



The bridge to possible

Webex Hologram Technology Preview

Mo Zanaty, Distinguished Engineer

Cisco Webex App

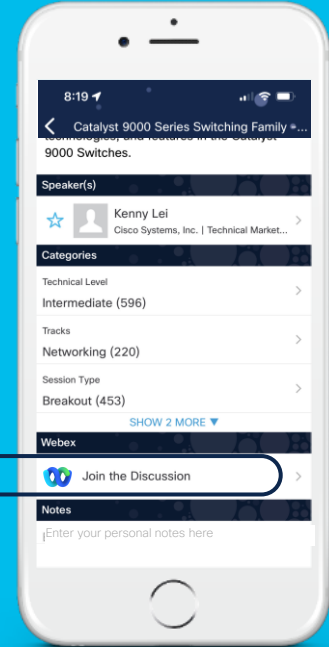
Questions?

Use Cisco Webex App to chat with the speaker after the session

How

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Webex spaces will be moderated until February 24, 2023.



HOLOGRAM live demo is worth a billion words

Visit Webex Lab at World of Solutions



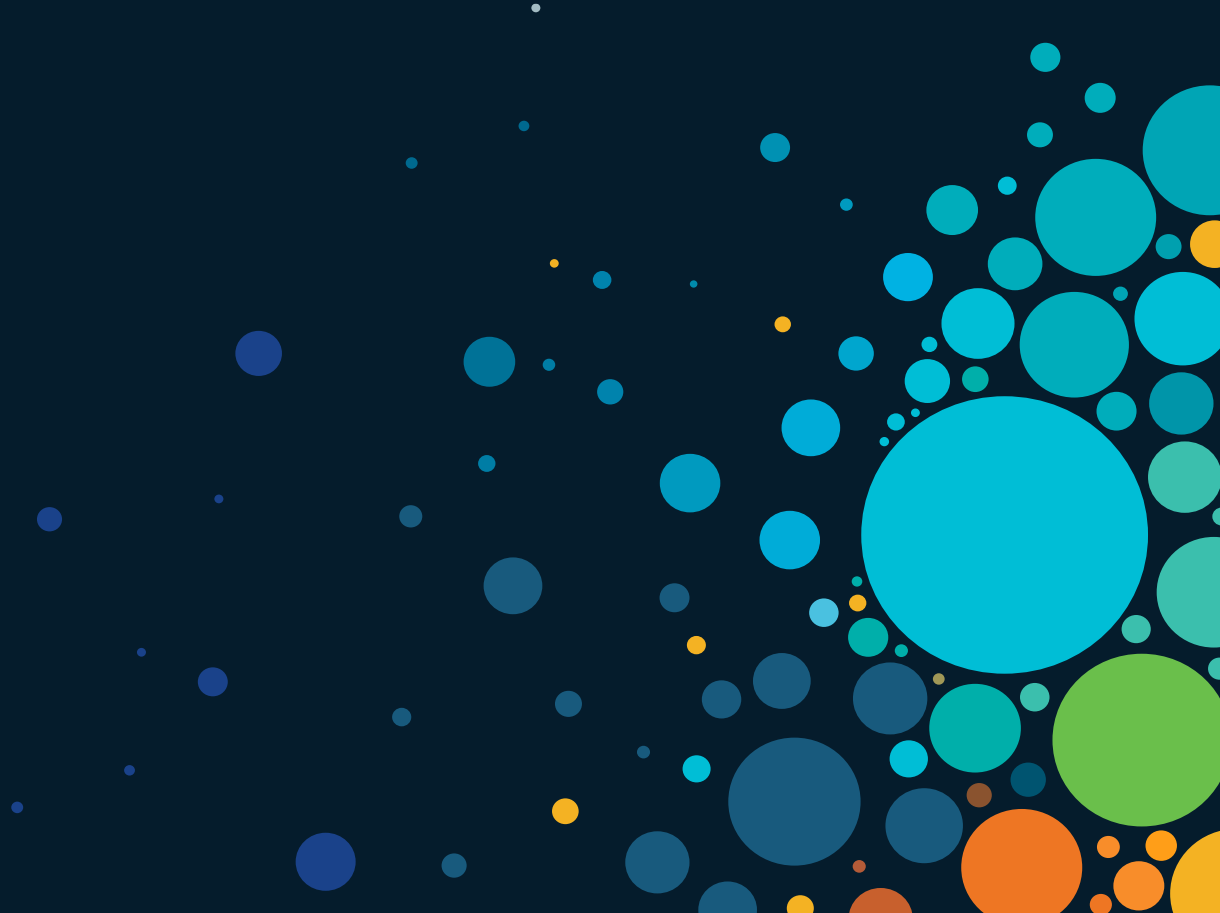
Webex Hologram Video Preview



Agenda

- What is a Hologram?
- Webex Hologram
- Underlying Technology
- XR Headsets
- Light Field Displays
- Live Demo and Beta Trial Options

What is a Hologram?



