

Virtual Reality's Darkest Secret

A secret document, authored by game company SEGA, has been leaked to certain members of the press.

It discloses the dark, dangerous, secret behind consumer virtual reality: ***VR can destroy your brain functions and permanently damage your neurologically and kill you through trips, falls and by walking into traffic.***

“VR can warp the way a young child's mind develops”, say experts.



Facebook and Silicon Valley technology ego-maniacs, again, rushed into a technology for the PR hype without considering the human and social dangers, previously documented.

Liability insurance issues, due to known communal sharing of the headsets, thought to be in the TENS OF BILLIONS OF DOLLARS

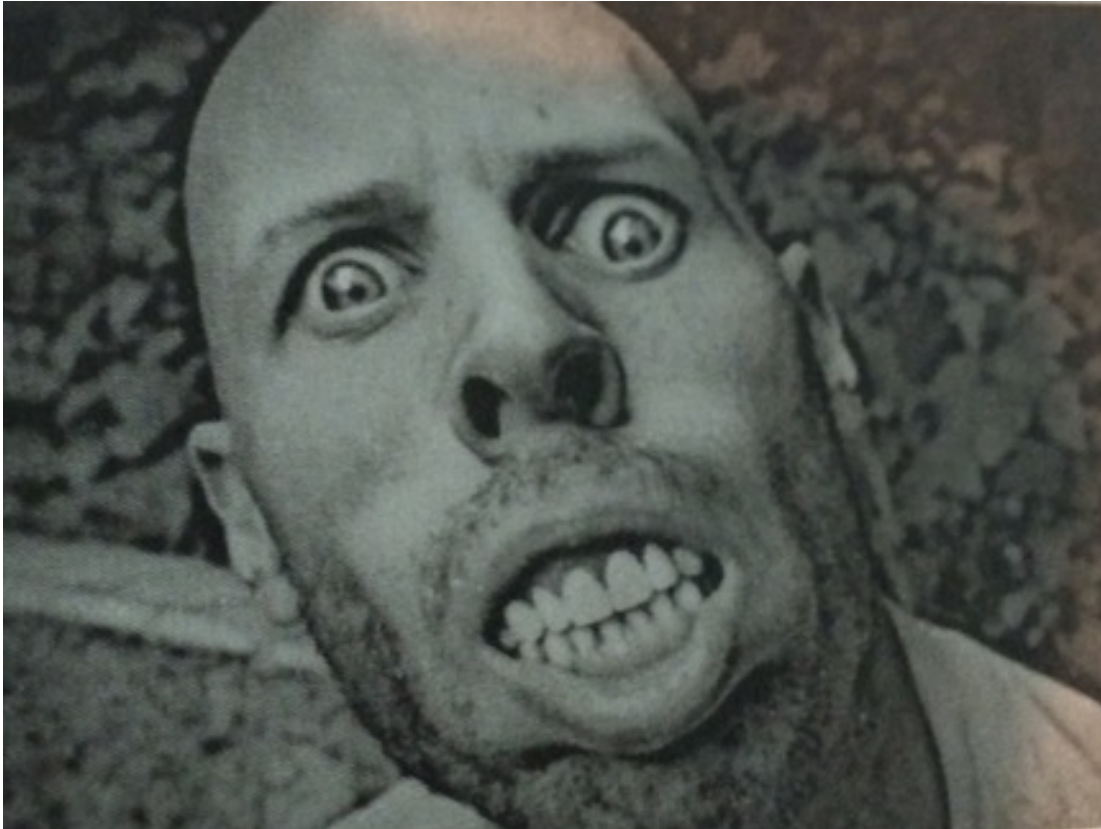
The biggest threat, from VR, is Facebook's and Google's “Mood Analysis UI/UX/VR” team. They are testing ways to mind control users, without their knowledge, within VR experiences, to get you to vote certain ways or buy certain things.



- [Tech](#)

• **THE WALL STREET JOURNAL**

What Does Virtual Reality Do to Your Body and Mind?



As technology comes of Age, headset makers, media companies grapple with potential side effects

Virtual reality is set for its mainstream moment in 2016 but the technology also faces big hurdles.

Photo: Getty Images

By

Jack Nicas and

Deepa Seetharaman

PALO ALTO, Calif.—Software worker Erin Bell inched across a wooden plank suspended over a deep, rusted pit. When a Stanford University researcher asked her to step off, she wouldn't do it.

