

Motricity in the Immersive Web
Inclusive & Accessible Locomotion and
Interaction in XR on the Web

November 5, 2019

@rolanddubois

Overview

- 1. The trend towards controller-free input**
- 2. Why is XR hardware failing?**
- 3. What can we learn from AT?**
- 4. Experiments, Tools and Projects**
- 5. Discussion**

What Is Accessibility? #a11y

When something is accessible, a person with a disability can (to the greatest extent possible):

- acquire the **same information**,
- engage in the **same interactions**,
- and enjoy the **same services** as a person without a disability,
- with substantially **equivalent ease of use**.

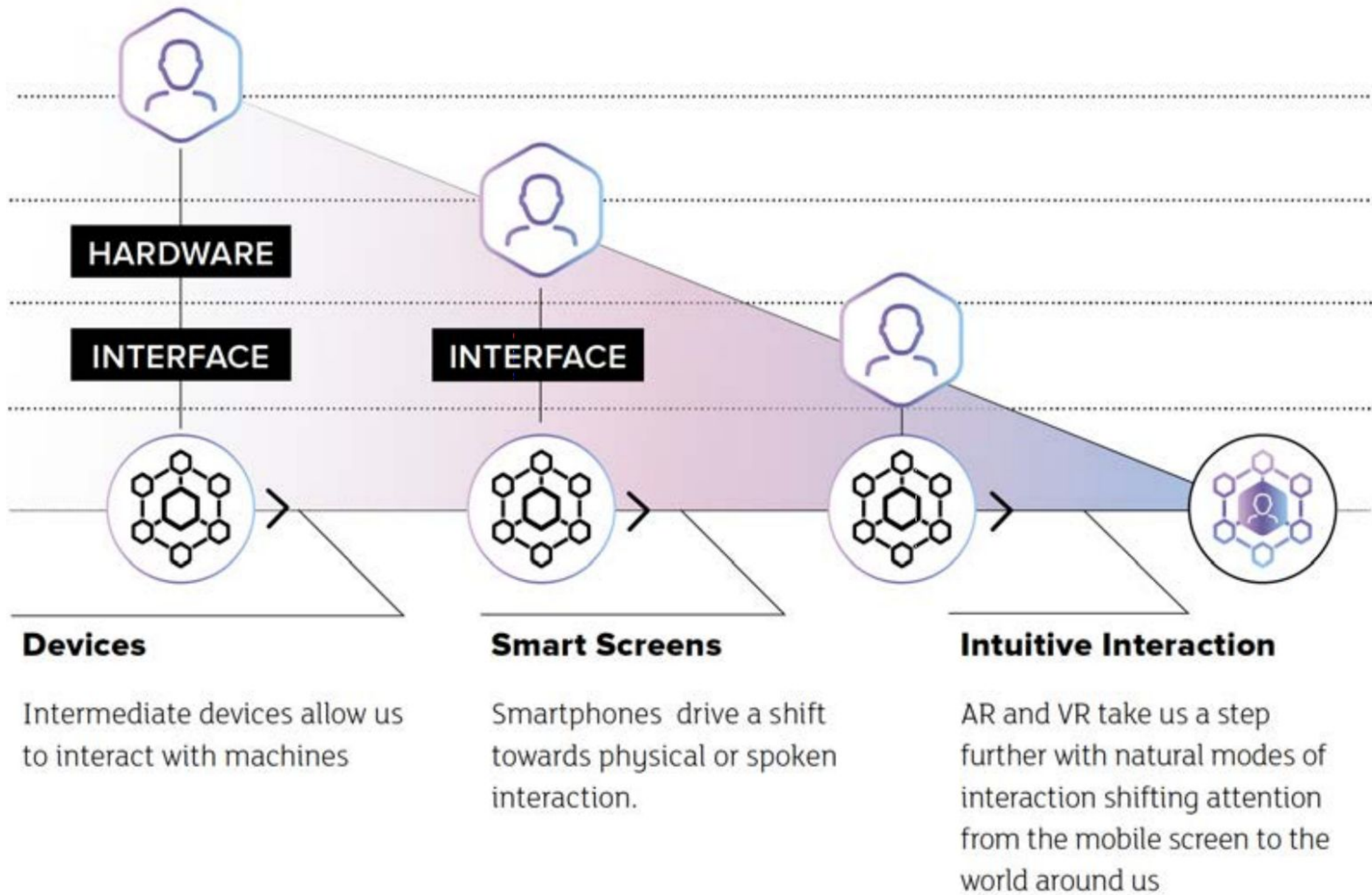
In Other Words:

**Accessibility = Designing
things to provide equal access
to people with disabilities**

**2D Web — making content
accessible**

**Immersive Web — making
experience accessible**

**The trend towards
controller-free input
allows no space for
graceful degradation**



POINT



CLICK



TYPE



TOUCH



SWIPE



TALK



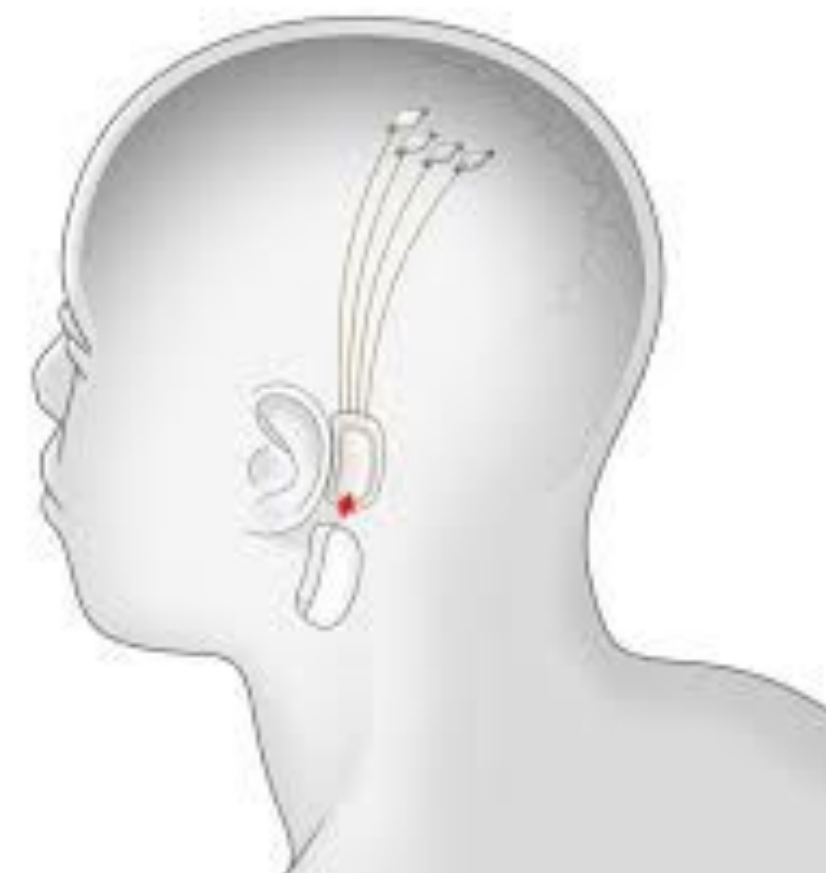
GESTURE



MOOD



GAZE



Low-cost brain computer interfaces (BCI)

Disruptions: Brain Computer Interfaces Inch Closer to Mainstream

BY NICK BILTON APRIL 28, 2013 11:00 AM 38



Emotiv



Neurable



Muse, a lightweight, wireless headband, can engage with computers, iPads and smartphones. Cadeau Creative