2009: Pepper's Ghost



2010: 3DTV with Glasses

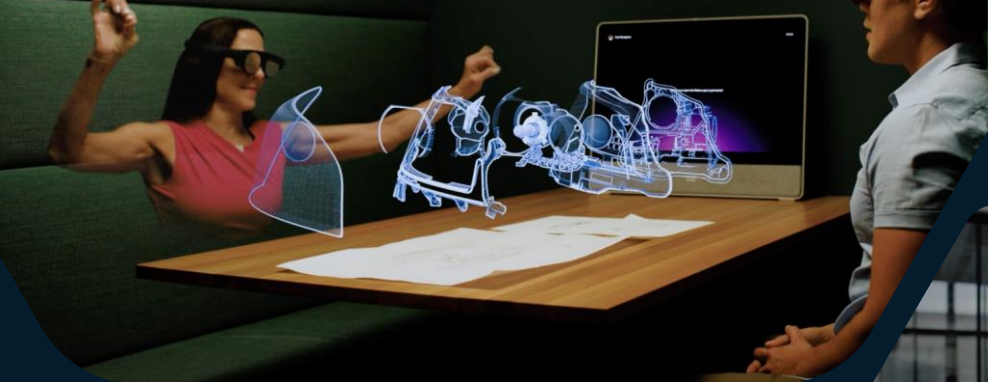
- Stereo disparity to mimic depth, but no parallax or focus cues
- Discomfort from glasses and vergence-accommodation conflict
- Crosstalk between L/R eye views
- Dim image in polarized glasses
- Sacrifice resolution for 3D
- Poor content creation
- Dead by 2017