In reality Ms. Bell was walking on a carpet with a virtual-reality headset strapped to her face. "I knew I

was in a virtual environment,” she said later, “but I was still afraid.”

The psychological impact of lifelike virtual experiences is just one of the challenges for virtual reality, a technology that might finally have its commercial moment in 2016—after decades of hype.

[Samsung Electronics](#) Co. and Google parent [Alphabet](#) Inc. recently have released virtual-reality headsets that use smartphones as the screen. And, in coming months, [Sony](#) Corp., [HTC](#) Corp. and [Facebook](#) Inc.’s Oculus unit plan to release higher-end headsets that promise to immerse users in experiences that seem to be all around them.

Meanwhile, tech companies and media titans such as [Walt Disney](#) Co. and 21st Century Fox are developing content for the headsets, including interactive short films, courtside views of pro-basketball games and popular videogames such as “Minecraft.” The technology also is expected to be one of the main draws this week at the Consumer Electronics Show in Las Vegas.

Beyond the common issues facing new technologies, such as whether consumers will pony up hundreds of dollars for another device, virtual reality is grappling with questions about how it affects a user’s body and mind.

The experience can cause nausea, eyestrain and headaches. Headset makers don’t recommend their devices for children. Samsung and Oculus urge adults to take at least 10-minute breaks every half-hour, and they warn against driving, riding a bike or operating machinery if the user feels odd after a session.

Apart from the physical effects, Stanford University professor Jeremy Bailenson says his 15 years of research consistently have shown virtual reality can change how a user thinks and behaves, in part because it is so realistic.

“We shouldn’t fathom this as a media experience; we should fathom it as an experience,” said Prof. Bailenson, who also co-founded Strivr Labs Inc., which helps football players relive practice in virtual reality.



The psychological unknowns are prompting some backers to suggest setting standards for content. “We have to be very careful,” said Alex Schwartz, chief executive of maker Owlchemy Labs. “Scares in VR are borderline immoral.”

Facebook and Samsung declined to comment on questions around virtual reality’s potential psychological effects. Said Richard Marks, a Sony lead virtual-reality engineer, “Just like any medium, [virtual reality] can have good effects and negative effects. I think people can get just as immersed in a book.”

HTC said that content makers have “a responsibility...to create experiences that are immersive and

hitting their intended mark,” and that it aims for “experiences that are fun, educational, and inspiring.”

Still, investors and analysts say virtual reality has enormous potential beyond entertainment. It can allow students to visit historical places or practice surgery; prospective tenants can walk through apartments without visiting them; and people can meet face-to-face in virtual rooms.

“Over the short term, there are challenges. But over the long term, we think it’s going to change every industry on the planet,” said Macquarie Capital analyst Ben Schachter.

Boosters have long pitched virtual reality as the next medium after print, radio and television, but engineers struggled with the technology. [Nintendo Co.](#)’s Virtual Boy headset in 1995 was one of the company’s biggest flops.

More recently, advances in screens, computer chips and sensors have made virtual reality possible—and commercially viable.

In 2011, 18-year-old Palmer Luckey built a headset in his parents’ Long Beach, Calif., garage that made virtual reality possible with a relatively small and inexpensive device. In 2014, Facebook bought his company, Oculus VR, for \$2 billion.

Facebook Chief Technology Officer Michael Schroepfer said virtual reality is now “the project I personally spend the most time on.”

The Oculus deal ignited a flurry of activity and investment in virtual reality and augmented reality, which displays digital objects in users’ view of the real world. There were 91 investments totaling \$1.1 billion in those fields in the roughly 18 months after Facebook bought Oculus, compared with 50 investments of \$316 million in the previous period, according to venture-data firm CB Insights.



The largest recipient of funding is Florida-based Magic Leap Inc., which is working on augmented-reality glasses.

Many consumers will be introduced to virtual reality via smartphone-based headsets, such as the Samsung and Google devices. The [New York Times](#) teamed with Google to send Google's \$20 cardboard headsets to more than one million subscribers in November. Later that month, Samsung's \$100 Gear VR quickly sold out on Amazon and [Best Buy](#).

More advanced—and costly—headsets are coming. The headsets from Oculus and HTC plug into high-end computers, while Sony's device connects to its PlayStation 4 game system. They use external cameras to track a user's motion. Oculus has said its headset and the computer needed to run it will cost about \$1,500, while Sony officials have said the roughly 30 million PlayStation 4 users can buy its

headset for several hundred dollars.