NeuroSky

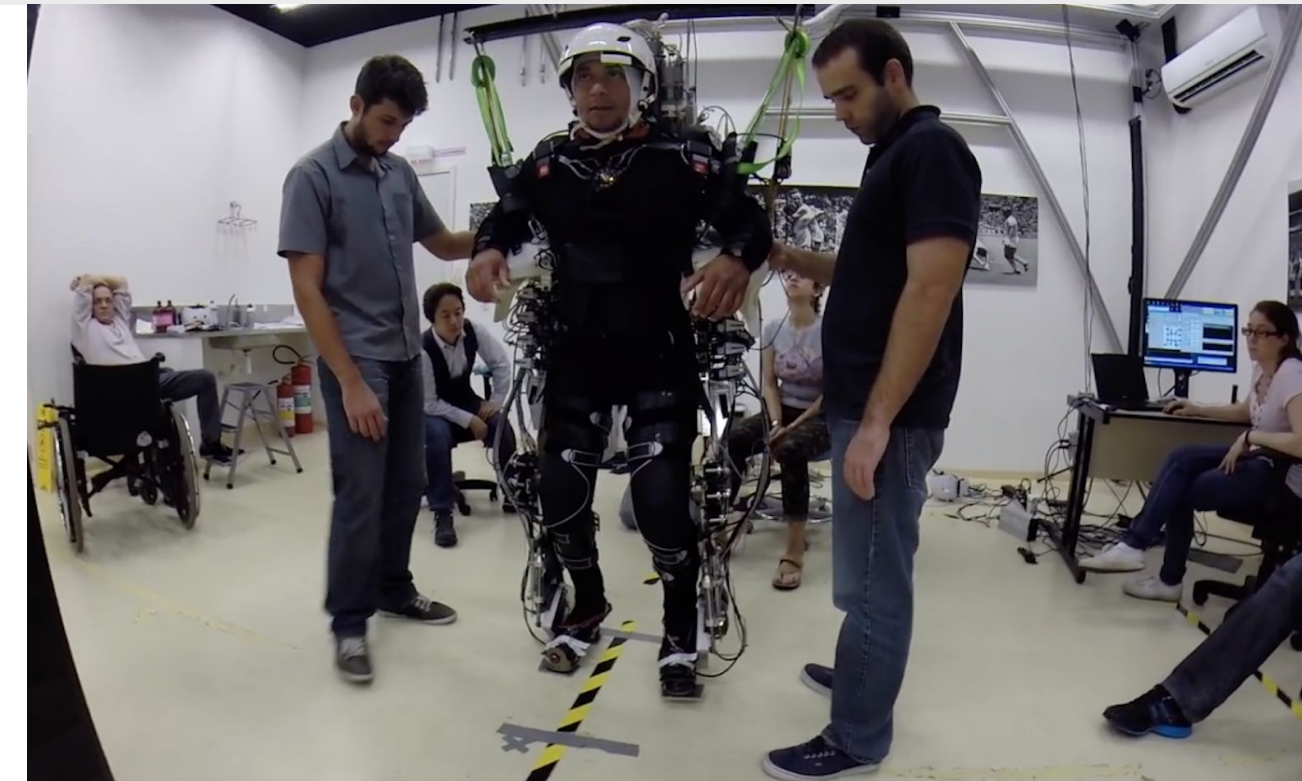


Muse



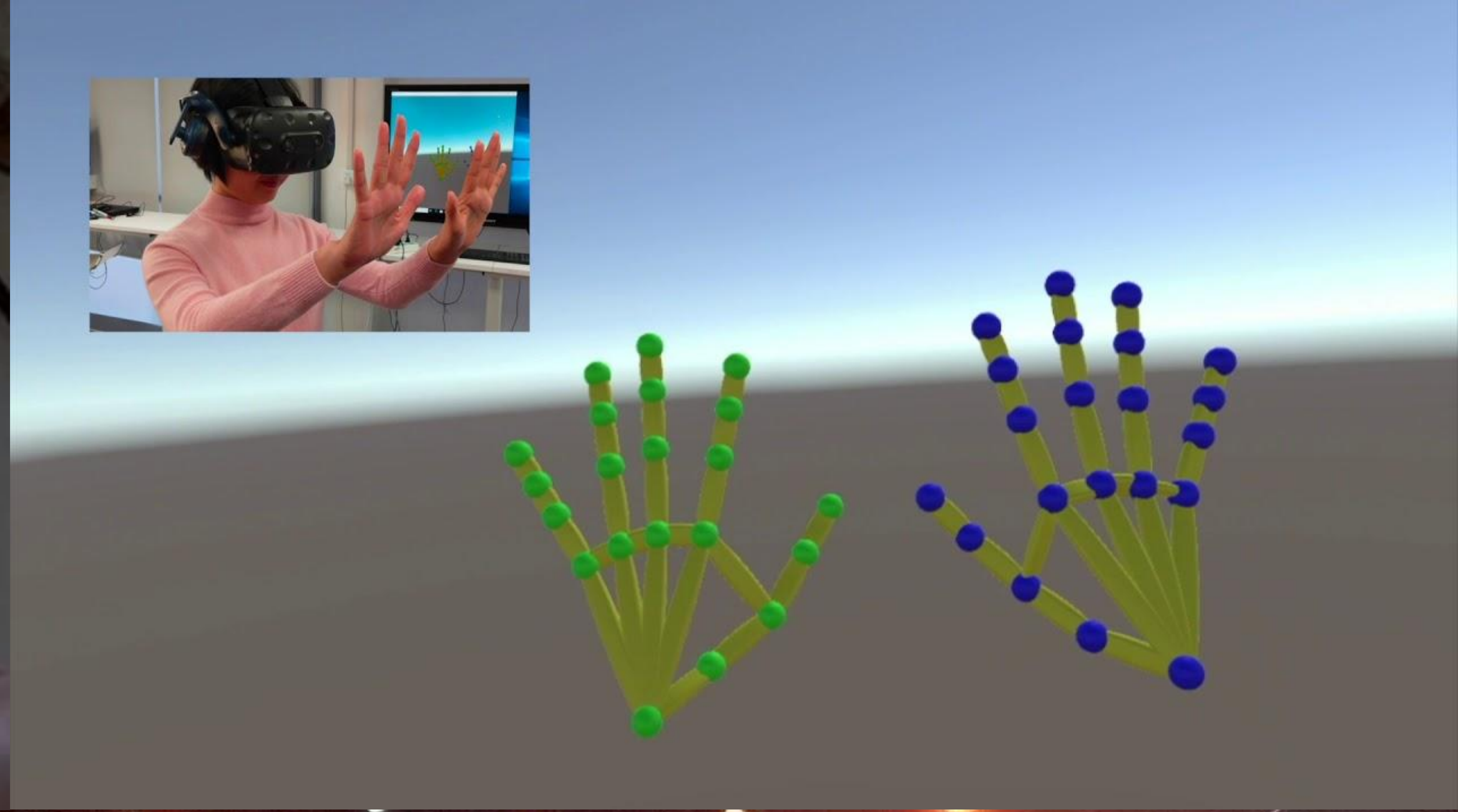
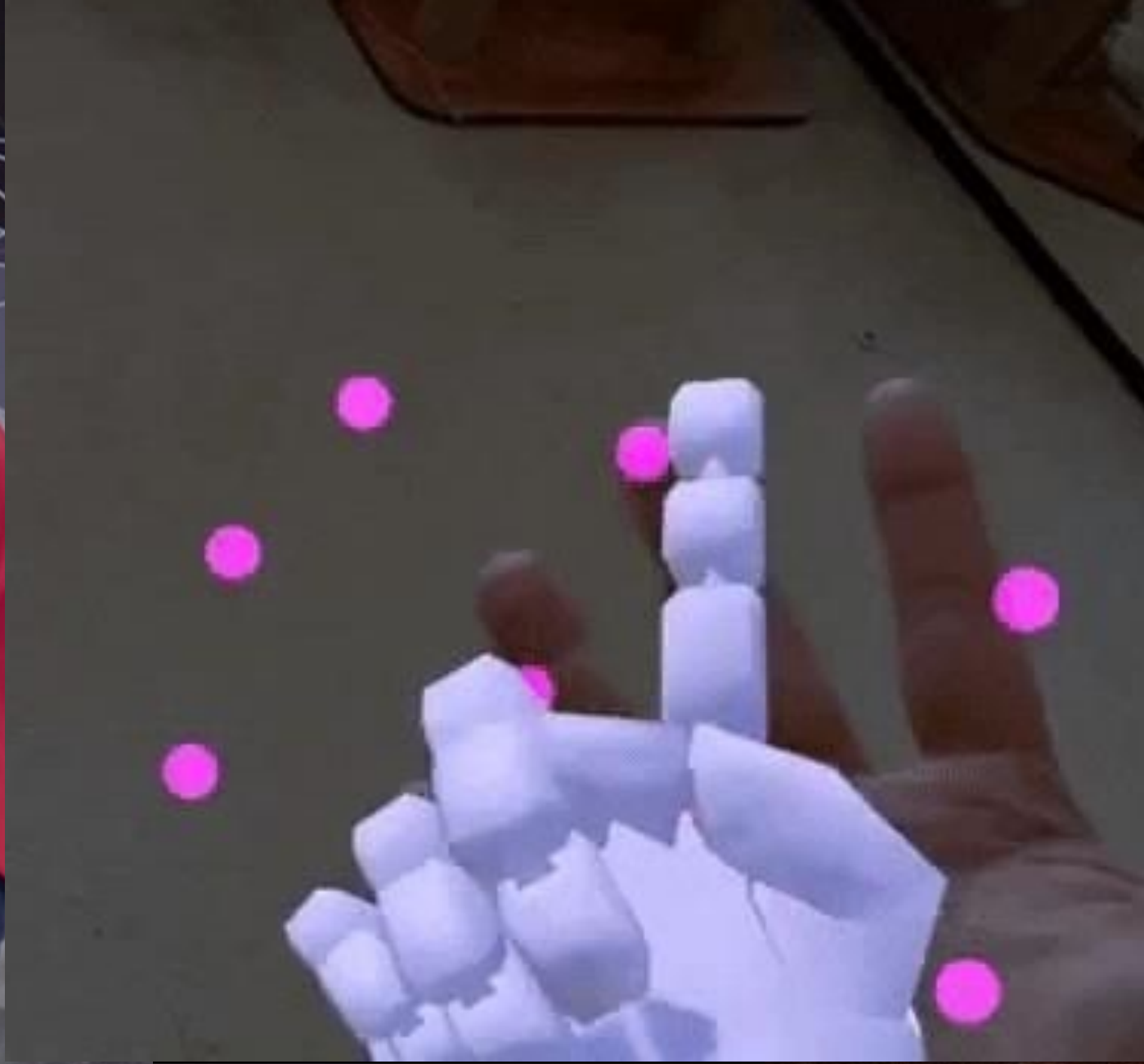
Nia