2017: Spark VR



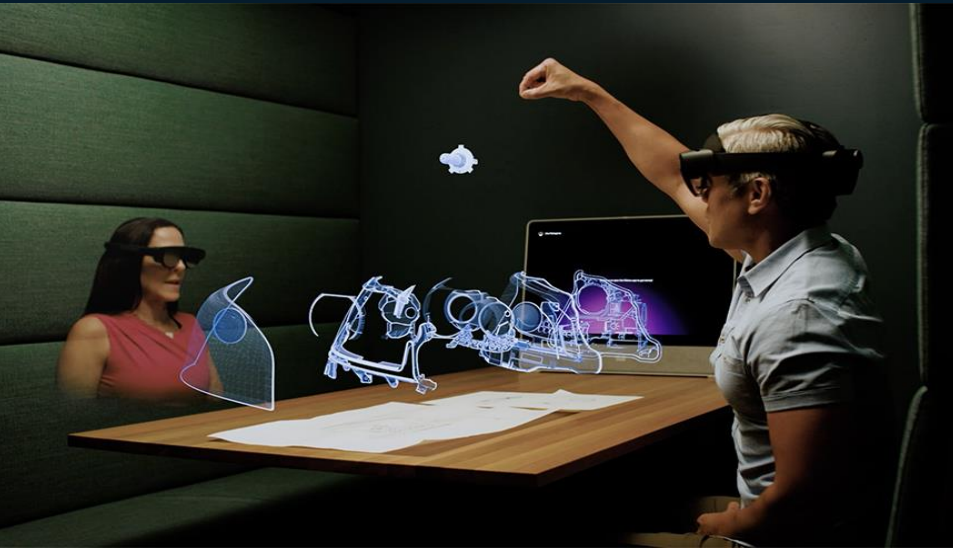
Hello, Hologram



Bringing immersive holographic meetings into Webex



1-to-1 or 1-to-Many Interactions



High-Level Overview

1. Capture Device



2. Cloud Services



3. Headset Client



Magic Leap 2



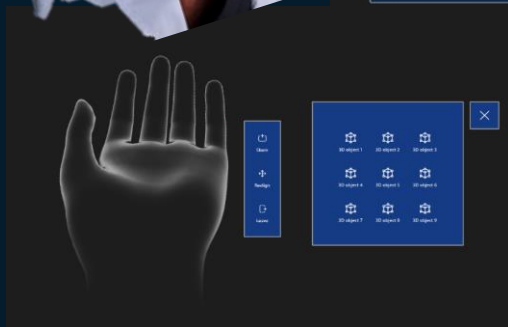
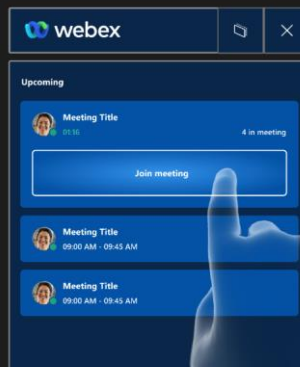
HoloLens 2



Webex app
downloaded
to device

- Universal challenge across industries
- Remote training and design review
- Bring your authentic self, holographically
- Be together when you can't





Webex Hologram – Beta Trials

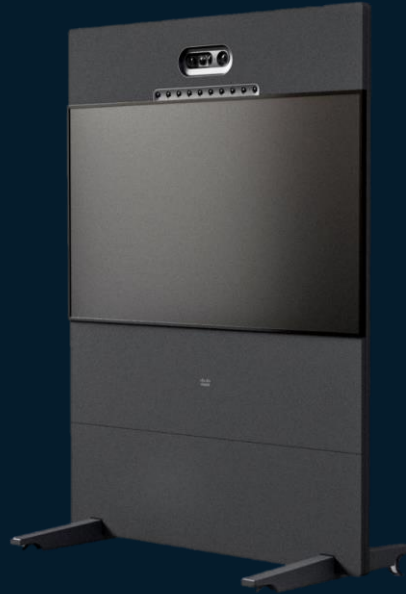
Building the future with our customers

Preview

Shared the
experience

Listened

Integrated the
feedback &
released



90%

90% would recommend
Webex Hologram to a
friend.

60%

Nearly 60% would use
instead of a conventional
system.

Next round of Beta is in flight with
the following industries: [Education](#),
[Military](#), [Energy](#) and [Petrochemical](#),
[Manufacturing](#), [Automotive](#) and
[Medical](#)

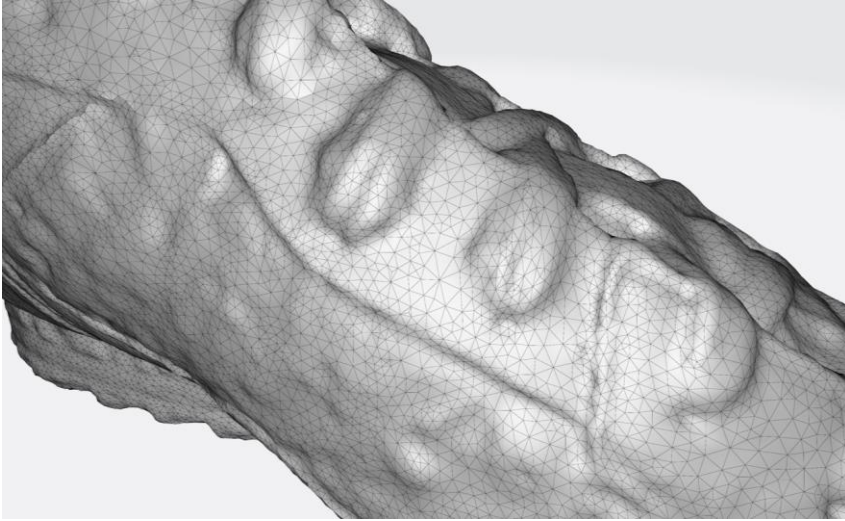
A photograph of two men sitting at an outdoor table in a restaurant or cafe. The man on the left, who is Black, is wearing a bright purple long-sleeved button-down shirt. He is smiling and looking towards the other man. The man on the right is seen from the back and side, wearing a dark blue patterned shirt and a watch. They are both eating from white plates. The background is a bright, sunny outdoor area with green trees and a modern building. A semi-transparent white circle is overlaid on the left side of the image, containing the text.