Scientists believe the technology can cause nausea when users move their heads and the virtual images don't keep up. Virtual experiences with a lot of movement, such as roller coasters and racing games, also can be unsettling because a user's eyes suggest the body is moving while the inner ear disagrees. Of course, some of the concerns might prove to be overblown, much like early worries that microwaves could cause cancer or TV hurts eyesight.

To reduce motion sickness, headset makers say, they are improving motion tracking and showing more frames per second, while content makers are having users "teleport" to different places in virtual worlds, rather than run or fly there. But some experiences may never be comfortable.

"There's going to be a lot of content that you're only going to want to watch on a [two-dimensional] screen," says Oculus Chief Executive Brendan Iribe. "You're not going to want to be necessarily in a car chase in VR. That's going to be too much motion."

Content makers say virtual reality also might be too overwhelming for prolonged use. Disney's Lucasfilm, which makes the "Star Wars" movies, said it is experimenting with 5- to 10-minute videos for virtual reality.

"We do have to have ethics conversations," but "the technology will be successful no matter what," said Mike Rothenberg, head of Rothenberg Ventures, which has invested in more than 30 virtual-reality startups. "Every technology has downsides; the only question is how do we handle it as a society."

Corrections & Amplifications

In an earlier version of this article, the last name of Facebook Chief Technology Officer Michael Schroepfer was misspelled.

Write to Jack Nicas at jack.nicas@wsj.com and Deepa Seetharaman at Deepa.Seetharaman@wsj.com

**GOOGLE THOUGHT
POLICE ANNOUNCE
NEW UNIFORMS**

ALPHABET



The Dangers of Giving in to Virtual Reality

by Tim Henry



Illustration by Jordyn Carias

In the past decade, technology has made massive steps forward in the areas of mobile technology and social integration. With the easy accessibility of social media, many people seem to disconnect from the world around them, which can be a danger to themselves and others. This type of disconnect from reality has the potential to reach new and dangerous heights with the use of virtual reality (VR). These advances, even though they seem positive, could prove to be harmful in the long run and could cause irreparable damage.

VR technologies are already being produced in the form of the Oculus Rift. Essentially, Oculus Rift is a pair of goggles that will allow the user to experience something entirely apart from his or her actual surroundings. Facebook purchased this highly anticipated VR platform last March and plans “to make Oculus a platform for many other experiences,” according to CEO Mark Zuckerberg in a post on the social network. In addition to using the Oculus Rift for social media purposes, Facebook is planning on further developing the technology for video games. Despite the ambitious plans for Oculus, there are a number of risks associated with the adoption of VR technologies.

The first big danger is disconnection from the real world. Even today, many people find themselves so immersed in social media and video games that they lose touch with reality. Two of the most notable cases reported by Time magazine occurred in South Korea, where multiple deaths have been reported as a direct result of excessive gaming. The first incident involved a 3-month-old child who starved to death while the parents were caring for an in-game child. The second death was that of a 22-year-old man who went into cardiac arrest after playing the popular game StarCraft for 50 hours straight in

2005. Technology like the Oculus Rift that immerses players even deeper into the game will likely increase this trend of excessive gaming and video game addiction.

The American Academy of Neurology has found a strong connection between video games and the release of dopamine, a chemical that causes pleasure, in the brain. This chemical release is very similar to that of both gambling and drug addiction and is triggered by the sense of accomplishment players feel after completing short tasks in video games. This form of addiction is most likely to occur in young adults and teens because the frontal lobes of the brain – the parts that are responsible for weighing consequences and making decisions – have not yet fully developed. With the addition of the Oculus Rift, the rewards can seem more real to the player and therefore cause a greater release of dopamine.