BCI & VR in Research



Spatial gesture / hand motion control





**Why is XR hardware
failing?**



Most Windows VR Headsets Have Vanished from the Microsoft Store, Limited Stock Elsewhere

By Ben Lang - Jul 8, 2019 117

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AR headset company Meta shutting down after assets sold to unknown company

By Adi Robertson | @thedextrarchy | Jan 18, 2019, 7:40am EST

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Google Discontinues Daydream View Headset, the Final Nail in the Coffin for its Android VR Ambitions

By Ben Lang - Oct 15, 2019 32 Google's Clay Bavor speaks at the 2016

Facebook Twitter LinkedIn Reddit Subscribe

It was abundantly clear by earlier this year that Google's interest in its Android-based Daydream VR platform had withered, but now the company has put the final nail in the coffin by discontinuing the Daydream View headset and confirming that its newest Pixel 4 smartphone isn't compatible.

Google had monstrous ambitions for Daydream at the start. The company figured that developers would leap at the opportunity to build VR apps on its platform thanks to theoretical chance they could reach to hundreds of millions of existing Android users. But things didn't turn out as they hoped. The

f 39,829 6,295 66,541 27,100
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Sony Pictures Teams With The VOID on 'Jumanji: Reverse the Curse',...
Nov 4, 2019

GADGETS

Smartphone VR Might Be Dead. Good.

Sam Rutherford
10/16/19 1:30PM • Filed to: SAY NIGHT NIGHT TO DAYDREAM

14.9K 50 Save f t e

HTC's Latest VR Effort Promises Sharper Images, But Its Market Appeal Is Unclear

Ralph Jennings Contributor @ Asia



An attendee tests the HTC Vive Pro during Mobile World Congress, on February 25, 2019 in Barcelona,... [+] GETTY

Augmented reality headset company Daqri is reportedly shutting down

By Adi Robertson | @thedextrarchy | Sep 13, 2019, 1:48pm EDT

f t SHARE



Daqri, known for its business-focused augmented reality headsets, is reportedly shutting down. TechCrunch wrote yesterday that the company's headquarters had been shuttered and many employees had been laid off, citing reports from former staff members. An email also apparently stated that Daqri is trying to sell its assets in preparation for a shutdown.

Road to VR elaborated on the email, which said that the company would end its Smart Glasses and Worksense programs by the end of September. The asset sale would "put an end to [Daqri's] industrial wearables business and begin the wind down of the company."

Magic Leap is partnering with Star Wars' Lucasfilm to make 'experiential story moments'

By Russell Brandom | Jun 16, 2016, 10:57am EDT
Source *Wired*

f t SHARE



For Magic Leap to be truly magical, it needs content, content, content

After shipping its headset this summer, the mixed reality startup will use its LEAP conference this week to woo developers.



Ian Sherr October 8, 2018 5:00 AM PDT



AR/VR

Magic Leap teams with Brainlab, SyncThink, and XRHealth for medical AR

JEREMY HORWITZ @HORWITZ SEPTEMBER 4, 2019 6:00 AM



Above: Magic Leap's Mika.

Image Credit: Jeremy Horwitz/VentureBeat

Most Read



AMD CEO Lisa Su interview -- 2020 will be a bigger product year for us

UPCOMING EVENTS

GamesBeat Summit 2020
Apr. 28-29

HTC Vive Cosmos unveiled at Rs 89,990 with free, one-year 'VIVEPORT Infinity' membership

The premium VR headset will be available at Amazon.

IAN S | Oct 25, 2019, 01.04 PM IST



0 Comments

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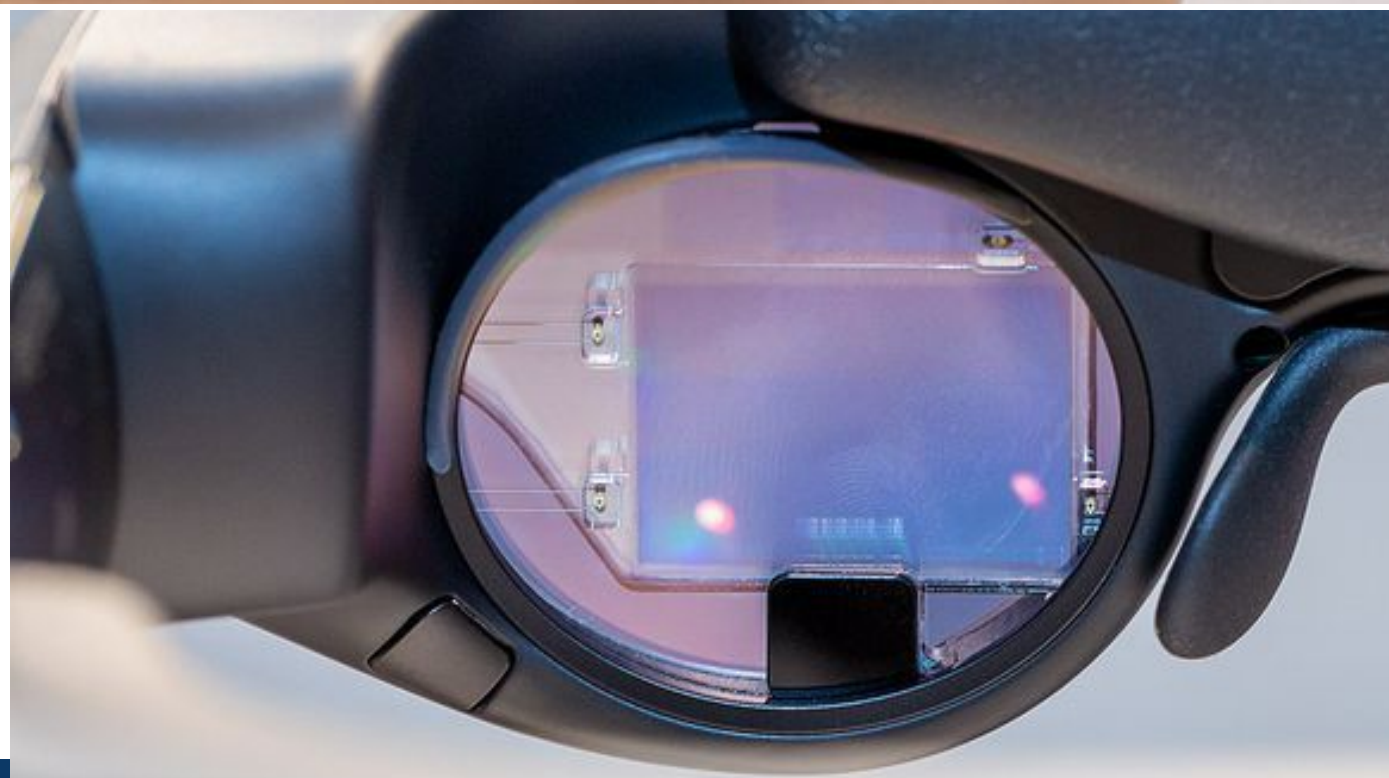
Agencies



HTC to Focus on VR Development Instead of Hardware in Future

INDUSTRY AJ Cortese October 8, 2019





Protective eyewear in medical and blue collar work environments, My name is Yanick/Unsplash