Evolving
Collaboration into

Connection

Underlying Technology Approaches

Texture-Mapped Polygon Mesh



Point Clouds and Volumetric Models

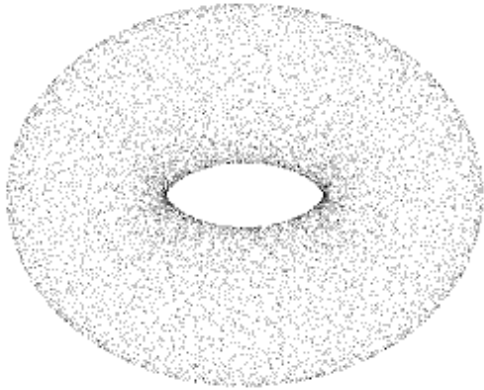
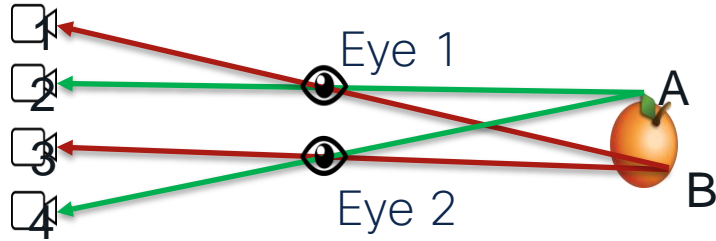


Image from Lucas Vieira



Model from Michael Nicolayeff

How Light Fields Work



Light Field Holograms



Comparisons

	Captured Polygons	Point Clouds	Light Fields
Capture	One depth camera	Several depth camera	Many cameras
Data size	Small	Large	Huge
Fidelity	Meh	OK	Great
Impact of Artifacts	Horrible	Bad	Subtle
Interaction and Intersection	Easy	Hard	Challenging
Translucent Objects	No	No	Yes
Reflective Objects	Bad	No	Awesome
Real-Time Capture	Not great	OK	Super

XR Headsets

Reality Soup

- XR – Extended Reality
 - Umbrella term that covers AR, VR, MR in general
- VR – Virtual Reality
 - Escape the real world into a virtual world
- AR – Augmented Reality
 - Adds virtual overlays to the real world
- MR – Mixed Reality
 - Merges real and virtual worlds, convincingly
 - Pass-through AR and VR blurs the lines



Oculus
Rift

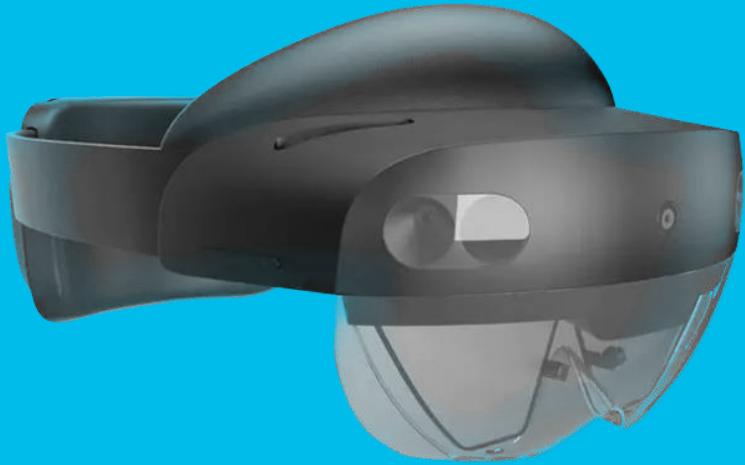


Google
Glass



Magic
Leap 2

Microsoft HoloLens 2



Magic Leap 2



Microsoft HoloLens 2



566 grams heavy

43x29, 52 diagonal FOV

“2k” resolution, 60 Hz

Qualcomm SD 850 CPU, GPU

4 GB memory, 64 GB storage



Magic Leap 2

260 grams light

45x54, 70 diagonal FOV

1440x1760 per eye, 120 Hz

AMD Zen 2 CPU, GPU

16 GB memory, 256 GB storage

Dynamic dimming

Controller for precision



Compare Headsets

[Create Comparison](#)[All Devices](#)[VR Headsets](#)[Standalone VR](#)[PC-Powered VR](#)[AR Glasses](#)[XR Accessories](#)[Manufacturers](#)[Random Headset](#)

Popular VR Headsets

[Oculus Quest 2](#)[HTC Vive XR Elite](#)[Pico 4](#)[Meta Quest Pro](#)[Pico 4 Pro](#)

Popular AR Glasses

[TCL RayNeo X2](#)[Nreal Air](#)[TCL NXTWEAR S](#)[Microsoft HoloLens 2](#)[Magic Leap 2](#)

Popular Manufacturers

[HP](#)[HTC](#)[Oculus](#)[Pimax](#)[Sony](#)

View summaries of 216 virtual & augmented reality headsets. Click on a headset's name to view a full specification.