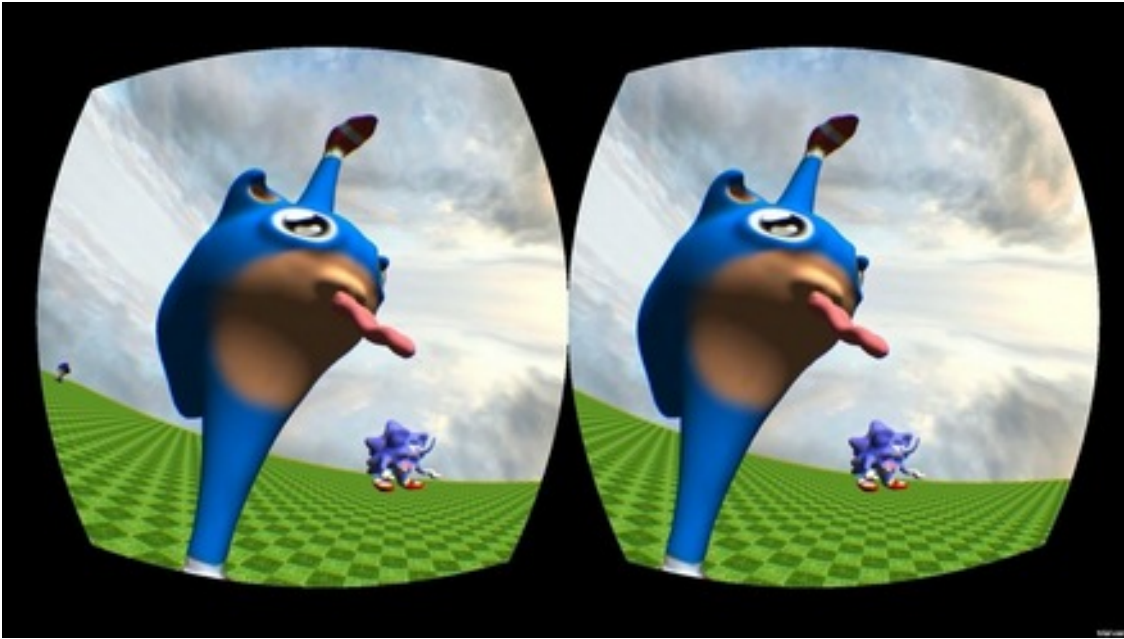
The American Academy of Neurology mentions not only the health risks that excessive gaming can cause, but also the risks to socialization and personal relationships. An article written for Neurology Now uses the example of Anthony Rosner, who became so involved with World of Warcraft, spending 18 hours or more per day on the game, that he nearly missed out on college. While this is an extreme case, more typical addicted gamers tend to lose interest in other activities and remove themselves from other people in the real world.

Despite the negative effects that virtual reality can bring to video gamers, there are positive uses for the technology. For example, the Oculus Rift could be used to train pilots in crash procedure without the danger of actually crashing a plane. This type of simulation could also be used for law enforcement or other first response workers. Athletes could use virtual reality for realistic training programs outside of team practices. Finally, virtual reality can allow people to experience activities that they would not be able to otherwise.

As the Oculus Rift is developed further, the focus of this technology should not be the general public but rather the people who face potentially deadly situations in their professional lives. The growing trend of video game addiction will only escalate with the introduction of VR technology in games. If the Oculus Rift is released to the public as a vehicle for video game delivery, players should be careful of how much time they spend using the system and be aware of the signs of video game addiction.

The dangers of bad virtual reality

Wes Fenlon



Oculus VR's E3 booth stands two floors tall in E3's West Hall, with a line snaking around one corner waiting to try on the near-final consumer Rift headset. Inside the booth, Oculus staff help usher press and game developers into interviews and meetings and hands-on sessions, or hover near [Oculus headsets](#) and [Touch controllers](#) on display for passers-by to gawk at. It's the kind of big, efficient production you'd expect from Oculus, with Facebook's money behind it. Over the past three years, Oculus has become the most recognizable, most successful face of VR. And where there's success, there's imitation.

A handful of VR booths were clustered near Oculus at E3 2015, [creating the impression](#) of a promising VR quadrant at the show this year. "Look at all these virtual reality companies," a savvy salesman would say. "They're proof that VR is successful. It's really happening!" Someone more cynical—someone like me—would say that these other VR experiences are not proof of VR's success, but hangers-on trying to ride a tidal wave of positivity to riches and recognition.

These second-tier VR companies and experiences are important, because trying them is a keen reminder of just how incredibly hard VR is to do right, and of the enormous engineering talent at Oculus and Valve making those experiences powerful, comfortable, and immersive. Trying on the consumer Oculus Rift will boggle your mind if you've never experienced VR before—but if you really want to be convinced, spend five minutes wearing a crappy VR headset immediately afterwards.

These second-tier VR companies are also dangerous, because not everyone knows the difference between good virtual reality and bad virtual reality. Not everyone gets to try on half a dozen different headsets and compare them. Not everyone reads about VR in detail online. If anything causes VR to be a disastrous mainstream failure, it will be these hangers-on, like the ones surrounding Oculus at E3. For the average person, all it will take is one terrible VR experience to assume that virtual reality in general is still just a crazy pipe dream. That it's not actually awesome and compelling.