**What can we learn from
Assistive Technologies
(AT) ?**

**What people
think when they
hear VR**

<https://www.flickr.com/photos/yelp/28474934237/>








Who do people interact and **play** in VR

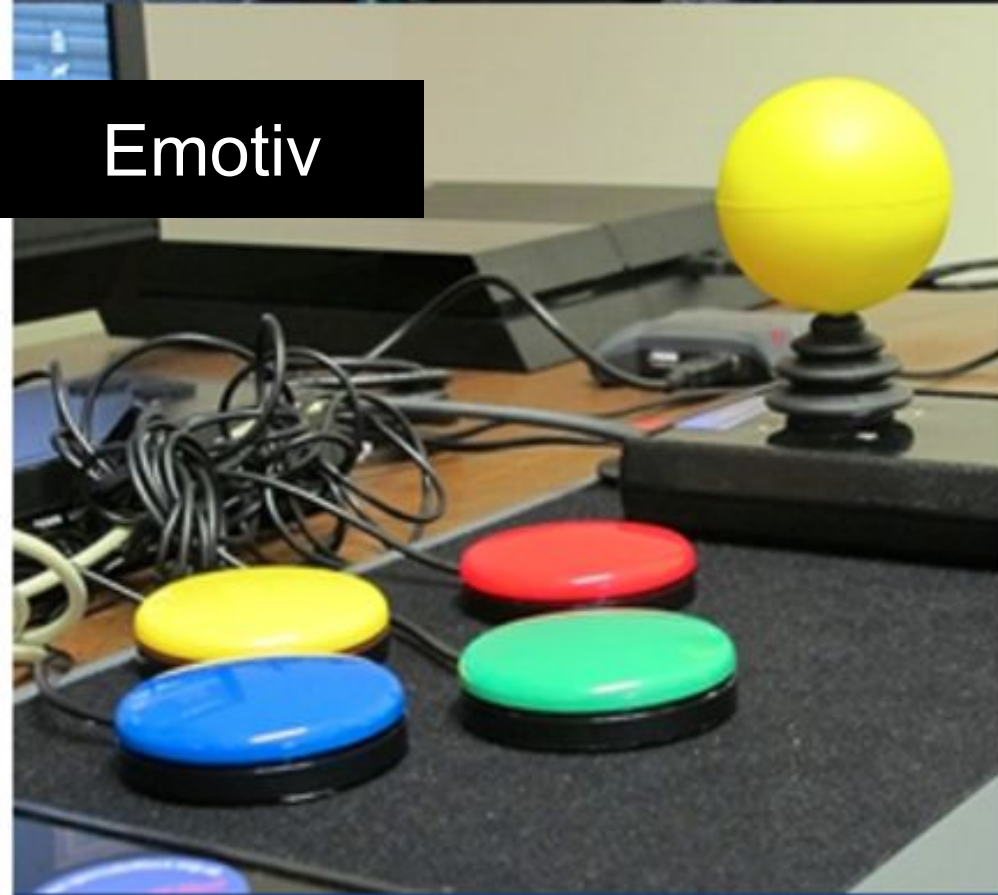


Accessible Controllers




Conjure
Facial expression VR Controller


swipe left	select	back	swipe right
			
smirk left	nose wrinkle	raise eyebrows	smirk right





Emotiv


The Controller Project
Custom Modifications for People with Physical Disabilities

Home Shop Build a Controller Post a Request



 Buy a DIY Mod Kit or Supplies
Purchase the parts to modify a controller of your own
Click to open the shop >

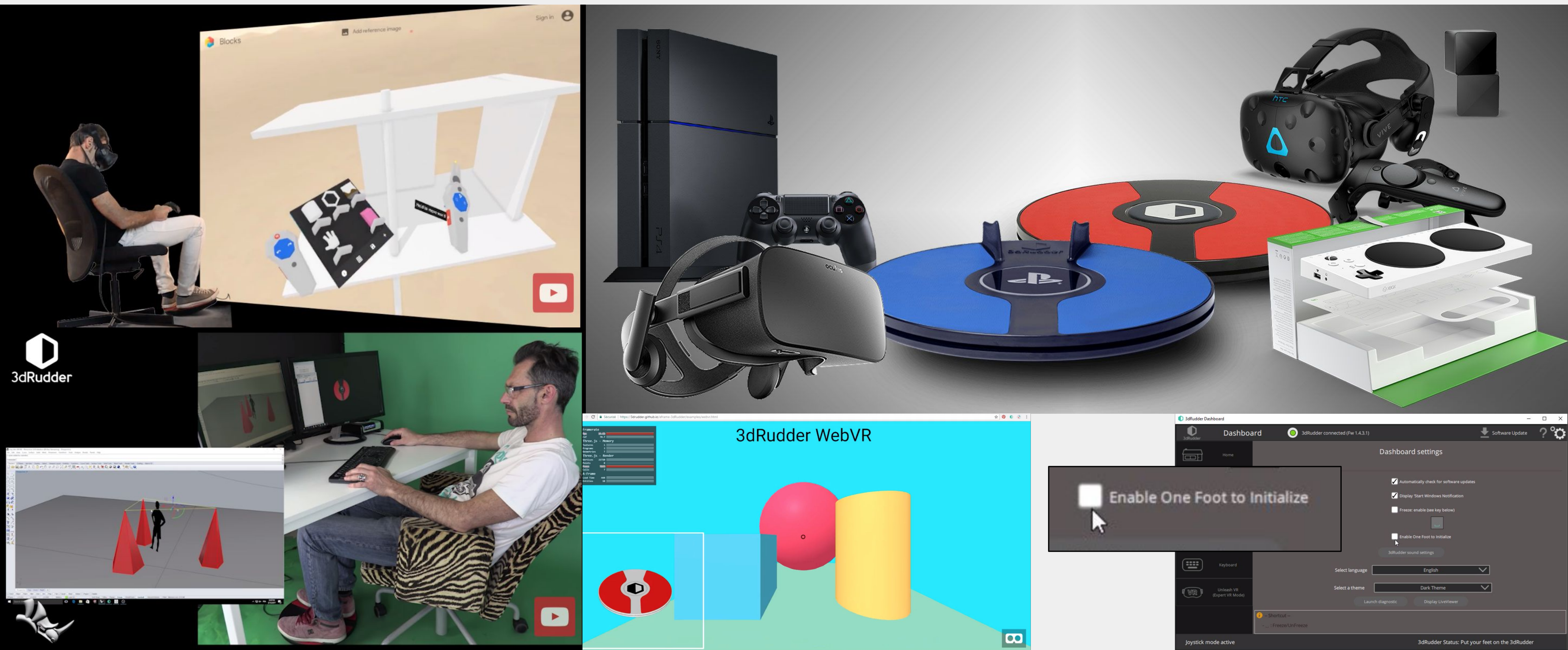
 Request a Custom Controller
Contact me to see if I can help you out by designing a custom controller
Read More >

 Donate
Like what I'm doing? Donate!
Click to Donate >



 **Special Effect**
The gamers' charity

Accessible Controllers - 3dRudder



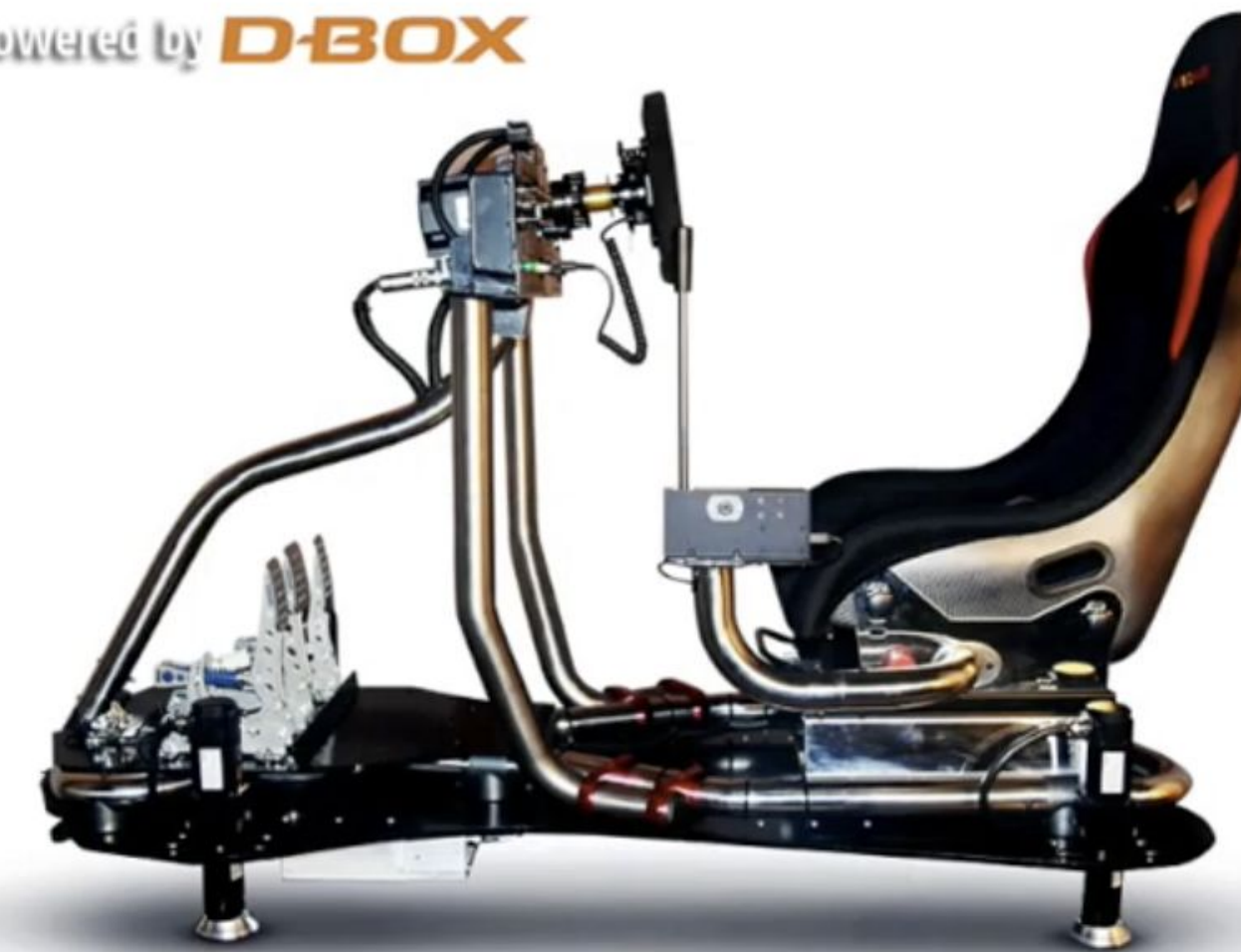
In-Vehicle Assistive Technology (IVAT)



