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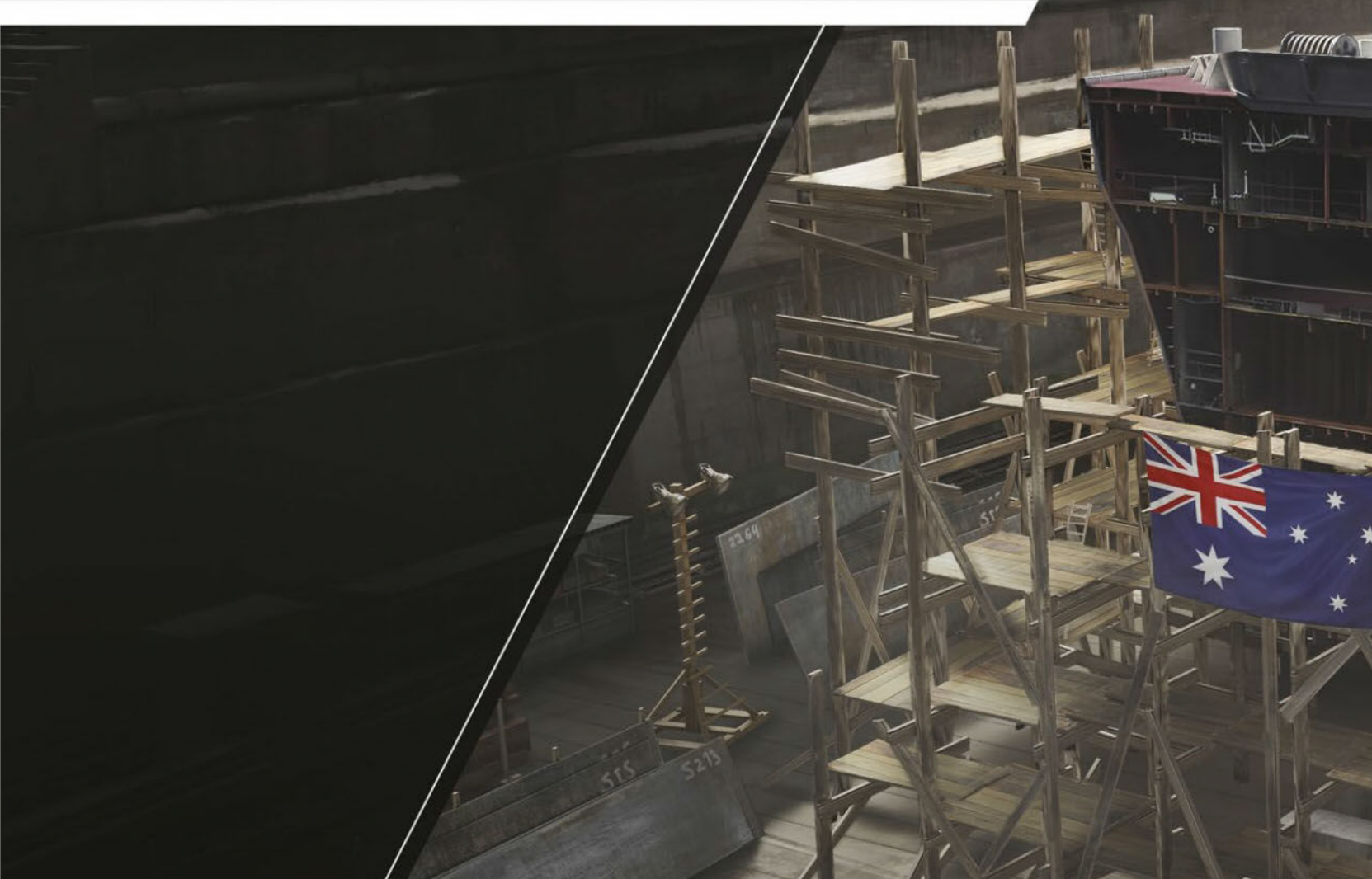
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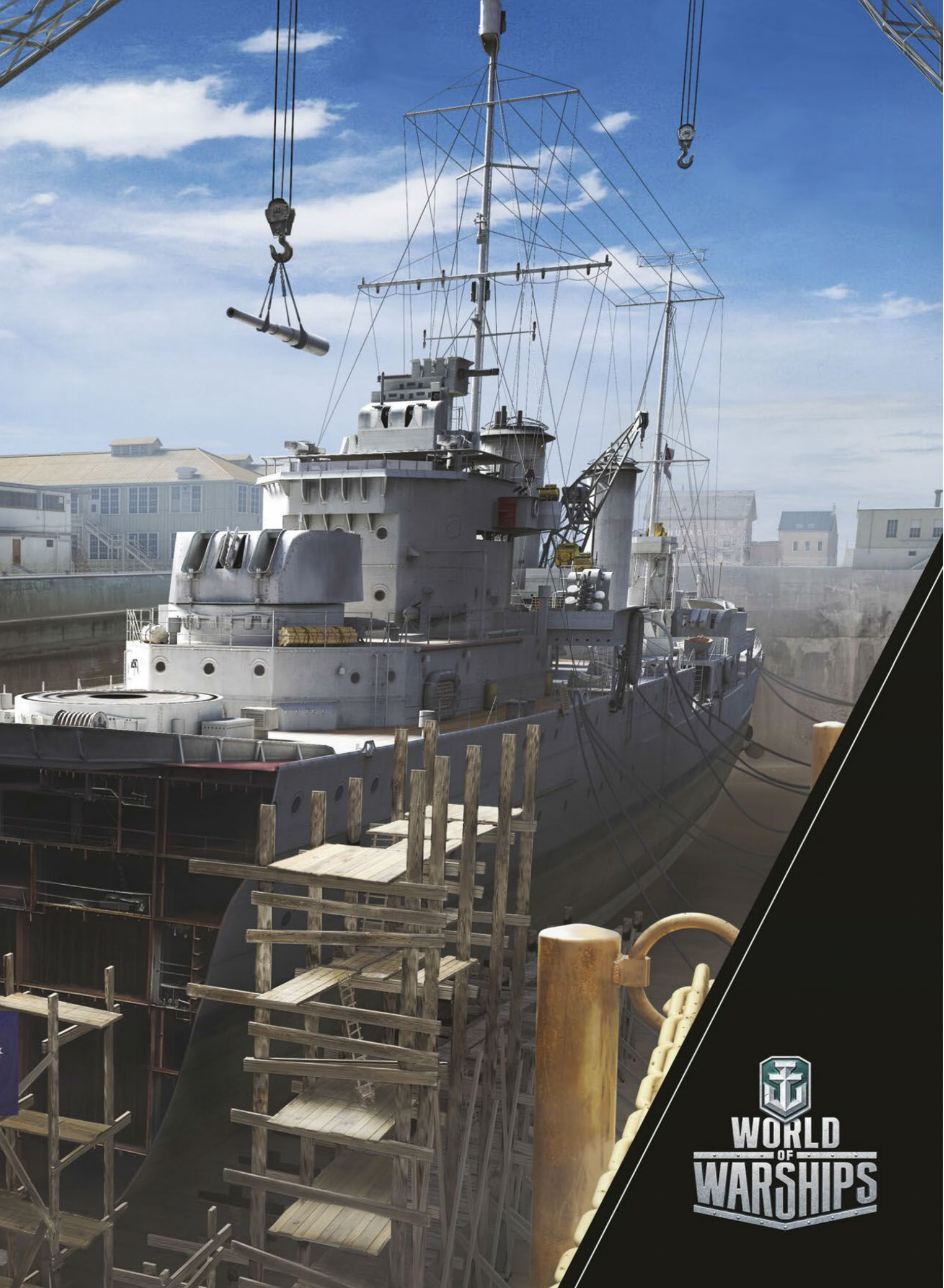
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It's 2016, and a technology that has been part of science fiction for decades can now sit next to a PC or console. Commercially viable VR is here, and given the amount of support that it has in the marketplace, it's here to stay. Just how VR will change the landscape of gaming is still up in the air, but change there will be. It's an exciting time to be a gamer, no matter your platform of choice.

DANIEL WILKS
EDITOR



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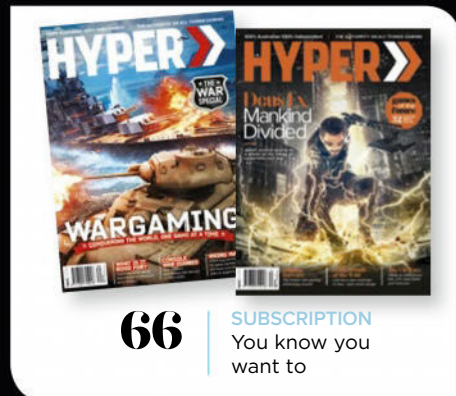
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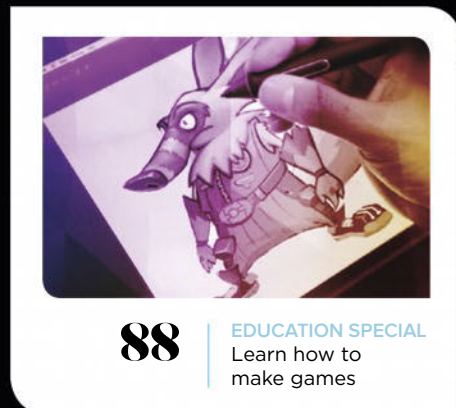
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VR Energised

NATHAN LAWRENCE *boldly goes...*



There's been a lot of chatter about the accessibility of virtual reality, given the requisite entry-level price point. After all, on PC at least, you're not just forking out for an Oculus Rift or HTC Vive headset; you also need the requisite high-end PC to run the newfangled tech. PlayStation VR is a little more forgiving in this respect, even if you still need to purchase a PlayStation 4 Camera and Move controllers atop the VR headset (and, obviously, the console).

But if you want to play *Star Trek Bridge Crew*, you'll want four lots of VR to get the most out of it. Sure, there's the option for solo play in this multiplatform VR experience, but

the real fun is found in four-player cooperative multiplayer. There's no word on cross-platform play, either, which suggests that you'll need to know three other players that have the same VR allegiance to play the full co-op experience. If you do, though, it's a hell of a VR treat.

And that's coming from the perspective of a casual *Star Trek* fan who really only got into the series after the J.J. Abrams 2009 soft reboot. *Bridge Crew* is actually set in the post-Abrams Kelvin Timeline, as players are placed in command of the U.S.S. *Aegis*, a new Starfleet vessel tasked with finding a new home world for the endangered Vulcan populace

in a region of space called The Trench. This part of space is also one in which the Klingon Empire is active.

This was the backdrop for my 15-minute hands-on demo with the Rift version of *Bridge Crew*, complete with the new Touch controllers. Like a Wiimote, the Touch controllers have handy wrist straps, which means you can loop them around your hands before donning the headset, so you don't have to blindly grope for them once the VR headset is on. It also helps that the lightweight Touch remotes are designed in such a way that left- and right-hand controllers are obvious (unlike the identically designed Move controllers).

START

After a short role-specific training video, the demo started appropriately in a shuttle on its way to the Aegis. On the right was Earth. To the left was the beautifully rendered Aegis ship we were about to pilot. Above was the vastness of space, and looking down at my avatar, I could see that developer Red Storm Entertainment has remained faithful to the revealing short-dress uniform issued by Starfleet Academy to female crew members.

After a proper tour of the external view of Aegis, the view shifted to where our four-person team would spend the rest of the demo: on the bridge of the starship. True to the in-game fantasy, our developer Captain sat behind us, while we remaining three sat in a straight line, reflective of our in-game positions.

To the left of me was the Engineer, whose job it was to route power and work the transporter. To my right was the Helm position, and he was in charge of flying the ship, as well as occasional moments of phaser fire. My role was in the Tactical position, and it was up to me to highlight objects of interest on a targeting panel, operate the shields and, of course, launch torpedoes and fire phasers. As anyone who's familiar with a Star Trek bridge will know, the Captain is in charge of maintaining the synergy of roles by issuing appropriate orders.

As the chief tactical officer, there wasn't a whole lot to do at home base. I was able to tap my targeting panel to highlight asteroids for weapons testing. Phasers have to be enabled and operate on a cooldown

system, while two torpedo bays must be first activated and take time to load. Once loaded, though, I made short work of a couple of asteroids before the Captain ordered the Helm to line up our HUD course trajectory then slide the appropriate handle forward for warp speed.

We were on a rescue mission, responding to a call from a derelict space station orbiting above a star on the brink of a spectacular supanova. The viewscreen of the Aegis has a limited field of view, which means the crew is somewhat reliant on the Helm officer to keep what's important out in space front and centre. The other option is to hold down a button to enter space view.

Given that VR works best in first-person, this switch to what's essentially a third-person perspective of the ship is initially jarring, but it also provides a fantastic view of the top of the Aegis and the immediate surroundings. It's easier to envisage it as the space equivalent of a jet airliner's tail camera to maintain the first-person illusion. Out in space, the dying star provided a vibrant backdrop to the damaged space station and the wreckage that floated around it.

Among this wreckage were escape pods, and as the Tactical officer, it was my job to select escape pods on my targeting panel for the chief engineering officer to scan for signs of life. As our Engineer scanned, Helm piloted us closer to the pod, before the Captain gave a simple order, "Energise!" to cue our Engineer to beam the survivors aboard. That's when the Klingon warbird appeared.



Supanova imminent – better go in for a closer look



"I'm just saying the dress could be a bit longer, is all. You wouldn't like it if Command made men wear stubbles."



I LOWERED THE SHIELDS, WHICH MEANT THE NEXT SALVO OF MISSILES FROM THE KLINGON WARBIRD TORE THROUGH OUR HULL LIKE A BULLET THROUGH BALISTICS JELLY

"Fire some torpedoes so he backs off a little bit," said Captain Reckless. While a sound and authoritative theory, the problem is that locking on to a target and firing at it doesn't exactly unleash a warning shot across the bow. As ordered, I launched the torpedoes and, as expected, they both hit. Understandably, the Klingon ship returned fire.

"Whoa! Shields up!" I yelled, taking matters into my own hands. It was the wrong move.

"Tactical, this is going to sound crazy, but let's put shields down because we need to transport these survivors aboard, and we can only transport if the shields are down," explained the ever-patient Captain.

I lowered the shields, which meant the next salvo of missiles from the Klingon warbird tore through our hull like a bullet through balistics jelly. Snapping to space view, I marvelled at the burning holes before returning to the bridge to continue the battle. Up close, I was able to unleash both phasers and torpedoes at the Klingon ship, but when it pulled away, I lost the option for phasers.

With all survivors aboard, the Captain gave the simplest of orders. "Fire everything!" Torpedoes were launched, but phasers were out of

range for Tactical and Helm roles. "Engineering, can we have more power to phasers, please?" This order was missed by our Engineer, but it didn't matter for too long because Helm had us on the tail of the Klingon warbird, which spun to fire another salvo.

"Phasers are up!" I yelled.

"Fire phasers!" shouted the Captain.

Helm and I obliged him and the Klingon warbird was soon another piece of space wreckage in the area. Our celebration was short-lived as the star erupted and we failed our mission, just as Helm had plotted a course for home and our Engineer had charged warp coils. So close.

Helmsman's log. Stardate 43125.8. Initially, I blamed our Engineer and Helm players for our destruction, but it appears my early, and unordered, raising of the shield delayed our safe departure. It's clear that tight teamwork under a Captain's strict orders is required for success in Star Trek Bridge Crew, but our failure wasn't enough to dampen the experience. I'm keen to get back out into space when Bridge Crew launches, and regardless of where you rank on the Trekkie fandom scale, you should be, too. ☞

PLATFORM PSVR
 CATEGORY ACTION
 DEVELOPER ROCKSTEADY STUDIOS
 PUBLISHER WARNER BROS INTERACTIVE ENTERTAINMENT
 DUE OCTOBER

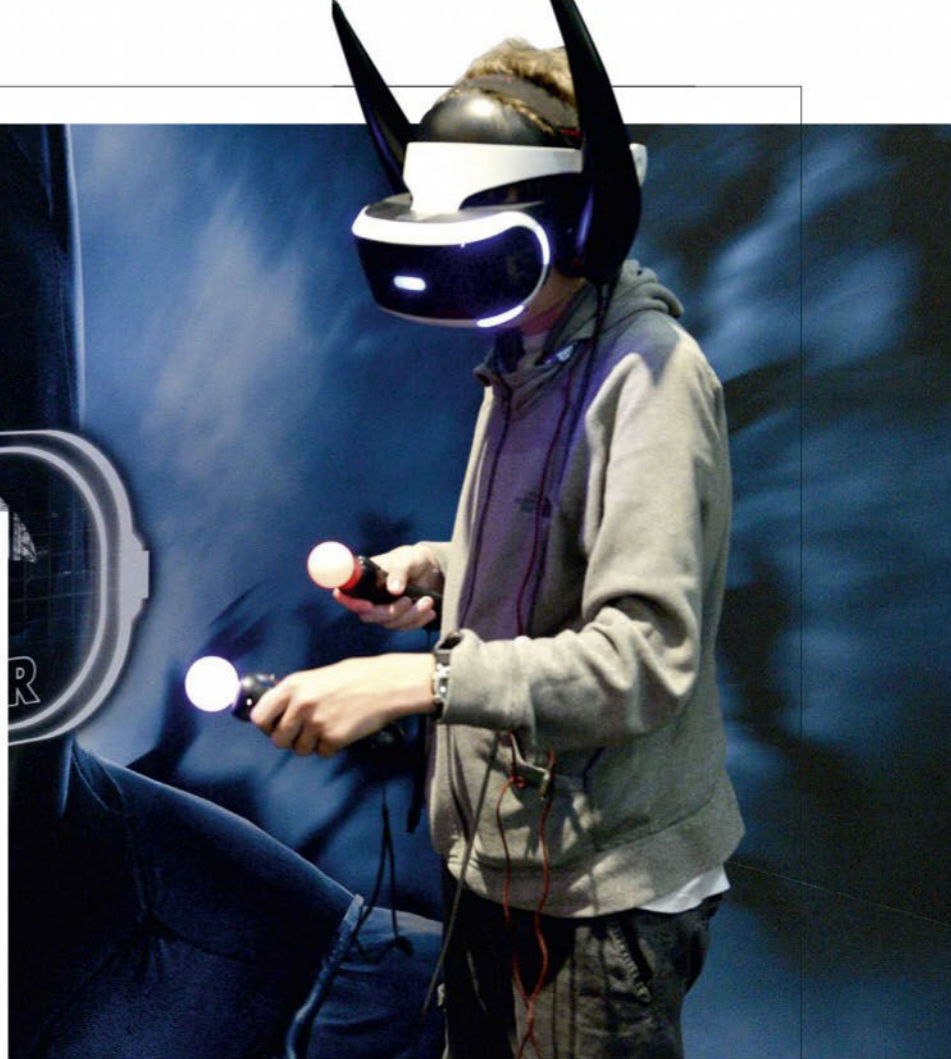


Mmm, yes, looking nice and "non-lethal" there, Bats.



Batman: Arkham VR

NATHAN LAWRENCE lives out the ultimate Bat-fantasy on PlayStation VR.



Like Batman, I won't pull any punches when it comes to the launch of PlayStation VR. The reason so many VR launch titles have such low RRP is because they're short experiences that are designed to introduce a mainstream market to the wonders of virtual reality.

This doesn't have to be a disappointment, especially when it gives players the chance to shit themselves in haunted-house rides, soar in the cockpit of an X-wing or, in this particular instance, be the Batman. That last bit was the oft-repeated catchphrase of *Batman: Arkham Knight*, and it seems like a wasted opportunity in that it should have been saved for *Batman: Arkham VR*.

With bat-eared headset covering my ears and a PlayStation VR unit offering me a Bat's-eye view of Batman's alter ego, the *Arkham VR* demo started off modestly enough in Bruce Wayne's rather lush lounge. Like PS VR title *The Deep*, the player is restricted to standing on the spot, armed with dual Move controllers that mirror real-world hand movements.

Rocksteady has a reputation for pretty games, especially in the *Arkhamverse*, but *Arkham VR* is on a whole new level. The room was visually impressive enough, but when faithful butler Alfred entered to inform Bruce Wayne that his alter ego was needed, I missed most of what he was saying because I was distracted by the amazing attention to detail of his character model.

Alfred handed over a key for the piano that was in front of me, and I hurriedly put key in lock, then bashed out a few out-of-tune chords, the Batman fan in me knowing I was about to enter the Batcave. But in expert

showmanship, Remedy didn't simply open a doorway to my expected location. Instead, the floor slowly lowered and I found myself in a small chamber adorned floor-to-roof with tech. It was time to suit up.

The bulk of the main Batsuit was applied automatically, but what followed helped to make up for that disappointment. To put on Batman's signature gauntlets, you have to stick both of your arms into side-by-side cylinders that contain the bladed gloves. The final touch is to grab Batman's cowl and pull it over your head, before you receive a mirror view of an impressively rendered Bat visage that moves in time with your real-world head and arm movements.

On the descent to the Batcave, there's some obligatory gadget testing, which is fun. There's the grappling hook, which I test-fire at a nearby target before snapping it onto my belt. There's a similar test with a forensic scanner, before Batman's iconic batarangs enter the fray, with some subsequent testing against rotating targets. It seems impossible to miss the targets, but that doesn't impact how cool it is to flick a batarang from the front of Batman's utility belt towards the targets with a simple gesture.

The elevator finally lowered into the full awesomeness of Rocksteady's *Arkhamverse* take on the Batcave and the demo faded to black. I was left wondering what the remaining detective mode is all about.

Like you, I'll have to wait for the release of the final game to figure that out, but if you have a bat in the belfry for all things Batman, you'd be nutty to miss out on this *Arkhamverse* experience if you're picking up PlayStation VR on day one. **🦇**



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RIGS: Mechanised Combat League

NATHAN LAWRENCE goes goggles-on with a competitive shooter spiced with a bit of VR sports.

With so many of the PlayStation VR's launch titles dedicated to limited experiences designed to guide the uninitiated in what to expect from this latest tech zeitgeist, it's refreshing that Guerrilla Cambridge hasn't forgotten that it won't just be stereotypical mums and dads who are playing with the tech. There are also legions of hardcore gamers looking for extended and competitive gaming experiences.

From the dozen PlayStation VR titles I've tried, RIGS Mechanised Combat League is the one that's most targeted at, for lack of a better phrase, "real" gamers. The pitch is part Rocket League and part Call of Duty: Advanced Warfare, as two small teams battle across tight arenas in a sports-like shooter where the emphasis is on scoring points.

Unlike Rocket League, there isn't a ball at play. Instead, the players themselves become the ball by destroying opponents and/or collecting their fallen orbs. Snatch up multiple kills or nab enough orbs, and your mech suit enters an overcharged mode, wherein you're able to score a point by scaling the map and jumping through a giant hoop.

It sounds a bit silly, but in execution, it's a fantastic mechanic that makes overcharged players priority targets for the other team which, in turn, means teammates need to employ shielding tactics to ensure their overcharged player can score. Despite having a crosshair painted on them, an overcharged player isn't at a complete disadvantage. Entering overcharge also gifts that player with the simultaneous activation of Turbo (speed boost), Impact (extra damage), and Repair (health regeneration) features, which normally have to be switched between manually on the DualShock face buttons, and only one at a time.

In terms of the other controls, the sticks break down into what you'd expect from your average console FPS, with the left stick in charge of directional movement, and the right stick controlling orientation. This means the VR headset is

used to fine-tune aiming, with concentric lasers from the two arm-mounted machine guns showing where your weapons are pointed. What I played was a little too automated on the aiming front, with the weapons locking on to an opponent as long as I kept my gaze close enough to an enemy player at all times.

Hopefully, that auto-aim is something that can be disabled in PvP modes for the final release to help lift the competitive potentiality and to boost player escapability. Aside from the guns, there's also a handy dash-melee

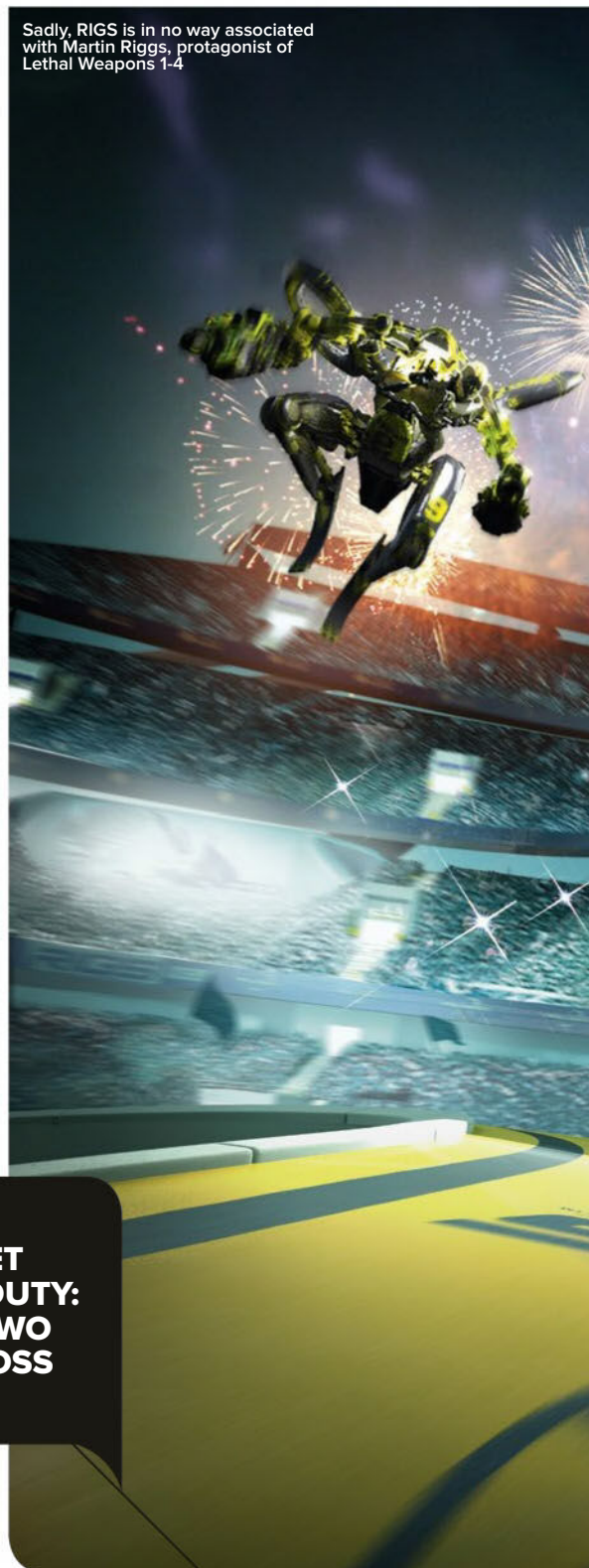
THE PITCH IS PART ROCKET LEAGUE AND PART CALL OF DUTY: ADVANCED WARFARE, AS TWO SMALL TEAMS BATTLE ACROSS TIGHT ARENAS

ability, that's not only useful for finishing enemies, it's also the best way to perform a replay-worthy defensive save as an overcharged opponent attempts to jump through the hoop to score.

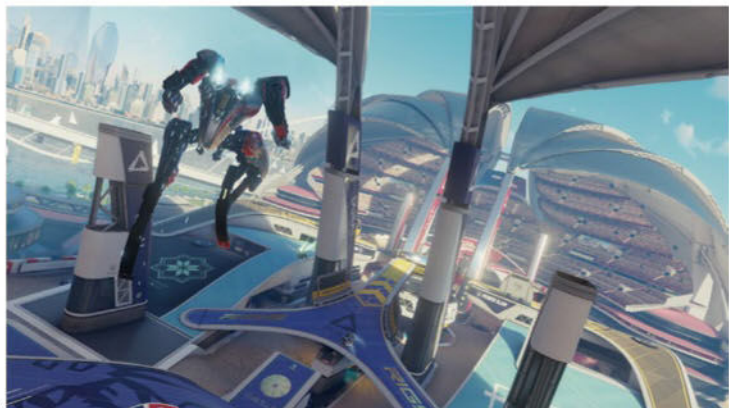
I found the default speed of the mechs a bit on the sluggish side, especially when it came to turning around to face an opponent who had the drop on you, but that wasn't enough to stop RIGS from being an impressive showcase of the competitive potential of a VR game on PlayStation VR. It's also one that has the potential to defy the usual right-stick aiming limitations of your average console shooter.

With the right spit and polish, RIGS could well end up being a strong contender for the debut eSports VR title that can help lift the PlayStation VR beyond the emphasis on the accessibility of its launch titles and into the kind of longevity stratosphere that competitive titles enjoy. 🗨️

Sadly, RIGS is in no way associated with Martin Riggs, protagonist of Lethal Weapons 1-4



PLATFORM PSVR
CATEGORY ACTION
DEVELOPER GUERRILLA CAMBRIDGE
PUBLISHER SONY INTERACTIVE ENTERTAINMENT
DUE OCTOBER 13



"And what did you do today, son?"
 "Oh, you know, killed a guy, ate his brains."
 "Mm-hm. And you, honey?"



Resident Evil VII

Could the shift to VR be the shot in the arm Resident Evil needs? ANDREW GRAY investigates...

After the action-driven and mostly underwhelming Resident Evil 6, Capcom look to be taking the series back to its roots. Much like the original game released back in 1996, the seventh instalment takes place in one location, the pace is often slow and deliberate, and the emphasis is on horror rather than havoc.

There will of course be quite a few new ideas thrown in the mix, but the most drastic one is the perspective. For the first time, Resident Evil has been designed to be played entirely in first-person.

This makes it a perfect fit for virtual reality, though the game can be played with or without it. In fact, the game began development before VR was even considered an option. Even so, Capcom look like they'll be using the technology to find new and exciting ways to give us all a case of brown trousers.

For example, at one point in the recent Lantern demo, the player has to inch through a crawl space while being pursued by a psychopathic woman. While using the VR headset, it creates a nasty feeling of claustrophobia and dread. Later in the demo, players are strapped to a chair as they witness a murderous family have dinner, with the freakish folk getting right in their face and even trying to force feed them food nastier than McDonald's.

