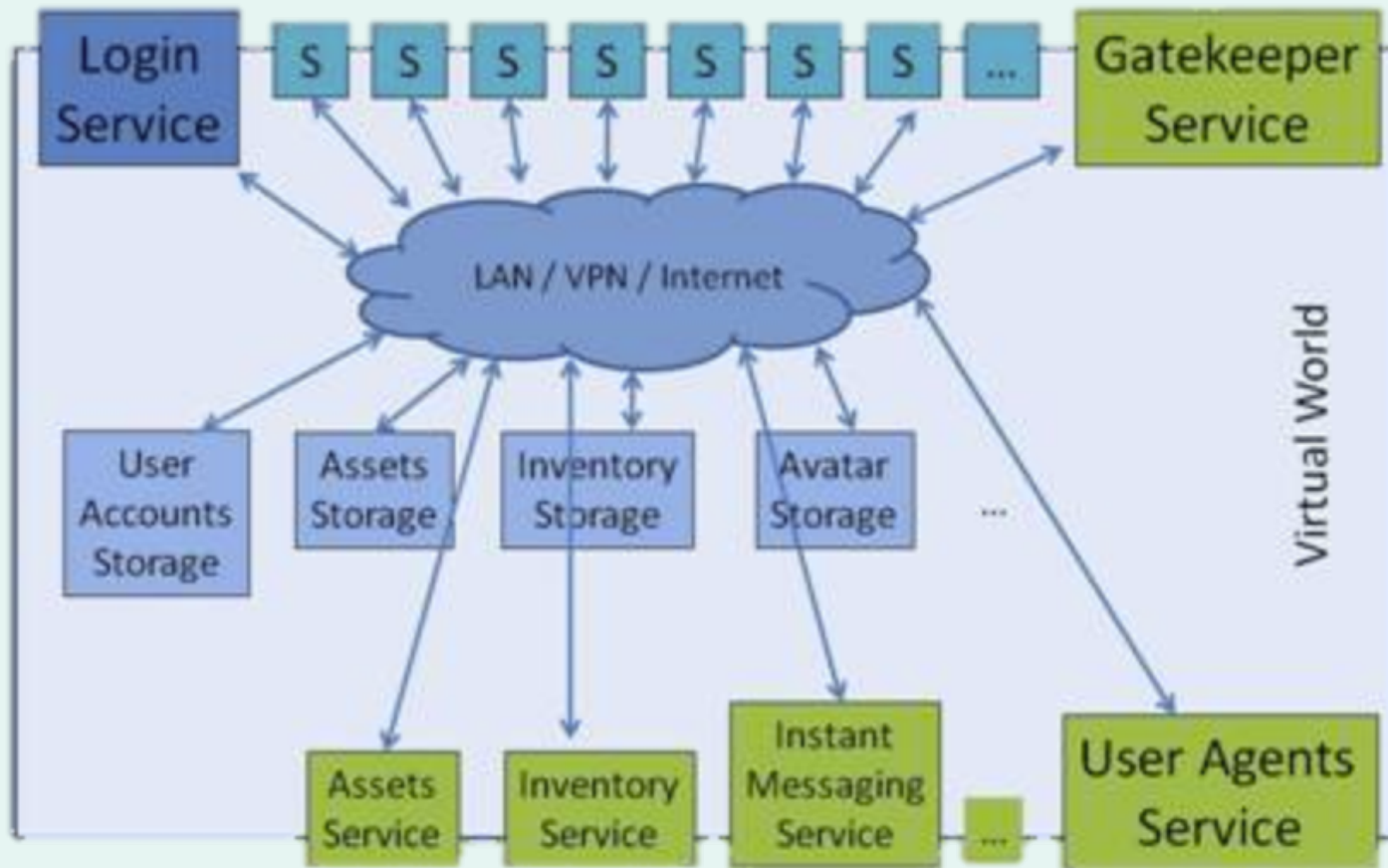
Photo Credit: Tom Flach

# Collaboration





# Hypergrid





**OpenSimulator Community Conference**  
November 8 - 9, 2014

Production by:  
Oculus Foundation  
Sponsored By:  
SIMUDYNE  
GRID

OpenSimulator Community Conference  
A joint production by:  
AvaCon  
Sponsored By:  
GRID