And these VR experiences truly are terrible. I knew they'd be terrible. But I decided I had to try one

anyway, just to remind myself.



The nauseating AntVR

AntVR's small booth sat right next to Oculus at the LA Convention Center's West Hall. It was mostly open space, with a small platform and two swivel chairs serving as a pair of demo stations for the AntVR headset. I sat down and one of the AntVR staffers helped me put the headset on. Once it was on my face, I knew things were about to go south in a hurry.

The headset was heavy. Wearing it for even 15 minutes would put serious strain on your neck and head, and would probably cause headaches by itself. Paired with the display's visibly low refresh rate, which was at best 60Hz, and the lack of head tracking, which left all movement sensing to the gyroscope, accelerometer and magnetometer, 15 minutes with the AntVR would be enough to leave just about anyone nauseous, headachey, and probably in need of a second lunch.

Because it'll definitely make you puke.

AntVR, which was [Kickstarter in 2014](#) for \$260,000, had more problems that are immediately obvious if you've used other VR headsets. The display was large, and AntVR's spec sheet says 1080p per eye, but its lenses weren't designed to make that display comfortable or practical for your eyes. It was like slapping a giant square screen in front of your face and saying "there, now it's virtual reality!" The optics did, at least, allow my eyes to focus on the screen, but the experience was more like staring at a pair of smartphone screens shoehorned into a heavy plastic housing than anything remotely immersive.

The software demo was also bad. It was a first-person shooter, and AntVR has designed a small gun-shaped controller for it, with an analog stick where your thumb rests and a trigger where you'd expect it. The analog stick was for moving your character, while aiming the gun did aim on screen. But

moving your head was used for orientation, and without good head tracking, it was awkward, sluggish and frustrating to try to turn, walk, and aim. Hence the swivel chair.

Also, despite the headset seemingly being on my head correctly, the whole thing was tilted at a bit of an angle. I stumbled around the FPS environment for about five minutes, feeling a wave of motion sickness hit me every time I slowly rotated 90 degrees to make a turn, and then I'd had enough.



The VR “Experience”

Using AntVR’s headset, even for a couple minutes, crystallized [Oculus’ mantra of virtual reality as an “experience.”](#) As Oculus’ technology has gotten more and more advanced, the company has moved away from talking about hardware specs. They don’t like to talk about resolution or the exact technology of their screens or give out precise numbers for those things.

And yeah, some of that is PR and protecting their corporate secrets—it makes sense for Oculus not to give away the secret sauce. But they’ve also figured out that specs don’t tell the story of VR. AntVR’s 1080p per eye screen may be similar to the Oculus Rift, but the experience of using them is vastly different. Sometimes numbers do lie.

There are so many other things Oculus and [SteamVR](#) do right that contribute to the experience of VR, but they’re hard to fully appreciate until you compare them to a crappier VR headset. Weight makes an enormous difference. The way the headset straps to your face is important. Tiny and not-so-tiny differences in head tracking latency, screen refresh, optics can separate good VR from a vomit-fest, and it’s impossible to understand any of those from a spec sheet.

Software is just as critical: Oculus is making a point of flagging games with “locomotion” in their Oculus Home store, identifying experiences that will move you around a virtual environment even

when your head isn't physically moving, as that's the primary cause of VR motion sickness. Game developers have to be very careful about how they implement cameras and movement in VR to keep the experience comfortable for players.

Unfortunately, most second-tier VR companies use their own software to try to show off the features that make their hardware a special experience. Or they use hacked-together VR versions of games that never should've been played in VR to begin with. Their custom software is usually terrible. Either approach is likely to create a bad VR experience, where motion sickness hits fast and hard.

The PC is an open platform, and without that openness we'd never see great VR like the Oculus Rift break onto the scene. That's crucial, and it's great for competition—nothing will drive Valve and Oculus to innovate more than what the other company is secretly cooking up. But as VR approaches its first real consumer roll-out, bad VR hardware from companies seeking to cash in can only harm its potential for success. It's up to us—all of us interested in and excited for virtual reality—to prevent that from happening, by helping people experience and understand good VR.