Capcom don't want to just make players jump, they want to scare them in ways games haven't done before. To make them feel uncomfortable. They want to get inside their heads and

make it an unpleasant place to be.

Despite the new direction in both horror and perspective, RE7 is still retaining many mainstays of the series. Resource management and healing herbs make a welcome return, and so does puzzle solving.

A simple example of the latter seen in the Lantern demo is rotating an object in front of a light projection to cast the shadow of a spider, which then opens a secret door. So yes, this is definitely a Resident Evil game.

Combat also makes a return, with some of the planned weapons to be shotguns, chainsaws, and good ol' fashioned flamethrowers, but don't expect a blastfest. In fact, in all the preview demos seen so far, the player has been left entirely helpless, with their only defense being to either run or hide as they're hunted.

In the Lantern demo, the player is stalked by a demented old woman named Marguerite, a member of the Baker family who appear to be game's primary antagonists. It's their Louisiana plantation mansion where the player has found themselves, cast in the role of a new character named Ethan who is searching for his wife.

Not too much else has been revealed about the story, but of note is that the narrative designer is one of the folks behind Spec Ops: The Line. Links to previous games have been promised, but the main cast is completely new.

With or without virtual reality, Resident Evil 7 looks to bring fresh forms of fear to players everywhere. **☛**



PLATFORM	PC, XBOX ONE, PLAYSTATION 4
CATEGORY	SURVIVAL HORROR
DEVELOPER	CAPCOM
PUBLISHER	CAPCOM
DUE	JANUARY 24, 2017



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START

PLATFORM VIVE, OCULUS
CATEGORY EXPLORATORY PLATFORMING
DEVELOPER VR NERDS
PUBLISHER VR NERDS
DUE Q1 2017

♪ She was a day tripper, a one way ticket yeah ♪



A BODY HARNESS HOLDS YOU AT 30 DEGREES AND MODIFIED QUADCOPTER ROTORS BLOW AIR AT YOU AS YOU FLING YOURSELF AROUND THE WORLD

Lucid Trips

The challenge for many VR teams is in creating opportunities for the player to move without negatively impacting the 'presence' which is so important to the experience. Most solve this by having the player fixed in one place, or teleport from spot to spot around the game world. It's slightly jarring, but less immersion breaking than using

**—
JOAB
GILROY
flings
himself
into a VR
fantasy**

a thumbstick on a controller to move around the world.

Lucid Trips, made by VR Nerds out of Germany, is taking a different approach. The HTC Vive Controllers (or the Oculus Rift Touch Remotes when they launch) allow a player's hands to exist in and alter the game world. And so, using these independent controllers, Lucid Trips allows you to move around using your hands, pulling yourself forward, left, right and backwards.

The trick is to use your hands in a rowing or skiing motion, instead of stepping forward one hand-foot at a time. Once you have the hang of it you can fling yourself through the air like a flying trapeeze artist, using your magic thrusters to maintain altitude. Soon you'll be effortlessly swimming underwater, climbing towering mountains, and gliding through fluffy white clouds.

Still in Alpha, Lucid Trips wants players to feel like they embody an alien form in an ethereal, dreamlike world. The gravity is low, the environment strange. Calm, gentle music plays as you throw yourself around the world. It's a genius solution to the problem of locomotion in VR, although it has the potential to be as tiring as it is fun.

One of the quirkier things the team at VR Nerds setup is a rig designed to fully immerse the player in their world. A body harness holds the player at 30 degrees and modified quadcopter rotors blow air at you while you fling

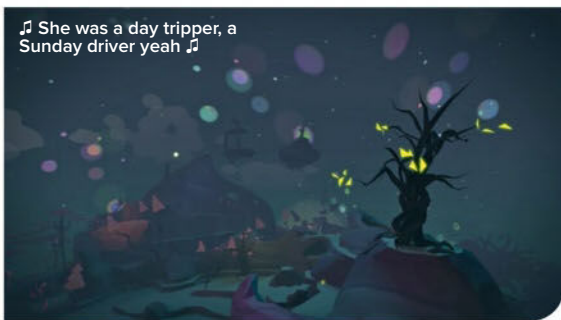
yourself around the world. This is the sort of experimentation which makes VR so exciting as a technology.

The game itself is shaping up to be a hide-and-seek exploration game, as players roam gorgeous worlds in search of artefacts hidden throughout each of the locales created for the game. It's a simplistic approach to goal-oriented gameplay which underlines the real aim of Lucid Trips - to encourage players to explore and experience the gorgeous art on offer. If a world in Lucid Trips were a landscape painting, then VR Nerds wants you to be able to go into the canvas to explore the world created by the artist.

Still, some people need objectives in their games, and others need competition. Before launch, VR Nerds plans to add an asymmetrical form of multiplayer, allowing players to hide the objects for one another before sharing their challenges. Hopefully they don't stop there - with robust enough measuring systems and even level design tools, the game could easily provide a platform for quirky, immersive, otherworldly competition.

It's great to see a game think as far outside the box as Lucid Trips, even if it's taking the experiential approach to its gameplay. There's oodles of potential here, and the team is working hard to secure more funding to make their (waking) dreams a reality. Still a few months off releasing a public demo, Lucid Trips is definitely worth keeping an eye on. ☞

♪ She was a day tripper, a Sunday driver yeah ♪



Golem

ANDREW GRAY is assuming control

Virtual reality has the potential to provide players with an escape from mundane reality. In the case of Highwire Games' *Golem*, it offers one not only to the player, but also to the character they inhabit.

The protagonist is a small child who, after being injured in an accident, has lost the ability to walk. The only way for her to leave the confines of her bed is to take control of entities known as golems: gigantic, mystical stone creatures. Oh, and they can also wield massive swords.

Of course, one has to work their way up the chain of power. When players first begin, all they'll be able to inhabit is a tiny doll and use it to explore the girl's bedroom, but it's not too long before they'll find a way under the house and into a system of small caves and then onto the outside world. This section acts as a sort of tutorial, but it also begins to show off the sense of scale *Golem* is trying to achieve with VR, making the player feel tiny at first, then eventually gigantic as they possess larger and larger entities.

Perhaps the most interesting aspect of *Golem* is the control scheme. After a year of prototyping, Highwire Games settled on what they call the Incline Control Scheme.

If the player leans forward slightly, as if they're about to take a step, the game detects this and begins to send them in that direction. In theory, this allows players to fully explore a 3D space intuitively. Highwire are also hoping these controls can help bring a hardcore game such as *Golem* to a more casual audience, allowing people who have trouble using traditional controllers to enjoy them as they lack the gaming experience the attractive people reading this magazine tend to have.

And the folks at Highwire Games are certainly a group of people who have experience in streamlining controls. Many of the team are ex-Bungie and worked on the *Halo* games, which are often credited as finally making FPS games work well with a console controller.

It isn't all about the VR headset, though. The PlayStation Move controller will also be used. When not in combat, it controls a crystal that acts as a flashlight, but when the action heats up, it's all about swinging that sword.

The swordplay is reminiscent of the *Red Steel* games on the Wii, but of course, considerably more involved thanks to the use of modern technology. Players will use the Move



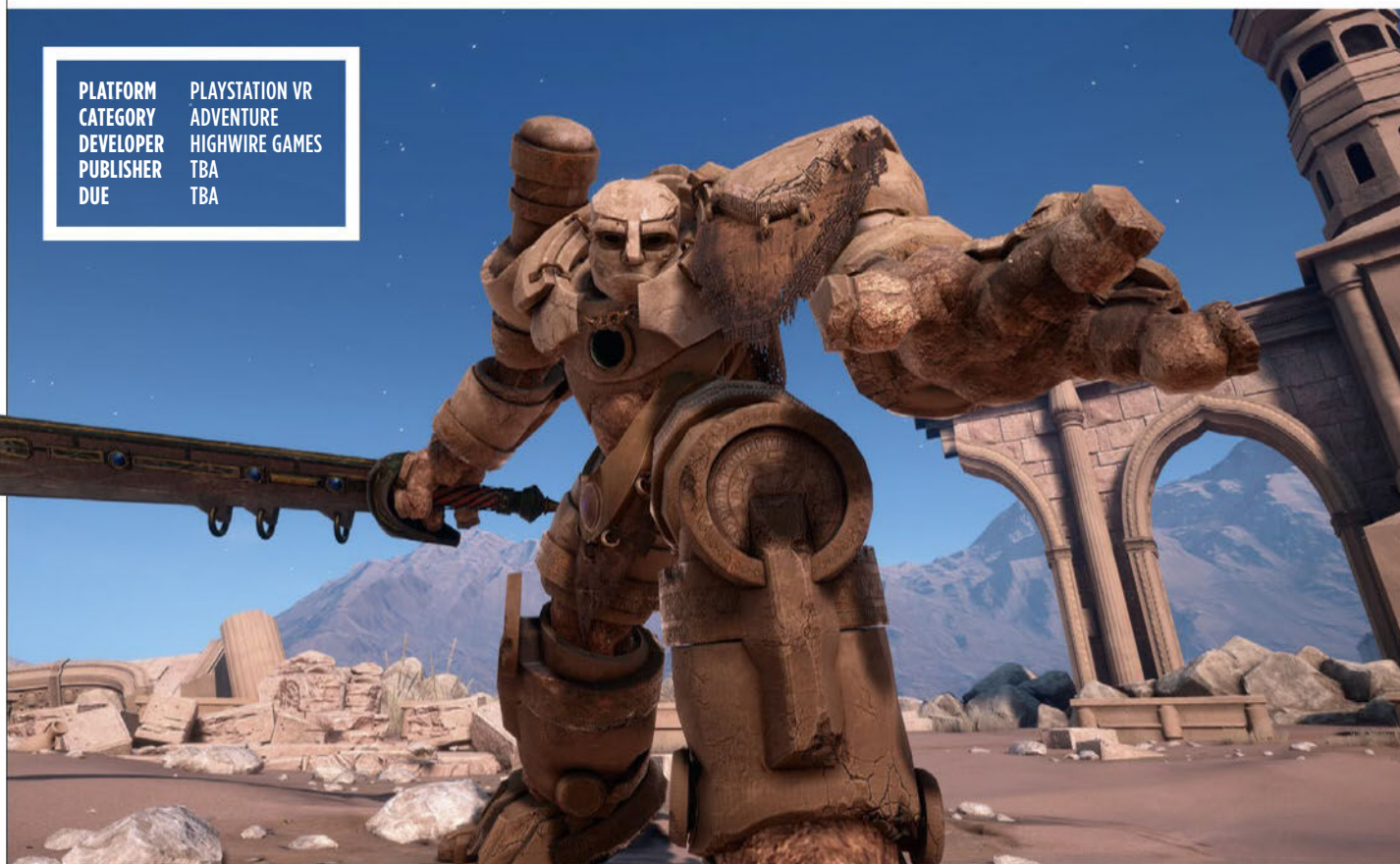
Dude, you didn't have to knock the whole thing down... you could've just, I dunno, used the doorbell? Christ.

to swing, jab, block, and parry the attacks of other Golems.

Despite the combat, *Golem* is planned to primarily be a story-driven game. Not much has been revealed about the plot, but the team at Highwire plan to tell much of the story through the environment, encouraging players to discover locations and objects and ponder their history and what purpose they had in the mystical world they've found themselves in.

Golem is certainly one of the more interesting and promising VR games we've seen, and may just help gamers all over the world get their rocks off. **«**

PLATFORM	PLAYSTATION VR
CATEGORY	ADVENTURE
DEVELOPER	HIGHWIRE GAMES
PUBLISHER	TBA
DUE	TBA





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Neptune Flux

JOAB GILROY suits up and deep dives into a virtual sea teeming with scares

Videogames have always given us the opportunity to safely confront our fears. Fears of failure, of others, of being a Japanese schoolgirl trapped in a house haunted by samurai ghosts. It's what sets games apart, that ability to not only face fears, but to interact with them and deal with them on our own terms. One of the most exciting things about Virtual Reality is how it will elevate games' ability to do this to the next level.

Aquaphobia is defined as a fear of water. Thalassophobia is a fear of the sea. Bathophobia is a fear of the deep, a fear of the parts of the water where light cannot penetrate and the atmosphere can liquefy a person. People are so afraid of the ocean that there are three different terms to describe variations of that fear--and that doesn't even start on the things which live within it.

Neptune Flux is a game about confronting exactly those fears. As Sarah, an employee of the A.Q.U.A. corporation, you live your life more than one hundred metres below sea level. Devoid of any natural sunlight, the game places you in an area of perpetual nighttime as you explore

massive, open underwater areas using just the floodlights on top of your divepod and the flares you can shoot (provided they're available).

With that in mind, the game tasks Sarah with repair and salvage jobs around A.Q.U.A.'s deep sea facilities - imagine being a caretaker on the outside of the SeaQuest DSV. The twist plays out early, as you investigate an electrical disturbance which is frying your electronics and ruining your attempts to make further repairs to the energy generation for the underwater habitat.

The supernatural and science-fictional soon take over as the game has you exploring eerily alive wrecked ships and abandoned dive sites. The game prides itself on 3D audio, which gives you an aural point of view to experience the creaking of ships long dead, or simply the bubbles expelled from your vessel.

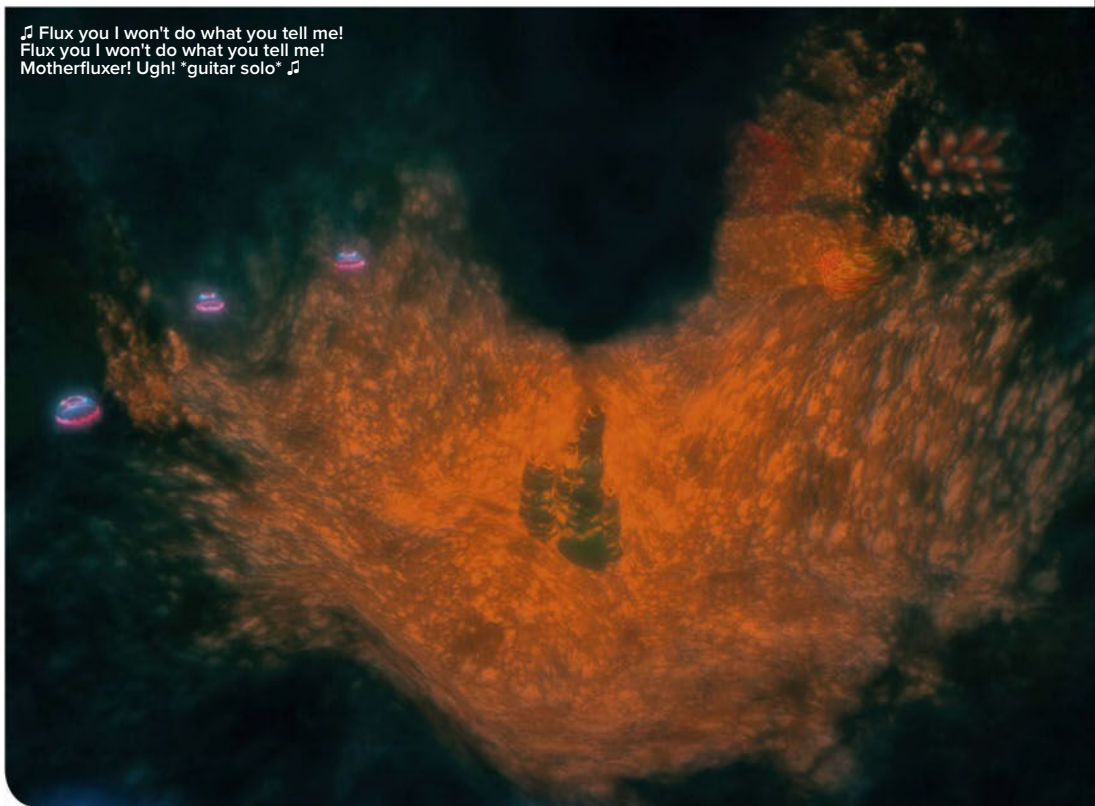
One thing absent from the game at this point is ocean life. It's the sort of thing you might not notice at first, because the animals which typically live at the depths Neptune Flux takes place at are usually slow, small, and extremely shy. It's a trade-off which

THE GAME TASKS SARAH WITH REPAIR AND SALVAGE AROUND A.Q.U.A.'S DEEP SEA FACILITIES - LIKE BEING A CARETAKER ON THE OUTSIDE OF THE SEAQUEST DSV

may harm the immersion of the game itself, but it affords the developers, Zoxide Games out of Orlando, more time to nail the exploratory experience they're going for. Fish require AI and resources, so they're not a high priority for the team right now.

Because Neptune Flux has the player embedded within a Dive Pod at all times it's afforded the opportunity to use controller as its primary form of movement. As such, they're aiming for release on all three major VR platforms - Oculus Rift, HTC Vive and PlayStationVR. It's launching on Steam on November 15 this year, and they're hoping to hit the PlayStation before 2017. **[[**

♪ Flux you I won't do what you tell me!
Flux you I won't do what you tell me!
Motherfluxer! Ugh! *guitar solo* ♪



As it turned out, Jebel was right: they weren't flying a sea-plane after all



PLATFORM	VIVE, OCULUS, PSVR
CATEGORY	DEEP SEA EXPLORATION
DEVELOPER	ZOXIDE GAMES
PUBLISHER	ZOXIDE GAMES
DUE	NOVEMBER 15, 2016



Star Wars Battlefront:

Rogue One X-wing VR Missions

NATHAN LAWRENCE goes eyes-on with the PlayStation VR exclusive *Star Wars Battlefront: Rogue One X-wing VR Mission*, revealing geeky immersion and accessibility that's at ends with that epic title

Before my session with *Star Wars Battlefront: Rogue One X-wing VR Mission* (phew), I'd been briefed on how amazing the experience was by a colleague. Dangerously, I let my expectations balloon to the same impossible heights as when the prequel trilogy was first announced. But I didn't get The Phantom Menace, Jar Jar Binks and a whiny pre-supervillain whose biggest gripe with his home planet was sand that

got everywhere. What I got was The Empire Strikes Back of experiences.

Even the obligatory PlayStation VR calibration screen is impressive. As I got the headset into focus, an immaculately recreated AT-AT stomped overhead and for a moment I forgot I was supposed to be flying an X-wing starfighter. Before the flight, there was an option to have a tour of the exterior of my X-wing. True to what DICE achieved with its damn-

Disclaimer: The above image is from *Star Wars Battlefront: Death Star*. There are currently no available images of *Rogue One X-wing VR Missions*.

near photorealistic recreation of iconic *Star Wars* vehicles in the core *Star Wars Battlefront* game, X-wing VR Mission developer Criterion Games has injected an impressive level of fidelity into the Rebel ship.

The only downside is that you can't walk around the X-wing, with preset teleportation points the only option for exterior observation. "We built the game ground-up to be a really comfortable experience for everyone, [whether] you're a VR veteran or you've never played VR in your life," explained producer Peter Lake, when I complained. "So we haven't included it, basically, for that reason, and it's not something we're looking to include at the moment. But we are looking to expand that area."

After some limited ogling – everyone was only assigned 15-minute slots for the demo – I hopped into the cockpit and waited for the mission to start. It's strange to think that the demo, in actuality, was only five minutes long, but the final version will be longer, albeit not massive.

"It's meant to be a mission, so our original goal was to be as long as any of the other *Battlefront* missions, so it can sit beside them," said Lake. "Honestly, I think it's going to be slightly longer, mainly because of our enthusiasm and what we've got planned it just is slightly longer. I guess you could blast through it in 15 minutes if you really wanted to, but I think most people are probably going



PLATFORM	PSVR
CATEGORY	COMBAT FLIGHT SIM
DEVELOPER	EA DICE
PUBLISHER	EA
DUE	OCTOBER

to spend half an hour doing it.”

The demo started at the beginning of the Mission, as my greenish pilot character shot out of hyperspace alone. Despite the concern in the pilot’s voice, I took the opportunity to marvel at the faithfully recreated cockpit. Behind me, my R2 unit chirped and, naturally, I had to swing around to look at him, but was distracted by the closed S-foils, then marvelled when I looked down and saw my flight-suit-adorned character.

The controls are identical to Battlefront’s simplified ship control, meaning right stick takes care of movement, which is mimicked by your avatar’s hands in-game, and the left stick is used to throttle up or down. In prioritising accessibility, Criterion has missed the opportunity to implement Move controls so that, say, a right-hand-held Move controller can move the flight stick and a left-hand controller can work the throttle.

It’s a shame, but it really is splitting hairs in what almost immediately amounts to an incredibly immersive experience. Your avatar isn’t alone for long. First, the temporarily lost X-wing squadron appears, taking it in turns to berate you for exiting hyperspace early. Next, the rest of a Rebel fleet appears, and it’s hard to not grin as familiar ships materialise above you. You can take the time to fly close to them and gawk at their impressive digital recreations, or you can move on to the business of swatting TIEs

as a distress call comes in and your squadron leader volunteers your squadron’s services.

Another Rebel ship is under attack not too far away, but its proximity to an asteroid belt means the larger ships can’t jump close enough to help in time. Naturally, that’s not a problem for a squadron of snubfighters. Reaching the rally point, we made the jump to hyperspace and soon appeared in front of a heavily damaged Rebel frigate near the asteroid field.

When the Mission was first announced, the general consensus was that it’d be an on-rails experience, but Lake said you can spend time in those asteroids, if you like, but you’ll likely fail the time-sensitive objective of protecting the frigate from what comes next.

“We designed it to have a sense of escalation, and not just in kind of experience but also in gameplay,” said Lake. “Obviously, there are moments where there are objectives where you’ve got to go to. We’re not doing anything that’s going to be on-rails. We’re a company that’s about player choice and player agency so, as Criterion in general, to take it away from them is not what we’re about. We want people to feel free. We want people to have fun.”

The real fun was what happened next, even though it was incredibly obvious. A squadron of TIE fighters returned to finish their damaged prey, but they hadn’t counted on the

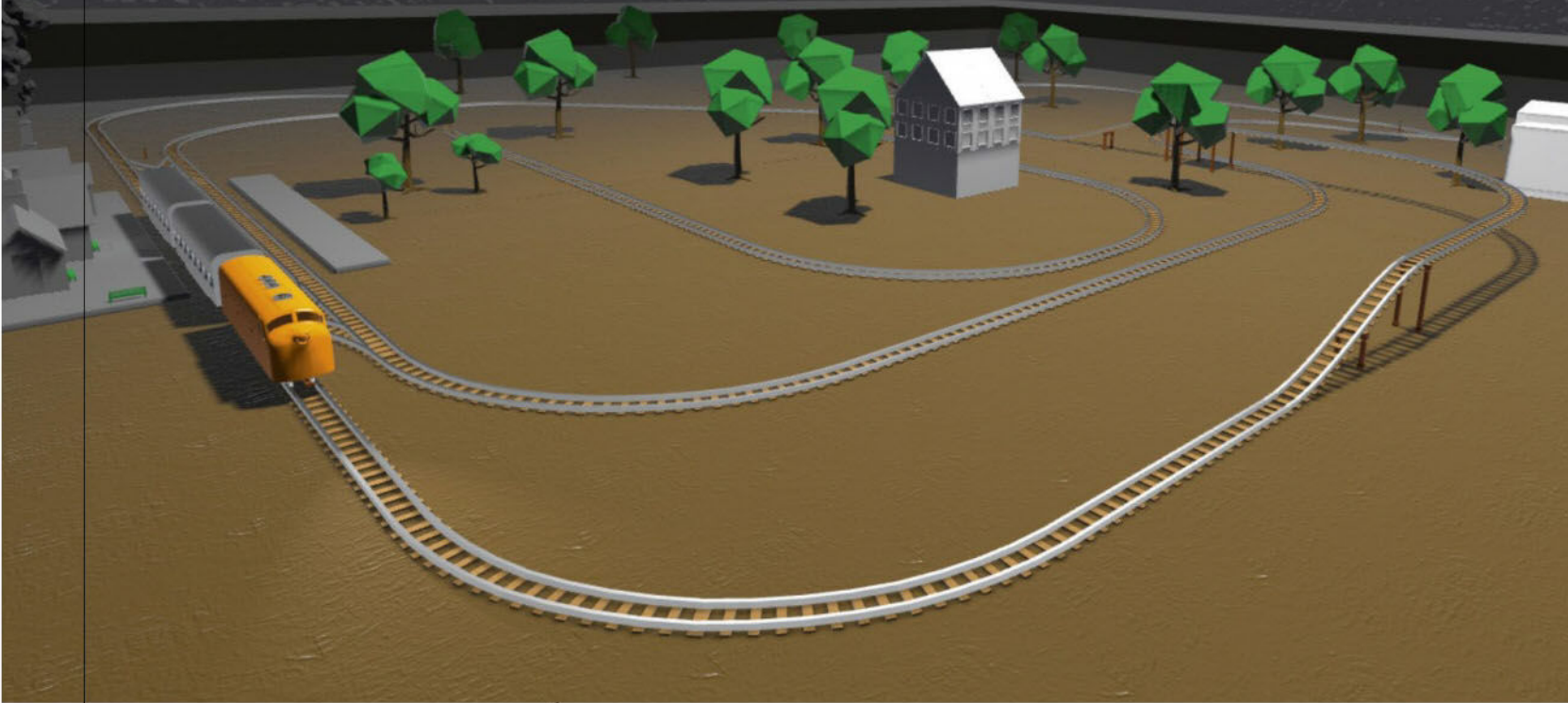
presence of a squadron of X-wings. There’s a single interactive button in the cockpit that locks S-foils in attack position. I mash it and ready for battle. True to the Imperial attack patterns of the original trilogy, each successive squadron of TIEs approached in a vertical wall-like formation, before they split off to engage us individually.

This is the kind of experience for which VR is built, as I throttled down to improve my turning circle and simultaneously boosted the power of my cannons. I used my head to track targets through the transparent parts of the cockpit, pre-firing the pitch-perfect-sounding laser cannons as I lined up kill after kill. It didn’t get old.

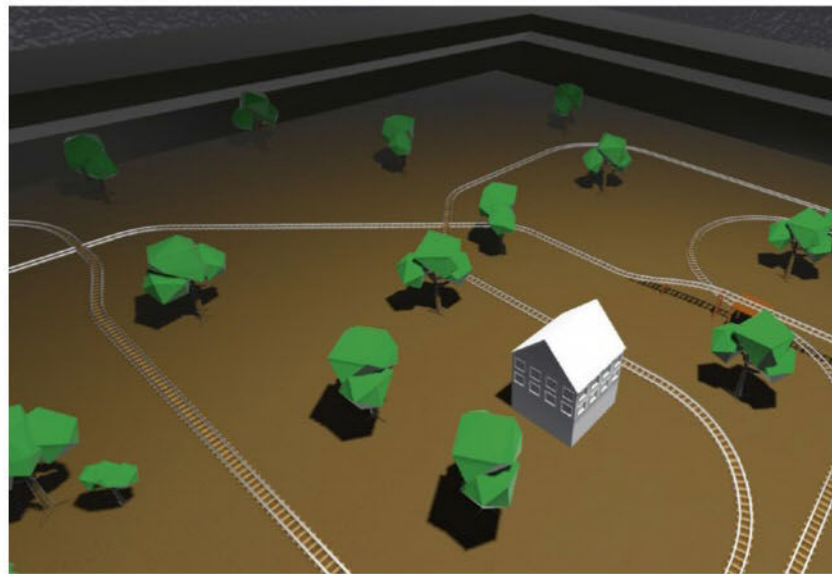
But as any Star Wars nerd would know, TIE fighters are short-range ships. Before I could wonder too hard about where they might have come from, a possible answer appeared: an intimidating Star Destroyer entered the fray as the demo faded to black and I uttered disappointed expletives. Obviously, I wanted more.

Alas, it’s unlikely there will be more, at least not anytime soon, as Lake admitted this is intended as a one-off and, sadly for fans of LucasArts’ Star Wars: TIE Fighter game, Criterion is “not working on that [a TIE fighter mission] at the minute”. To compound the disappointment for Star Wars fans on other platforms, it’s also definitely exclusive to PlayStation VR, so you can stop holding your breath for a Vive and/or Oculus version, too. ❧

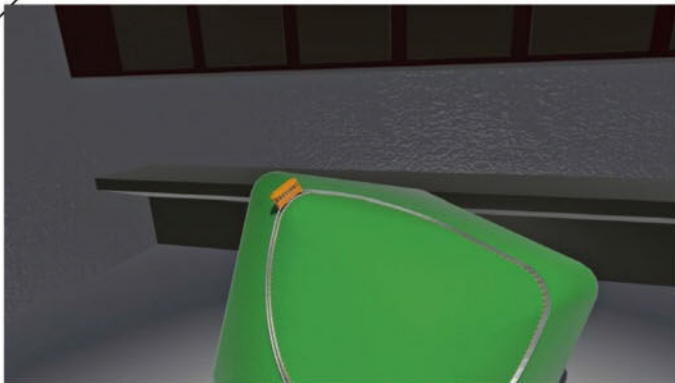
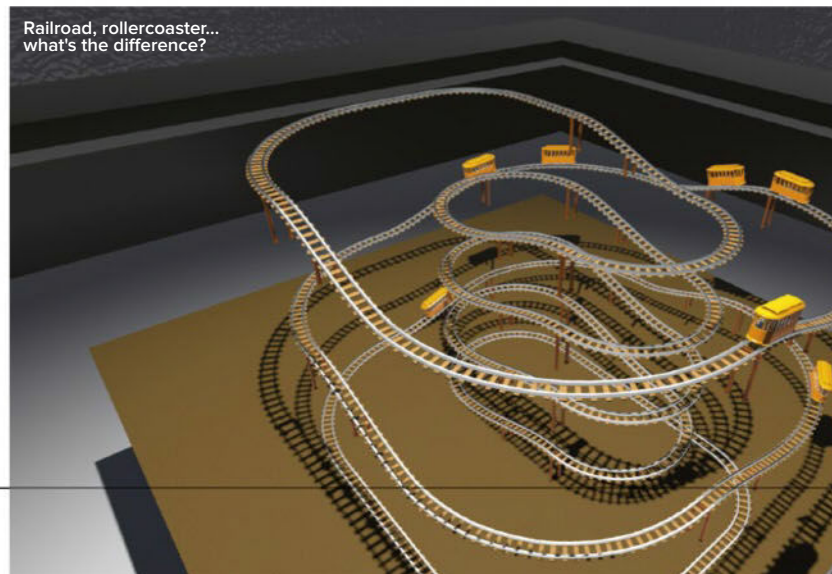
START



LOCOMANCER ISN'T A TRAIN SIM – IT'S A LIFE-SIZED REPLICATION OF THE ACT OF BUILDING AND PLAYING WITH MODEL TRAINS



Railroad, rollercoaster...
what's the difference?