Popular VR & AR headsets



Oculus Quest 2



HTC Vive XR Elite



Pico 4



Meta Quest Pro



Pico 4 Pro



TCL RayNeo X2



PlayStation VR2



Pimax Reality 12K QLED

Upcoming VR & AR Headsets



AjnaXR Enterprise Edition



AjnaLens AjnaXR



TCL RayNeo X2



Rokid Vision 2

Latest Releases



Meta Quest Pro



Pico 4



Vuzix Blade 2



Magic Leap 2

Search headsets

AR WARS



Light Field Displays

Light Field Displays


- True Holographic
 - Wavefront modulation
 - Nascent, but promising
- Auto-Stereoscopic
 - Single viewer, Multiple viewer
 - Mature, but many compromises



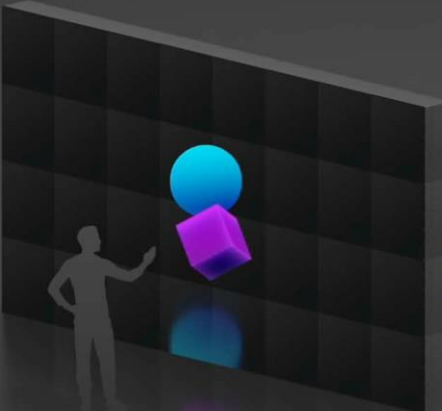
3D Light Field Displays – How Do They Work?

- True holographic wavefront modulation (\$\$\$\$\$)
 - Example vendor: Light Field Lab
- Lenticular optical layer fixed over front glass (\$)
 - Bends light from a group of pixels in a specific direction
 - Example vendors: Dimenco, Looking Glass
- Switchable backlight modulator behind LCD panel (\$\$)
 - Beams light source through panel in specific directions
 - Example vendor: Leia Display

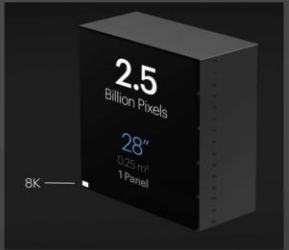

True Holographic Display

 LIGHT FIELD LAB

SolidLight System



Display Architecture	28" (.7m) modular square SolidLight Surface panels
Type	Broad-spectrum complex-amplitude dense converging wavefront
Sample Density	10 billion pixels /m ²
Image Format	Wide-gamut 10bit HDR @ 60Hz
Wall Controllers	Integrated proprietary FPGAs and electronics
Realtime Compute	Distributed synchronized GPU render systems
Software and Rendering	WaveTracer™ plugins and factory calibration LUTs
Playback Systems	File manager and synchronized media player



Auto-Stereoscopic Displays

Single Viewer Desktop Display
Needs fast, accurate eye tracking



Dimenco 32" 8K

Multiple Viewer Room Display
Needs high bandwidth and compute



Looking Glass 65" 8K

**Desktop
Monitor
FOV is
smaller
than AR.**

**3D Display
does not
replace AR
but can
add more
immersion.**



VR Quest 2
90°x90°
1832x1920 pixels
21 pixels/degree

"Retina" resolution is
60-120 pixels/degree

Live Demo & Beta Trial Options

HOLOGRAM live demo is worth a billion words

Visit webex.com/hologram



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Cisco Webex App

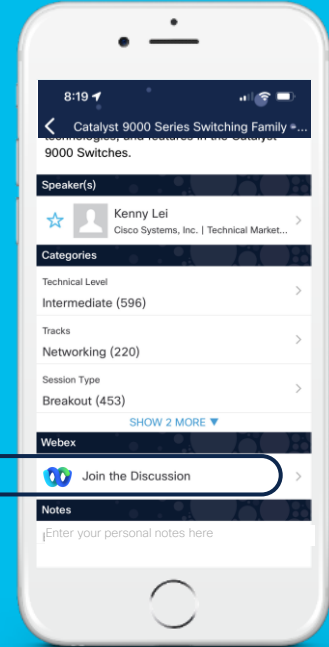
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Thank you

CISCO *Live!*

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