

FEATURES

MAKING VIRTUAL A REALITY



Virtual reality has come a long way since the 1990s, with Oculus VR and Sony leading the charge. But there are still a few loose ends to tie up before you can pick up a VR headset at your local Best Buy. BY CHLOE ALBANESIUS

Minutes after Facebook announced plans to buy virtual reality firm Oculus VR in March, the jokes began popping up on Twitter. “Just checking my Facebook news feed!” the messages read, accompanied by photos of people in unwieldy, Facebook-branded Oculus Rift headsets.

It was amusing because the people in the photos looked ridiculous sporting the bulky Rift, but the jokes highlight a persistent problem: The equipment needed to make VR a reality is not as cool as the technology behind it.

In a video titled “The Faces of Morpheus,” Sony recorded attendees at this year’s E3 trying out its new Project Morpheus virtual reality headset. And although those who experimented with it seemed impressed, they still looked like goobers stabbing the air with Play controllers, trying to fight off virtual sharks.

Facebook doesn’t seem too concerned with the VR cool factor, and it is making a \$2 billion bet that it’s actually the next big thing in technology. But can manufacturers find that sweet spot between amazing technology and stunning equipment to match? And can your stomach handle the ride? Oculus, Sony, and even Google are hoping the answer is yes.

ESCAPING REALITY

Though it’s made a lot of headlines recently, virtual reality is nothing new. One of the first devices dates back to the 1960s, when Morton Heilig unveiled the Sensorama. People would sit in a chair and stick their faces inside a display that covered the top and sides of their heads to see, smell, and feel the action going on inside.

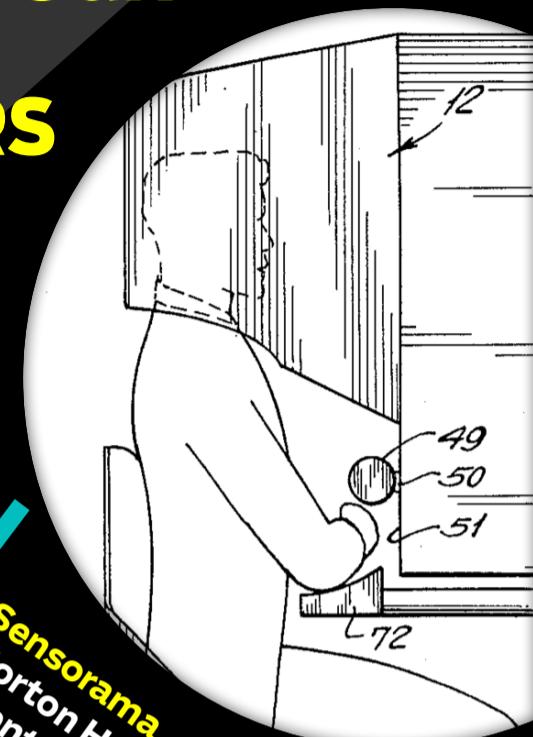
VR became a bit more portable a few years later when Ivan Sutherland developed what is

VIRTUAL REALITY THROUGH THE YEARS

1962

Sensorama

Morton Heilig's mechanical invention was designed to unite the senses and the movie screen.



1968

The Sword of Damocles

The first head-mounted VR display was designed by Harvard computer scientist Ivan Sutherland.



considered to be the first head-mounted display. Wearing it was still a slightly precarious endeavor, though. According to the Association for Computing Machinery, Sutherland's headset was jokingly called The Sword of Damocles because it was suspended from the ceiling above the user's head.

Until the mid 1980s, virtual reality was largely used and developed by federal agencies like NASA and the military for flight training simulators. The term "virtual reality" didn't really emerge until the late 1980s, when it was coined by Jaron Lanier, a former Atari employee who cofounded VPL Research to push VR tech forward. The company foundered, but the concept picked up steam going into the 1990s.

In fact, when you think of virtual reality these days, you probably think of the 1990s—and the many movies that tried to depict it. *The Lawnmower Man*, *Brainscan*, *Strange Days*, and more didn't exactly paint a consumer-friendly picture of VR, but since when has a little danger deterred people from trying out exciting new gadgets?

One of the first times the general public got to try out VR was in British arcades in 1991 thanks to the Virtuality 1000CS. The headset was massive—you kind of looked like you had a vacuum cleaner strapped to your head—but in the pre-Internet era, it was likely an amazing ride. But it didn't quite take the tech world by storm, and neither did much of anything else.

As we focused our attention on the Web and portable computing devices, VR largely took a backseat to more affordable innovations and was viewed as more of a novelty than something for our living rooms.