Locomancer

Playing with pretend trains in a virtual basement? Well JOAB GILROY has always been a bit loco...

There's a stigma attached to railway modelling which is quite similar to the one gamers have. The idea of the solo weirdo, stuck in their basement with their expensive toys, experiencing something you could do in real life if you simply applied yourself. That stigma, that perception, is dumb on both accounts. Gamers don't want to do in reality most of the things they do in games, and modellers are as interested in the construction as they are in the operation of the train itself.

The problem with getting deep into railway modelling is similar to many modelling hobbies - it's unbelievably expensive to get started, and it gets more expensive from there on out. Locomancer for the HTC Vive aims to solve at least that portion of the problem - it's a model railway simulator taking advantage of Room Scale VR.

As a person whose primary interaction with railway modelling was Reverend Lovejoy's depressing basement monologue, the idea of a virtual simulation of the hobby seemed extremely weird. And I still think it is, in a way. We're not talking about a railroad simulator, ala Trainz or... Railroad Simulator - Locomancer is a life-sized replication of the act of building and playing with model trains. It's like if Dawn of War 3 doggedly adhered to the rules of Warhammer 40,000, giving you a ruler, some dice and some blank white models before asking you to paint and play it. Actually, I'd play the hell out of that.

In action though, it's charming in a way which makes complete sense. Using the Vive controllers to represent the modeller's hands, the entire process of building complex

railway systems is laid in front of the player. The railway parts are presented neatly in drawers before you, and you can duplicate or delete any tabled piece with a squeeze of your hands, greatly simplifying the process of creating and cleaning up your virtual basement.

One fantastic feature which you can't enjoy if you stay in the real

available to would-be modellers is limited - you can build fairly complex tracks, but you can't populate those tracks with much more than trees and tiny stations at the moment. The game is being built by a single developer, Eric Lipschutz, and he's committed to continue building out the model set of the game as it goes. The good thing is that, because it's

"If the passengers will look to their right, you will see a sad man. That is all."



world with real (fake) trains - with a point of your in-game fingers or a push of a button on the in-game remote, you can ride and drive your train from the first person perspective. This includes adjusting the speed, turning at switches, tooting the horn and feeling like David Dunn when your train derails but you walk away unscathed.

The only issue is that, at the moment, the number of parts

built in Unity, it's a cinch for helpful types to create and add their own models to the game.

I didn't expect a model train game to be in my wheelhouse, but there's something so peaceful, so serene about the act of building a model railway without having to worry about credit card bills or clean-up time. And there's something hilarious about watching tiny model trains collide and derail. ☹☹





I'm Doing It

Nothing makes BEN MANSILL happier than sitting snug in a virtual cockpit

As VR was emerging, and we all buzzed about the cool things we'd experience, all I cared about was how sims would undoubtedly become mind rockingly totally-really-there, I'm doing this for real awesome. And that's what happened. I play an awful lot of Assetto Corsa and War Thunder. And not much else. I no longer play these games - I do these things.

I've always invested in super huge monitors, which I pull as close to my face as possible, and TrackIR for the lookarounds, all to immerse myself til my eyes bleed. Oculus makes it real. There's little time to pause and try and appreciate the sensation of realism because it's so utter that you just get on with it, and on and on.

I stick my head in it, the outside world no longer exists, I'm flying, I'm driving. I no longer rely on muscle memory for racing braking points and pedal pressure - I'm controlling a car now, so it's natural. I'm quicker, have fewer offs and can zingle between opponent cars with a paintcoat

separating us because I can see everything, all around.

Flying in War Thunder is particularly nutso magnifico. The addition of a third dimension (height) compared to driving rams home the seat of the pants, nerve endings alive with fear and exhilaration ecstasy that flying should be about. Often now, instead of joining a battle I just fly solo, exploring, flying under bridges, or best of all, setting up loads of puffy clouds (War Thunder's clouds are heavenly), dial in some sunset colours then swoop and swerve through the pillars of golden white like Superman. It's a serious trip. I lose track of time, I never grow impatient or bored and it goes on for hours. I feel like I own a private plane and this is my weekend joyflight.

While TrackIR lets you look around, the movement is exaggerated so your eyes don't fall too far off the screen's center. But with the Rift movement is true 1:1. That's the big wonderful difference. I look down into the cockpit to read gauges, look out

the side over the wings, and follow enemies in a dogfight so perfectly it's a very serious unfair gaming advantage. VR is fun and amazing, but it also imparts significant competitive gains.

I've tried loads of other VR experiences, and they range from interesting to nauseating to blissful, but the big takeaway I've learned is that it's all about having a cockpit. Whether a horse-drawn cart, a fighter in space or over the cliffs of Dover, or a car - that's the secret sauce for experiencing motion without the sickness. Our brains have a lifetime of experience sitting stationary while the scenery whizzes by, and that's why cockpit games are fun and cool and FPS games make you feel weird and sick. You need a point of reference. And if that happens to be a vehicle you innately love, then oh boy will you get off on having that world of pseudo-reality magic sitting on your desk ready for takeoff whenever you feel like transporting yourself somewhere wonderful. «



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Virtually Harmless?

DAN STAINES looks at the real risks posed by a virtual future

Donning the goggles and experiencing virtual reality (VR) for the first time is a powerful experience. "It's different from anything I've ever experienced in my life," said Facebook CEO Mark Zuckerberg of his first time with the Oculus Rift. Cliff Bleszinski, former design director at Epic Games and godfather of the Unreal engine, described his first time with the Vive headset in breathless, evangelical soundbites. "I was nearly in tears at one point," he tweeted. "Pure magic. Next level stuff. Mind blown."

Zuckerberg and Bleszinski talk about VR in terms usually reserved for acid trips and ecstasy highs: an intense and transformative experience, unlike anything else you've ever done. But what if the characteristics of VR that make it so seductive and powerful – the sense of presence, of immersion and agency – amplify its potential to cause real psychological harm? We know what regularly getting high on acid or ecstasy will do to someone over the years; the same cannot be said of regular VR use.

Don't worry – drug analogy notwithstanding, this isn't going to be a scare piece. It isn't my goal to frighten you off using VR or to suggest that the technology is inherently destructive. My goal is to inform: to condense what we know about the potential hazards of VR into a digestible format, so that you can make your own decisions about how to approach the technology. Zuckerberg and Bleszinski tell one side of the story; this is the side they haven't told you.

The power of presence

Our world is saturated in digital media. Research conducted by Deloitte and the IGEA indicates that Australians spend 17 hours a week watching TV shows and movies, 10 hours a week playing videogames, and about an hour looking at their phones. We spend huge chunks of our lives glued to digital devices of various kinds... so why should we be concerned about VR?

"The important thing is that VR gives you a sense of being in a place other than where you really are," explains Dr Michael Madary of Gutenberg University. "It does this by tracking your bodily movements, your head movements in particular. Our brains seem to treat the virtual world as if it's real and our bodies react as if it's real."

A philosopher and expert in the ethics of immersive technology, Madary points to the embodied

nature of VR as a key factor distinguishing it from other types of media. It's by responding to body movements in real-time that VR tricks the brain into treating the game as real, a feeling referred to in the academic literature as "presence". The sensation is not unique to VR - good films, books, and especially videogames are all capable of "transporting" their audiences in various ways - but only in VR is it so complete, so *convincing*.

Of course, the rational part of you knows that you're not actually flying a spaceship or fighting off screeching horrors, but you have to remember that the rational part of you doesn't always have final say. The brain didn't evolve at all once as a single cohesive unit, but over time, layer-cake style. New cortical structures literally sit on top of their older, more primitive counterparts, and the two don't

always communicate as much as they should. What this means is that it's possible for the "smart" parts of your brain to know that an experience is virtual while the "dumb" parts respond as though it were real.

"We maintain the true belief that it's not real, but despite that belief our bodies react as if it is," says Madary. That's presence, and it's VR's defining characteristic and number one selling point.

For once, "feel like you're really there!" isn't hyperbole, and therein lies the problem. What happens to a person who spends hours a day "really" shooting other people in the face or being pursued by creatures ripped from HR Giger's nightmares? For now, the answer is simply that we don't know - but based on what we do know about media effects more broadly, it's possible to make some educated guesses.



But first: here's something positive

In addition to its entertainment value, VR possesses a great deal of potential as a tool for education, rehabilitation, and positive social change. Here are just a few of the cool things smart people are doing with this revolutionary technology.



EDUCATION AND TRAINING

VR has been used in the military for years, with immersive simulators proving especially useful for training pilots and tank drivers. Now that the technology has become cheaply available, VR is rapidly establishing itself in other spheres as well, giving students access to valuable experiences that would be impossible or unethical to recreate in the real world. For example, Immersive VR Education's medical training simulator, ER VR, allows medical students to participate in a simulated trauma scenario, practising real skills in a safe context. Expect to see a lot more of this sort of thing in the near future, particularly when the tech becomes affordable enough to appear in public schools and universities.

EMPATHY AND PROSOCIAL DEVELOPMENT

Empathy is the ability to take another person's perspective and experience the world as they experience it. Most of us are born with an innate tendency for empathy, but even naturally sensitive, emotionally perceptive people can have trouble extending it beyond the circle of their immediate in-group – a problem in an increasingly globalised world.

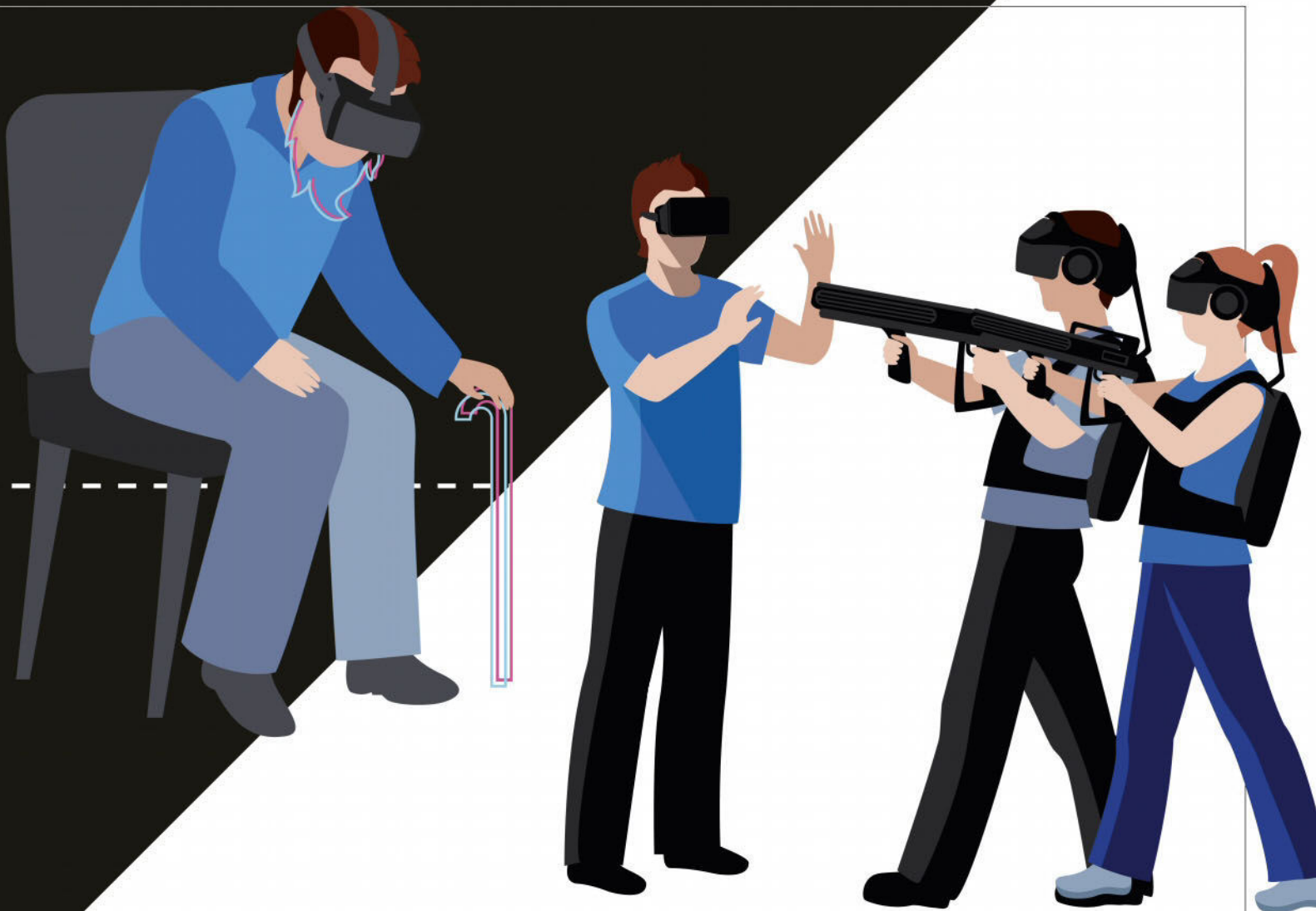
VR can help, allowing us to almost literally see the world through another person's eyes. In one experiment, a group of researchers had white subjects inhabit a black avatar in VR, leading to decreased measures of implicit racial bias. In another, students who inhabited a superheroic virtual avatar showed an increased tendency to help experimenters pick up their "dropped" pens later on. Whether either of these effects persist in the longterm is an open question.

THERAPY AND REHABILITATION

In combination with cognitive behavioural therapy, exposure therapy is one of the more common and successful ways to treat serious phobias and anxiety disorders. It works by building up a tolerance, so to speak, for the thing that scares you. So if you were an arachnophobe, exposure therapy might begin with looking at spiders in pictures, then movies, then in captivity, and on and on until eventually you aren't cripplingly scared of spiders anymore.

VR can contribute to this process with simulated exposure, giving therapists the ability to recreate problem scenarios and dynamically adapt them to the patient's needs. So far the technology has been successfully integrated into a multitude of treatment programs for disorders, including arachnophobia, fear of flying, anxiety, all the way through to major depression and battlefield-induced PTSD. Several major companies already specialise in VR therapy and counselling, and we can expect many more to pop up as the tech becomes better understood and more widely available.





Virtual violence

In the perpetual squall of controversy engulfing the subject of violent videogames, it can be difficult to distinguish facts from politically and commercially-motivated misinformation. Typically of a complex issue, the media has a tendency to exaggerate and misconstrue the data, creating the appearance of a fierce ongoing debate when in fact the matter has been largely settled. Again and again, psychologists have demonstrated that violent videogames – like others kinds of violent media – have a small but significant psychological impact in short and long-term timeframes. While they're not the psychopath factories depicted by tabloids, they aren't psychologically inert either – and in the right circumstances, yes, they can be harmful.

"Like other forms of media, there is consistent evidence that videogame content has some impact on players," explains Dr Wayne Warburton, psychologist at Macquarie University. "Educational content is linked to learning outcomes, simulators are linked to skills acquisition, pro-social content is linked to increases in empathy, and violent content is linked to increases in hostile thoughts, feelings and behaviour. The majority of active researchers in the area are convinced by the latter findings; a small minority are not."

Whether or not adding VR to the mix exacerbates the effect of violent videogame content remains to be seen, but there are good reasons to think that it might. In theory, VR should produce stronger psychological effects, says Warburton, because it's "more immersive, more interactive" and because it stimulates a wider range of senses, providing "more and stronger cues for thoughts, feelings, memories and knowledge structures."

That's in theory. In reality a great deal of research remains to be done

before we can begin to assess the impact of immersive tech on how we perceive and react to violent content. "The way VR impacts people psychologically is yet to be properly explored," says Warburton. For now, all we can do is consider possibilities in light of what we already know. Are violent videogames associated with increased aggression? Yes. Does "presence" enhance psychological and physiological arousal? Also yes. What happens when the two are combined...? Well, we'll have to wait and see, but it's clear what the smart money's on.

TEARS FOR FEARS

Horror games have a great deal to gain from the transition to VR, with extra immersion translating directly to better scares. But how scary is too scary? According to Warburton, it's possible that realistically frightening VR scenarios may provoke a "fairly extreme fear response" in a small number of people, potentially resulting in psychological trauma. "Content that is very disturbing may cause some people to feel upset and disturbed for some time afterward, and some of these people may need assistance to overcome this."

If this is true, it raises some troubling questions regarding the obligations and responsibilities of VR developers. Are developers aware that VR is potentially traumatic? Are they obligated to consider that potential when making games intended to scare people? While writing this feature, I reached out to a number of devs working on horror games for VR platforms, but none were willing or able to comment.

Social engineering

Have you ever wondered why Facebook spent \$2 billion USD to buy Oculus VR, an unproven tech startup which, at that point, had been in operation for less than two years? In a blog post announcing the deal, Mark Zuckerberg talks about how VR is “a new communication platform” destined to become “a part of daily life for billions of people” and how this naturally aligns with Facebook’s mission to make the world “more open and connected” for everyone. He doesn’t specify to whom or what we’re supposed to be more open and connected, but given what we know about Facebook’s data and advertising-driven revenue model, it’s not hard to fill in the blanks.

This is a worry. We already know that human behaviour can be strongly and subconsciously influenced by the social and physical environment. Some of the most (in) famous psychology experiments of the 20th Century – including the Stanford Prison experiment and the Milgram obedience experiments – testify to this fact, as does the design of everything from grocery stores to public parks and train stations. The question is: what happens when the environment is virtual and entirely beholden to the whims of a multinational corporation?

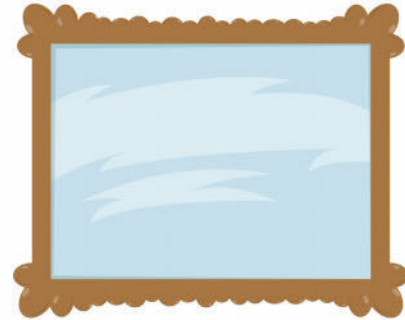
Virtual environments open up new and powerful possibilities for so-called neuromarketing: an intense

kind of targeted advertising in which micro-gestures like eye, head, and hand movements are tracked and used to infer details about the person making them.

“When we have VR in the hands of neuromarketers, two things change,” says Madary. “First, [developers] have control over the entire environment. In the real world, the space in which advertising appears is fixed, but in VR the advertisement can be anywhere in that space. Second, because the technology works by tracking bodily movements, the neuromarketers will have much more information about how we react to advertisements. When marketers have that kind of information they can really take advantage of it because they can track exactly how people react.”

But neuromarketing is just the tip of the iceberg. VR’s ability to subconsciously influence people’s behaviour may also make it a potent vector for indoctrination. We’ve seen how VR might be used to enhance empathy – now imagine the opposite: a simulator designed to decrease empathy, to dehumanise the other from the inside out. Or imagine a kind of exposure therapy for extreme violence: soldiers deadened to acts of real brutality because they’ve done it all in VR so many times before.

“If we use our imagination, we can think of some really unpleasant uses for VR,” says Madary.



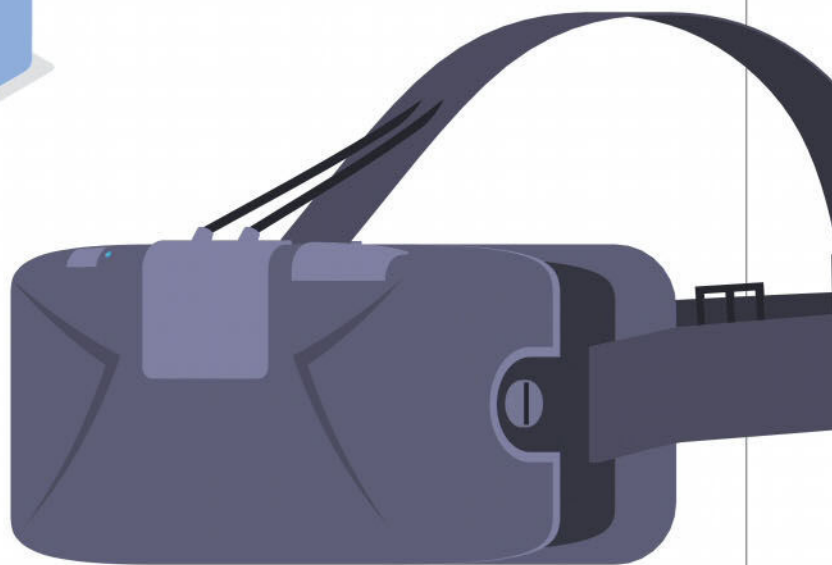
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ABANDONING MEATSPACE

One of the dangers more commonly associated with VR is that it will simply be TOO good; that the lure of living in a virtual world where we exercise complete control may prove too much for some. "We can imagine people preferring the virtual world and neglecting their own physical environment, their bodies, the cleanliness of their surroundings, neglecting people who are with them: friendly and friends," says Madary. In Japan, this kind of behaviour is already a serious social problem - adding VR to the mix is unlikely to help.



Reality check

VR has finally arrived. For years it existed on the periphery of consumer technology, too expensive for the mainstream and too primitive for dedicated hobbyists. But thanks to the explosive popularity of smartphones, technology is now sufficiently advanced to make consumer grade VR affordable and powerful. Seeing this, big players like Facebook, Sony, Microsoft, Samsung, and HTC all have chips in the game, and are no doubt expecting to reap huge dividends. If VR can't gain traction now, in these conditions, with this kind of money and support behind it, it never will.

As consumers and enthusiasts, it's our responsibility to prepare for VR's imminent arrival by acknowledging its potential to have real and lasting psychological effects on the people who use it. We've established that VR's a powerful experience - well, powerful experiences seldom come free. LSD and ecstasy are (allegedly) powerful experiences but try getting

high every day and see where that gets you.

"The public should be made aware that we don't know the psychological effects of immersion, especially long-term immersion," says Madary. "People are spending days in there now. There are YouTube videos of people going twelve, twenty-four hours, and we just don't know what that does to the mind."

Nobody's saying VR is "bad" for you or that you shouldn't play violent games - or use Facebook, for that matter - on your Rift, Vive, or whatever else. As with any powerful and potentially dangerous experience, awareness and caution are key.

"I don't want to come across as anti-VR. I think it's an amazing technology and some good things can come of it," Madary says. "But it's important that we look at the downsides before it's too late. We need to ask the questions: How might people be harmed by this?

And what can we do now to minimise that harm?"

The responsibility for harm minimisation that Madary talks about extends also to the entities that produce VR devices and content. While government regulation may be required in the future, for now the industry could perhaps benefit from establishing a voluntary "VR code of conduct", taking into account the effects discussed in this feature and in the scientific literature. Further, it is incumbent upon companies like Facebook and Sony to inform the public of the risks associated with VR, particularly those related to advertising and behavioural manipulation. If they're going to try and influence us, we should know about it.

VR is going to change the world as we know it, and we - consumers, journalists, academics, developers, manufacturers - all need to work together to ensure that these changes are for the better. **«**



Star Trek's Holodeck is the ultimate in VR

DAVID HOLLINGWORTH nerds out about how the holograms in *Star Trek* aren't actually holograms

One of the most enduring iterations of virtual reality technology is Star Trek's Holodeck. It's also amazingly iconic, built around a deceptively simple set as well – a big, empty room, with a yellow grid-pattern on black walls. It's so iconic that the HTC Vive uses a similar graphic to warn users when they are approaching the edge of their real space.

But, despite the name, the fictional technology behind the holodeck is anything but holographic. Warning – we're about to dive deep into some serious Treknobabble!

All modern display technologies are based on the manipulation of light – our monitors, VR headsets, AR devices like Microsoft's HoloLens – but the holodeck uses actual, real matter to create its 'projections'. By tying into its starship's transporter (the technology that beams people and objects from ship to surface in the show) and replicator (the technology that creates Picard's cups of "Tea, Earl Grey, hot") systems, the holodeck effectively turns raw matter into whatever the program needs at hand.

This is, understandably, an incredibly energy intensive application, so to cut down on power drain, only the material close to a user is simulated in such a way – anything far enough away to not need to be real is an actual hologram.

At the end of a program, the matter making up each object is returned to the ship's matter stores. Which, incidentally, is where all the ship's waste goes, too...

Aside from the creation of temporary objects, the holodeck also uses an array of other tricks to create the illusion of vast distances and open worlds. When two or more people use a holodeck together, it's impossible for them to be more than a few meters apart. But to produce the illusion of distance, the holodeck can manipulate photons to form a 'lens', through which objects appear further away. And since all gravity on a starship is generated artificially, the holodeck can manipulate that, too, to create low and high gravity environments.

To make users think they are able

to traverse those artificially large distances, the holodeck can create forcefields with a treadmill motion, so that users feel like they're moving, but are in fact standing still.

And, on top of all that, the power of a starship's computer can simulate all matter of artificial intelligences with relative ease, populating its programs with people and creatures at a moment's notice.

Star Trek's holodeck is pretty fantastical, but like much of the technology on the show, it's also very inspiring. The HTC Vive's grid aside, companies like Virtuix are borrowing holodeck concepts in our own drive to make VR more real. The Omni is a 360 degree treadmill that lets VR users actually move around in virtual worlds, while remaining on the spot – just like the holodeck's forcefield. And then there's Virtual Motion Labs and its VMG 360 Plus gloves, which use haptic feedback to let VR users feel virtual objects.

It's not quite turning raw matter into whatever you want, but it's aiming for the same effect. **🔥**

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When 2 Worlds Collide

Or how the digital world augmented our reality

MIKOLAI becomes one with the machine

We're first introduced to cyberspace, and the concept of a new digital reality, in William Gibson's 1984 classic, *Neuromancer*. In the book, a computer hacker jacks into an online world known as the matrix via a series of nodes attached to his head.

As the text famously explains, cyberspace is "a consensual hallucination experienced daily by billions of legitimate operators in every nation." It's a "graphic representation of data abstracted from banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data. Like city lights, receding."

Some 30 years later, our idea of alternate digital realities is still very much shaped by that initial idea. That

someone has to physically connect with a peripheral to see and interact with these worlds. It's the basis of the Oculus Rift and the new generation of VR gear that's getting rolled out for mass consumption.

But as William Gibson himself argued in a 2009 speech titled *Googling the Cyborg*, this fundamentally misses the point. We've already transcended the need for a bulky attachment strapped to our head. In 2016 we live inside an augmented reality that connects the physical with the virtual; it's just not the one we were promised.

As he explains, "The physical union of human and machine, long dreaded and long anticipated, has been an accomplished fact for decades. We tend not to see it, because we are already it."



A BRIEF HISTORY OF AUGMENTED REALITY

Augmented reality simply means a real-world environment that's been supplemented (or augmented) by computer-generated inputs such as graphics, video, sound, or GPS data. While the term augmented reality was first coined by researcher Tom Caudell in 1990, its origins can be traced back to the 1950s and 60s when patents for head mounted displays that overlaid visuals on top of real world locations first surfaced.





PLUG ME IN

In the original Matrix film, Neo has to access cyberspace with a crank shaft plunged into his nervous system. That imagery is straight out of Gibson's Neuromancer, and it's how many people view the eventual collision of real and virtual worlds.

According to Gibson, "It's easier to depict the union of human and machine literally, 'close up on the cranial jack please', than to describe the daily and largely invisible nature of an all encompassing embrace."

In the past, this was all pretty self-explanatory. After all, we inhabit the 'real world' and have the ability to access secondary, digital worlds via computers, or consoles, or suchlike. In the late 70s this may have meant a text based adventure on an Apple 2 computer, in the early 90s it was Mario running through the Donut Plains, and more recently it's the Witcher 3 and vast open worlds.

But those distinctions are starting to blur, and an alternative theory has been offered, one that rejects this 'digital dualism' in favour of a unified whole. It argues that there's no difference between atoms and bits; that they're one and the same, and that they provide the framework for a brave new world. One that overlaps the physical and the digital.

In other words, we don't need expensive VR headsets to experience alternative realities, we're already walking around inside them thanks to the intangible flow of data from our phones, TVs, laptops, cars, and fancy refrigerators. We might not see it, and for the most part we choose to ignore it, but that doesn't mean those invisible lines that connect people, places, and digital personas don't exist.

THE FUTURE WAS A FRIEND OF MINE

Technology is funny. We get so caught up in the big-ticket items, the flying cars, moon colonies, and hoverboards, that we tend to miss the small incremental shifts that really change our lives.

No one held a party for the launch of university intranets, dial up modems, or early web browsers, but they provided the building blocks for the future.

As famed science fiction writer Bruce Sterling explains in The Hacker Crackdown, this alternative cyberspace we've inadvertently constructed, is an extension of that same hazy timeline. It's one that we only tend to see in retrospect, because the future, the real future, rarely announces itself with a giant neon sign.

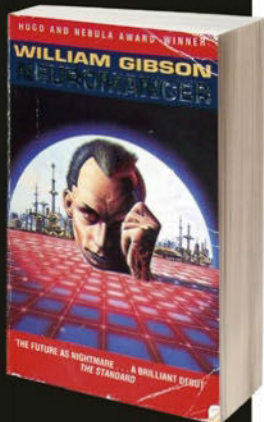
As he puts it, "Cyberspace is the 'place' where a telephone conversation appears to occur. Not inside your actual phone, the plastic device on your desk. Not inside the other person's phone, in some other city. The place between the phones. In the past twenty years, this electrical 'space', which was once thin and dark and one-dimensional - little more than a narrow speaking-tube, stretching from phone to phone - has flung itself open like a gigantic jack-in-the-box. Light has flooded upon it, the eerie light of the glowing computer screen. This dark electric netherworld has become a vast flowering electronic landscape. Since the 1960s, the world of the telephone has cross-bred itself with computers and television, and though there is still no substance to cyberspace, nothing you can handle, it has a strange kind of physicality

now. It makes good sense today to talk of cyberspace as a place all its own."