Driving Game Controllers



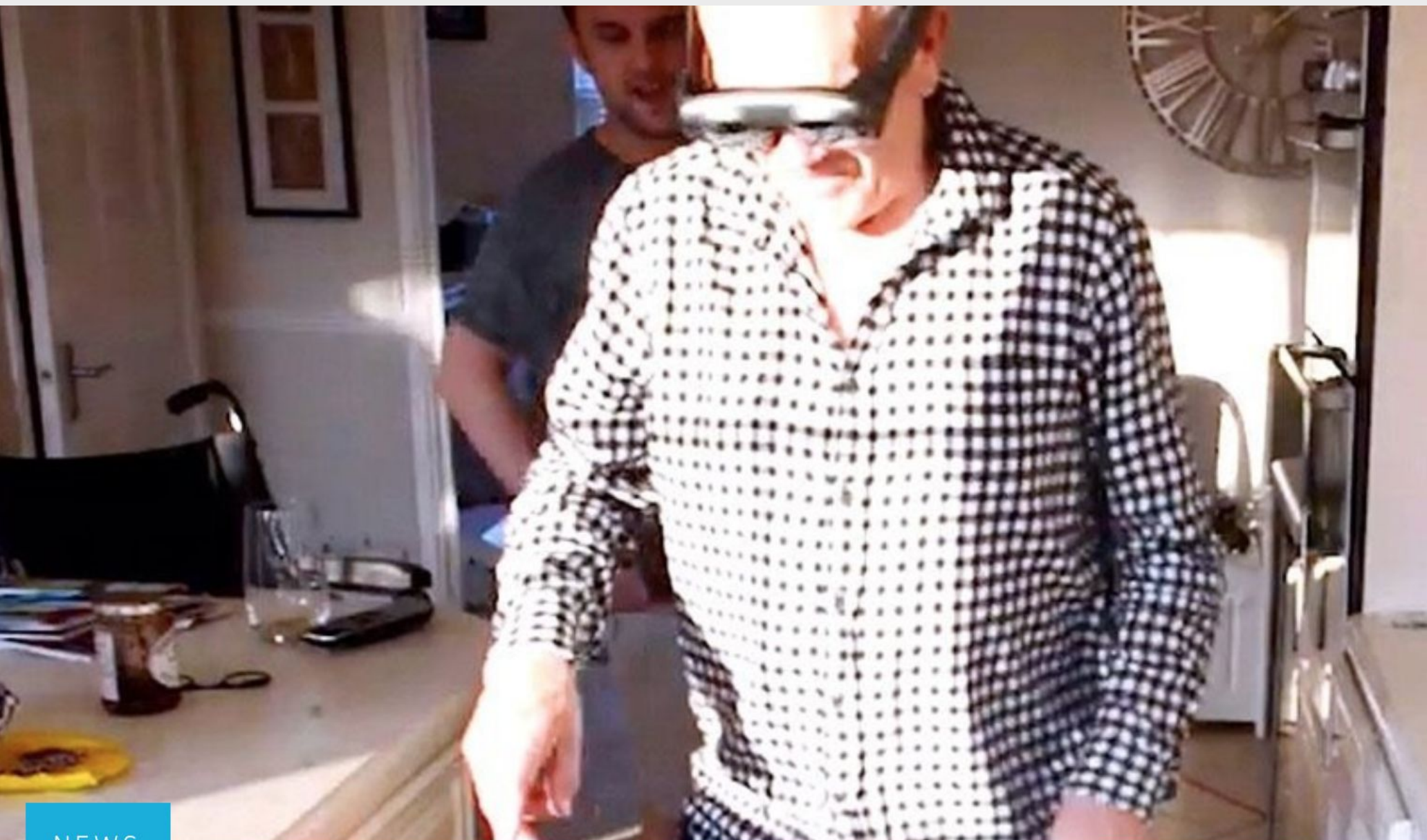
Proudly powered by **D-BOX**



Experiments, Tools and Projects

SeeingVR: Low Vision Tools For VR





NEWS

Magic Lines Works to Restore Mobility to Parkinson's and Dementia Patients Through AR on Magic Leap & HoloLens

BY JIM MANNING 08/26/2019 3:03 PM

APRIL 9, 2019

Virtual reality offers benefits for Parkinson's disease patients

by Experimental Biology

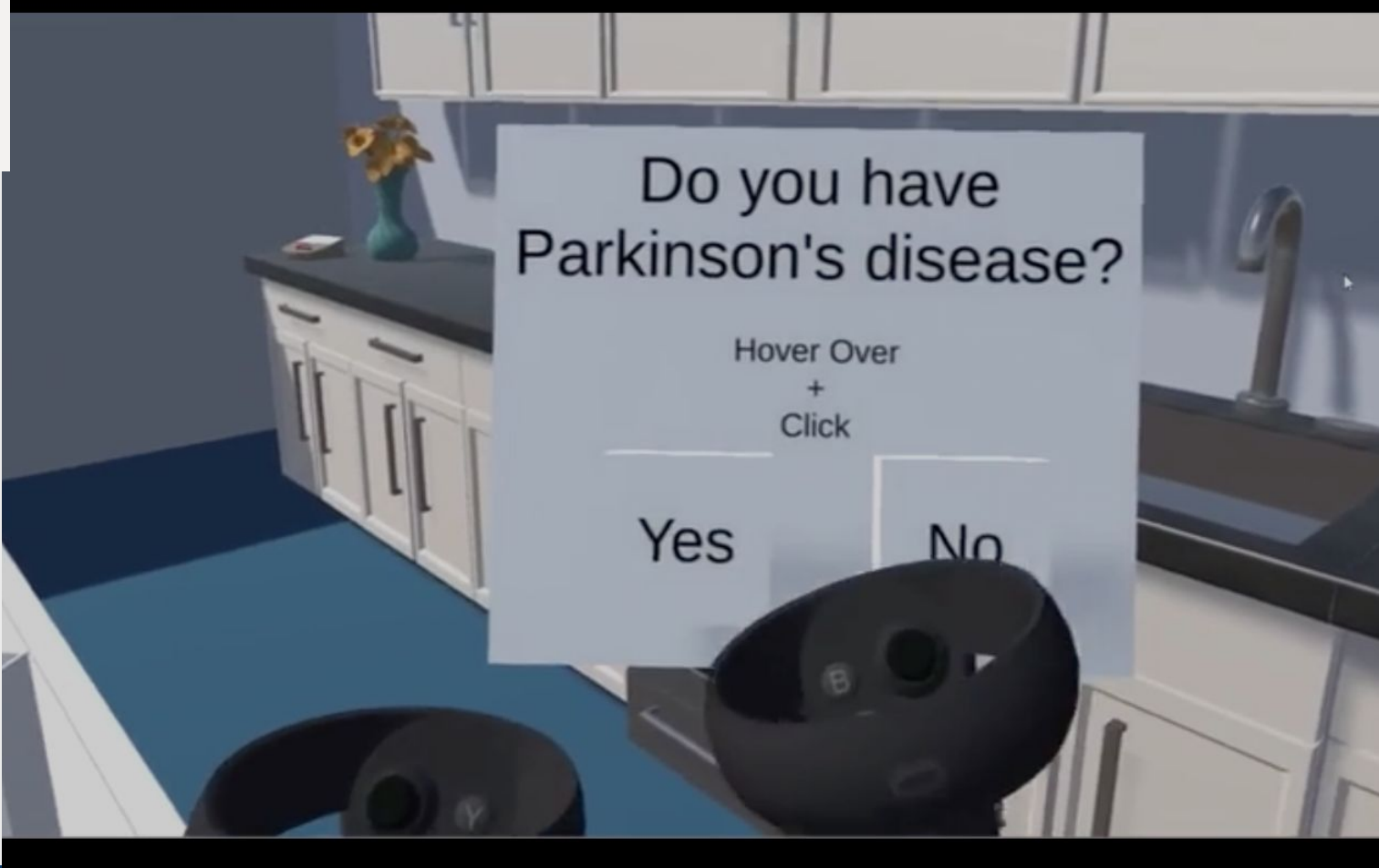


neurostorm
a neurotech company

Translating neuroscience research
into real world applications

Good Vibrations

Patients with Parkinson's disease endure constant shaking of their hands 24 hours a day for multiple years. For the first time, we provide a technology where their hands no longer shake.