1980-1990

NASA Flight Training

In the 1980s, government agencies were among the few organizations with resources sufficient for VR.



"Virtual Reality" Gets Real

Jaron Lanier, working at VPL Research, popularized the term "virtual reality" in 1987.

1991

Virtuality 1000CS

Virtuality's virtual reality "pod" put early-1990s gamers right into the center of the action.



THE VR RACE HEATS UP

The tide started to turn in 2012, when the Oculus Rift nabbed \$2.4 million in funding on Kickstarter by promising a “truly immersive gaming experience.”

“Most products either lack the technical features required for believable immersion or sit at a very high price-point (\$20,000+) reserved for the military or scientific community,” Oculus VR wrote on its Kickstarter page. “We set out to change all that with the Rift, which is designed to maximize immersion, comfort, and pure, uninhibited fun, at a price everyone can afford.”

Oculus only sought to raise \$250,000 with that 2012 campaign, but ultimately brought in an astounding \$2,437,429. A year later, it secured another \$16 million investment from Spark Capital and Matrix Partners, before achieving the biggest windfall of all: a \$2 billion acquisition by Facebook.

Thus far, the Oculus Rift is just a dev kit meant for software developers to create software for a future consumer version of the device. A second-generation version, dubbed DK2, was released at the Game Developers Conference (GDC) this year, and in a brief hands-on with the device, *PC Magazine* found it to be a “much more mature system than it was a year ago.”

One concern about VR, though, is how it makes you feel. That is, will all the twists and turns and virtual fun exhilarate you or make you vomit on your shoes? Some people can barely handle a 3D movie without feeling queasy, so stepping into a virtual world could be a stomach-churning experience.

The DK2 “uses a low-persistence OLED display to eliminate motion blur and judder, two of the biggest contributors to simulator

1995
Virtual Boy
Nintendo's innovative head-mounted VR console proved a literal and figurative headache for gamers.



2012
Oculus Rift



Oculus Rift
The Kickstarter-funded Oculus Rift captured the public's imagination just when technology was making true VR possible.



sickness,” Oculus said. “Low persistence also makes the scene appear more visually stable, increasing the potential for presence. The high-definition 960-by-1,080-per-eye display reduces the screen-door effect and improves clarity, color, and contrast.”

PC Magazine reporter Damon Poeter didn’t feel any motion sickness during his GDC demo, though Oculus limited the test drives to 3 minutes. During a hands-on with Sony’s Project Morpheus at the same show, Damon wrote that his stomach started “to offer the faintest of protests” after a few minutes, “and for the first time in a VR demo I had the feeling that my time in the space would have to be limited.” He also spent twice as much time with the Morpheus as he did the Oculus Rift, however.

“Given the similar specs between the two rigs, I can’t help but be suspicious that simply using Sony’s headset more than twice as long as the Rift DK2 is what started to make me queasy,” Damon remarked.

2013

Oculus Rift DK2

The newest version of the Oculus Rift development kit combines the original’s unique functionality with a (somewhat) more attractive design aesthetic.



Sony's Project Morpheus is also a prototype device, but it at least looks a bit sleeker than the boxy Oculus Rift. The rounded black-and-white device emits a cool blue light when engaged, and works in tandem with Sony's wireless DualShock 4, the PS4's primary controller, and the motion-sensing PlayStation Move wand.

"Virtual reality is the next innovation from SCE that we believe will shape the future of games," SCE Worldwide Studios president Shu Yoshida said in announcing Morpheus at GDC. It was in the works for more than three years at Sony, he said, and the final product will deliver "a sense of presence, where you as the player actually feel like you're inside the game and your emotions feel that much more real."

Samsung is also rumored to be working on a VR headset (called Gear VR) that it will show off at the IFA trade show in Berlin this September.



WHAT'S NEXT?

Much of the focus on virtual reality has been on gaming—Morpheus will work with Sony's PS4, and Oculus has staffed up with gaming legends like John Carmack.



Project Morpheus
Sony's upcoming VR system is designed for use exclusively with its PlayStation 4 and Vita gaming consoles.



Project Morpheus in action at this year's Electronic Entertainment Expo (E3).

But when Facebook acquired Oculus VR, Mark Zuckerberg talked of a future whereby VR tech would be incorporated into everyday social networking. Why just look at photos of your friends at the World Cup when you can strap on a VR headset and “join” them there virtually? Forget having your friend show you her house via video chat—VR will make you feel like you’re sitting in the living room with her. And how about having a doctor’s visit from your living room couch?