DATA FLOWS ON CITY STREETS

Mark Zuckerberg has a vested interest in virtual reality, what with Facebook owning a significant stake in Oculus and all that. But speaking at the Facebook F8 conference in April 2016, he was already looking beyond the horizon, to the sort of world William Gibson and Bruce Sterling probably discuss over pints.

As Zuckerberg explained in his keynote, "Over the next 10 years, the form factor's just going to keep on getting smaller and smaller, and eventually we're going to have what looks like normal-looking glasses that can do both virtual and augmented reality. And augmented reality gives you the ability to see the world but also to be able to overlay digital objects on top of that. "So that means that today, if I



Gibson's Neuromancer is regarded as the first cyberpunk novel

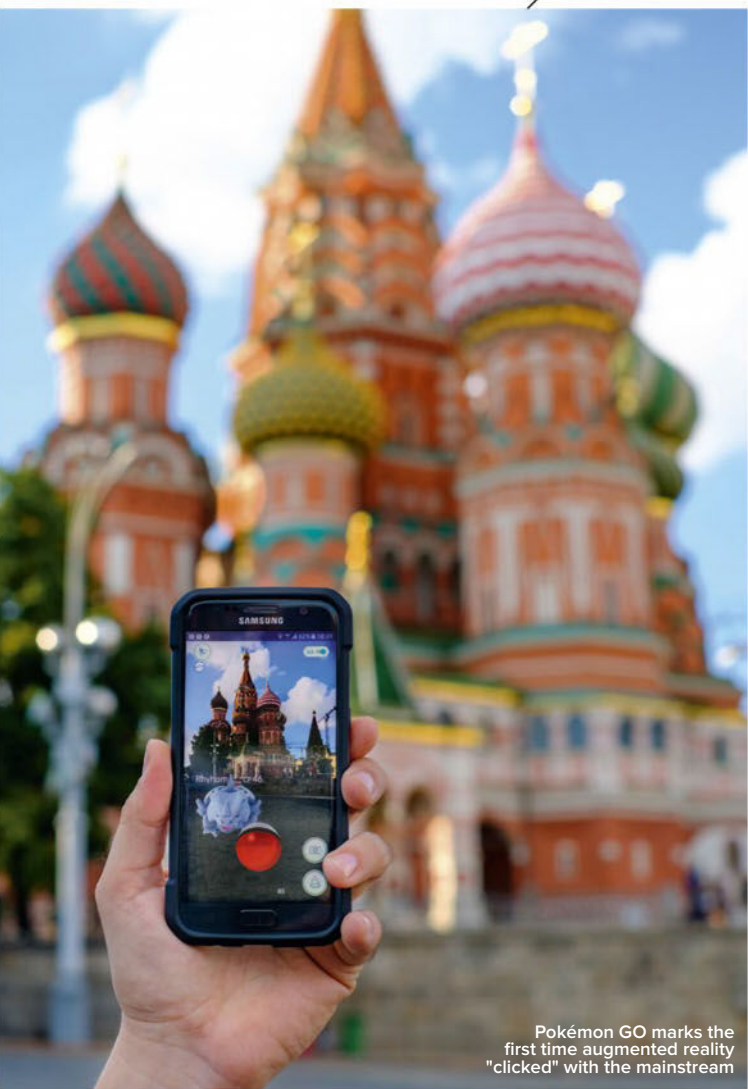
WE DON'T NEED VR HEADSETS TO EXPERIENCE ALTERNATIVE REALITIES... WE'RE AWALKING AROUND INSIDE THEM ALREADY



The Matrix's vision of VR seems almost quaint now

SEGA'S LATE 80S EXPERIMENTS

During the early 90s VR heyday, Sega decided to create its own headset for use with the Mega Drive. Prototypes were developed, games were announced (Virtua Racing!) and a 1994 launch was scheduled. This never happened, and Sega explained that the headset was actually "too realistic," and they were worried people might injure themselves. Which is a particularly optimistic spin, given most people familiar with the project described it as rubbish. (For more info, see "Peripheral Vision" on p.60.)



Pokémon GO marks the first time augmented reality "clicked" with the mainstream

want to show my friends a photo, I pull out my phone and I have a small version of the photo. In the future, you'll be able to snap your fingers and pull out a photo and make it as big as you want, and with your AR glasses you'll be able to show it to people and they'll be able to see it.

"As a matter of act, when we get to this world, a lot of things that we think about as physical objects today, like a TV for displaying an image, will actually just be \$1 apps in an AR app store. So it's going to take a long time to make this work. But this is the vision, and this is what we're trying to get to over the next 10 years."

Mark Zuckerberg obviously doesn't wear contacts, because his talk about AR/VR glasses is already quaint when you throw digital lenses into the mix, but you get the idea. Our worlds are colliding, and that distinction between the physical and the digital is slipping away much faster than many of us realise.

According to Gibson, it's a journey that we started in the last century, as the Cold War propelled innovation and technology. "By the 1950s the human species was already in the process of growing itself an extended communal nervous system, and was doing things with it that had previously been impossible; viewing things at a distance, viewing things that had happened in the past, watching dead men talk and hearing their words... And the real marvel of this was how

utterly we took it for granted."

If you need evidence of all this just reach into your pocket. A century ago the features, apps, and power of your smartphone would have been considered witchcraft. Or at the very least something out of a distant future; one where we all live on moon colonies and hang out with aliens at space ports like it isn't even a thing.

What we rarely stop to consider are all the algorithms, data, and infrastructure that allow our smartphones to play Pokémon Go, order an Uber, or geo-tag a location, and how this all interacts with the physical world to create a new, overlapping reality.

Pokémon GO found huge success by connecting the physical and the digital in a seamless fashion. It was probably the first time that augmented reality had 'clicked' with a mainstream audience. At the same time, it provided a fascinating insight into the complex, overlapping layers of data and information that envelope us.

Head into town on a Saturday afternoon and your average city streets is alive with social media posts, check-ins, geo-tags, blue tooth and Wi-Fi connections creating a web of data flow and digital worlds that we walk through in ignorant bliss.

This technology is only getting better and more integrated. Night Terrors, a new horror AR game currently in the works, utilises all this data to map out users home,

place ghosts within rooms, send text messages, and measure heart rate while people explore their suddenly quite terrifying surroundings. It's one of many games headed to market following the success of Pokémon GO.

WHAT'S REALLY REAL, FAM?

This all brings us back to what's real and what isn't. And while that philosophical debate is beyond the scope of this article, the interconnection of man and machine, physical and digital, and the future evolution of games and entertainment gives us plenty to think about.

As Gibson stated in his speech, "The electrons streaming into a child's eye from the screen of the wooden television are as physical as anything else."

It's a theory that's further expanded by Nathan Jurgenson, who writes on Thesocietypages.org that, "We are not crossing in and out of separate digital and physical realities, ala The Matrix, but instead live in one reality, one that is augmented by atoms and bits. And our selves are not separated across these two spheres as some dualistic 'first' and 'second' self, but are instead an augmented self... A physical body as well as our digital profile, acting in constant dialogue."

Jurgenson argues that this relationship between our physical bodies and our digital lives is ever growing, strengthening, and firming. And that the actions we take in one sphere are increasingly crossing over to the other. There's plenty of evidence to back his claims.

Second Life offers players an abstract world to explore and build, but when real estate in the

WE ARE NOT CROSSING IN AND OUT OF SEPARATE DIGITAL REALITIES LIKE IN THE MATRIX, BUT ONE REALITY AUGMENTED BY ATOMS AND BITS

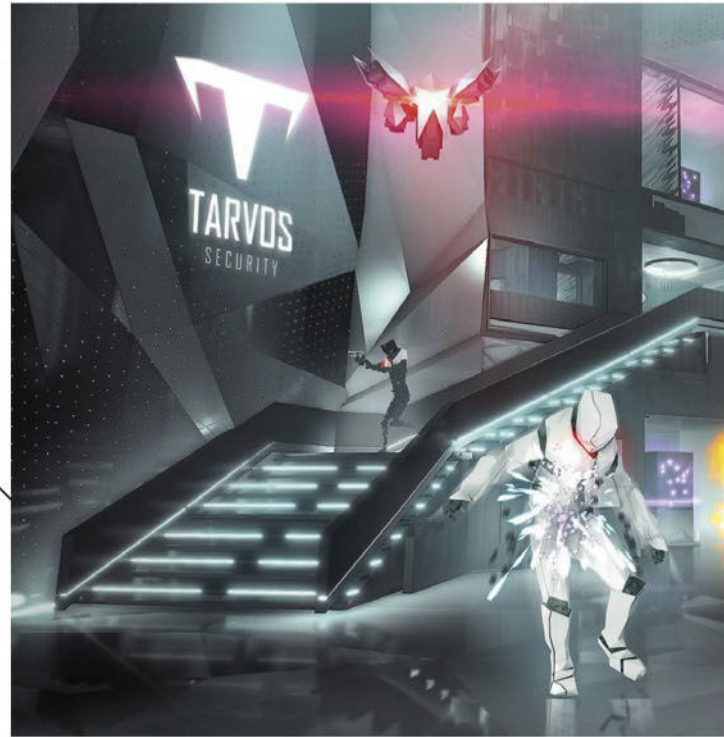
game began selling on eBay for hundreds of thousands of real world dollars back in the mid 2000s that divide between bits and atoms didn't seem to account for much.

Sony's failed experiment with Home on PS3 might not have attracted the numbers expected, but its advertising partnerships, and the ability for corporations to set up shop inside a digital world, felt like logical progressions.

Then there's World of Warcraft and the Chinese data mining farms it birthed. When real world factories are being set up to mine virtual goods to resell on the open market there's an inertia that can't be ignored.

As Sally A. Applin and Michael Fischer write in their paper, A Cultural Perspective on Mixed, Dual and Blended Reality, "The world has found a way to imbue itself within, around, underneath and on top of the Internet, and is indeed, currently in the process of expanding the Internet well beyond that which resides in machines."

The Internet of things, which promises to connect everyday devices like toasters and fridges to



SOMETHING ELSE TO PLAY

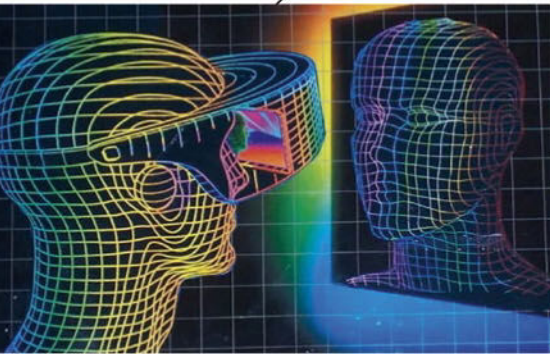
Pokémon GO may be the poster child for augmented reality gaming, but there's a bunch of other titles you can try once you catch them all. Zombies, Run! motivates you to keep going during your evening jog by placing a horde of undead on your tail. The soon to be released Nigh Terrors turns your home into a horror movie and looks genuinely creepy. Clandestine Anomaly has you battling an alien invasion in your neighbourhood by deploying offensive and defensive structures. And if you want to see where Pokémon GO had its start there's always Ingress, a massively multiplayer game with a sci-fi twist that was developed by the same company.



We live in a world increasingly augmented by digital technology



A preview of our own digital future, perhaps?



POKÉMON GO.

Since it launched Pokémon GO has had more installs than Tinder, and more daily active users than Twitter. Over 130 million copies of the game have been downloaded, and at its peak 45 million people were playing on any given day. Which just goes to show what the right mix of (aging) technology and pop culture can achieve.

an online network is already here, slowly meshing with our social media accounts, our smartphones, our geographic location.

All of this is much bigger, grander, more ambitious, and more fraught than anything that has come before. It has the potential to fundamentally change both our world, and our place within it. But then it's hard to see all this when you're caught in the eye of the storm, and as Gibson reminds us, "The Internet is the largest man made object on the planet."

MANKIND DIVIDED

Deus EX: Mankind Divided has attracted media attention for taking contemporary issues about race and identity and projecting them into the future with its 'Aug Lives Matter' teasers. Go beyond the clickbait headlines, and the game's premise offers a fascinating take on the future, and what might happen if our phones and gadgets become part of our bodies as bolted on augmentations.

If that seems far fetched just think about the advances in biomedical engineering already being showcased at the Paralympics, or the fact we had artificial hearts being successfully inserted into patients as early as 1952.

This drive towards connection certainly hasn't been smooth. Most recently, Google Glass crashed and burned under a wave of poor product design, nerd shaming, and very real

questions about privacy. But the push continues, and the once steadfast rules about what's real and what isn't are being challenged as mobs of people scour city centres in search of virtual monsters, digital real estate continues to sell for real world cash, and Sega uses a virtual idol to pitch shampoo products.

It's strange days indeed. And it's only going to get stranger. Within that context the arrival of VR seems almost dated. Like a throwback to a simpler idea - a primitive physical manifestation of a concept we hadn't quite worked out. And while it allows us to explore new worlds, it doesn't fundamentally alter ours, or our place within it.

Whether VR goes on to be the next big thing is still up for debate. But in the long run it may well be a footnote, or an evolutionary stopgap. Because the real leap forward, the one that may define the next century, isn't about visiting digital worlds, it's about merging with them. And whether we realise it or not, we're already barreling down that road.

As Hideo Kojima recently stated in an interview with Edge Magazine. "I think everyone expected VR would come first and then AR would arrive much later. But it seems as though, against all those expectations, and with the help of cellphones, AR will come to dominate before VR even has a chance." ❧



Seagate BarraCuda Pro and FireCuda

PERFORMANCE AND CAPACITY FOR A PERFECT GAMING RIG

If you're a die-hard gamer with a massive Steam library, Seagate's new Guardian Series range of HDDs, featuring the BarraCuda Pro and FireCuda drives, can help supply large amounts of cost effective storage.

A brand you may already be familiar with is BarraCuda, which has provided reliable, fast and value for money storage for over 20 years. If you've built a computer over that time, chances are you've installed a BarraCuda drive in your rig. The newest iteration of this classic brand is split into two models - the BarraCuda and BarraCuda Pro.

The BarraCuda Pro is the top of the line HDD in Seagate's Guardian Series, with 6TB, 8TB and a crazy 10TB of capacity available in a single drive. A massive 256MB cache is the star feature of the BarraCuda Pro,

providing a huge space for accessing frequent cuts down game load times.

PRETTY QUICK FOR A HARD DRIVE!

Thanks to the high density, 7200RPM and large 256MB cache BarraCuda Pro is one of the fastest HDDs on the market, achieving a maximum sustained transfer rate of 220MB/s.

The combination of speed and massive capacity means you no longer have to make the tough decision on which games to uninstall when Steam has their next sale. Just install whatever you want and play it on demand. No more waiting to download 7GB over ADSL because you ran out of hard drive space - just download the game once and keep it there. You've got up to 10TB, install everything!

Compared to a standard BarraCuda drive

// the BarraCuda Pro is one of the fastest 3.5-inch HDDs on the market



comes in sizes from 500GB to 4TB with up to 7200 RPM spindle speed and up to 64MB cache. Whilst not as speedy as the BarraCuda Pro, they're still excellent for cheap and reliable bulk storage of whatever media you keep on your PC - movies, TV shows or music. Seagate offers a 3-year warranty on the BarraCuda drives and a 5-year warranty on the BarraCuda Pro.

BEST OF BOTH WORLDS

SSDs may be all the rage, but if you're a die-hard gamer with a massive Steam library, you just can't fit all those games on a single SSD without paying thousands of dollars for a large capacity version.

This hybrid SSD and HDD is perfect for gamers who still want loads of space for all their games, but also require fast SSD-like loading times.

These combination SSD and HDD units are called SSHDs (solid state hybrid drive). The FireCuda is paired with a 7200RPM drive with a 256MB cache, so even if the data you need isn't on the SSD, it'll still be fairly quick to access, as opposed to the rather sedate 5900RPM drives with much smaller cache currently available.





The FireCuda combines an 8GB MLC SSD with 1TB or 2TB HDD so you can enjoy the best of both SSD and HDD worlds. Seagate provide a 5-year warranty on the FireCuda SSHD, giving you peace of mind that any trouble you face will be taken care of.

MAXIMUM PERFORMANCE

Performance on an SSHD is much faster than a standard HDD, with game load times 5x faster and boot times in seconds instead of minutes. An ideal application for an SSHD is in a small form factor gaming rig where there just isn't space for two drives, but you still want a fast, large disk for your games.

The main benefit of the FireCuda is that no setup or drivers are required to make full use of the SSHD features. It simply appears as a single, normal hard drive to any operating system. With a RAID setup, there's always setup or drivers required that can sometimes cause issues.

The FireCuda's Flash boost is automatically configured and arranged by the drive's on-board hardware controller. The FireCuda intelligently decides what files, applications and operating system components are accessed the most often and moves those to the SSD for quick access. It'll also move items back to the HDD if they're no longer required.

Both the BarraCuda and FireCuda storage solutions from Seagate are available now from your favourite PC hardware store. For more information on the entire Guardian Series of drives, visit www.seagate.com



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The Oculus Shift

JAMES O'CONNOR explores how virtual reality will change our actual realities

The Holodeck – Star Trek’s portrayal of virtual reality, which premiered in the 1974 Star Trek animated series episode ‘The Practical Joker’ – has served many purposes throughout the franchise’s life. Sometimes it’s used for recreation, for facsimiles of sports or for running through interactive narratives. At other times it has been used for forensic analysis, or incident simulation and training, or even for simulating the right sexual environment.

Virtual Reality, the kind promised to us by science fiction for years, is now more-or-less properly upon

us. As a gaming publication, Hyper (along with just about every other site and mag out there) has approached virtual reality headsets like the Rift and Vive as devices that will cause us to experience a greater sense of embodiment in games, that will allow for new experiences and perspectives. But virtual reality means a lot more than that – it’s already starting to change the way that people train for work, the way they learn, the way they experience the world.

Novus Res, a two-man VR development team based in Adelaide, realised earlier than most that VR was

going to have a lot of uses outside of game development. Working out of a small office in the middle of an open-plan shared work space (located within a church, as so many Adelaide start-up businesses are), brothers Matt and Luke Wilson have created a variety of programs and apps for different companies alongside the games they’re also developing. “Every day we get something from someone around the world, asking for something”, Matt says. “It’s been really good.” There are several fields, beyond games, where VR is going to make a huge impact.

IF YOU GO INTO A VIRTUAL MUSEUM... THERE'S NOT MUCH DIFFERENCE BETWEEN A CASE OF STUFFED ANIMALS AND DIGITAL ANIMALS, IS THERE?



James tests the lights in his new virtual house

EDUCATION AND SIMULATION

In Marge vs the Monorail, arguably the single best episode of The Simpsons, Lisa imagines a futuristic VR device that allows her to travel alongside Ghengis Khan and learn about his life. "You'll go where I go, defile what I defile, eat who I eat", he promises. This sort of thing is now pretty feasible, although there aren't likely to be many cannibal simulations currently in development.

The VR education-focused startups we reached out to declined to comment for this article (which



was, in fact, a bit of an on-going theme - it seems like a lot of companies out there are a bit cagey about what they're doing), but the guys at Novus Res outlined some of the potential benefits of VR for education and historical simulation. One of the team's projects is a recreation of Adelaide's old F1 track (Melbourne snatched away Adelaide's F1 glory in 1996), which allows users to do a lap of the old track from within a F1 car shell outfitted with a headset and wheel. The set-up is currently available to play at the Birdwood Motor Museum in South Australia. Thanks to force feedback in the wheel, the Wilson brothers feel that it's a good approximation, although the driving model has intentionally been kept relatively casual to account for the number of children who will be drawn to it.

The pair has been working on prototypes for museums; they've even created a full digital version of the International Space Station to explore. "We've build a virtual museum too, on the history of space flight", Matt told me. "It's a massive open space, with space shuttles, Saturn 5, all the rockets. We've recreated the moon landing site in one room. You can walk into another room and there's the Earth and the moon, sitting in this huge space." The pair believes that this technology will be huge for museums, and that more virtual museums are likely to pop up, where "you can do a virtual tour sitting at a table, as a tour guide leading you around the pyramids, or a space station". As Luke puts it, "if you go into a virtual

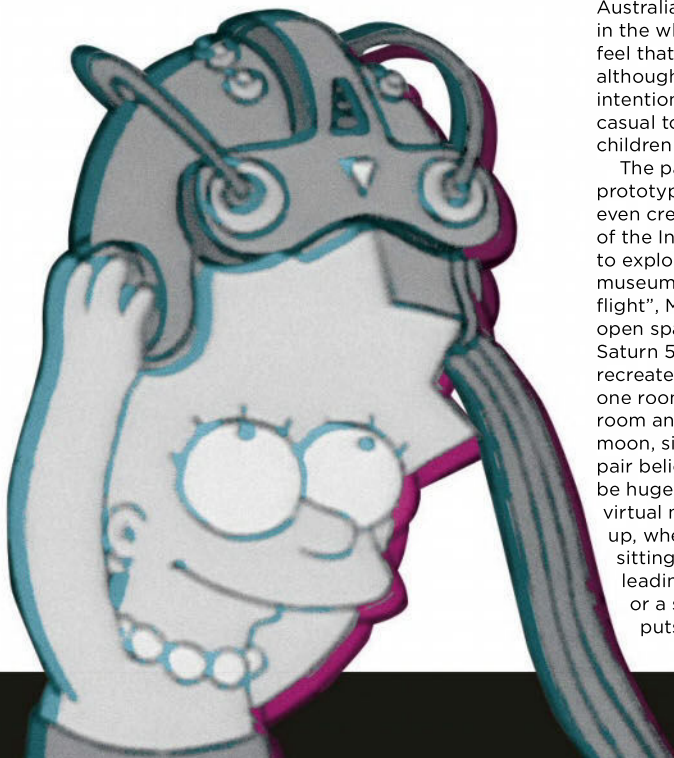
museum and a real museum... there's not much difference between a case of stuffed animals and digital animals, is there?"

THE WORKFORCE

On-the-job training can, in some fields, be very expensive and resource-heavy. Typically, training for many labour-intensive jobs that require the use of high-end machinery has required expensive simulation equipment, but VR training allows trainees to test out certain situations at a fraction of the cost.

Stan Rolfe of Barmingo, an underground mining company based in Western Australia, helped implement VR training tools into the company. The system, developed by Immersive Technologies (the world's leading producer of mining simulation equipment, most of it far, far more expensive than a VR simulation), allows the user to fulfil some basic training and learn more about the mines and their jobs within them.

"We've found retention rates of participants to be higher using VR than traditional training methods" says Rolfe. "There is the potential to conduct large scale training in short time frames. There's a reduced reliance on trainers and therefore lower long-term costs." Barmingo, an international company, is able to use these programs worldwide with a few language adjustments. "It also provides an excellent job preview for industries such as ours where there is no opportunity to go into an underground mine to experience it before accepting a job", he says. These training methods have proven





ISS CUPOLA EXPERIENCE

NOVUS RES 2016

very effective so far, and they allow the company to “immerse people into high risk scenarios without putting them at risk”.

Novus Res has also prototyped an app for a real estate company in Sydney, which allows users to explore a house design and change it on the fly. “It’s visualisation, basically”, Matt says. “You can walk through the entire house, check different paint schemes, move walls, change things and see what it looks like.” This isn’t the kind of thing that first-

medicine obsolete, VR technology may be helping with medical training and treatment. Medical training has long relied on donor bodies to test surgical procedures, and training equipment isn’t cheap; while things aren’t likely to drastically change any time soon, VR may introduce new and effective ways of training and testing potential surgeons.

At Flinders University in South Australia, researchers have designed a haptic pen that can be used in conjunction with a VR device to simulate simple medical procedures. Although the team involved was too busy for interviews, Matt at Novus Res gave me some information about it: “they created a little pen that was mounted on a rig, which had feedback. You work with an Oculus headset, and you can use it to perform a very basic little test. There’s haptic feedback for particular instruments. As you move your hand, the motors inside actually provide the feedback as if you were touching a body.”

Researchers in Canada have taken this even further. The CAE Healthcare NeuroVR is touted as “the world’s most advanced virtual reality neurosurgery simulator” on their website. The rig - which uses a Viewmaster-esque eyepiece system that can switch between a stereoscopic microscope view and 2D indirect endoscopic view - contains 30 different training modules, and can simulate procedures that are generally logistically difficult to train surgeons in, such as open cranial and endoscopic brain surgery. This is an updated version of a previous system that simply projected the results of your actions onto a screen; whether or not a more immersive VR simulation will actually result in improved surgical practices is yet to be proven.

VR could also be used in the diagnosis of and treatment of certain conditions, according to the guys at Novus Res. Luke explained that the pair had been talking about

VR training means not having to replace the forklift when a newbie drives it into a wall



IMAGINE TELEMEDICINE; YOU’VE GOT A SPECIALIST AND A PATIENT WHO AREN’T IN THE SAME CITY, BUT THE PATIENT CAN PRESENT TO THE CAMERA AND GET HELP

generation VR devices are likely to get absolutely perfect, but it’s a great example of the way VR can affect jobs where concepts are often difficult or expensive to visualize. The two brothers have also been working diligently on training tools for government employees, which aim to educate workers on immigration affairs and practices.

MEDICAL

While we wait for those healing pods from Neill Blomkamp’s Elysium to come along and render modern



TERMINATOR SIX, OR SEVEN, WHATEVER THEY’RE UP TO NOW

Back in May, Disney unveiled Jimmy, a robot outfitted with air-water actuators that allow it to make eerily human movements. Jimmy is controlled by a person wearing an Oculus Rift, who is able to see the world through his robotic eyes. When the robots take over, keep in mind that there might still be humans controlling them.



NeuroVR: "the world's most advanced VR neurosurgery simulator"

developing an app for optometry, which could help to isolate ocular issues. "We can already do vision training, especially for younger people", says Luke. "Making eyes work better through repetitive actions. But we're also looking into changing the way you can actually see. Basically, you can render the world however you want to with these devices. It's mimicking what a lot of high-end optometry machines do, but it's more accessible."

"They're using it to treat certain conditions", says Luke. "People who have issues with how their brains are wired, who can't read people's expressions, who can't understand empathy... you can put them in this for a couple of hours a day and train them how to recognise things. The brain is very plastic. You can retrain it. So you show them faces and have them interact with a virtual character, and you explain to them what this situation is, what that little facial movement is. It's like a brain training little exercise, but because it's immersed, it has more impact."

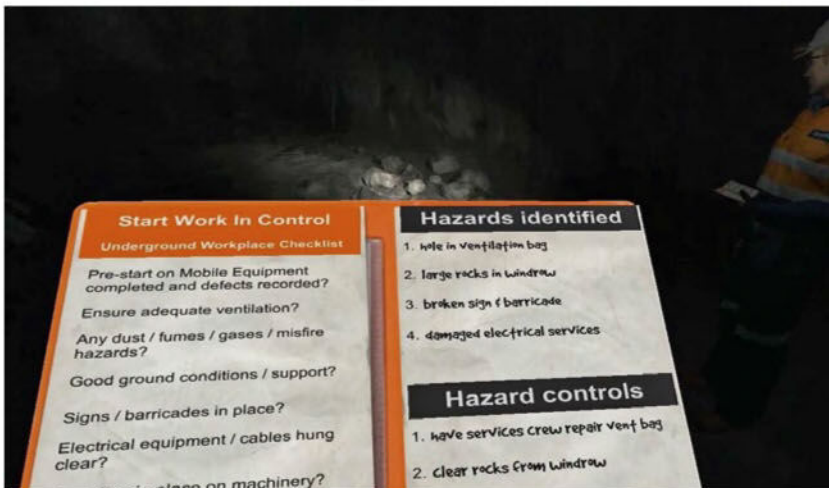
There are also applications that help people who suffer from autism to learn without the distractions of the environment around them. "People who suffer from autism suffer from all the noise, everything gets in the way", Luke says. "With VR you can isolate them, focus them. "

Some of these benefits, the pairs concede, are still somewhat theoretical, but medical researchers are investing more and more in the idea of VR being important for future treatments and procedures. Luke likes to imagine a future where the Internet in country Australia allows for easier access to doctors: "Imagine telemedicine; you've got a camera out in the surgery, a specialist and the patient aren't in the same city, but the patient can present to the camera and get help."

FILM

At the time we spoke, Matt and Luke had been working on a 360-degree camera for a year and a half. "The other side of what we do", Matt told me, "another exciting side of VR, is 360-degree video." The two brothers had constructed a 360-degree camera, which films events in real time - "no stitching, in real-time, and outputs directly as a standard video file". It's a system that allows you to feel like you're directly participating in the scenes that play out in front of you.

The guys showed me a short film they'd created for a local theatre production called 'Cold as Ice'. The entire second act of this play is a VR film, in which every audience member dons a headset and finds themselves sitting in a party that a notorious



Training in a virtual mine is a lot cheaper and safer than the real thing



CONSERVATION EFFORTS

Australian researchers are using virtual reality to bolster conservation efforts by making it possible to 'visit' troubled areas without needing to actually physically travel to them. Queensland University of Technology and the Lupunaluz Foundation have put together an Oculus app that stitches together a 360-degree explorable section of the Amazon that can be used to demonstrate an area where the local jaguar population is under threat, which will help to predict their movements and decide on conservation strategies.



VR films like *Gnomes and Goblins* give the audience control of the camera



VR theatre is already a thing – who's up for a bit of Virtual Hamlet?

meth dealer shows up at. The head movements of the other characters in the scene indicate for the audience which ways they should be looking, but they're free to crane their neck in any direction. It's an interesting premise – filmmaking where the director has little control over the camera's actions. This is something filmmakers have experimented with before (Lars von Trier let a computer dictate his shots when filming *The Boss of it All*), but VR filmmaking requires a different sensibility.

This technology will, eventually, let you do the sort of virtual boardroom stuff we've seen in *Star Wars*, *Deus Ex*, and every other science fiction saga ever made. "You can Skype in real-time", Matt says. "You could be in Sydney with a headset on, we set the camera up, it's like you're right here in the room. Once the NBN rolls out, that sort of thing becomes doable. It might be a while before it takes off in Australia, though. "There's a larger bandwidth requirement – about five times larger than standard video."