...d Cave Automatic Virtual Environment (CAVE) VR system ...
...s are reporting early success with a new tool to help

WalkinVR: Steam Driver For VR



WalkinVR: Steam Driver For VR





Alice Wong ✓
@SFdirewolf



I would LOVE to force-choke someone as DARTH VADER in a #VR experience. A girl can dream. #a11y #VRaccess



♡ 16 7:28 AM - Dec 27, 2016



👤 See Alice Wong's other Tweets



Deadline to participate in this online survey:

January 31, 2017

Online Survey

https://docs.google.com/forms/d/e/1FAIpQLScKkpxMwB5dHiE6k_73xpQCNL1hxCUR0xxnpTiD

Share Your Photos!

If you want to share photos of you using VR, please send them to: DisabilityVisibilityProject@gmail.com

Or tweet [@DisVisibility](#) with the hashtag [#VRaccess](#)

Does Pokemon GO pass our accessibility tests?



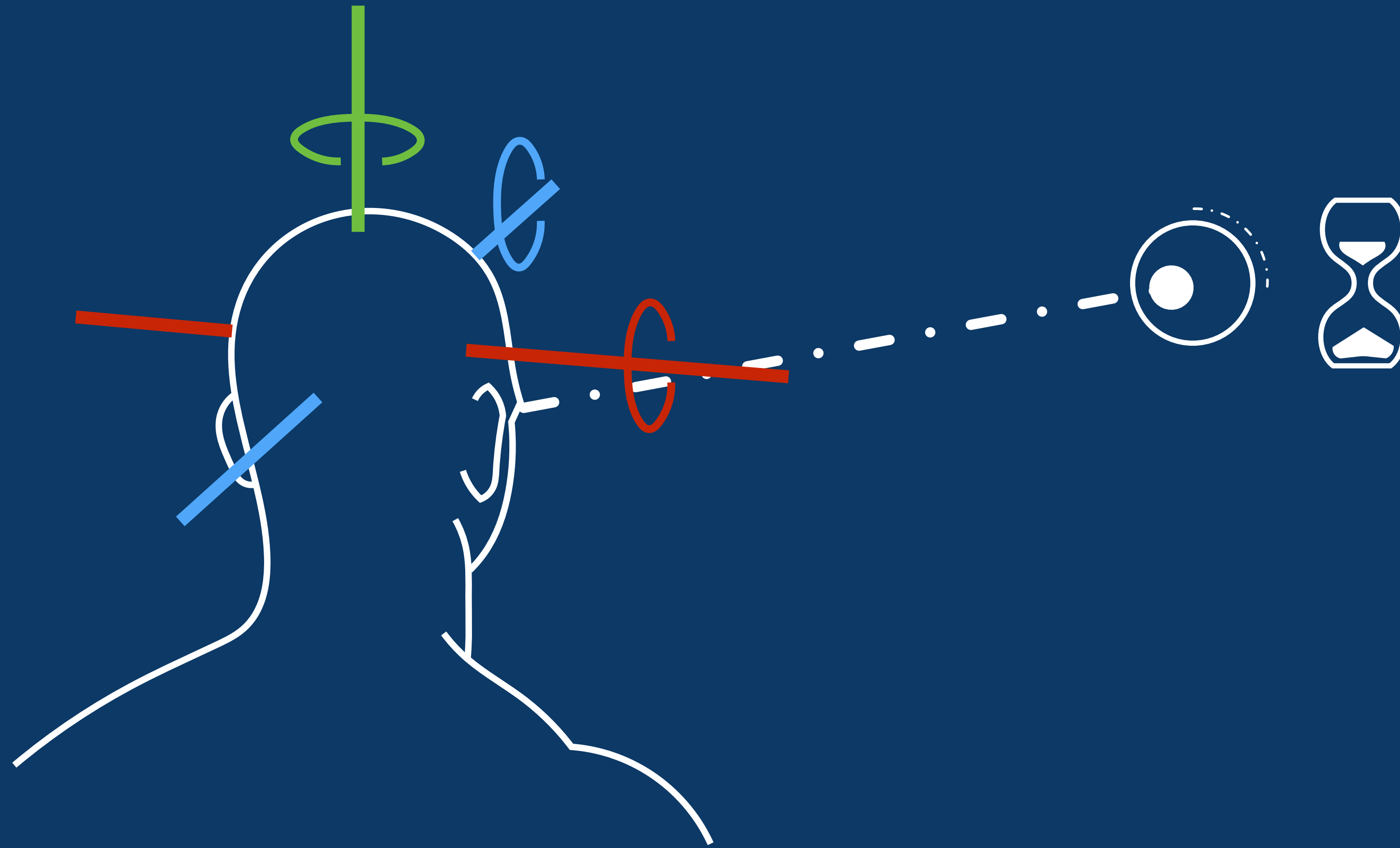
From Sip-and-Puff To Binary





Single switch controllers, name 'em all!