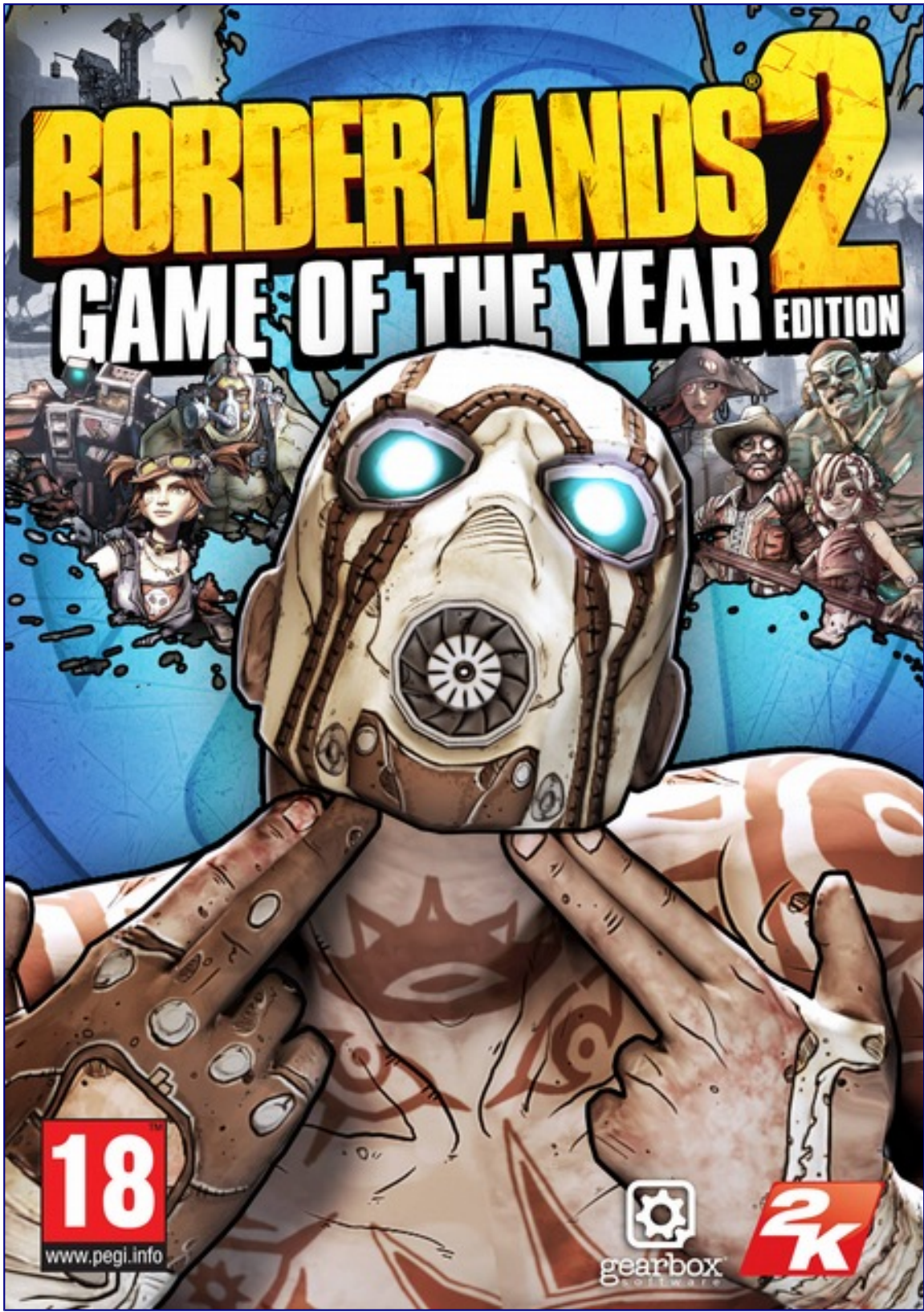
I don't think that's going to be too difficult, because once you've used what Oculus and Valve have cooking up, it's hard not to be excited for the next few years of gaming.

About the Author

Wes Fenlon

As hardware editor, Wes spends slightly more time building computers than he does breaking them. Deep in his heart he believes he loves Star Wars even more than Samuel Roberts and Chris Thursten, but is too scared to tell them.

[E3 2015 Hardware Oculus Oculus Rift Oculus VR SteamVR virtual reality](#)



[Borderlands 2 Game of the Year Edition](#)

[-75% \\$10.00](#)

A L I E N I S O L A T I O N™



SEGA®

Comments

Oculus Rift deals



highlights

Mega-preview

[Guide to the games of 2016](#)

PC Gamer - Dec 31, 2015

star power

[Meeting the stars of Star Citizen](#)

Chris Thursten - Dec 30, 2015

[The PC hardware you should spend your holiday money on](#)

Wes Fenlon - Dec 29, 2015