VR filmmaking is a growing industry. Like with games, a lot of VR directors are veering towards horror (*Eye for an Eye*, a VR film about a séance that will release on Halloween, looks particularly spooky). It'll be a while before we see this sort of thing in cinemas, but even the more lo-fi VR devices we're seeing now – like the Samsung Gear VR and Google Cardboard – are well suited to VR films.

The other form of VR filmmaking – the one that might, ultimately, break through and enjoy mainstream acceptance – is porn.



FUNNY LITTLE GREEN GHOULS

VR filmmaking is starting to attract attention in Hollywood as well. Jon Favreau (*Elf*, *Iron Man*, *The Jungle Book*) is currently working on '*Gnomes and Goblins*', a HTC Vive cinematic experience that he has compared to lucid dreaming. It will allow users to visit a tree village filled with the eponymous creatures.





LONG-DISTANCE NETFLIX AND CHILL

There are some VR applications that simply allow two people to feel like they are inhabiting the same space at the same time. AltspaceVR, for instance, allows you to feel like you're catching up with your long-distance partner or your overseas friend, albeit virtually. It might not totally replace Skype dates, but it's something.

VIRTUAL SEX

The very first issue of Hyper is best remembered for its article on virtual sex, which was a controversial enough notion to get the magazine lambasted in Australian parliament. In 2016, virtual porn is very much a thing. While the Black Mirror episode 'The Entire History of You' may have warned us that increased realism in sex simulation could lead to intimacy issues, the pornography industry has

good reason to embrace this new technology. "Free tube sites have caused many studios to go under and quality has suffered" says Ian Paul of Naughty America. "The adult industry needs to raise the bar to get people to pay again and VR is the best way to do that."

Naughty America's VR pornography positions the user as someone involved in the scene, on the receiving or giving end of whatever the camera has filmed. "We are experimenting with being an observer, but there are challenges in streamlining the production process when doing that", Paul says. "You can't look through the VR camera rig like you can a traditional camera, so it requires us to predefine the distances between the camera and the actor. There is a lot more risk of incorrectly filming the scene when you position the camera as a third-party observer."

There have been some complaints from users that the participatory nature of VR porn can be extremely confronting, particularly when your partner in the scene isn't someone you are attracted to, but it seems to be succeeding at bringing in new customers, with Paul calling the growth rate "exceptional".

There are, in fact, several unique challenges making this kind of content. Paul acknowledges that they're still working on making content that women can enjoy as well, and that their test videos haven't been hugely successful. "Some women commented that since the woman whose perspective you assume is quiet and isn't making any noise, they wondered whether

she was actually enjoying it or if she even consented to it", he says. "Since that feedback, we began having the woman make approving noises. We know that we can't film male-style porn from the female perspective and expect it to drive sales from women."

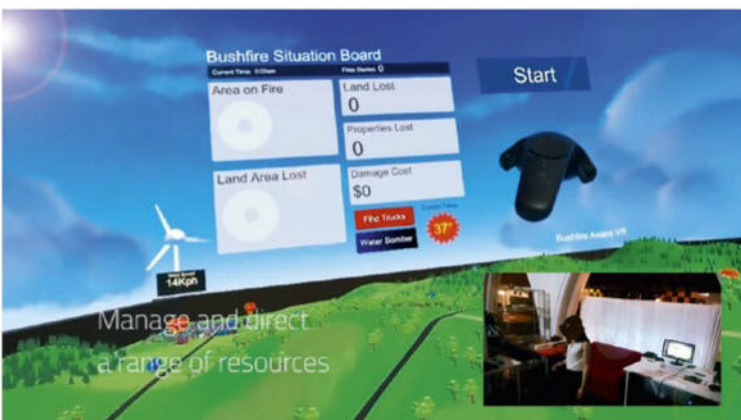
There is often talk of new forms of content delivery being bolstered by pornography – it was widely reported that Blu-Ray won out over HD DVD because of the availability of Blu-Ray porn, for instance – but in this case, it might be the other way around. Pornhub has added a virtual reality portal to its site, while various digital plug-ins have become available that allow for further sensations during virtual porn, some of which could, in theory, allow you to simulate sex long-distance with a partner.

While there are arguments, of course, that all of these new developments will lead to less personal intimacy, in some cases they may allow partners to engage in experiences that they cannot otherwise due to distance or health or other issues.

VIRTUAL WORLD

"A lot of people are saying that games will drive VR", Matt Wilson ponders, "but we think that'll be maybe 20-25% of the market once it's up and running. There's going to be so many applications that have a big impact." Current estimates state that, within the next five or so years, the VR industry will be worth around \$150 billion. We may not have actual Holodecks just yet, but VR is going to change not only videogames, but the world around them. ☞

Sims like Novus Res' Bushfire Aware VR can help save real lives



WHEN THE LIGHTS GO DOWN

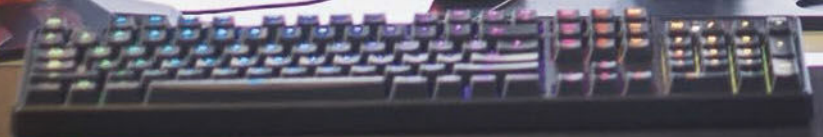
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What do we do when Augmented Reality bleeds into 'real' reality?

JOHN ROBERTSON has caught 'em all

The image of a 21st-century human staring into their phone screen is nothing new. Ever since Apple released the original iPhone in 2007 our species has adopted smart phone devices as a new limb. We see it as the gateway into something bigger than what we can physically perceive in front of us. It's our connection to the wider world, a comfort blanket linking us to absent friends and family, retail therapy, and social media narcissism. It's a young invention, but its presence has changed the fabric of society dramatically and to the point where much of our modern existence relies on its functionality.

Evolution is not limited to the organic, with our relationship to the device altering cultural norms as technological advances open new avenues to explore. The smart phone, and the interactions it allows, has changed the fabric of our lives and how we approach and appreciate it. Dating apps have drastically altered what we think of as normal when it comes to meeting new people, taxi hailing services are disrupting the entire automobile industry, and shopping apps continue to undermine high street retail. Given the prevalence and success of voice calling systems

that use the ever more efficient and expanding mobile internet infrastructure, some economists are even predicting the imminent end of traditional phone calls.

Smart phones are not just forcing us to rethink how we take advantage of them, they're forcing us to rethink what we consider existence. In 2016, no app has highlighted the active power of these devices more succinctly and successfully than Pokémon GO. Unless you've just emerged from an extended stay in a sensory deprivation chamber, in which case all of the above is going to be news to you, you'll know that Pokémon Go uses augmented reality to bring Pokemon into existence in the world as viewed through your phone.

As per the franchise's TV shows and "traditional" videogames that preceded it, Pokémon GO uses the 'Gotta Catch 'Em All' tagline to tempt you into travelling around our world to capture all of the different species of pokémon. The success of the idea highlights just how deep-seated the legacy of earlier Pokémon products is in our culture. This is an app played by millennials the world over, it is not merely a children's toy, and it's this legacy that has created the enormous



GOLD IN THEM HILLS

Pokémon GO developer Niantic Labs was formed in 2010 as a startup enterprise within the Google umbrella of companies, becoming fully independent in October 2015. The company is named after the Niantic, a ship that ferried treasure hunters to San Francisco during the Gold Rush of 1849.

FEATURE

number of people that refer to themselves as Pokémon Trainers.

The speed and widespread nature of the app's success is causing a problem, though. Society has simply not been able to keep pace with the cultural changes that Pokémon hunting in the real world has brought with it and, as such, friction between users and non-users of the app has existed since the day it launched.

One of the high-profile examples of the cultural behaviours promoted by Pokémon GO having an unwanted effect in reality involves the US Holocaust Memorial Museum in Washington DC and the volume of trainers that descended on the building seeking to catch new pokémon. The foot traffic was generated by the existence of a Pokéstop within museum grounds, a location marker placed on the app's real world map that provides players with free in-game items such as Pokéballs. Lures that tempt pokémon to the area can also be attached to a Pokéstop. Understandably, the museum was hardly impressed by what it saw as visitors undermining the significance of the location by turning up to catch colourful, imaginary animals.

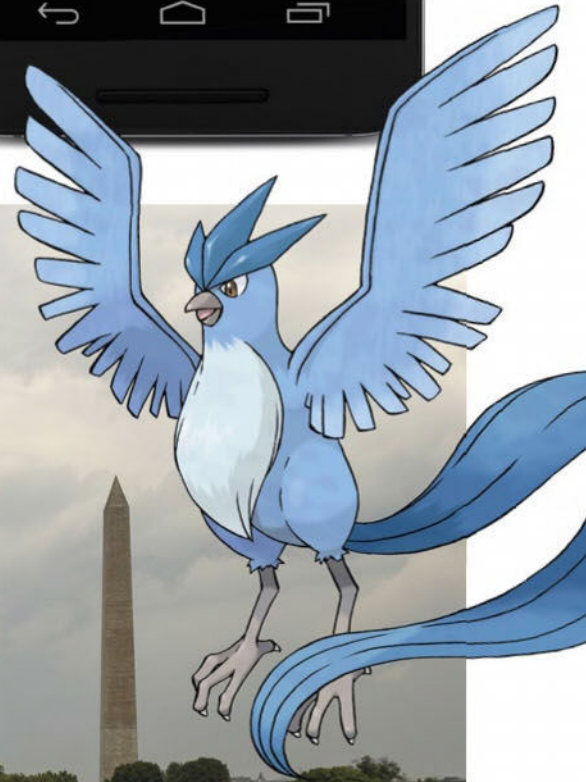
Pokémon GO developer Niantic Labs listened to the complaints of the Holocaust Memorial Museum and has since removed the Pokéstop, but the case is by no means isolated. Over 30 Pokéstops dot Japan's Hiroshima Peace Memorial, as well as three 'gyms' in which players can battle each other with their pokémon. Again, Niantic has removed these locations from the game, but not before thousands of players had already flocked to the site as a prime area for catching new pokémon to add to their growing collections.

Auschwitz, Sydney's Anzac Memorial and Arlington National Cemetery are also on the list of locations that have voiced distaste over the visits of Pokémon Trainers.

Whilst Niantic seeks to address such complaints, the slow response begs the question of whether or not a creator can ever remain in full control of something that grows so big so quickly. Upon launch Pokémon GO was popular to the point that it caused enormous pressure on the servers it uses to connect players to the augmented reality world they're moving through. In turn, this server load became the priority fix for Niantic and issues such as showing



Boorish behaviour like this tarnishes the reputation of all Pokémon GO players



CANDY CRUSHED

Upon release in July 2016, Pokémon GO set a new record for most downloads in the first week of an app appearing on Apple's App Store. Within a week the app had 21 million active players in the United States alone, eclipsing the peak of 20 million enjoyed by Candy Crush Saga.



Note how the entire rest of the world fades blurrily into the background



sensitivity to historic locations took a backseat. As is so often the case with stories of rapid growth and success, it's entirely possible that Niantic didn't realise that Pokémon GO would even cause the kinds of concerns raised by Auschwitz and the Hiroshima Peace Memorial.

With Niantic racing to stay on top of such complaints whilst also making sure its creation worked for the users it needs to attract and engage in order to turn a profit, it makes you wonder whether the game is controlling Niantic or if Niantic is controlling the game. In just the same way, is Pokémon GO controlling the actions and desires of its players, or are the players actually in charge of the game they're playing?

It's a tough psychological and philosophical question to grapple with, not least from a deterministic perspective. If you're only taking a trip to the Holocaust Memorial because you've downloaded Pokémon GO, then are you genuinely in charge of your own actions and motivations? You might think that you've chosen, completely independently, to make that trip, but would you have made it without the app tempting you there? As such, where does your life and your

life in the game begin and end? Maybe they're now the same thing?

This is the kind of question that could be applied to any game, whether on your smart phone or not. Would one choose to level up a Fallout 4 character if one didn't own Fallout 4? No, of course not. Therefore, Fallout 4 is in some part controlling the thought processes that dictate how one chooses to spend the time they have.

However, the question of free will has more weight when applied to Pokémon GO because the act of playing it alters the life and actions of those without any interest in it and, therefore, the game is also playing a role in the lives of these non-players. The team at the Hiroshima Peace Memorial wouldn't have been forced to spend their time protesting Pokéstops if Pokémon GO didn't exist. The inward looking Fallout 4, conversely, doesn't have this kind of social impact.

Augmented reality of this kind creates a second nature to the reality that everyone jointly experiences, the disconnect between the two causing problems for all involved. In this second reality, how are the rules - legal and ethical - enforced?



Can they even be enforced when the second reality in question is as big and popular as Pokémon Go?

Washington DC's Holocaust Memorial might have the status needed to have a Pokéstop removed, but private individuals don't tend to have the same voice. Disgruntled residents around the world have been highlighting their irritation at the fact that their homes and neighbourhoods have become epicentres for hunting pokémon, with some individuals reporting that hundreds of Pokémon



TFW when you've been chasing pokémon literally all day and now you have no idea where you are

GO players arrive throughout the day searching for new captures. The volume of people is accompanied by pollution, littering, and even attracts entrepreneurial types selling supplies to the crowd.

Niantic has a system set up to allow for the reporting of Pokéstops located on private property, but that in itself is not necessarily a foolproof plan for preventing players encircling a house in search of loot and pokémon. A Pokéstop might be located in a park flanked by houses, or at a bus stop on an otherwise quiet residential road. The Pokéstop is not on 'private property' but the disturbance effect of having hundreds of players congregated in the middle of the night is the same for nearby residents as it would be if the Pokéstop was right on top of them.

Then there's the issue of the lone pokémon that exist throughout the world independently of Pokéstops. If you get word that that one pokémon you've yet to catch has been seen in the garden of a house down the street, are you not going to be tempted to make your way there and catch it? After all, you've gotta catch 'em all.

The question here, then, is one of ownership. Home owners own the physical bricks and mortar of their house, but do they also own the virtual space that Niantic has created around that? It's a question that hasn't been asked before and, again, given the meteoric rise of Pokémon GO, it's one that society isn't in a position to answer yet as the legal framework doesn't exist.

If Niantic decides that Pikachu is so common in your area that they're regularly found wandering about your kitchen, are you in a position to challenge that? Given that catching pokémon requires you to physically visit a place to do so, the act of hunting augmented reality creatures

is akin to searching for something physical. Just as you would have to enter a building to find a hidden gold coin, you have to enter a building (dependant on its size) to catch a pokémon. The virtual world created, then, takes on a very real meaning in our physically perceived world.

Such complications are surely only going to become more common as other products, inspired by Pokémon GO's success, seek to harness augmented reality technology to grow their own brands, deliver more fans and followers, and generally increase visibility. For instance, should we all start wearing augmented reality glasses that are connected to the internet and do away with having to play the likes of Pokémon GO through our phones, what's to stop our houses being bombarded with virtual advertising boards?

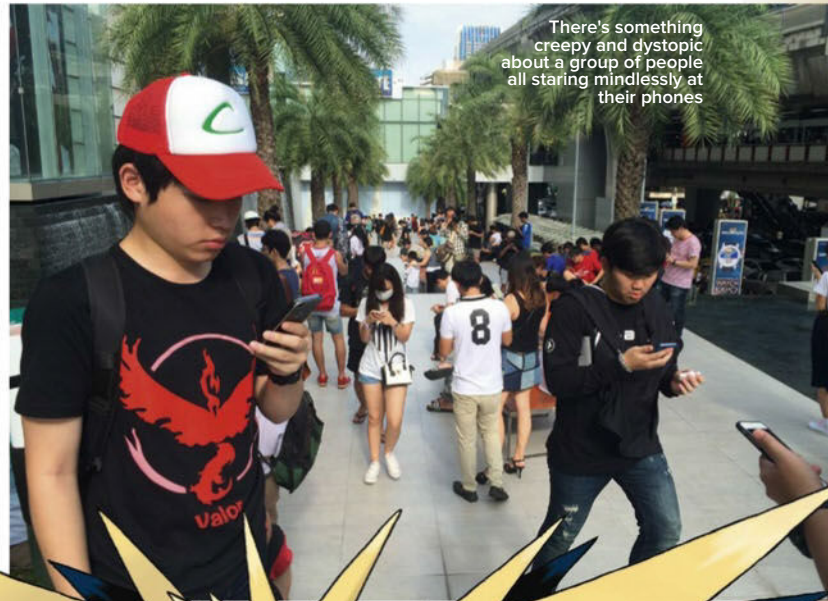
If your house can be seen clearly from a busy road junction or frequently crowded area such as a sports stadium or shopping centre, would advertisers be able to print their own virtual advertisements across your house? Do you own the virtual space around your house, is it sold separately (and by who) or is it free for anybody to do as they please with? Perhaps more pertinently, would advertisers be able to deliver augmented reality advertisements to you in your own house? These questions relate directly to Pokémon GO in that the app has become the catalyst for serious discussion to take place around them. Niantic has forced the world to sit up and take notice of the increasingly blurred lines between the real and the virtual.

More nefarious advantages have already been found for taking advantage of the blurring of lines caused by Pokémon GO's augmented reality system, with criminals setting lures at Pokéstops in order to attract



A MATTER OF NATIONAL SECURITY

A number of countries have voiced concerns over Pokemon Go as a threat to their national security due to the collection of information from players, not least location-based data. Russia and Egypt are amongst the highest-profile nations on this list, although national security centres from all over the world - including the Pentagon in the US - have banned the game on their property.



There's something creepy and dystopic about a group of people all staring mindlessly at their phones

GOING VIRAL

The popularity of Pokémon GO resulted in 1.1 billion mentions of the game on Facebook and Instagram in its first month of release. Both Hillary Clinton and Donald Trump have made mention to the app in their US Presidential campaigns.



Who owns the virtual "space" around real world property?



looking to commit a robbery, then, Pokémon GO is a powerful tool as, at the very least, you know those seeking out lured Pokéstops are going to be in possession of a relatively modern smart phone. You don't have to go looking for the right kind of victim, they come to you.

Niantic isn't necessarily to blame for this use of their technology, but the studio is certainly part of the chain that leads to its possibility. In just the same way that an automobile company is not always at fault when someone driving one of their cars causes a traffic accident, Niantic isn't always responsible for a mugging orchestrated with Pokémon GO. The difference, though, is that society has laws and regulations detailing standards for vehicle safety, how cars can be used, and how pedestrians should act around them. These kinds of laws do not exist for services that seek to create a whole new reality through which to experience the world and until that changes the likes of Pokémon GO will remain fertile ground for this kind of debased criminal activity.

Those that dismiss Pokémon GO as a fad might be right, but the cynicism of the disregard misses the point and the importance of the game when it is considered as a cultural artefact. It raises so many questions as to how augmented reality might change our

and it's on the list of most important games ever.

Even once the fad is over the legacy will continue in the form of debates that surround the inevitable avalanche of similar apps, games and technology that are just around the corner. Pokémon GO is by no means the first augmented reality game to be released, with Niantic itself having cut its teeth on 2012's Field Trip - a location-based app based on finding "unique things in the world around you". They released Ingress soon after, an augmented reality MMO. FourSquare, too, is based around many of the same principles of travelling to real-world locations and interacting with other users of the app.

Pokémon GO is in many ways a simplified variation of those precursors, the key difference being the coupling of the technology with such a beloved franchise as a means to generating initial interest. It has set the blueprint for how to engage people from societies all over the world, of all ages and genders, with such earth-shattering success that the ripples from its rise will continue to be felt for years to come. The question now is whether society is ready to alter the way it functions in order to harness the power created when our perceived reality is no longer limited to a single plane. «

Peripheral Vision

Consoles and virtual reality share a surprisingly long and tumultuous history. Here's DAN STAINES with the highlights.



Power Glove

Based on the much more sophisticated (and expensive) VPL Data Glove, the Power Glove is a combination motion-controller and NES control-pad.

Two ultrasonic speakers embedded in the glove take turns transmitting inaudible bursts of sound to three receivers placed around the television. By measuring the amount of time between transmission and reception, the system can detect (using complicated maths) the position of the Power Glove in space, specifically its yaw and roll.

So you'd put it on and move your hand around and it would translate to on-screen action. Nintendo's marketers conjured imagery of real-time fistfights with virtual martial arts

masters and 1:1 recreations of sports like fencing and golf. The reality was quite different.

Made with cheap components, the Power Glove seldom functioned as intended. Input lag was a constant, frustrating companion, while the system's sound-based positioning system proved unreliable at best, rendering motion controls all but useless.

As is typical of failed peripherals, Power Glove suffered for lack of supporting software. Although all NES titles were technically compatible with it, only two games made to take advantage of its unique features: Super Glove Ball, a clunky puzzler developed by Rare that played a bit

like a 3D Arkanoid, and Bad Street Brawler, an excruciating beat-em-up made by Australia's own Beam Software. That was it. Two other games – Glove Pilot and Manipulator Glove Adventure – were announced, but quietly cancelled when it became clear the Power Glove had bombed.

And bomb it did. Originally released with an RRP of \$75.00 USD, the Power Glove was savaged by the media and received with total indifference by the public. Within weeks of going on-sale, retailers across America and Japan were heavily discounting it. Within a few months you could get one for 20 bucks, brand new. When production was discontinued in 1990, total global sales were just shy of 100,000.

Sega VR

Two years after the Power Glove bombed, Sega announced it was working on a head-mounted display (HMD) for its popular Mega Drive/Genesis consoles. Featuring dual LCD screens, stereo headphones, and inertial sensors to track head movement, the HMD was scheduled for a 1993 launch, would cost 200 bucks American, and would come bundled with a port of Virtua Racing.

To keep the HMD affordable, Sega's engineers were forced to use low-quality components. Lag was abysmal and the display's low resolution rendered even very simple scenes

a blurry mess, causing testers to complain of nausea and headaches. For all Sega's ambition – some might say hubris – there was simply no way the Sega VR would live up to the hype without a very large price hike. The tech simply wasn't there yet.

So they canned it. The official spin was that the experience was too realistic, and Sega was concerned that people might, like, hurt themselves or neglect their real-world



responsibilities or something.

In addition to the Virtua Racing port (which was released by itself later on), four games were in development before the hammer finally fell: the hovercraft combat sim Nuclear Rush, Desert Strike rip-off Iron Hammer, a Snatcherish cyberpunk adventure called Matrix Runner, and Outlaw Racing, an arena racer in the vein of Rock'n-Roll Racing.

Virtual Boy

The Virtual Boy wasn't Nintendo's idea, at least not originally.

In 1990, Massachusetts based Reflection Technologie developed a stereoscopic 3D display and began looking for a partner to turn it into a marketable product. Barbie-maker Mattel was the first to decline, followed soon thereafter by Sega, whose executives – abortive VR project still fresh in mind – worried that the monochromatic, low-resolution display would cause headaches and motion sickness. Reflection then approached Nintendo.

Gumpei Yokoi was intrigued. Having found enormous success with his Game & Watch and Game Boy designs, Yokoi was looking for the next big innovation that would cement Nintendo's position at the top of an increasingly competitive marketplace. He figured Virtual Reality was just the ticket, and – undeterred by the technology's obvious limitations – began working on a prototype of the Virtual Boy in 1991.

Development was long and difficult. Regarded as something of a bastard child by Nintendo's higher ups, the Virtual Boy project did not receive as much funding and manpower as the company's other projects, with resident auteur Shigeru Miyamoto consumed with what would eventually become the N64.

To keep the unit affordable, Yokoi opted to keep Reflection's monochromatic red display, but ditched the head-tracking out of concern it would cause (even more) motion sickness. Instead, goggles were mounted on a heavy bipod designed to be placed on a flat surface. A controller not unlike the N64 pad was plugged into the goggles and powered the entire unit with six AAAs housed in a detachable battery pack.

By 1995 the Virtual Boy had begun to take shape, but was not – in Yokoi's opinion – anywhere close to a complete product, ready for market. Nintendo management disagreed, releasing the Virtual Boy in Japan on July 21 for 15,000 yen. A month later it was released in the US for \$180 USD.

Bossman Hiroshi Yamauchi confidently predicted it would shift 3 million units in its first year.

Not even close. Word quickly spread that early adopters were complaining of nausea and headaches. Nintendo was compelled to admit that the device could cause permanent eye damage in children under seven. Every fifteen minutes the unit would remind you to take a break to avoid hurting yourself. The launch line-up was abysmal, with only four thoroughly uninspiring games available: Mario's Tennis, Red Alarm, Teleroboxer, and Galactic Pinball. These would be joined by ten more titles over the course of the Virtual Boy's lifetime, only one of which – Virtual Boy Wario Land – approaches playability.

And so in December 1995, a mere six months after its debut, the Virtual Boy was quietly discontinued, selling a total of only 770,000 units worldwide. Gumpei Yokoi – who didn't want to release it in the first place – was forced to leave Nintendo under a cloud of shame. He was killed in a traffic accident two years later.



MAXX NECK STRAIN

The Victormaxx Stuntmaster Headset was a monoscopic colour HMD for the Mega Drive and Super Nintendo released in 1993. Retailing for around \$200 USD, the Stuntmaster's head-tracking mechanism consisted of a plastic rod that dangled from the side of the visor so that when you turned your head the rod would hit your shoulder and tell the computer which way you're looking. The problem was that the rod wasn't especially sensitive, meaning you'd sometimes be forced to thrash like a crazy person to make anything happen. This was exactly as enjoyable as it sounds.

Activator

Another wildly ambitious project, the Activator was built with the same technology as the light harp, an esoteric high-tech synthesiser popularised by Jean Michel Jarre. The Activator substitutes controller buttons for infrared beams of light, which it projects in an octagonal ring around the player. To press a button, you'd break the corresponding beams with something – usually a hand or foot.

It was advertised by Sega as a full-body motion controller, with commercials depicting Mortal Kombat-style kung-fu duels where every punch and kick was mimicked by your steroidal avatars. Bullshit, of course. It became clear within minutes of using an Activator that it was a glorified and cumbersome control-pad.

Assuming the thing worked at all. Light harps are notoriously sensitive

instruments at the best of times, and the Activator was a cheap knock-off, made with inferior parts that would stop functioning with only the slightest provocation.

Unless it was set up in a pristine cube purged of furniture and other obstructions, one or more of the Activator's "buttons" would periodically stop working. This made accomplishing even very simple tasks – like navigating an options menu -- exhausting ordeals as players were forced to repeatedly punch and kick the air in the vain hope of getting something to register. Forget Mortal Kombat fights: just selecting a character was hard enough.

The Activator wasn't just a bad controller, it was a broken controller most of the time as well. Small wonder it was discontinued not long after release.



EyeToy

The EyeToy is where Sony's journey to PlayStation VR begins. A webcam coupled with computer-vision and gesture recognition software, it was a "controller-free" controller designed to translate movement, colour, and sound into in-game action. Punch the zombies! Kick the soccer balls! Humiliate your family! You get the idea.

Bundled with a collection of multiplayer mini-games designed to show off its capabilities, EyeToy was an immediate and enduring success, selling over 10 million units in its lifetime and spawning two progeny: PlayStation Eye for PS3 and Camera for PS4 (see p.64 for more on those).

Sony succeeded where Nintendo and Sega had failed. Why? Price was an obvious factor: at just \$70 for the Play bundle, EyeToy was affordable enough to pique the interest of the general public. Also, unlike the Power Glove or the Activator, the EyeToy *worked*. It wasn't perfect: the 640x480 resolution meant that it sometimes had trouble distinguishing anything but sweeping gestures, but it

worked and the games were fun. Sort of. For a little while.

Sony also had the foresight to dedicate a first-party studio – SCE London – to developing games for the device, ensuring a constant stream of new content for it.

In 2008, SCE London and Nike partnered up to release EyeToy Kinetic, a fitness training program featuring virtual trainers who'd shout vapid encouragement while you debased yourself in front of the camera's pitiless glare. This was a full three years before Nintendo released Wii Fit, which was much the same idea but with a bespoke balance board instead of a camera.

Unsurprisingly, and unfortunately for Sony, the product that doesn't require the user to look at themselves straining to do basic exercises ending up being way more popular.



**A WEBCAM
CAPABLE OF
COMPUTER-VISION
AND GESTURE
RECOGNITION,
EYETOY IS
WHERE SONY'S
PLAYSTATION VR
JOURNEY BEGINS**

Wii

The Wii is the most successful home console Nintendo has ever produced, selling over 100 million units in its lifetime and igniting an immersive technology arms race that is only now reaching its zenith.

It's chief innovation was of course the Wii Remote, or Wiimote: the wand-like motion controller that uses light sensors and inertial sensors to translate movement into input. But what really sold the Wii was Wii Sports: a small collection of addictive sports-based mini-games designed to get people used to using the Wiimote.

Who didn't love Wii Bowling – if only for a little while? Who didn't

make little Mii versions of a hated boss or colleague and then beat the shit out of them in Wii Boxing? The appeal of Wii Sports was that it required almost no explanation: you don't need to know anything about videogames to know how to roll a ball or throw a punch. Sure, the Wiimote wasn't super accurate, but it was close enough for broad, repetitive gestures like a golf- or tennis-swing.

There's a lesson here for Sony and Microsoft (and Oculus and Valve and etc.): technology by itself is never enough. Without a killer app to demonstrate their strengths to the mainstream, PlayStation VR and Hololens will be dead in the water.



Playstation Move

When Sony announced PlayStation Move at E3 2009, it was hard not to be cynical. By this time the Wii was selling more than Xbox 360 and PlayStation 3 combined, and it was all down to a feature Sony (and Microsoft) had written off as a pointless gimmick: motion-control. Now here was Sony's Jack Tretton enthusiastically spruiking the PlayStation's own motion-controller - a wand similar to the Wiimote, but black and capped with a coloured sphere that looked like an iridescent afro.

Again: it was hard not to be cynical. But Sony's wand had something the Wiimote didn't: the PlayStation Eye. Successor to the EyeToy and built using better versions of basically the same technology, the Eye sports a higher resolution and framerate than its progenitor, as well as a wider field of view and greater sensitivity to movement. Used in conjunction with Move, it recognises the colour and size of

the controller's afro, which it combines with data from the wand's internal sensors to accurately calculate its position in space. The result is smooth and responsive motion tracking superior to the Wiimote's - superior even to the Wiimote with MotionPlus add-on.