Friends will not just share moments, Zuckerberg said, but entire adventures. With Oculus, Facebook has “the potential to be the most social platform ever.”

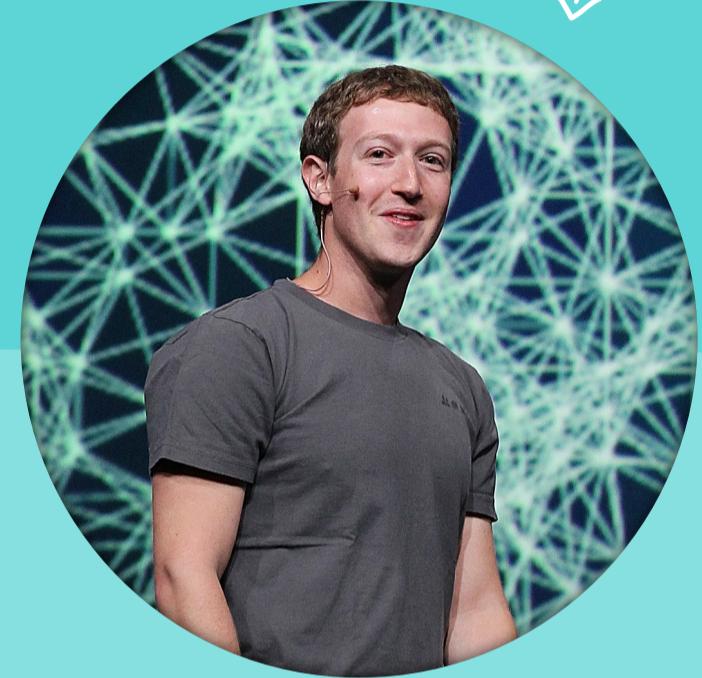
Oculus CEO Brendan Iribe has said that Oculus is still committed to gaming. But the question is, “do we want to be Game Boy or do we want to be iPhone or Android,” Iribe said at May’s TechCrunch Disrupt. Do you want to build a platform that reaches one billion people or one that reaches 20 to 50 million?

It seems Oculus is aiming even higher. Ultimately, with Facebook, Oculus will be able to create the largest massively multiplayer online game (MMO) ever made, Iribe said. “We want to put a billion people in VR,” so why not start with Facebook and its infrastructure?

Whether or not Facebook can pull it off remains to be seen. Some of the company’s major efforts—from Facebook Home and Graph Search to frictionless sharing and Beacon—have fizzled or created controversy. But Facebook at least can afford to take big bets (\$16 billion for a messaging app, anyone?), so perhaps Zuckerberg will have the last laugh when we’re all taking virtual vacations on Facebook 20 years down the line.

MARCH 2014

Facebook Acquires Oculus
Facebook's \$2 billion purchase of Oculus sent shock waves through the technology world.





VIRTUAL REALITY AT HOME

For now, if you want to experience VR in your living room, you can't exactly head to Target, Wal-Mart, or even Amazon to purchase a consumer-friendly device. But for tech-savvy shoppers who want to tinker with a prerelease product, you can purchase the Oculus DK2 for \$350 from oculusvr.com.

New DK2 orders are expected to start shipping in August. But Oculus makes you check a box to acknowledge that you understand that "this hardware is intended for developers and it is not a consumer product." The kit comes with a headset, two pairs of vision lenses, an external camera for positional tracking, a camera USB cable, an HDMI-DVI adapter, a sync cable, and a power cord with adapter and three international power adapters (U.K., Australia, and the EU).

To get it to work, you'll need a computer running Windows 7 or higher, Mac OS X 10.8 or higher, or Ubuntu 12.04; two USB ports (at least one powered); and a DVI-D or HDMI graphics output. Oculus VR recommends a desktop PC equipped with a dedicated graphics card with DVI-D or HDMI graphics output, which can support current-generation 3D games at 1,920-by-1,080 resolution at 75 frames per second or higher.

Oculus promises that the consumer version will be "worth the wait," though not even a tentative release date has yet been announced. But those who do purchase a DK2 can check out some of the games, demos, and experiences created by the dev community on share.oculusvr.com. Expect more details at the Oculus Connect developer conference, which kicks off September 19 in L.A.

Sony's Project Morpheus, meanwhile, is not yet available for purchase in beta or final form.



GETTING STARTED WITH GOOGLE

If you're looking to get your virtual reality sea legs, but find the Oculus DK2 process a bit daunting, Google might have the answer. At its annual Google I/O developers conference in June, the search giant gave all attendees their very own Google Cardboard, a mask-shaped corrugated box equipped with lenses, which turns a smartphone into a VR device.