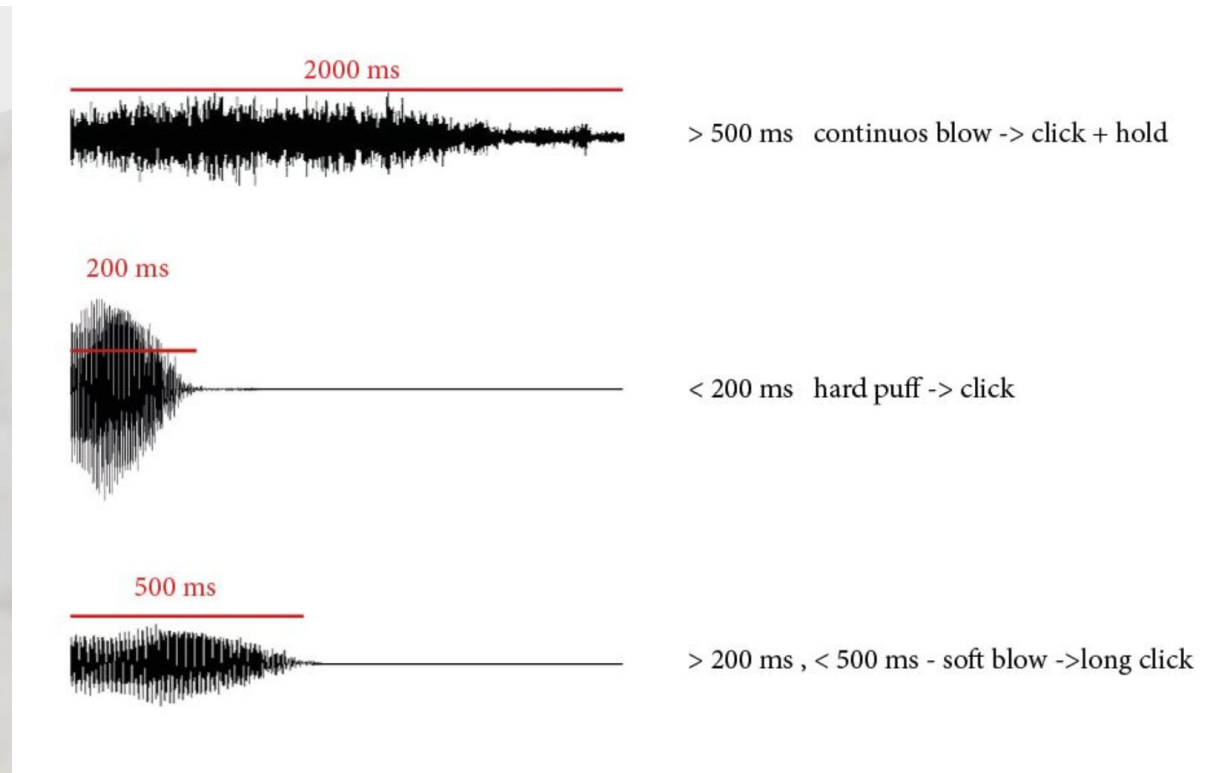
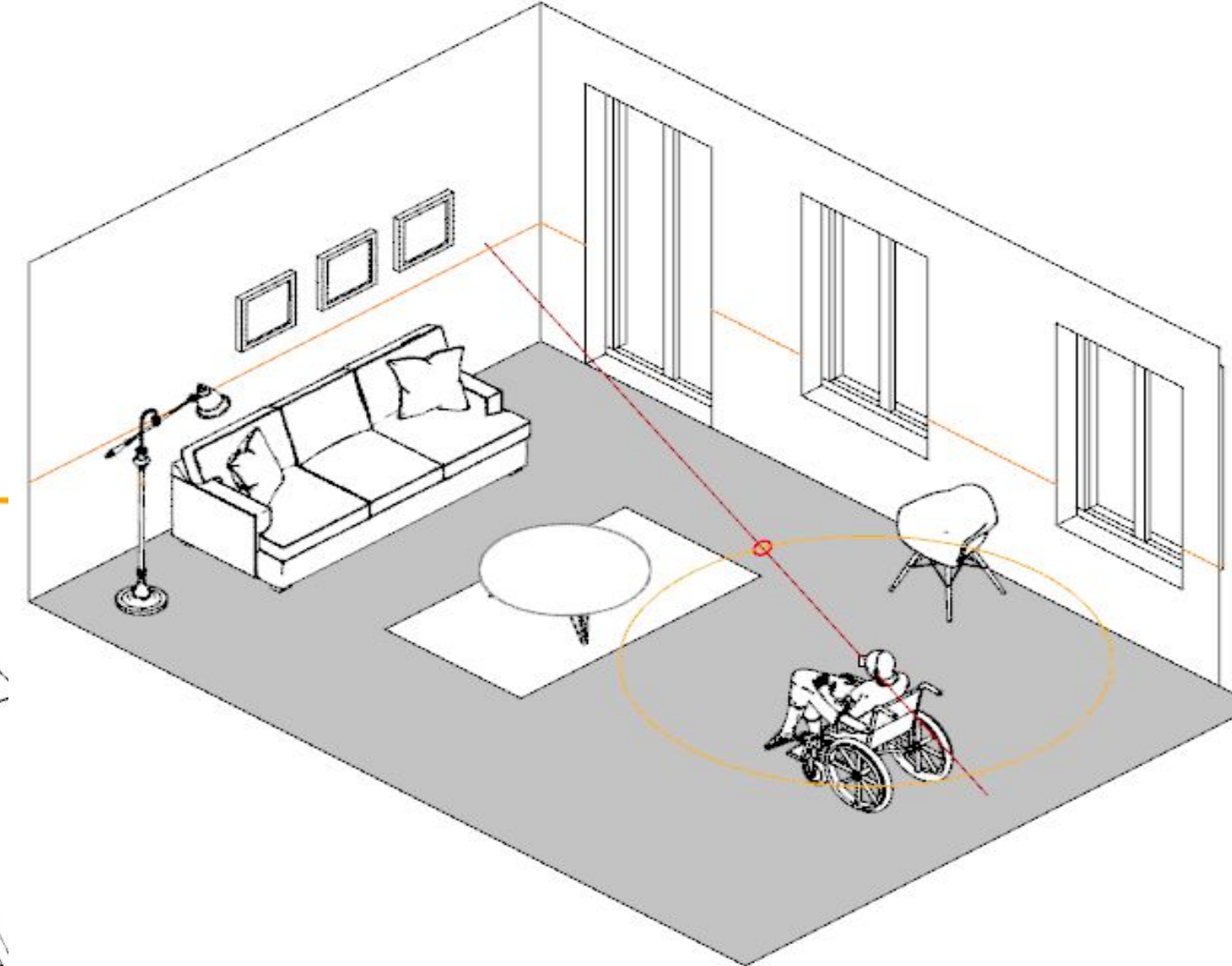
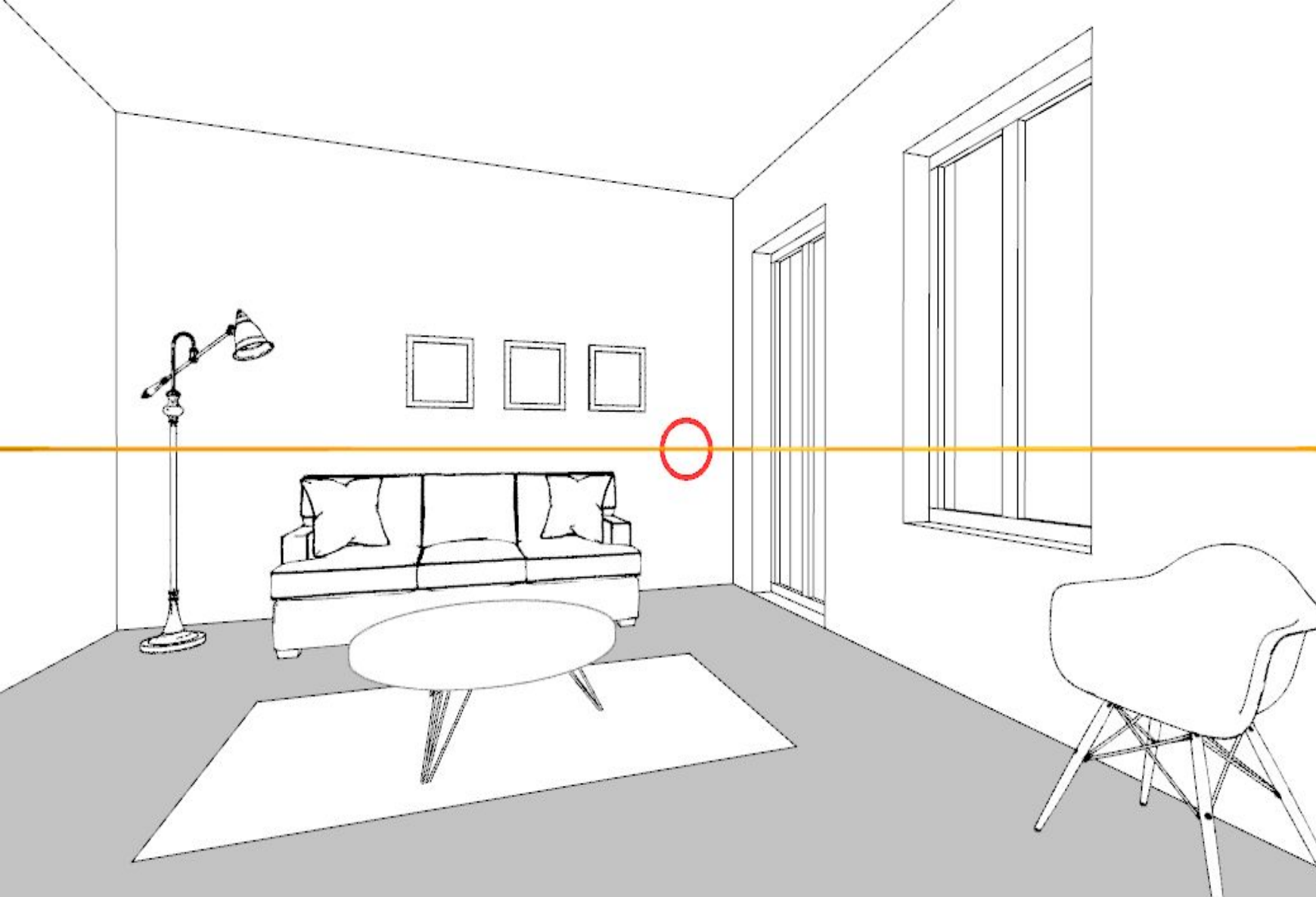