(To illustrate this fact for yourself, simply grab a copy of Sports Champions 2 and try out the boxing - you'll see that it's much more responsive and satisfying than the Wii Sports version. Same goes for tennis, which is actually pretty fun.)

In 2013, Sony announced a successor to the PlayStation Eye: the imaginatively titled PlayStation Camera for PlayStation 4. With two 1280 x 800 motion tracking cameras, an even wider aperture, and better depth and movement sensing capabilities, it and the Move wands form the core of the four piece tech ensemble that is PlayStation VR.



Playstation VR

Here's what you need to dive into VR on your PS4. First and second, there's the PlayStation Camera and Move controllers - the latter recently rebranded and re-released as the PlayStation VR Move Twin pack. Then of course there's the HMD, which sports a 5.7 inch 120hz OLED display and inertial sensors for accurate, responsive headtracking. Finally there's the PlayStation 4 itself - or if you want an optimal VR experience, the PlayStation 4 Pro.

There's little doubt that PSVR is a robust bit of kit. The (reasonably) high-res OLED display keeps visual artefacts like motion blur and jaggies to a minimum, while Move controllers (in combo with the cam) afford accurate and responsive motion-control - a must for truly immersive VR. The downside is cost: \$550 for the HMD, \$110 for the Move wands, \$90 for the camera, and - assuming you don't already own one - \$430 for a PS4 or \$560 for the Pro. Total cost for the complete PSVR experience: \$1200, give or take.

Whether the price is worth it will depend largely on the games available. So far Eve: Valkyrie and Until Dawn: Rush of Blood are the most promising launch titles, and in the immediate future we have Star Wars: Battlefront: X-Wing and Resident Evil VII to look forward to. What's lacking is a Wii Sports: mini-game collection PlayStation VR Worlds (which you can buy as part of a PSVR bundle) is a good start, but enough to convince people to spend over a grand on hardware? We're sceptical.



Kinect

With hardware developed by an Israeli computer-vision firm and software hewn by Microsoft's very own Rare, Kinect represents the Xbox's big play for the lucrative casual gaming market snared so successfully by Wii. Taken on its own merits, it's an extremely cool bit of technology: a motorised motion-tracking camera with accurate face and gesture recognition capabilities, all for under \$200 Australian.

The Kinect's great advantage over its Sony-made competitors, the EyeToy and Eye, is that its vision is 3D: using a low-frequency laser, it scans the room in front of it, using the reflections to construct a depth map that is married to footage captured by the camera. Voice-recognition software allows you to bark orders at AI companions and access system functions with simple voice commands.

With a \$500 million USD marketing campaign behind it - more than Microsoft spent on marketing the first Xbox - Kinect sold 80 million units within four days of hitting shelves, setting a Guinness World Record in the process. Microsoft was so chuffed with its success that it resolved to make an upgraded Kinect a mandatory

component of the Xbox One, adding an extra \$100 to the console's already hefty price-tag.

As you might expect, this was not received well by the hardcore gaming crowd or enthusiast press, a sentiment reflected in the One's poor launch performance. Eventually, after it became clear that consumers hated it and developers weren't going to support it, Microsoft backpedalled and released a version of the One without the Kinect, effectively putting the device out of its misery in the process. Oh sure, the Kinect is still around, it's still there... but it isn't alive. The unblinking eye has shut for good.

MICROSOFT WAS SO CHUFFED WITH ITS SUCCESS THAT IT RESOLVED TO MAKE AN UPGRADED KINECT A MANDATORY COMPONENT OF THE XBOX ONE

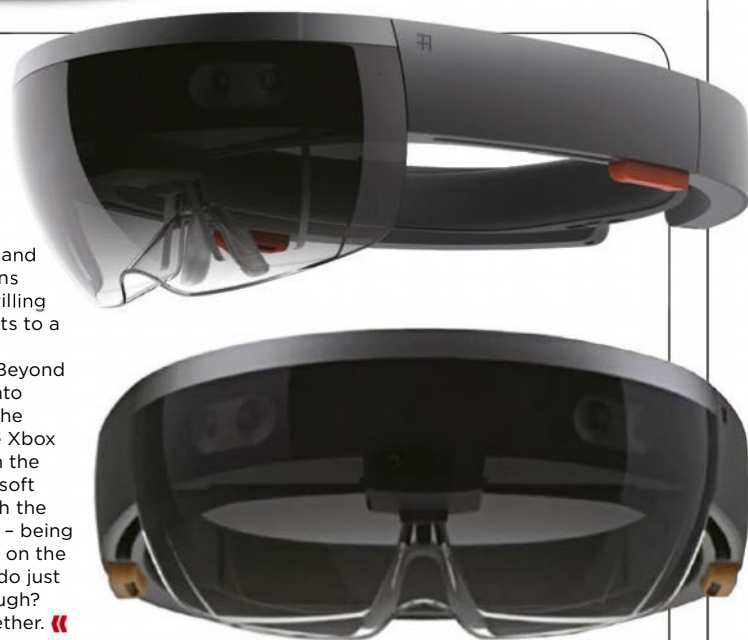
HoloLens

It's a bit inaccurate to include the HoloLens in a feature about VR peripherals because it is a) not a VR device, and b) not a peripheral. It's a "mixed-reality" headset that uses a complex and expensive array of custom-made chips, sensors, and projectors to superimpose holographic images on the environment around you. Interacting with projected images is achieved with gaze, voice, and tap commands, the latter being the real-world equivalent of a mouse click.

The potential commercial, artistic, and educational applications of this technology are obvious and exciting, but gaming remains something of an open question. The E3 2015 Minecraft demo was an impressive piece of theatre but an unconvincing

demonstration. It's one thing to look at the cool 3D hologram projected on your tabletop, quite another to meaningfully interact with it - and it's with the latter that HoloLens evidently struggles. Are you willing to pay \$3000 for what amounts to a really cool display? Is anyone?

We'll have to wait and see. Beyond the ability to stream games onto a virtual TV, it isn't clear how the HoloLens will interact with the Xbox One. What is clear is that, with the Kinect dead and buried, Microsoft needs something to distinguish the One from its competitors, and - being the only mixed reality headset on the market - the HoloLens would do just that. Making it affordable, though? That's another question altogether. ❧



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VR is a needy little nerd

Today's VR kits aren't exactly cheap, with a minimum cost of around \$1100 for Australians, but there's another, hidden cost - the PC required to run it.

You see, VR needs to run games at extremely high refresh rates/frame rates of 90fps, all on a screen that is 2160 x 1200. In case you didn't know, that's damn demanding. Developers of the first range of VR games have overcome this issue in two ways: firstly, HTC and Oculus have put in place relatively demanding hardware minimum specs, which we'll look at in a minute. Secondly, the first round of VR games all have extremely minimalistic graphics styles. We're talking low resolution textures (if textures are used at all - some games just use flat colours), low detail environments, and overall low polygon counts. There are games on the original PlayStation that outshine the current crop of VR titles.

There are a few VR games that are simply converted 2D games, but to run them in VR with the minimum specs requires dropping the graphics options dramatically. If you want to run them the way the devs intended, you're gonna need serious grunt.

This is going to become even more of a problem as we see VR games mature. Right now the vast majority are quite simplistic, short demos with simple graphics that on the rely on technology's novelty to remain interesting. But as VR develops, we're going to start to see much more ambitious games with more detailed, lifelike characters and environments.

We've already seen this in early previews of the next generation of VR games. For example, The Unspoken from inFamous developer Insomniac Games features a level of detail far in excess of today's VR games, yet is apparently due later this year. No wonder it was running on a PC with a GeForce GTX 1080. This issue of increasing hardware demands will become exacerbated when the second generation of VR headsets drop, probably sometime in 2017, because they'll sport 4K screens. So to really futureproof your PC for VR, you're going to need something that can run 4K at 90Hz - OUCH.

With that in mind, let's look at what will do for now, and what will be VR proof for the next couple of years. Get your credit card ready - you're gonna need it.

PROCESSOR

Currently both the HTC Vive and Oculus Rift Consumer Version 1 have extremely similar hardware requirements in nearly ever regard. This begins with the CPU, with both companies recommending an Intel i5-4590 (\$289) or AMD FX 8350 (\$248) or better as the base line CPU. However, we'd go a step up to the Intel Core i5 6600 (\$315), which has a 3.9GHz Turbo Speed compared to the 3.5GHz Turbo speed of the 4590. Having said that, VR is much more reliant upon the GPU than the CPU, but spending an extra \$20 is easy to justify.

MOTHERBOARD

This depends on whether you're going Oculus or HTC. HTC only requires a single USB 2.0 port or better, while Oculus is much more demanding. To run the Rift you're going to need a minimum of 3x USB 3.0 ports plus 1x USB 2.0 port. Youch. For many people this is going to require a motherboard upgrade, or at the very least a new PCIe card that adds extra USB ports, which can be picked up for around \$20.





MEMORY

It's here that the only major difference in the specs between the Vive and Rift exist. The Vive needs just 4GB of memory, while the Rift doubles this to 8GB. However, RAM is so cheap these days that we'd again suggest going above the baseline and getting 16GB. It won't just help for VR, it'll also make your PC better at multitasking.

GPU

It's here that things get... icky. Once again the recommended specs for the Vive and Rift are basically identical, with the minimum spec being an Nvidia GeForce GTX 970 or Radeon R9 290 (\$240) or better. AMD is tackling this market with its new "affordable" Radeon RX 480 (\$369) but at this price in Australia, it's worse value than Nvidia's competing GeForce GTX 1060 (\$320), which is

approximately 10-15% faster in most applications.

AMD claims there will be 200 million VR headsets in consumer's hands by 2020, which we think is optimistic to say the least, and they want the RX 480 to power most of these. We've tested the 480 with most of today's VR games, and it does a fine job... to a point. Fire up a demanding game like Project Cars or Elite: Dangerous, then crank the detail settings up, and performance dives well below the 90Hz required for a comfortable viewing experience. Even the GeForce GTX 1060 doesn't have the horsepower required to run more detailed games in VR mode.

We're going to go out on a limb here and suggest Nvidia's new GeForce GTX 1070. Yes, it's crazily expensive with the cheapest one being \$639, but it's the only card we think that can handle the next generation of VR games with ease. A huge plus Nvidia has over AMD with VR is its

Simultaneous Multi-Projection (SMP) technology, something that AMD lacks. Instead of having to render the scene twice, once for each eye, it simply puts two in-game cameras into the scene. This can improve VR performance by between 50% and 100% in best case scenarios, making Nvidia the card to have for serious VR experiences.

CONCLUSION

As you can see, today's minimum specs really are that - a bare minimum. They're fine for the tech demos masquerading as games found in the SteamVR and Oculus Stores, but once we start to see real, AAA, detailed VR games, running on higher resolution headset, the performance bar is going to go through the roof. You can buy cheaply enough now to run the basic games of today, but we suggest spending that \$500 extra to ensure your VR machine is good for at least another couple of years.

Make your PC VR-ready



If you're reading this, chances are you've already got a PC gaming rig stashed away somewhere in the house. That doesn't necessarily mean it's ready for VR gaming though, as we've shown that VR demands some serious horsepower. We're going to show you how to make your PC VR ready, in the most affordable way possible.

1. UPGRADE THE GPU

If you're rocking anything less than a GeForce GTX 970 or R9 290, you're not going to be able to get the frame rates necessary to keep the experience smooth and judder free – instead you'll be on a one way journey to pukerville. The cheapest VR-ready GPU on the market at the moment is Gainwards GeForce GTX 1060, which is currently retailing for around \$320. Not only does this have the sheer grunt for VR, it's got NVIDIA's SMP technology to deliver a huge performance increase when

used in VR mode when compared to AMD's devices.

2. UPGRADE THE CPU

Considering how slowly CPUs have evolved over the last four or five years, we're guessing your gaming system's CPU should be ok. The minimum required by both systems is an i5 4590, but that equates to something as old as an i5-2500k that has been overclocked to 4GHz – we're talking about a five year old chip here. However, if your CPU really is so decrepit that it can't match the minimum specs, you're going to have to go for a new one, and the cheapest one that is VR ready is AMD's . We'd consider trying to overclock your existing CPU first though – you may still get the warning at the start when playing VR games, saying your system isn't up to spec, but we've played on such systems with nary a stutter or belch.

3. USB

The HTC Vive isn't too bad, but the Oculus Rift simply devours USB ports. If you're packing an older motherboard, chances are you won't have the three USB 3.0 and one USB 2.0 port required for the Rift, but don't throw out that motherboard yet. It's possible to pick up a USB PCIe card for about \$25 that will give you four brand-spanking new super-fast USB 3.0 ports. Problem solved. Another option is to get a single USB 3.0 port and buy a USB 3.0 hub to split it into four ports, though we're not sure it'd have quite enough bandwidth to support everything that the Rift requires. As such, the PCIe card seems to be the safer option.

4. HDMI ADAPTOR

If you've got an older graphics card that is still extremely powerful but lacks any form of HDMI support, don't worry about having to buy a new card. Simply grab a Dual DVI-I to HDMI adaptor from your local Jaycar for about \$10 and you should be good to go. You'll also find that the Vive is slightly more forgiving when it comes to HDMI needs; it's good to go with HDMI 1.3, while the Rift requires HDMI 1.4.

5. HDMI PASS THROUGH CABLES

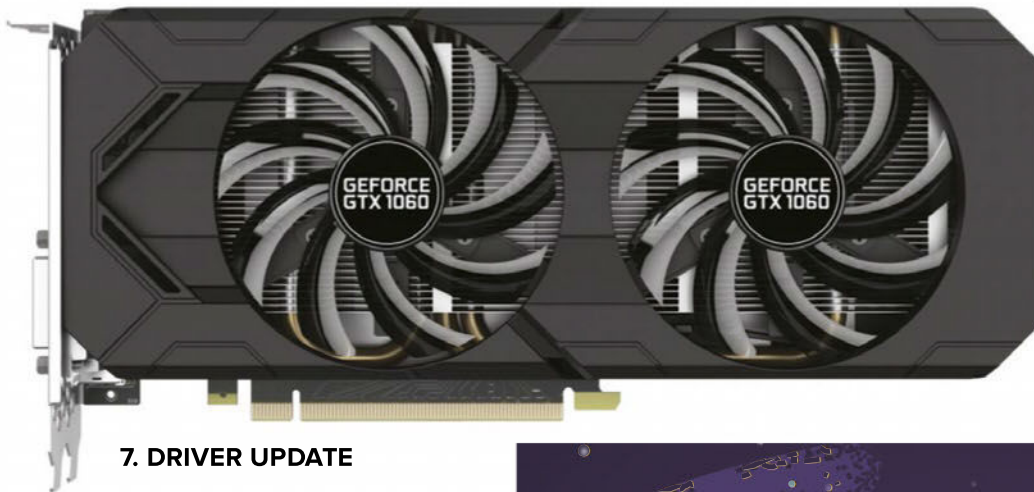
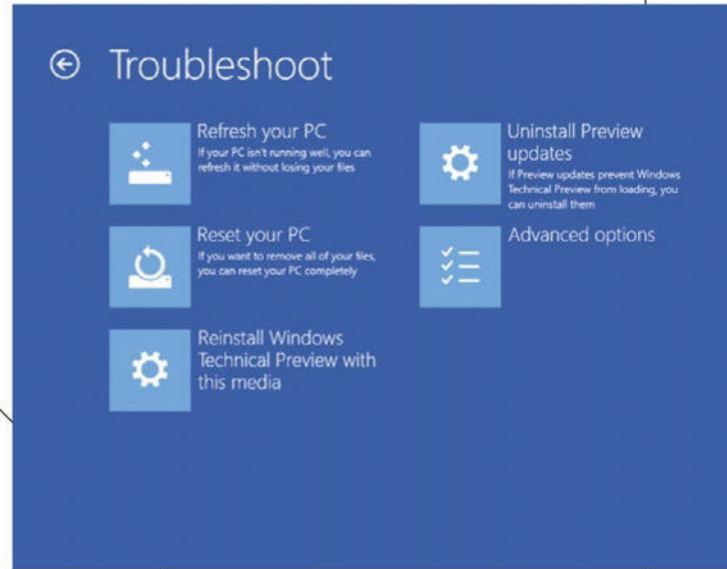
This is less relevant with the Vive, which has a breakout box that brings all your HDMI and USB cables to the front of your AV case. However, the Rift requires you to bring your HDMI and USB cables to the rear, which is where pass through cables can come in handy. These attach to the HDMI port at the rear of the card and then pass internally through the front of your PC, and are usually attached to a plate that fills your optical drive bay, allowing you to have HDMI ports on the front of your case.

This is why a lot of case makers are now also including HDMI ports on the front or top of their new case designs, to make it easier to connect HDMI. It also means there's a lot less risk of damage if you pull the cable too hard – pull it while it's connected to the rear of the case and there's a good chance you'll damage the HDMI port. Give it a yank while it's connected to the front and it should just pop out without wreaking havoc.

6. CLEAN IT UP SLACKER

Most PC users are guilty of letting their PC build up with bloatware over a year or two before doing a full system format, and this can impact performance by 20% or more. If you're going VR and find you don't have quite enough performance, first try giving your PC a thorough cleanout with malware and virus detector applications.

If that's still not good enough, do a full, clean Windows reinstall – you'll be amazed at the difference it can make to game performance when your system is really dirty.



IF YOU'RE ROCKING ANYTHING LESS THAN A GEFORCE GTX 970 OR R9 290, YOU'LL BE ON A ONE WAY JOURNEY TO PUKESVILLE

7. DRIVER UPDATE

Nvidia and AMD are constantly working on improving VR performance given its highlight in the media and the drive to sell their products, so upgrade your graphics card drivers as often as possible. In fact, many VR games will refuse to run unless you update your graphics card drivers, so just do it, ok?

8. CLEAN YOUR ROOM UP

Not to get all motherly on you, but you'd be surprised at how even stationary VR kits like the Rift require quite a lot of space around the user. Remember those old warnings that would display before Wii games, telling you to move stuff out of the way lest you knock it over? Well this is doubly true for VR games. So make sure your chosen VR play area is well clear of objects that you can bump into - we're talking at least a metre of extra space from the boundary of your VR area to the objects such as tables, chairs and walls.

Trust us, you don't want to bust your expensive motion controller in the middle of a particularly hearty sword fight.

9. DO IT IN THE DARK

To get the ultimate VR experience, we recommend playing in the dark. This results in less light spillage into the HMD, leading to a vastly more immersive experience. It's not like you need to see what you're doing right, so you might as well?



PortaVR

HP, Zotac and MSI all had VR backpacks on show at this year's Computex. The concept is simple. Today's VR headsets are all tethered to a PC via a large USB/HDMI cable, which means two things: it's incredibly easy to get tangled up in the tether and trip over, smashing your face into your computer desk. Secondly, you're limited in the extent that you can walk away from the PC hosting the VR kit, tied via a giant, heavy umbilical cord. This cord also adds neck strain, as it delivers weight to the rear of the HMD.

The answer to this is the VR backpack, which is basically a mini-PC inside a backpack. Both HP and MSI had special backpacks that were designed specifically to ergonomically hold a specially built PC inside, so that the user is completely comfortable while the backpack was in use. HP's Omen X used an extremely thin design that looked almost like a laptop that straps to your back. It's got a belt with twin batteries, and they can be swapped when they run out. Detach the straps and it becomes a powerful desktop PC.

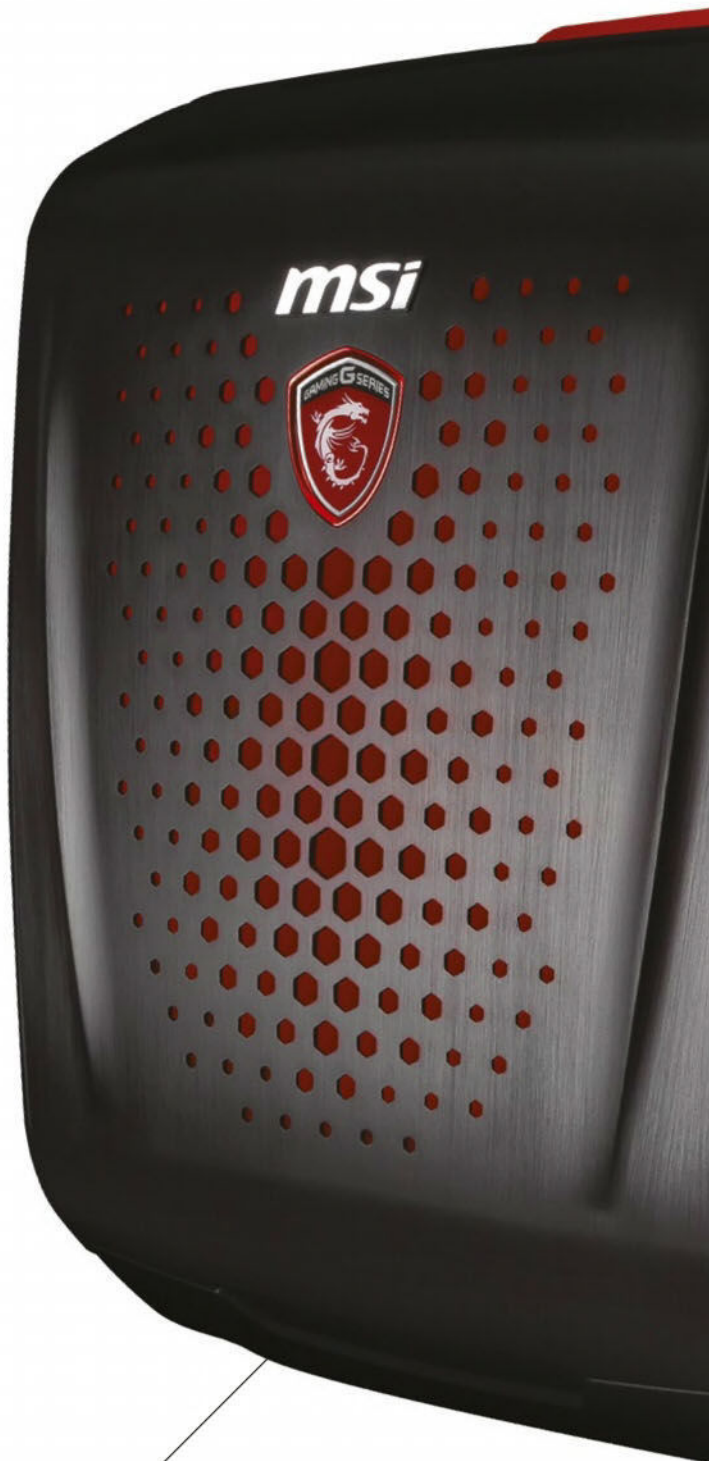
Meanwhile MSI went with a larger design that incorporates more powerful hardware - an i7 and GTX 980 to be precise (we're guessing the 980 will be swapped out for a 1080). It's significantly bigger than the HP due to the better hardware. There was no word on swappable batteries though.

Finally, Zotac went with the simplest design, simply chucking one

of its mini-PCs into what looks like a regular backpack. Battery life is rated at a mere two hours, so hopefully it's swappable. Sadly they didn't release any information about specs or weight before we went to print.

To be frank (*Hi Frank, I'm Ed! - Dad Joke Ed*), we think the idea of VR backpacks for home users is frankly ridiculous for a few reasons. Firstly, the Oculus Rift is actually designed to be a stationary device (though the release of Touch might come with room-wide tracking), so it's not an issue if the cords aren't long enough to track across your entire house. Secondly, the maximum space supported by the Vive isn't exactly huge, so there's no need to be able to walk around a warehouse or your home with a VR backpack. They're also going to be rather heavy - much heavier than the tether currently required by VR headsets, and they'll make it much easier to accidentally step outside of the Virtual playspace offered by the Vive, leading to more accidents.

Where we can see these being awesome is in warehouse sized virtual experiences, such as the Aussie Zero Latency. Because having a 200 metre tether is untenable, we can expect to see VR theme parks start to use these backpacks. But for home users, a simple hook in the ceiling used to hang your tether from is a much cheaper, simpler and far more sensible idea than a VR backpack.



MINI-VR PCS

Now this idea makes far more sense to us, for two key reasons. Firstly, most people will probably want to set up their VR rig in the living room, and having a giant ATX tower next to the TV isn't exactly attractive. Secondly, because so few people currently have VR, many owners are keen to take their headset over to friend's places - I can't believe how many people have asked me to do so. I'm happy to bring the VR kit, just not my 15kg gaming PC.

There were a number of mini-PCs on show at Computex that were all rated as VR ready. In fact, the mini-



Unless you're opening a theme park, Mini VR PCs make more sense than a VR backpack

ITX form factor has just reached the perfect point for today's VR experiences. It's possible to stuff a GTX 1080 and high end i5 or i7 into a box the size of a shoebox, weighing just a few kilograms.

In fact, mini-ITX was arguably one of the most popular computer case sizes at Computex, partly for this reason. The entire Fractal booth was setup with high-end, custom built systems housed in its hugely successful Define Nano S case, a mini-ITX case that has room for all of the VR-ready hardware you could need, plus a hand-built water cooling loop. CoolerMaster also showed off ATX cases with HDMI 2.0 ports at

the front, perfect for those who want to hook up their VR kit to the front of the case. However, it seems that VR-ready Mini-ITX cases are going to be hugely popular in the future, and that's where we'd place our bets.

PC-FREE VR

The next step in VR is to build Head Mounted Displays (HMDs) that don't actually require a PC. They'll have all the necessary hardware built into the headset, and Samsung's Gear VR is the first example of such a device. This uses a smartphone instead of a PC, and while the experience is rather rudimentary to say the least, it's the

first step towards PC-free HMDs. While not strictly a VR headset, Microsoft's HoloLens Augmented Reality headset also has all of the hardware built into the headset... which probably explains why it's likely to cost over \$2500.

With the likes of John Carmack focusing on delivering VR powered by smartphones, and companies like NVIDIA designing GPUs that will go straight into a HMD, the age of the PC-free VR experience is inevitable. Just don't expect it to come for another five years or so, and for the experience to be nowhere near as spectacular as a VR HMD tethered to a powerful PC. ☞



Virtual Home Video

DAN STAINES remembers the bad ones

If you'd like to see some genuinely good movies about VR, consider any of the below:

- Tron (only the first one)
- The Matrix (only the first one)
- The Cell (debatably)
- Strange Days (a must)
- Existenz (a must)

I love bad movies. I love to watch and mock them with friends. Films about VR, particularly ones made in the 90s, make especially good fodder. For every Matrix and Strange Days, there are like five hundred Lawnmower Man 2: Electric Boogaloo's, and – because I'm a giant dork – I've seen at least 499 of 'em. Here are three that I remember being particularly heinous.

The internet tells me that *Arcade* (1993) was written by David S. Goyer, who you might recognise from his subsequent work on the similarly amazing and not at all ridiculous Superman movie, *Man of Steel*. The story follows Alex Manning (Megan Ward): a normal suburban teen who, following the death of her mum, becomes sullen and rebellious. One day, Alex and her friends (one played by a teeny-tiny Seth Green) are hanging out at an unusually dank and grimy arcade when a slimy businessman invites them to try out a new VR game he's testing: *Arcade*.

But whoops, turns out *Arcade* was somehow made with the braincells of a dying child (who is also, confusingly, named *Arcade*) and now the game is sentient and out of for revenge.

After one of Alex's crew is trapped in the game, a Tronish "we're in the computer now!" rescue attempt commences; but in place of Tron's timeless gridwork VFX, substitute kids running on the spot in front of what looks like an ugly fantasy version of the Windows "brick maze" screensaver. For a long time I thought *The Langoliers* (1995) was the worst example of early 90s CGI committed to film. I was mistaken.

Starring *Terminator 2*'s Edward Furlong and Frank "Richard Nixon" Langella, *Brainscan*'s (1994) premise is a dark and troubling one: what if a videogame... came to LIFE? And what if when a videogame came to life, it took the form of a leering Shadowrun reject who introduces himself by playing some Primus on your bitchen three-disc stereo? And what if this ugly weirdo told you to kill? What then, hotshot?

Well, if you're Edward Furlong's character, you go and murder a bunch of people, including a stranger, your best friend, and the girl next door with whom you're creepily infatuated. Except you don't because, as you find

out when Detective Frank Langella bursts through the door and shoots you in the chest, none of this really happened, it was all just a game. Or WAS it...?

(It was.)

Denzel Washington reportedly took the lead in *Virtuosity* (1995) because his son wanted him to, and you can see he's not exactly committed to the material. Playing the role of a disgraced former cop hired to hunt down a virtual serial killer made real, Washington delivers his lines with such apathy that it borders on sarcasm. Meanwhile, SID 6.7 – a virtual composite of more than 150 of history's worst criminals – is played with genuine relish by Russell Crowe, making Washington's "zero shits" approach that much funnier.

Unlike the other films I've talked about, *Virtuosity* was not a B-grade, straight-to-video kind of deal: it was a big budget cinema movie, costing in the vicinity of \$40 million USD (about \$60 million in today's money) to produce. Apparently it only made thirty of that back at the box-office. I can't imagine why. ❧



FUTURE = DELIVERED

OCZ RD400 NVMe® PCIe® 3.0 x4 Solid State Drive

Introducing a new breed of enthusiast storage, the OCZ RD400 NVMe Express® M.2 solid state drive series, designed to propel high-end computing into a new realm of possibility. The OCZ RD400 PCIe Gen3 x4 outperforms legacy SATA SSDs by up to 4.5 times in sequential read (up to 2,600 MB/s)¹, and up to 3 times in sequential write performance (up to 1,600 MB/s) so your system won't be deprived of the storage bandwidth your data-intensive workload requires.² The OCZ RD400's next generation NVMe interface provides a more responsive PC experience with shorter storage latency than that of today's traditional hard disk drives and SATA SSDs. Along with high performance, the OCZ RD400 is designed for mobile, desktop, or workstation applications.