OpenSimulator Community Conference  
Sponsored By:  
GRID  
SIMUDYNE

Brought to you by our sponsors...  
AVINATION  
SIMUDYNE  
GRID

AvaCon  
Oculus Foundation

OpenSimulator Community Conference



Oculus  
Development



# Augmented Reality Rift



# AR-Rift





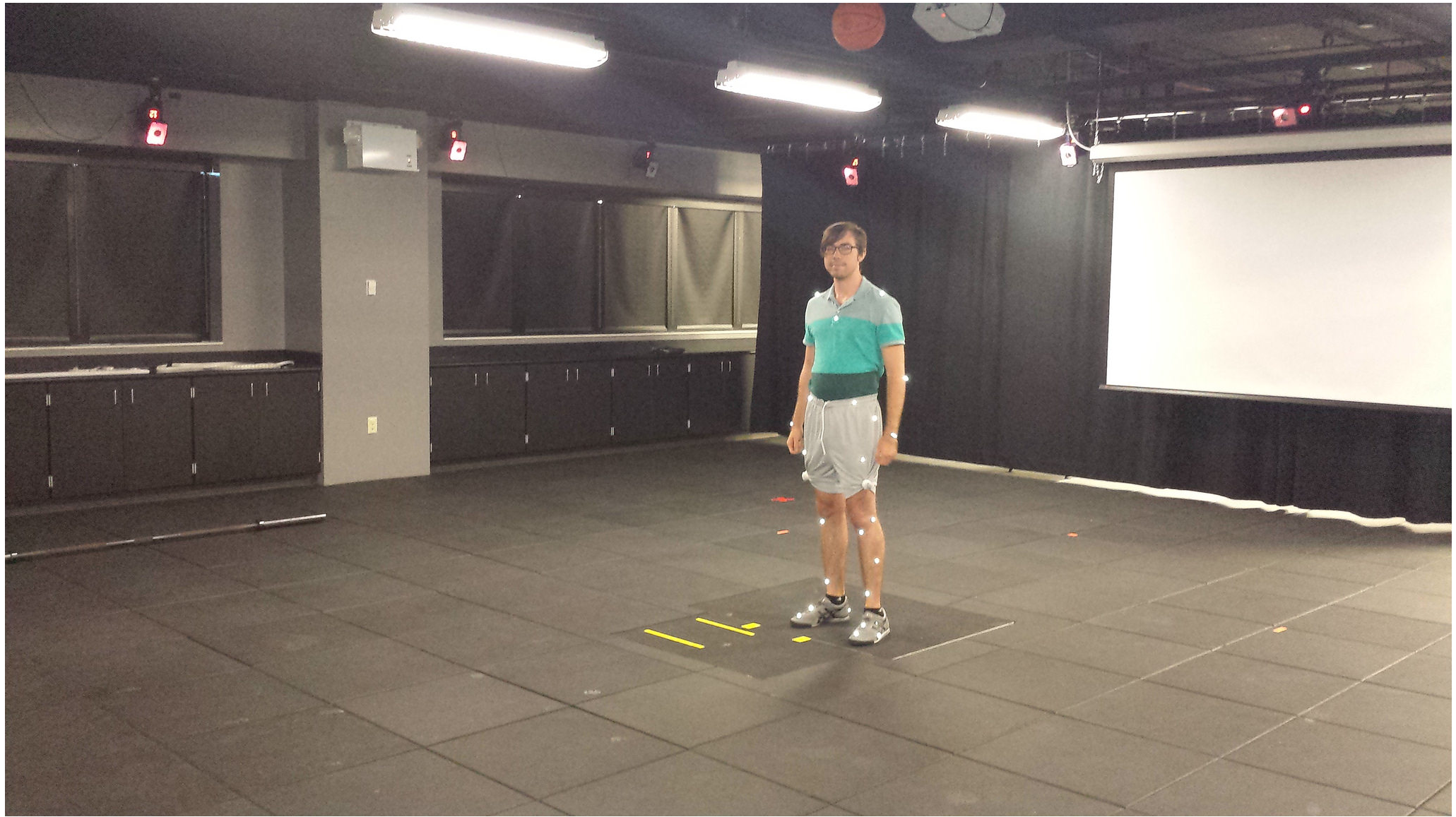
# **Lifesize 3D Video Avatars**

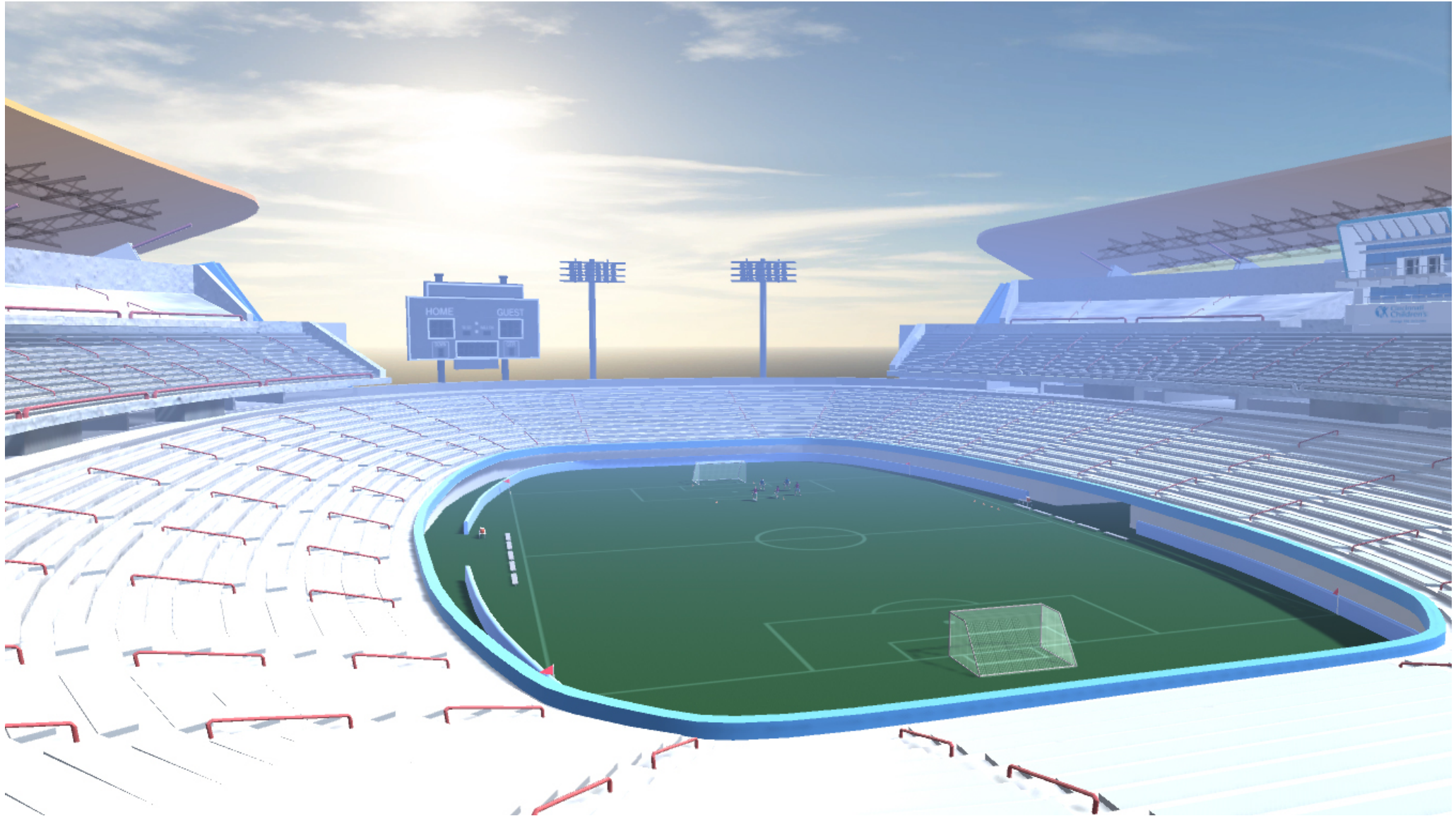
# Research



# Injury Prevention & Rehabilitation











# Implications for Campus IT & Infrastructure



# Campus IT and Infrastructure

## Early-Adopter Students

- Entertainment and Curiosity - early drivers
- Residence Halls – VR rooms, physical safety
- Classroom – Probably limited initial applications, but students may drive faculty curiosity and adoption

# Campus IT and Infrastructure

## Early-Adopter Faculty

- Entertainment and Curiosity - early drivers
- Pedagogy – Faculty development funding, training, workshops
- Classrooms & Labs – VR HMD requires PCs with more horsepower (GTX 970/980, 16GB RAM)

# Campus IT and Infrastructure

## Network Considerations

### Latency

- Cell phone latency 450 milliseconds
- Need latency between 50 – 100 milliseconds for believable emotion capture in VR

### Video

- Oculus Rift CV1 – 1080P
- Next generation Rift – 4k
- Youtube 10 minutes of 1080p video:  $3774 * 60 * 10 / 8 / 1024 = 277 \text{ MB} * 5 \text{ for 360 video (est.)} = 1.3\text{GB}$
- NextVR used an 8 Mbps stream, at 6k resolution and 80 frames-per-second.

### Motion Tracking (Head + Body + Hands)

- The raw amount of data streamed from one Kinect is 22 MB/s

# Metaverse Working Group

[metaverse@internet2.edu](mailto:metaverse@internet2.edu)



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