"Virtual reality has made exciting progress over the past several years. However, developing for VR still requires expensive, specialized hardware," read a statement posted on the Cardboard project page. "Thinking about how to make VR accessible to more people, a group of VR enthusiasts at Google experimented with using a smartphone to drive VR experiences."

Google Cardboard is the "no frills" version of VR, company representatives have said. Indeed, you can build your own with a few pieces of cardboard, a rubber band, magnets, two lenses, some Velcro, and your smartphone. For developers, Google also has an experimental VR Toolkit for immersive experiences that work with Cardboard and other viewers.

JUNE 2014

Google Cardboard

Cardboard is a stereoscopic viewer that can transform your smartphone into a VR setup. It's intended less as a polished product and more as proof that VR doesn't have to be complicated.



Though Google hopes that manufacturers will create simple devices using Cardboard, you could make one yourself from, say, a pizza box.



At I/O, Google also showed off what it has accomplished with Project Tango. Though Tango is largely focused on bringing 3D motion and depth sensing to mobile devices, the I/O demo included a German company, Durovis, which showed off its Dive virtual reality headset. As with Cardboard, users insert a smartphone (or, at I/O, the 7-inch Project Tango device) into the Dive headset for some VR fun.

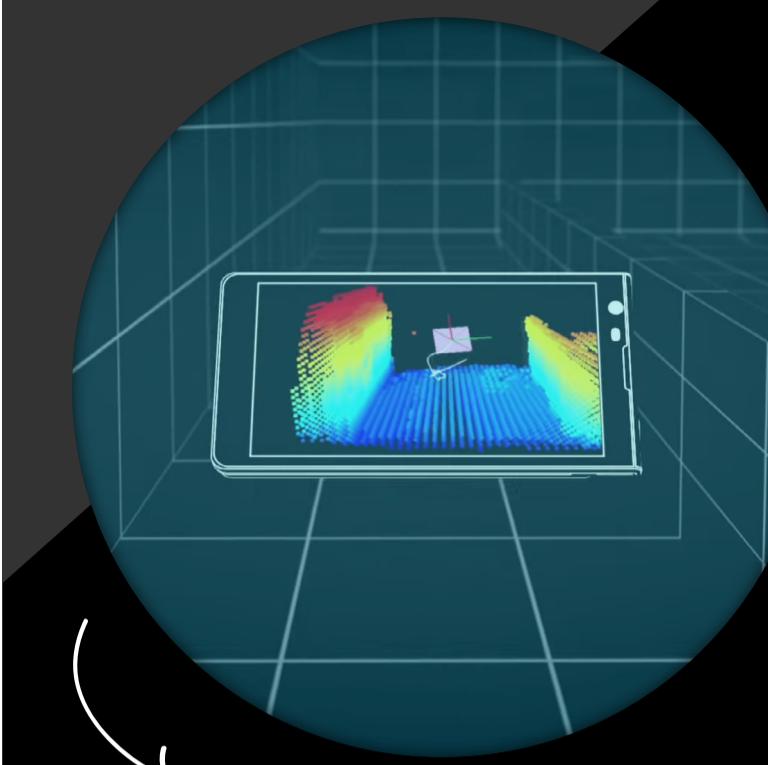
If you want to check it out, a consumer version of Dive—which works with the iPhone and Android devices that are 5 inches or less—is for sale on durovis.com for €57 (about \$77).

Could Google integrate VR tech into Google Glass? Thus far, the high-tech specs offer more augmented than virtual reality treats, like street overlays for walking directions, as they don't truly envelop your field of vision. But I could see that changing with the addition of some Diane von Furstenberg VR wraparound shades. That might even make it worth the \$1,500 price tag.

MAKING VR REAL

It's clear that many big companies are making major bets on virtual reality, in a bid to bring the technology out of the 1990s and into our living rooms. It will probably take another year or two before we can stroll into Best Buy and pick up a truly immersive VR headset the way we currently can a smartphone, tablet, or gaming console. There's work to be done on making the VR experience less stomach-churning, and Oculus at least might want to make some design tweaks.

But as *PC Magazine* saw in our GDC demos, the VR experience is miles ahead of the arcade VR we all remember from two decades ago. The trick now is pulling it all together into an easy-to-use and affordable package.



Project Tango
Google's enigmatic Project Tango currently uses a tablet and a smartphone to map spaces in 3D and track movement within that space.



The Future?

Copyright of PC Magazine is the property of ZDNet and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.