Features

- NVMe Interface: Reduces latency resulting in boosted responsive performance
- PCI Express® Gen. 3 x4
- M.2 2280 Form Factor
- RD400 Driver: Delivers higher performance than standard Microsoft driver³
- 128 GB, 256 GB, 512 GB, and 1024 GB capacities⁴

NVMe® and NVMe Express® are a trademark of NVM Express, Inc. PCIe® and PCI Express® are a registered trademark of PCI-SIG.

Speed may vary depending on the host device, read and write conditions, and file size.

1. 128KIB sequential speeds measured with ATTO v2.47

2. This reflects maximum performance of RD400 512GB compared to OCZ VT180 480GB. Speed may vary depending on the host device, read and write conditions, file size, and other factors.

3. Based on internal testing comparing OCZ driver version 1.2.126.827 to the MS inbox driver.

4. Definition of capacity: Toshiba defines a megabyte (MB) as 1,000,000 bytes, a gigabyte (GB) as 1,000,000,000 bytes and a terabyte (TB) as 1,000,000,000,000 bytes. A computer operating system, however, reports storage capacity using powers of 2 for the definition of 1GB = 2³⁰ = 1,073,741,824 bytes and therefore shows less storage capacity. Available storage capacity (including examples of various media files) will vary based on file size, formatting, settings, software and operating system, such as Microsoft Operating System and/or pre-installed software applications, or media content. Actual formatted capacity may vary.

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Mobile Virtual Reality Technology

*Mobile Virtual Reality: is it just VR on the go or something more?
JULIAN RIZZO-SMITH is on the case...*





ABOVE: Mobile VR HMDs may look dinky, but they work pretty well

CIRQUE DU SAMSUNG

A 360 degree free to download performance of Cirque du Soleil's Zarkana show is available to Samsung Gear VR users. While not live, the surround sound visuals create an immersive experience that gives the impression that you're physically attending the famous show.

Mobile virtual reality offers an on-the-go alternative to standard virtual reality hardware. While still new, there are headsets for many smartphone devices and a decent amount of software with an abundance of entertainment and educational opportunities.

Much like the Oculus Rift and HTC Vive hardware, mobile headsets project your phone screen through two lenses, one for each eye, giving the impression of depth. Unlike computer-based virtual reality devices, mobile VR uses the motion sensors of your smartphone to follow your point of view. The device uses your point of view to track what is shown and heard in-game with surround sound aesthetics and three dimensional environments to explore.

Nearly all modern smartphones are functional with virtual reality. Samsung collaborated with Oculus to develop its own branded Samsung Gear VR headset compatible with most Galaxy note smartphones. iPhone and most Android hardware are compatible with the Zeiss One, which comes with a compartment to securely contain your phone, as well as the Merge VR

Goggles which are compatible with iOS and Android devices of the last two years. There's also the cheap Google Cardboard that works well with HTC, LG and Sony Xperia models, as well as Samsung Galaxy, Acer Iconia and Sony tablets. Alcatel have bundled their goggles, headphones, and a phone case with their new Alcatel IDOL 4S smartphone

"With the addition of affordable hardware we are going to see an explosion in content," said the co-founder of a virtual reality product price comparison site, VR Bound, Daniel Colaianni.

According to Oculus' John Carmack, the public's interest in mobile virtual reality is on the rise despite being fairly new.

"We have [over a] billion plus smartphones [in the market] [and] we're heading towards a billion plus tablets", said Carmack in a keynote speech at the Game Developer's Conference in 2015. "In the long run, mobile technology is going to become the dominant platform.

"The VR headset of our dreams doesn't have wires, it's probably going to be built on mobile technology... We

can [take] photos and videos with virtual reality headsets in a way that is better than traditional devices."

Setting up your headset is fairly easy. Simply download the respective application linked to the headset on the iOS, Samsung, or Android store - or for Alcatel's headset, through the pre-installed virtual reality store - launch the application and slide your phone into the headset where it will begin tracking your movement. It's heavily recommended you use headphones rather than sound coming from your phone's speakers as it makes the experience more immersive. While the Samsung Gear VR offers a trackpad to navigate the application's menu screens, most mobile headsets require you to interact with your environment and menus by holding your gaze on something for a second or two.

Samsung Gear VR appears to be the most popular of the devices, with more than 250 applications made exclusively for the device via partnership deals with Samsung and software developers. In fact, over a million people used the device in April this year, according to a post on



Oculus' Facebook page, less than six months since its launch in November last year. Google, Alcatel, and Zeiss are each working on newer models of their devices, too, with the Google Daydream, Alcatel Vision and Zeiss VR One Plus respectively. At their annual I/O developer's conference in San Francisco, Google announced Google Daydream, a software-based virtual reality system for Android devices using Android N software, consisting of faster processing power, lower latency and a 120 degree field of view. Alcatel's Vision headset sees an improvement from their first model by being the first headset to not require a mobile device or computer, introducing two 3.8-inch 1080p Active Matrix organic light-emitting diode lenses, an octa-core processor, and three gigabytes of RAM. The Zeiss One VR Plus increases the device's supported range to 53 to 77 millimetres, with an approximate 100 degree field of view and smartphone holding tray for devices between 4.7 and 5.5 inches.

Most headsets are controller-supported. If you have a PlayStation 4, you can connect your controller to a Google Cardboard or Gear VR headset by rooting your Android device, using the Sixaxis Controller application on both your phone and computer and enabling gamepad mode. (Do this by downloading and installing the Sixaxis Controller application to both your phone and computer, inserting your local Bluetooth address from the app on your phone into the

computer version of the application before turning the controller on using the PS4's Home button, and enabling gamepad mode in the Sixaxis Controller settings.)

The Bluetooth Wireless Xbox One-styled SteelSeries Stratus XL is compatible with Samsung's model as well, while Zeiss One users can use the magnet controller, which simply attaches to your headset using adhesive tape. Google's Daydream platform includes a motion controller mimicking the Nintendo Wiimote, only with an additional sensor trackpad for your thumb.

Despite being fairly new, developers have already begun creating games, educational tools and interactive experiences for VR. Syfy's upcoming sci-fi crime series, Halcyon, is a multi-platform narrative with both a linear television format and a virtual reality application for Oculus and Samsung Gear VR. Players explore the virtual world of Halcyon – a setting also featured in the show, hence the name – re-enacting crime scenes and investigating the virtual world from the series.

"When the VR episodes start, environments [from the show] will transform into the crime scene itself, and will allow users to walk around and interact with objects in that crime scene", said the original concept and creative director Stefan Grambart.

"You can explore and move around the world, interact with objects, picking up clues and tracing fingerprints, helping the main

VR CRAFT

Currently in early access, CoSpaces is a community driven three dimensional visualisation tool where players create virtual spaces from a collection of environments, characters and objects, exploring both their own and other players' world. The game supports cross-play functionality, as you can carry your projects over from mobile to PC.



The upside to mobile VR? Totally portable. The downside? Doing stuff like this in public



VR

oculus



Jurassic Park wouldn't have been such a disaster if it had been entirely in VR

characters solve the crime in the story", said the director of motion Stephen Bosco.

In an interview with Hyper, Grambart explained that the film studio decided to develop for the Oculus and Samsung Gear VR to extend the reach of their audience.

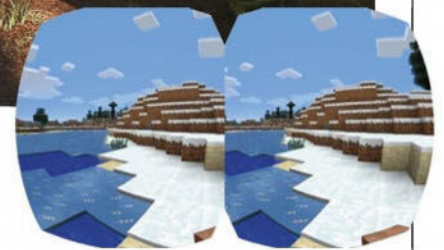
"The fact that the Samsung headset runs off of a phone means that it's an affordable and accessible platform that will be many users' first foray into VR tech", said Grambart in an interview with Hyper. "...VR adoption is rising and the more quality content that becomes available, the more stable the medium's growth."

Grambart believes that multi-platform narratives are a "possible future of television entertainment".

"We were able to develop a hybrid series, designed to be multi-platform from its inception", he said. "I'm certain we'll see more concepts built as cross-platform properties, allowing audiences to experience new worlds by binge-watching episodic content, playing interactive games, and diving into virtual reality."

Mobile headsets also support films that can be watched entirely in 360 degree surround visuals, with many made exclusively for Samsung Gear VR. Marvel's Battle for Avengers Tower, for instance, is an action-packed short film based on the Age of Ultron sequel, placing the viewer in the middle of a battle between the Avengers and Ultron in the Avengers Tower. Other experiences, such as an immersive take on the world of Jurassic Park titled Jurassic World: Apatosaurus, and a personal viewing of musician Patrick Weston performing live in his studio, offer more unique experiences, albeit are also exclusive to Samsung's model.

There are some interactive films available on Android and iOS devices however. 11:57 is an interactive horror film for both mobile and Oculus Rift and the first of its kind, placing the viewer as the main character trapped in an abandoned underground labyrinth with only the ability to turn the camera angle. LucasFilm's iOS, Android, and Samsung supported Star



Wars 360 VR, is a poorly acted if not nostalgic short film using Star Wars properties, set after Revenge of the Sith following a continuation of the Jedi Order 66 from the film. Players can also explore the deep ocean ecosystems in the ambient theBlu, with a close encounter with an 80 foot whale, as well as experience a virtual art gallery with over 100 pieces of iconic art.

Some smartphone apps are compatible with mobile virtual reality devices, too. Mojang's Minecraft is compatible with Samsung, Android, and iOS supported headsets yet requires a controller to function. Square Enix's Hitman Go: VR Edition is exclusive to Samsung Gear VR however, allowing the player to witness assassinations and takedowns from any angle. Clash of Clans also has an Android-supported three dimensional version of the mobile tower defense strategy game, placing the user in the heat of battle as opposed to making moves from a bird's eye view perspective. In Netflix's VR app, viewers watch Netflix from a cosy cabin in the snowy mountains from a widescreen television set. Posters of Daredevil, Orange is the New Black, and other Netflix-original shows are seen framed hanging on the walls.

While some of these apps' virtual reality functions feel forced and tacked on, there are a variety of games built around the immersive experience. These games vary from first-person procedurally generated dungeon crawlers, like Dreadhalls, where the player is trapped in a labyrinth searching for an exit while avoiding terrifying creatures that inhabit it, to niche Japanese arcade shooters like OhanaChan.

Unfortunately because of Samsung's various licensing deals, a lot of the unique games are exclusive to Samsung Gear VR, although they



VIRTUAL SUICIDE

In collaboration with Warner Bros., Samsung have created a VR game based on the recent Suicide Squad film. Despite the film's reception, the game looks like a nice distraction, as you play as Harley, Deadshot and Diablo in survival mode, although the lack of multiplayer is a bit disappointing.

are often available on the Oculus Rift as well. As expected of a mobile market, however, few experiences are comparable with what's available on a decently specced PC, although there are a few notable exceptions.

Rococo VR is a murder mystery set in the middle of a party in the Baroque period. Unlike the traditional murder mystery trope of playing a detective, you play as a poisoned victim searching for your killer to enact revenge before the poison takes full effect. The game looks visually intriguing with the use of black and white to emphasise the periodic setting, and faceless characters

reinforcing the uncertainty of who is after you.

Keep Talking and Nobody Explodes on the other hand is a local co-op based simulation where one player wears a headset and sees a ticking time-bomb and various wires in front of them, while the other player instructs them on how to defuse a bomb using an instruction manual. The game requires teamwork and communication, and is one of the few games that you can not only show to friends to demonstrate the uniqueness of virtual reality, but also play along with them.

Created by the team behind Monument Valley, Land's End offers an immersive tranquil adventure of the same quality of exploration based games on Steam. Players explore spectacular landscapes, some man-made, others completely natural phenomena, to unravel the secrets of a lost civilisation.

There is also the card based fantasy strategy game Ascension VR, and a Lemmings-inspired puzzler called Waddle Home, where players navigate an environment guiding a group of penguins to safety. Music-driven virtual reality experiences such as VRock and GrooVR, which aren't exclusive to Gear VR, use songs saved to your phone's hard drive or your SoundCloud and Spotify playlists, creating unique visual spectacles mirroring a virtual world reminiscent of Disney's Tron.

There are also a variety of educational applications on mobile virtual reality. Speech Centre VR and Public Speaking for Cardboard, help improve one's public speaking skills visualising the user talking to a crowd of people at a boardroom meeting, office and theatre. Others educate the user using simulations of the human body, solar system, and an even an interactive cooking simulator – without the mess involved with cooking!

The Medical Realities company is a universal agency specialising

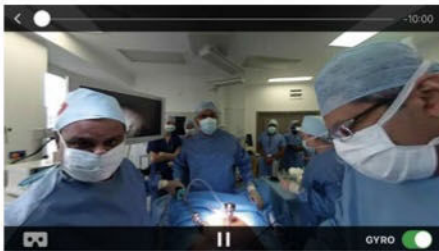
in training medical students in real practices using a three-hour demonstrative operation in 360 degree film with Virtual Reality in Operation Room (VRinOR). Additionally, The House of Languages teaches some European languages using mini-games testing your knowledge, such as finding objects in a house by their foreign name.

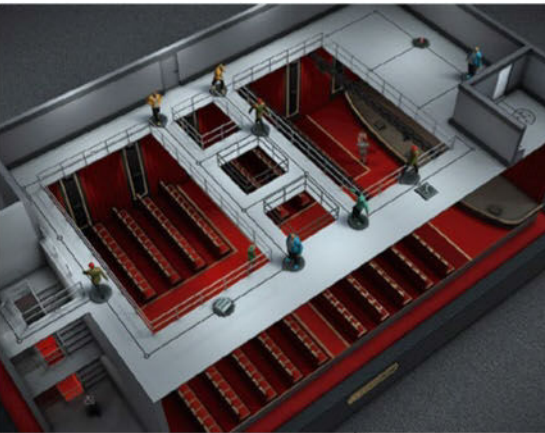
Virtual reality has also seen the rise of augmented reality software, whereby developers create images within mobile apps that blend in with real world environments. Nintendo introduced augmented reality to the mainstream market with the launch of their Nintendo 3DS model, bundling the console with a pack of cards that when viewed with the 3DS' camera, create artificial images used in basic mini-games. Using a similar motion sensing system to mobile devices, their Wii U home console used the environment around the player, with players aiming a bow and arrow in Legend of Zelda: Wind Waker by tilting the gamepad thereby merging their real world surroundings with game environments.

In 2012, Niantic, Inc. created Ingress, a location based augmented reality game for mobile devices. A take on the classic capture the flag mode, Ingress used real world locations based on Google Maps' map interface, to create markers known as portals, which players would visit to capture for their team.

"By exploiting the capabilities of smartphones and location technology and through building a unique massively scalable server and global location dataset ... Ingress, our first "real world" game, has given millions of players an entirely new way to see the world around them", said a representative of Niantic, Inc. in a blogpost on the company's website.

The developers later used the first 150 creatures in the Pokémon series in their AR-based mobile





Halcyon is a mixed media experience incorporating TV and VR



The Netflix VR app puts you in a virtual cabin adorned with Netflix posters

game, Pokémon GO, using real world locations as markers for Pokémon gyms and Poké-stops, where players could visit to replenish their items. The app used the camera from players' smartphones to show Pokémon they were in the middle of catching in real world environments.

Novum Analytics are also working on Night Terrors, an augmented reality survival horror game that is according to the game's developer, Bryan Mitchell, "so believable and immersive that you're afraid to play it". The game is meant to be played in the dark as you experience terrifying supernatural beings in your home seen through your phone's camera, discovering secrets and searching for a way to save a terrified young girl trapped in another dimension.

"The game takes advantage of every component in the device: the camera, the microphone, the LED, the accelerometer, the gyroscope and GPS," said Mitchell. "Every component comes together to form a single camera depth estimation system that makes the impossible, possible."

Much like the Oculus and HTC Vive, mobile virtual reality has introduced an abundance of opportunities for

both consumers and developers.

Users can be both an observer and participant of their virtual surroundings with interactive narrative experiences and some games. Despite Samsung's deals with developers creating content exclusive to Samsung Gear VR, the Zeiss One, Google Cardboard, and Alcatel offer immersive alternatives to popular mobile games. Yet, until Zeiss', Google's, and Alcatel's updated models release, Samsung Gear VR appears to be the preferred product, offering a great catalogue of films and games comparable with the PC market. That said, mobile virtual reality is still in its early years and already beginning to innovate with multi-platform narratives bridging the gap between traditional broadcast television and VR. **»**



WEAR VR

Wear VR, a database of virtual reality software, is a must for anyone interested in virtual reality. The site lists the games, films, and interactive educational experiences available on each mobile market - iOS and Android, Samsung Store and Alcatel - as well as the Oculus Rift and HTC Vive.

Hyper VR hotware

Creating a virtual reality is a big job; it's not just a case of mashing the nearest smartphone onto your eyeballs. There are a lot of moving parts, things that need to be accounted for, and considerations that should be... well, considered, if you're going to create an amazing VR experience. And in this very special Hotware we're going to give you the information you need, to buy the tools you need, to do it!

Headsets

There are few options when it comes to how to enable the visual aspect of virtual reality, so here's a rundown!



HTC VIVE

Where the Rift was first, the Vive is... second. Mind you, that hasn't stopped a whole lot of people unequivocally preferring it to Oculus' offering. For example, there's a larger tracking area capability, and slightly lower system requirements for functionality.

THE HYPE: Having real-world awareness which allows the front-facing camera to show you the room you're standing in is quite handy, and should save a few banged shins. Unlike the Rift, this ships with the motion controllers, which helps to justify the higher cost. Having the Vive on Steam is also likely to help with the quality and range of support for the device.

THE GRIBE: It does have higher price entry point than the Rift, assuming your PC is equally fine with both headsets.

OCULUS RIFT

Going toe-to-toe with HTC, Oculus has been making waves with the potential of the Rift for years now, but the public release (as opposed to the dev-kit) is relatively new.

THE HYPE: Six hundred USD buys you the headset, remote, sensor, XBone controller, associated cabling, and a game called Lucky's Tale. Also, EVE: Valkyrie.

THE GRIBE: In addition to the outlay required for the headset itself, you'll need to ensure your PC is Rift-ready. Thankfully this can be done via a bit of software that can be downloaded from Oculus' site. Unfortunately there's potentially further significant outlay required to bring your existing PC up to scratch, depending on where your system falls down. If it's video card that's the problem for example, that's a simple fix with varying costs. If it's something like USB ports then it might mean your motherboard needs replacing, and that's a path that has a lot of potential flow-on upgrade requirements. Doesn't come with the Oculus Touch controller.

PRICE \$800
DISTRIBUTOR Oculus
www.oculus.com





PRICE \$1300
DISTRIBUTOR HTC
www.htcvive.com

PLAYSTATION VR

We spoke about this elsewhere in this issue, but it's worth restating in the context of this Hotware, and with the Rift and Vive also listed here, with the caveat that at time of writing it was possible to buy both the Rift and Vive, but the PSVR was not yet released.

THE HYPE: With the PSVR comes potential; the potential of a huge install base courtesy of the PS4 console, and a much cheaper price point. It's feasible we'll see higher uptake of this than any of the competition, which in turn could mean more support from developers. This is all theoretical hype at this point though. The raw numbers speak for themselves: 120Hz refresh rate eclipses both Rift and Vive, and the 18ms latency is slightly better than the Vive's 22ms. And for when VR isn't available, the "cinema" feature works to give you the impression you are viewing things on a cinema screen. Neat.

THE GRIPE: Slightly less viewing angle than the competition, as well as a slightly lower resolution. The PSVR is unfortunately not entirely free from the hardware update issues of its competitors, as it will require the PS Camera and you'll probably also need to pick up PS Move controllers, and both will obviously bump up the price a bit. And then. Then, there is the PS4 Neo - or PS4.5 as some are calling it - with slightly upgraded specs to better drive the PSVR, though Sony state you definitely do not need to upgrade to get your VR goodness. The previous name of the PSVR was Morpheus, and it was a much better name.

PRICE \$549.99
DISTRIBUTOR Sony
www.sony.com



STARVR

We wouldn't blame you for not having heard of this, given the worldwide focus on the aforementioned contenders in this space. StarVR is the lovechild of game developer Starbreeze Studios (whom you may know for the Chronicles of Riddick or Payday games) and InfitEye.

THE HYPE: 210 degrees of field of view, created by two 5.5 inch LCD panels with a total resolution of 5120x1440. Starbreeze is also working on a Walking Dead game to showcase the headset, which seems like a horrible (in a good way) idea. There are already a number of big players on board, lending weight to StarVR's challenge. One of these is IMAX; StarVR's panoramic display seems a good fit for IMAX's love of gigantic screens. The other is Acer; a company increasingly known for its gaming peripheral and paraphernalia.

THE GRIPE: The main concern here is really whether the market can support another entrant competing at this level. At what point do we start losing out by not having the "right" VR headset?



PRICE \$TBA
DISTRIBUTOR StarVR
www.starvr.com

SAMSUNG GEAR VR

Speaking of market penetration, Samsung was recently flogging these as a free bonus for purchasers of the Galaxy S7, which might help its popularity a little, and the fact it's "Powered by Oculus" certainly doesn't hurt either.

THE HYPE: Most of the things you need from a dedicated VR headset: accelerometer, gyro, proximity sensor. Drop in your Galaxy phone with the appropriate adapter, and you're a few short steps away from VR. For owners of the right phones this could be an entirely valid way to get some cheap VR action going.

THE GRIPE: Yes, you'll specifically need a Galaxy phone (S7, S6, Note5) to use this.

PRICE \$150
DISTRIBUTOR Samsung
www.samsung.com



GOOGLE CARDBOARD

The ultimate in affordable VR, Google Cardboard is pretty much what it says on the box. Cardboard. You can buy a number of different viewers from Google, with different designs and made of different materials, and all of them are very cheap in comparison with anything else here. Or if you're REALLY strapped for cash, you can access the design, and cut one out of an old pizza box, and drop in your phone (compatible with more than just the Galaxy series too!), and that's all there is to it: pizza-scented VR!

THE HYPE: The easiest, cheapest way to get your VR on.

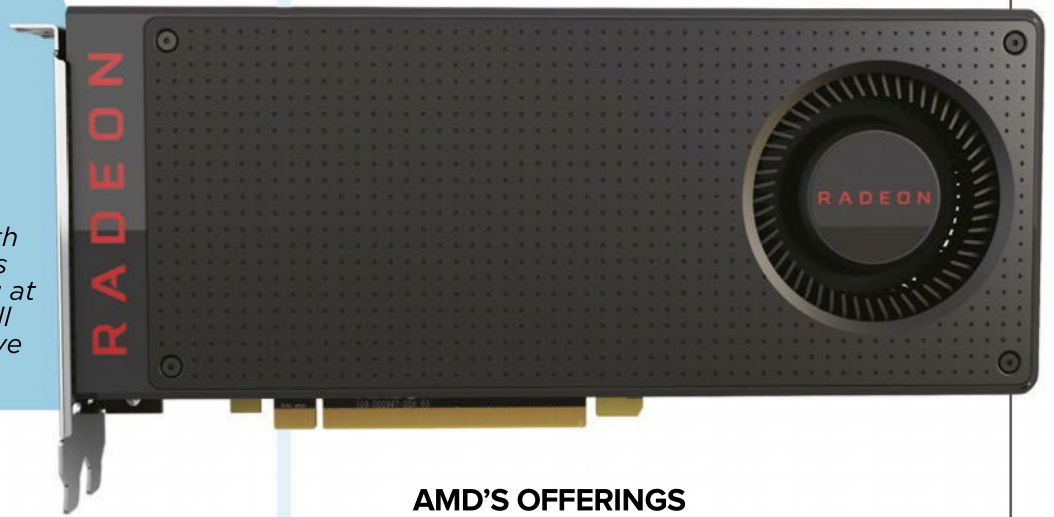
THE GRIPE: The range of supported apps looks disappointingly small, but that might be a good thing, because cardboard won't be the most comfortable of wearable materials, and you aren't going to want to use it for long sessions.



PRICE \$20
DISTRIBUTOR Google
www.vr.google.com

VR Video Cards

The latest range of video cards from both NVIDIA and AMD are designed with performance optimisations for VR, so if you're looking at getting a Vive or Rift, you'll need to make sure you have the power to run it.



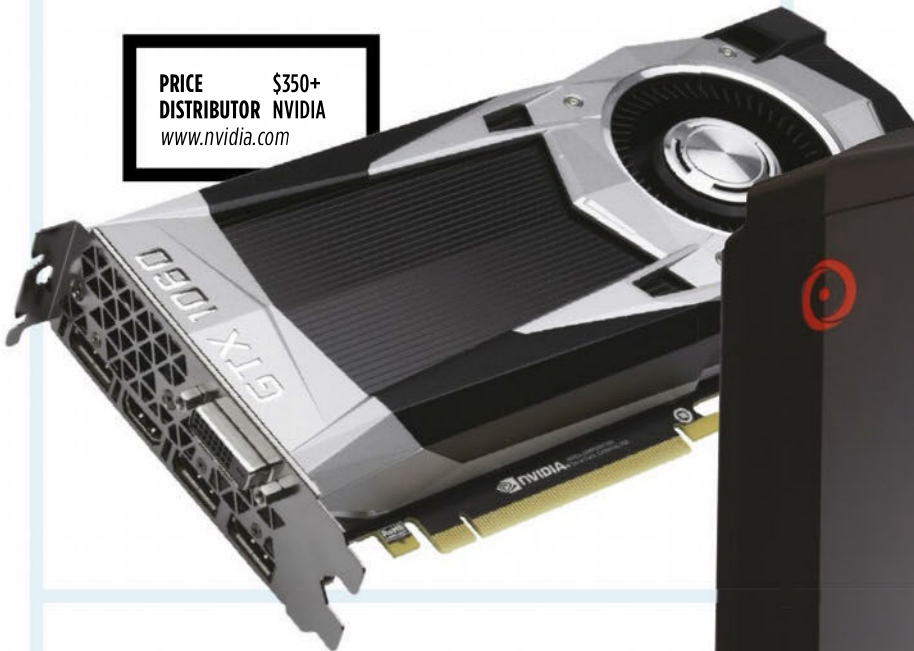
NVIDIA'S OFFERINGS

The cards that NVIDIA classifies as VR-Ready stretch from the last generation GTX 980 and 980 Ti, to the entire 10-series, giving a full range of budget to enthusiast options for upgrades.

THE HYPE: The optimisations that have taken place within the halls of NVIDIA essentially mean that the latest cards have twice the performance of the previous cards in VR applications, so the last-gen high-end stuff is still capable, just not optimal.

THE GRIPE: It's pretty irritating that we need to consider upgrades for VR, but hey, welcome to PC Hardware Cycles 101. The adoption of VR is still in its infancy, and as with every new tech, the early adopters pay more.

PRICE \$350+
DISTRIBUTOR NVIDIA
www.nvidia.com



AMD'S OFFERINGS

As with NVIDIA, AMD has a line of VR-Ready video cards which include the RX 480, and the R9 series: 290/290X, 390/390X, Fury/Fury X, as well as the Nano.

THE HYPE: For a very brief window, AMD has a hold on the budget end of the VR Market with the RX480.

THE GRIPE: Then NVIDIA dropped their 10 series, with the budget 1060, and AMD lost out a bit once again. Poor AMD. That said, the amount of "loss" seen in benchmarks is distinct, but not necessarily huge, so if someone gave you the RX480 you shouldn't be too sad about it.

PRICE \$350+
DISTRIBUTOR AMD
www.amd.com

VR READY PCS

So you've reviewed the headsets, checked out the system requirements, and unfortunately a video card update won't cut it - you're going to need to upgrade the whole PC. You could go through the painful deconstruct/salvage/purchase/rebuild process, or you could give your current PC to a family member in need and get a whole new one. We won't list individual PCs though - there are too many. If you Google VR Ready PC you'll get a bunch of results from dedicated gaming PC providers like www.maingear.com, www.alienware.com.au, and www.originpc.com.au. Or consider buying local and chat to the lovely people at www.pccasegear.com and www.scorpatec.com.au.

PRICE \$OUCH
DISTRIBUTOR See below!



Extras

With a headset selected, your "virtual" is right in front of your eyes, so you're going to want to round out the "reality" part of the experience for the rest of your body.

VIRTUIX OMNI TREADMILL PACKAGE

One of the main problems with the way VR is currently positioned is that it requires a relatively sedentary approach. You pop on a headset and sit in your comfy gaming chair, or stand, if you're feeling particularly adventurous, and then play inside a virtual world with a strange dissonance while your avatar moves around and you're physically predominantly still. The Omni changes all that. It's like a Virtuality pod you can actually buy and have in your house.

THE HYPE: It's pretty simple: when you walk, your character walks. When you run, your character runs. You strafe, your character strafes. Walk backwards, or jump, and yep, those are replicated in-game too. Facing and running in any direction is supported (Omni, you see) on the special floor pad, wearing specially designed shoes, while your torso is supported so you don't fall. And best of all, while there is an SDK for developer-supported integration of its features, the Omni is designed to be able to be used with almost any PC game, as long as it uses keyboard or gamepad input. Includes the treadmill base, the shoes (select your size!), tracking pods for the shoes, harness for body support, and a 1yr warranty.

THE GRIPE: Not that great with anything that isn't first person. The thousand dollar package also doesn't include all of the accessories; the VR rack which holds stuff like controllers and headsets and drink bottles is an extra \$110, as is the VR Boom which acts as additional cable management. It should go without saying at this point that you'll need your own head-mounted-display (Rift or Vive or whatever), and a PC that's capable of running VR.



PRICE \$1000+
DISTRIBUTOR Virtuix
www.virtuix.com

DELTA SIX CONTROLLER

So by this point you're almost ready to go gallivanting about in your favourite FPS, but the problem is that holding a control pad or using a keyboard and mouse feels pretty silly, and while the controllers designed for use with the Rift and Vive are a good middle ground, they can't compare to the Delta Six.

THE HYPE: The most realistic gun controller you're able to get your grubby hands on right now. An actuator provides recoil for every shot, while sighting down the barrel can trigger an ironsights or scope view in-game, hit the bottom of the mag to reload.