**Is the fallback input for mobile VR
inclusive enough for everyone?**



Navigating VR for Physically Disabled Users

with Binary Input Controls



433 Hackers

110 Team submissions

Best Application For Accessibility

Wayfair Way-more

Best Use of an HTC Vive Focus

3x winner at the **world's largest, most diverse XR Hackathon.**

January 17-21st, 2019

@ the MIT Media Lab, Boston



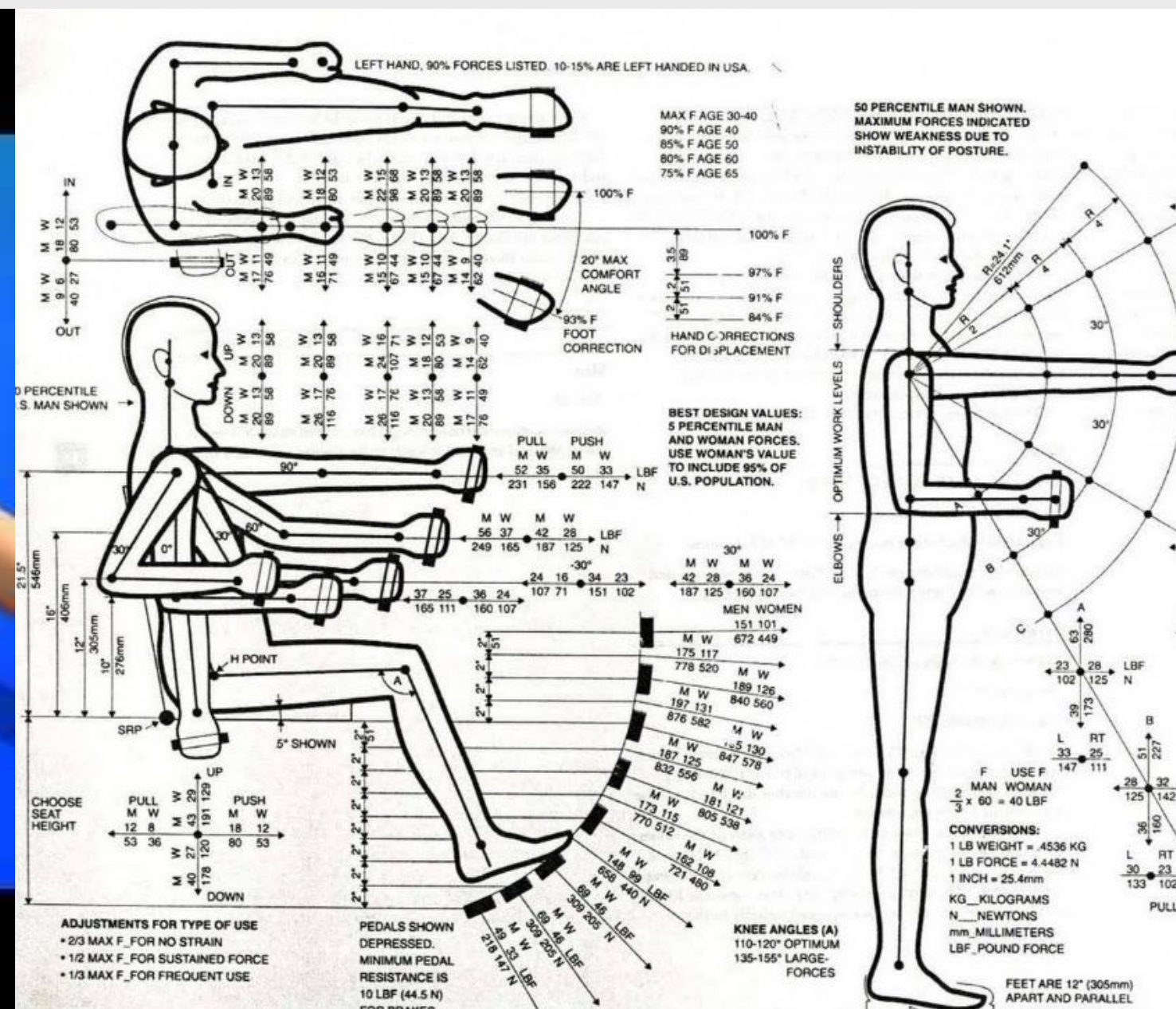
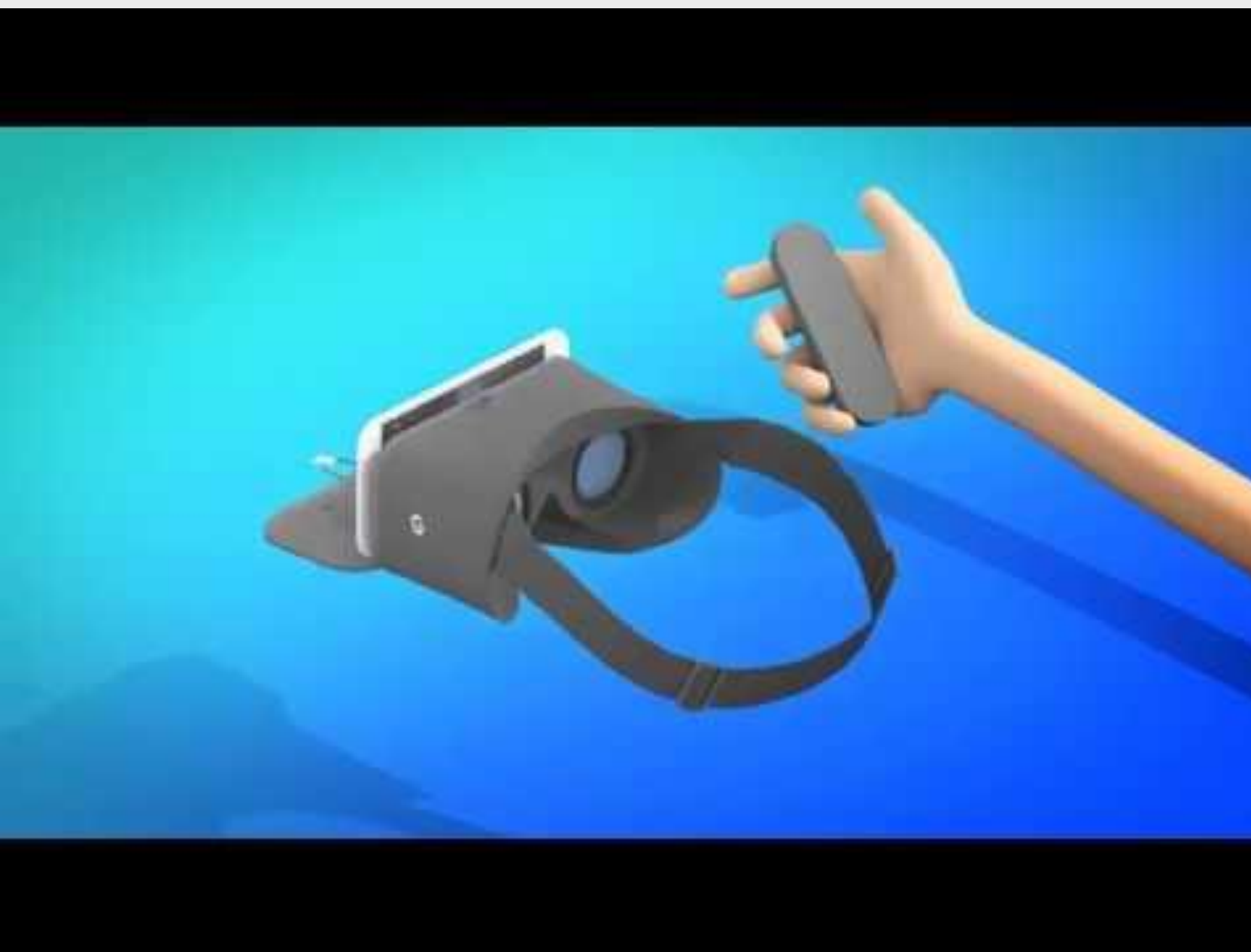
Binary Input

- single button control
- binary input frequencies: on/off - short/long/continuous
- mapped with the W3C standard Gamepad API to enable assistive technology (AT) devices

Discussion

Discussion

- How can we progressively enhance the XR experience?
- What do **HMI & Ergonomics** teach us better than flat GUIs?
- Can Assistive Technologies **guide us** to interaction standards?



Engage and Interact

Meetups

[A11yNYC - Accessibility New York City](#)

[CUNY Tech Meetup](#)

Events

[Access + Ability Build-a-Thon](#)

Links & Resources

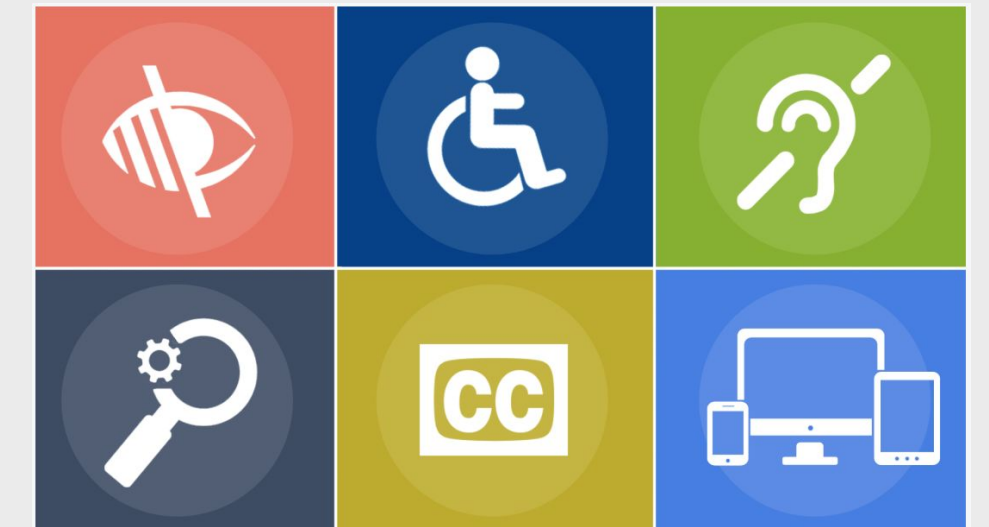
[5 VR Games with A11y Features](#)

[Why VR/AR Developers Should Prioritize A11y in UX/UI Design](#)

[XRAccess](#)

[Ablegamers.org](#)

[The Geeky Gimp](#)



Thank You!

Roland Dubois

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#aframe_nyc

Hello, I am Roland Dubois

- Product UX Lead at Virtual Facility
- XR Accessibility Lead and co-founder at Virtuleap
- Mozilla Tech Speaker
- Creator of GRAVR — a globally recognized avatar for WebVR
- Member of the W3C Immersive Web CG
- Member of the XR Access Initiative
- Host of WebXR (A-Frame NYC) workshops & events
- Creating immersive experiments that make the current VR/AR industry accessible for everyone.



GRAVR