THE GRIPE: The design obviously won't suit every gun you use in-game, but then again you'll have a headset on, so you won't actually see it when gaming. Oh and have fun getting it through customs! The realism is of somewhat questionable taste, and if this is a problem, then we suggest looking up Cabela's Top Shot Elite, which is what players in the videos on the Virtuix Omni site are using (and is much cheaper), just don't expect the same level of realism.



PRICE \$200
DISTRIBUTOR KOR-FX
korfx.com

KOR-FX HAPTIC GAMING VEST

Your eyes are telling you you're in another reality, your body can move you around that reality, your hands are gripping your only defense, but there's still a missing ingredient from the virtual reality recipe we're putting together: feedback. Sure, we get a little from the Delta Six, but what we really need is to feel the world we're in.

THE HYPE: Unlike something like TN Games' 3RD Space Gaming Vest, this isn't designed to make you feel bullets/attacks against your game character, and it doesn't require developer support through custom coding in order to work. Instead the KOR-FX plugs in to your sound card, and consequently works based on the audio, so you'll feel gunfire and explosions, as well as ambient environmental sound loud enough to trigger the haptics. What's more, you'll feel it directionally, which will really lend itself to a suspension of disbelief in a virtual environment.

THE GRIPE: The main problem with the KOR-FX vest is its requirement for audio, because this means it becomes your main audio output, so while it has 3.5mm pass through for headphones, if you have a USB headset you won't be able to use it and the KOR-FX at the same time. Requires eight AA batteries if not connected via USB, four if it is. There's also a lot of messing about required in the initial configuration stages: even just to wear the thing you'll need to put it on/take it off several times because it's not possible to adjust for size while being worn due to the location of the straps. Then you'll need to play with the intensity configuration settings to get it right for the type of games you're planning on playing. It's also recommended those with heart conditions check with their doctors first, and not for use by those with pacemakers, as apparently the magnets used could cause some problems.



PRICE \$550
DISTRIBUTOR Avenger Controller
www.avengercontroller.com

NINTENDO VIRTUAL BOY

In the 90s it was every kid's dream to experience VR, to be able enter a game world and feel like you were really there. The gaming consoles of the era – the Sega Master System and Nintendo Entertainment System – weren't quite up to the task, but Nintendo thought it could find a way to thrust people into its game worlds. Its attempt would last less than a year, releasing in North America in 1995 and being discontinued there in March of '96.

THE HYPE: Fascinating virtual realities to explore, like Red Alarm's space ship/fighter combat, and Galactic Pinball's table, and Mario's.... Tennis... and... Tetris? Because who didn't want to get amongst those blocks.

THE GRIPE: There were only 14 games released in North America, and a lot of them didn't make use of the "virtual reality" aspect in any meaningful way, opting instead to do gimmicky 3D tricks. Game cartridges came with the option to pause every 15-30 minutes so you could rest your eyes, because this console came with a headache and seizure warning. Everything was rendered in monochromatic red, because of the cost of colour LCDs would pushed an already ridiculous \$180 price (in the mid 90s, remember) up to around \$500. The Virtual Boy sat on a desk/table rather than being worn on the head, and even now looks more like a device you'd use for laser eye surgery than for experiencing another reality. This is one of those "for the collectors" type systems, where no-one in their right mind would want to sit down and play this thing seriously; watching videos on YouTube is enough to give you a headache.



PRICE \$300+
DISTRIBUTOR eBay
www.ebay.com



VIRTUALITY 1000 CS

PRICE \$NA
DISTRIBUTOR NA
www.google.com

A company called the Virtuality Group released a console of sorts; a Virtual Reality Pod – the 1000 CS. There were only around 350 of these ever made, but for a lot of us in our formative gaming years, playing Dactyl Nightmare on one of these in the local Timezone arcade

was the first glimpse into the possibilities a future of VR could hold.

THE HYPE: Powered by an Amiga 3000 (!), and featuring two 276x372 (!!) screens in the headset, the tracking relied on a magnets in the headset, waistband, joystick, and outer ring of the pod to determine player body and head facings.

THE GRIPE: This thing was cumbersome. The headset and weight belt was heavy, giving the wearer a closer resemblance to one of the Borg undergoing regeneration, than to a human being experiencing virtual reality. The graphics were also awful (as were all 3D graphics in 1991), and the 3.2" LCDs were a blurry mess of 50ms of motion sickness inducing latency. Due to the low production number there may only be a couple of these machines in working condition still in existence, so your chances of seeing one in action ever again – much less being able to purchase one – are remote.

A Brief History of VR

Let's take a journey back in time, before Oculus and HTC were battling head to head for VR supremacy, to the early, murky days of VR Hotware: the 90s.

VIEW-MASTER

View-Master has been around since 1939, and although there's definitely an argument to be made that this is simply "3D" as opposed to "virtual reality", the usage of stereoscopic images that allowed this functionality is still how modern VR imaging works today – albeit with advanced digital rendering techniques as opposed to flat pieces of Kodachrome.

THE HYPE: Believe it or not View-Master has a current product, but instead of slotting in circular discs of film, you slot in your phone, and instead of viewing what was ostensibly a 3D postcard, you view an educational app from the likes of Discovery or National Geographic, in a virtual reality environment.

THE GRIPE: If you want the older, clickier model, you'll need to do some eBay trawling. There are a few gems to found, but you'll be paying much more than this for them.

PRICE \$30
DISTRIBUTOR ViewMaster
www.view-master.com





Games Education In Australia 2016

By James O'Connor

Each year, there seem to be more options for potential games students in Australia. AIE is expanding out (they're currently establishing their Perth campus), developers, programmers, and artists of all kinds are moving into teaching roles, and many of the independent developers working around Australia are made up of people who met in class. We've reached out to educators, students, and alumni around the country to talk about getting an education in games.

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ANTHONY WOOD Associate lecturer and studio facilitator, SAE Brisbane

Anthony Wood's course requires students to ship a complete game to Android by week 10.

You work as a game developer for Screwtape Studios as well. How do the two jobs inform each other?

Being an active game developer running a small studio gives me a great deal of insight into the current trends in gaming. I also have practical experience shipping games and all the hurdles that come along with that. In-class I can bring up specific examples from my development and share the lessons from my students. A lot of the time people learn with small examples that highlight a specific aspect of game development but never get to put them together to make something more complete. I can push students in a certain direction because I do it myself every day.

Shipping an Android game is part of the criteria in your course. What do students take from this experience? Does it better prepare them for the realities of independent development?

You can't simulate shipping a game, which is often the most complex part of development. Because a lot of graduates will go

out and try to start their own studios, having a title under their belt puts them streets ahead and helps them stand out in a very competitive space. A lot of people are intimidated by the process of releasing a game and spend much longer than they need to polishing things that will have little value in the end product. Knowing what is an acceptable standard and being cool with shipping that is often not something you can understand without just putting it out there and seeing what works. Releasing to the public also pushes students to learn about who may play their game and to keep them in mind while developing. The best chance of being successful comes from creating value for an audience, not just having a cool idea. That's probably the biggest lesson.

Do you encourage students to keep working on these games after the class finishes, or is the intention to release something complete and then leave it behind?

Students are absolutely encouraged to keep working on their games after the class ends. They all have the potential to generate income, and making a living from games is the ultimate goal for most students, so why not take advantage of that. On the other hand, once they have made their first commercial game, making the next

one and the one after that becomes much easier as the process is better understood. If their resumes have two or three shipped games on them when they graduate, that makes them much more employable.



CHRISTY DENA
Chair of Games (SAE Australia/Dubai) & Games Department Coordinator (SAE Brisbane)

What does your work entail?

I make decisions about how games are taught at SAE (including equipment, pedagogy, marketing, and third-party relationships). We revise all topics that are taught and rewrite them in consultation with everyone who teaches. Basically, when major decisions happen about games then we make a decision and endorse them for the Academic Board.

How does an education at SAE prepare students for the realities of the industry?

We're all about the realities! A few years ago we switched to a studio model, which means that we simulate a studio environment and give the students briefs to fulfil by fixed deadlines. We

design those briefs so they're learning about different parts of game design or programming, and they have to produce within the constraints by the due dates. The teachers act as studio managers, project managers, and creative directors guiding the student teams. There's a mix of individually-produced and group projects, working with audio and animation students. They learn how to speak to different disciplines, how ideas are cheap, how creative production is all about relationships, how to scale, how to keep your vision, and so on. We have high stakes for the deliveries as well, sometimes bringing in external clients or holding public exhibitions. Due dates aren't just about submitting to the school's online portal; it's about industry people seeing what you've produced in three, six, or twelve weeks.

When talking about the industry with students, is there a focus on what local development looks like, or global? Are students encouraged to consider independent development over working at bigger studios?

We made the switch a while ago to make sure students are capable of being employees and employers. The reality is they won't all walk out straight into AAA studios. They know that too, so we train them in running their own company as well. They do all parts of production: ideation, development, collaborations, marketing, and how business models



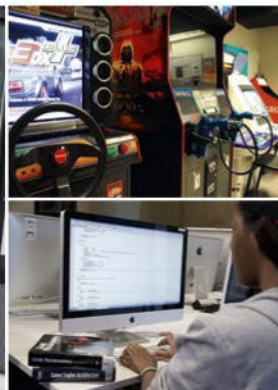
“ THE REALITY IS [STUDENTS] WON'T ALL WALK OUT INTO AAA STUDIOS, SO WE TRAIN THEM TO RUN COMPANIES TOO

affect design. We send out a weekly newsletter sharing info about Australian indie releases, plus festivals and events happening overseas. There is no competing interest with covering both skillsets because they'll be better employees when they know how all the elements fit together, and better employers if they know all parts of production.

If a student isn't sure where to enrol, why might you recommend SAE to them?

They need to find the place that is right for them. Different places offer different things. What SAE offers is true industry and craft training. You'll have a

full portfolio when you leave, and many releases under your belt. You'll understand not just how to work in teams and develop your games, but also what is unique about you. What can you do in games that no-one else is doing? What is your voice? We're also a private institution that cares about its students. If you don't turn up, we notice. You're not some number; we talk with you, find out what is happening, and come up with plans to address any personal or academic issues you may have. We want you to achieve. By the time you've obtained your SAE degree you'll know how make your own games from scratch to release and beyond.



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MURRAY LORDEN
Game Design
& Production
Coordinator, Game
Design teacher, AIE
Melbourne

What does your job entail?

I'm involved in all areas of Game Design and Production. The second year of our course has an emphasis on team work,

so I focus on mentoring project management and production during that time. I emphasise the need for our design students to not only focus on their design work, but to lead and manage the teams, using SCRUM methodology, daily meetings, motivating and organizing the team and facilitating communication. This also provides the benefit that our best game design students come out of the course being employable not only as game designers, but also as producers and project managers.

How do you keep on top of new trends, consoles and technology as a design teacher? Are the

fundamentals for mobile and console and VR the same?

The fundamentals of game development are largely the same across different technologies, but there are definitely specific nuances and issues that come up for mobile, VR and consoles. Vives have been purchased by AIE across all our campuses this year to make sure we were participating in this new wave. Right now we have four second year teams in Melbourne working with HTC Vives for their major projects. Other projects on campus have been using Google Cardboard and Oculus Rifts as well. We've often included interest technologies into our courses over the past years, including things like the Arduino, Nvidia Shield and the Sony PSP. People are still experimenting with how to move around and interact with VR worlds. There's room for whole new genres and types of games, so it's great to have the students exploring these issues alongside us as teachers! It also gives them a wider range of employment opportunities in a burgeoning field when they graduate.

What might a student learn from your classes that they cannot get from an online course?

What I love about a face-to-

face classroom is having the students working together and socialising like they would in a studio environment. It's difficult to emulate the benefits of having a meeting together in the morning, and quickly talking over any issues that have come up for the day. Working with a crew of talented artists, programmers and designers is one of the best things about studying game development with other people; we're all like-minded people with a common goal to achieve a product that means something to all of us. This close collaboration is something you don't get when you study a course online. The network of people you connect with in the course will very likely be the same people you actually work and collaborate with in the years to follow.

Some of the benefits can still come out of studying online, as they still have students interacting, and sharing virtual classrooms, and working together on projects. I think we will see more and more real-world teams and studios probably run in that online/virtual type fashion. But I like the benefits of getting people face-to-face where communication can flow, and it's easier to go and grab lunch, and keep the conversation going.



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DR MIKE COOPER
Game Programming
Lecturer (Advanced
Diploma), AIE
Adelaide

Does a game programming course focus on coding and logistics over 'design'?

The Games Programming stream of the Advanced Diploma is focused on the technical side of things. We have a separate Game Design stream which covers a balance of technical skills, like Unity scripting, and softer skills like the psychology of game design. In contrast, the Games Programming stream that I teach starts off with an in-depth look at the C++ programming language, and basics like memory

management, and ends with students building their own graphics engines and physics engines from scratch. It has a very strong focus on technical know-how over design.

Having said that, many of my programming students are also game designers, working on projects in their own time and participating in game jams. The final major production project, which lasts 4 months, puts students from all streams (Art, Design, and Programming) together to work on a project, where all students are encouraged to think like designers and add their creative input.

What might a student learn from your classes that they cannot get from an online course?

We try to recreate the environment of a real games studio as much as possible. This comes into play most strongly with the team projects, where the lecturers act as producers and help the students organise into mixed-discipline teams to



“ FROM VERY EARLY ON, EVERY ASSIGNMENT CAN BE A POTENTIAL PORTFOLIO PIECE

work on game projects with considerable scope. Some areas of game development always require this kind of close collaboration. Character animation, for example, requires the programmers and artists to work closely together to get the desired results happening in game. This kind of teamwork is much easier to do in a face-to-face situation.

Our students also benefit from having a lot of one-on-one face-to-face time with the teachers.

We've all worked in the local games industry, and can get old colleagues in as guest lecturers. Some of our students will go on to become potential employers, or start business ventures together, so the

network that develops between the students gives them a great springboard for their careers in games.

How do you cater for students with different levels of prior knowledge and expectations?

In the first few weeks of the Programming Diploma, we assume no prior knowledge of C++, which is obviously not the case for many of our students. We encourage students who are ahead of the curve to add extra features to their assignments, or even work on side projects during class time. From very early on, every assignment is a potential portfolio piece, and an opportunity for the student to stand out from their competitors in the job market after they graduate. Later assignments, like the graphics and physics engines, are quite open-ended and have scope for the stronger students to set themselves more ambitious goals while students who are struggling with the material can still fulfill all the basic requirements. During the coursework modules I'd say I spent at least half of my day working one-on-one with the students, or in small groups.



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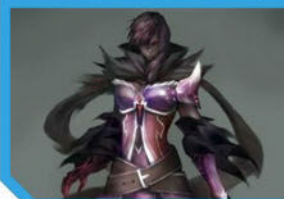
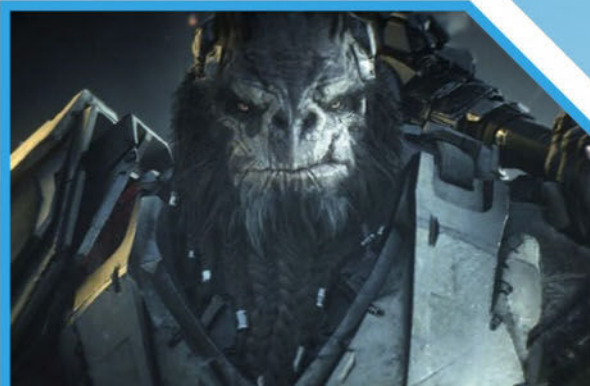
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EDUCATION SPECIAL



SHELL OSBORNE Department Coordinator of Games Programming

What is your background in education and game development?

Although I have been teaching at various universities and institutes for the past six years, I actually have no degree. I never studied games beyond a TAFE Diploma. But building games was more than just a hobby for me, it was an escape. I was able to build anything and be anyone in these worlds, and I hid in them throughout high

school. By the time I had acquired my certification I had already released two games: very minor, buggy titles, but I had experience. I used that to get a job teaching at TAFE, and from there I became a university lecturer and finally a department coordinator.

I've also been developing games since I was 12. I have six personal titles publicly released, that are all drastically different, from third-person team based goblin warfare to a cacophonous greyscale artscape/tear-fest. I use my projects to reflect where I am physically and emotionally; some take years to complete, some take weeks. Most notably I am currently working on the PC/PS4 title One Night with Epona Schweer, shown at PAX 2015 and GX this year.

Do students typically come to CG Spectrum with a good idea of what the local industry looks like now,

and a decent idea of what sort of work they might be doing afterwards?

I often find students consider the industry a big question-mark. They don't know if it exists, they hear bad things, they sometimes think they'll be destitute for going down this path, but they do it anyway. Students enrol in games with the most dismal prospects, but they love games and they want to be a part of it anyway. They eventually learn where to find the industry and that companies are out there, but I still teach with a great emphasis on marketing yourself as a developer, making and releasing personal projects rapidly to help them to create a portfolio. Once they can make their own job or join the industry with something to show for it.

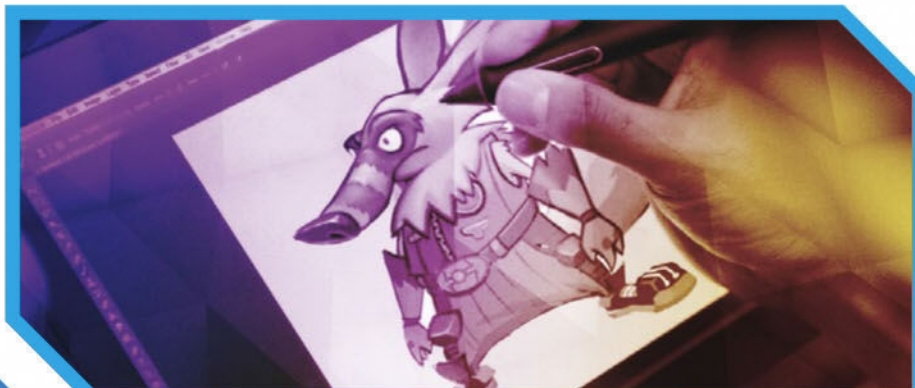
How does 'programming'

differ from 'design', in terms of how it's taught?

I don't think that programming and design should be that different. They both affect each-other so deeply that it's been an aim of mine to dissolve those barriers. Programmers should be able to make their own work look and feel great, designers should know how to make their plans an actuality. I think that teaching a programmer and designer should be more or less the same, with optional avenues of further exploration into whichever field they prefer, be it code, design, lighting, 3D, sound.

What do you think is the most important thing students can take away from a games course, that they are unlikely to get if they are self-taught?

The main thing I see students gain through study that I never received is a sense of direction and that boost into the industry. Skills can be acquired through many avenues and study is just one. But a way into the industry space, connections and the knowledge of where to go next and how, is something that can take many, many years to achieve otherwise. Plus, I still get 2am texts from ex-students I had years ago, asking me how to do something. I always answer.



Current Students

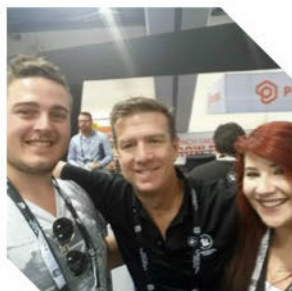
We reached out to a few current games education students to see how they're faring, what they're learning, and what the future looks like for them.

EDUCATION SPECIAL

“YOU HAVE TO BE MULTI-SKILLED OR HIGHLY SKILLED IN ONE SUB FIELD, LIKE AUDIO OR ANIMATION

process afterwards”, they said. “There have also been moments where I've had clashes with other students with work ethic or creative direction, and sometimes, straight up not being respected. But I guess that's great in a way, it's just like I'm preparing for a creative business! I've seen people on my course fighting to put disrespectful content in their games (like illustrating women as sexual objects), but our education staff are really good at cracking down on that sort of behaviour.”

me to represent AIE in a professional setting”, she says. “It tells me I must be doing something right.”



CASEY THOMAS AIE Incubator, Sydney

◆ Casey Thomas is currently working on Drone VR, a VR drone-racing game, in AIE's intensive Incubator program. “Prior to my second year design course, I had never heard about VR and this growing technology”, she says. “My class assignment challenged me to research, develop and implement a VR immersive experience. I was instantly hooked, and I would not be here today without my teacher Peter Chown's support, instruction and guidance.” She and her team at Dark Shadow Studios are aiming to show the game at PAX Australia, and eventually release it. “We want to give people the chance to play something that we are passionate about and share our idea with the world”, she says. “We want to build a high level of visual content that is easily picked up and understood by anyone, from no background in drone racing through

to experts. As a collective we are all very excited to be working on a drone based game, to help facilitate training and enjoyment of this developing sport.”



MADDISON ROVERE Games and Interactivity (Bachelor of Arts), Swinburne.

◆ Maddison is about to enter into their final year of university. “This course has opened my eyes into the variety of roles I could pursue into games”, they said. “It's also clarified that just 'being the designer' isn't really viable, at least not here in Australia. You've got to be multi skilled or highly skilled in one sub field, like audio or animation.” Maddison entered the course with “a love of games”, but has come to understand the local industry much better over the last few years. “The best moments have come from being accomplished- finishing that game project or design, and reflecting on the whole

CASSANDA GRAY Advanced Diploma of Game Development: Game Design and Production, AIE Melbourne

▲ Cassandra is a first-year student at AIE, but she already feels like her studies have helped her. “It's definitely helped me to figure exactly what part of the industry I'm keenest to work in”, she says. “Coming into the course I was still vague about what exactly I wanted to do beyond just 'design' or 'making games', but as the course has gone on I've found myself taking on the role of producer. It's become such a natural fit that it's all I want to do now.” The course has given her a better understanding of the industry too. “Before I began my course I was mostly teaching myself things like basic programming and how to use various game engines, but I had no idea what the actual process of getting a game released was, or what the process of creating a game is actually like.” Cassandra's highlight of the first year was when she was selected for vocational placement at Opaque Multimedia, a local VR company. “It was nice to know that they trusted

IVE SOROCUK Bachelor of Design (Games), RMIT, Melbourne

◆ Ive is currently wrapping up the final semester of his three-year degree, and by the time this article is published he will have made a decision on whether or not to pursue Honours next year. “I'm not sure what I'll be doing work-wise”, he says, “but I will definitely continue working on my own games in my own time”. Despite coming from an art and visual design background, Ive found himself unexpectedly interested in Unity development. “There are things I had no interest in learning when I applied but will definitely continue to work on”. The networking aspect of the degree has also appealed to him – some of his highlights include being mentored by Michael McMaster and Jake Strasser from House House (Push Me Pull You) and having Douglas Wilson (Johann Sebastian Joust) as a tutor. “The degree has been great in making us aware of the local indie scene and encourages us to be a part of it”, he says. “We've had former students return as guest speakers, all of them with differing careers but all of them had their behind the scenes stories about developing, releasing and promoting games”.

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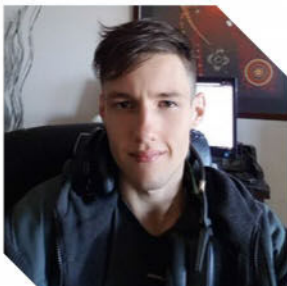
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BATMAN: A TELLTALE GAME / RECORE

Game Degree Alumni

The goal of any given degree is to finish it and take your skills out into the wider world. We chatted to five former game students to see what they've been up to since they finished.



MICHAEL VATSKALIS

Double major in Games Art and Design, Games Software Design and Production, Murdoch University, WA.
Graduated: 2015

◆ Michael Vatskalis believes that his degree prepared him well for game design: "I gained a lot of skills relating to pretty much every aspect of game design and production, as well as project management in general, thanks to the broad nature of the study I undertook", he says. "I learned how to look at games from a critical perspective, both narratively and mechanically, which in turn allows me to break down games into their component pieces and examine how they work on and with players." While he focused on design and programming, Murdoch offered several mandatory introductory courses that invested him with further skills. "Thanks to the 3D modelling classes I undertook, I find it

relatively easy to give the 3D artists I work with the direction that they need". The staff at Murdoch are active in getting their students to show off work and explore the industry. "Every year, the lecturer for my game design class

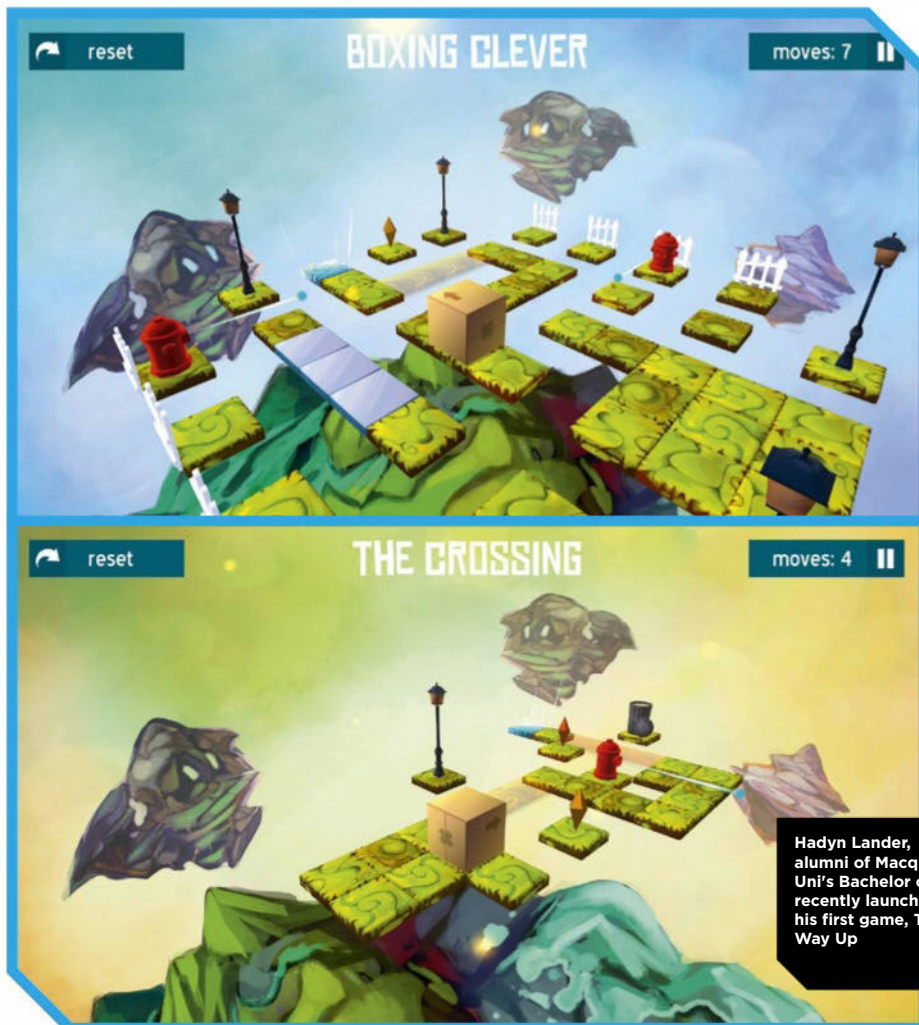
organised for students doing the Games Art and Design capstone project to publically showcase their work at the Perth Games Festival", he says. "Not only is a good way to teach students what conventions will be like, but it also exposes them to people looking for cool ideas or people to hire." This year, Michael decided to extend his education with a one-year post-grad course in games and app production.

JOSHUA WHITTINGTON

Bachelor of Information Technology, Games Design and Development, Macquarie University, Sydney.
Graduated: 2015

◆ Joshua has appeared

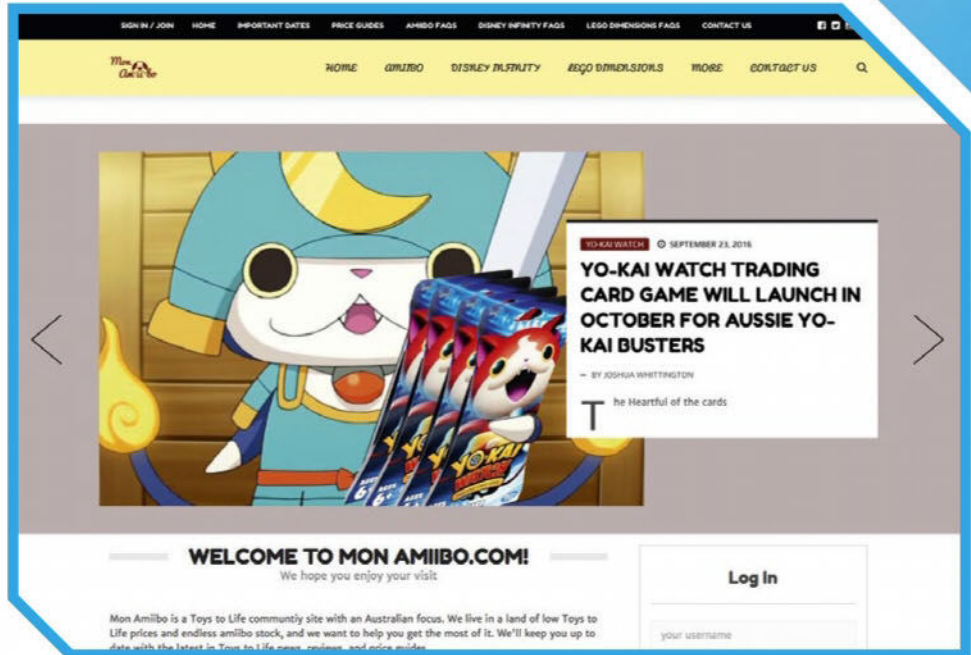
in one of these education specials before, early in his degree. Now on the other side, he feels that the biggest thing that came from his degree was "a deeper understanding of the actual design process of games", which has affected the way he plays. "I play games now and can identify why they work or what's wrong with them on a much deeper level than I could before", he says. "I often find myself making mental notes of things that really stand out in a game's design." This has helped him with the games criticism he has produced on the side, and he now runs his own games site, Mon Amiibo, focused on toys-to-life games. "It's a fun way of ensuring my design knowledge doesn't



Hadyn Lander, alumni of Macquarie Uni's Bachelor of IT recently launched his first game, This Way Up



go to waste”, he says. Joshua admits that it hasn’t been easy to work on games since he finished. “I took a full-time job in a different field with the aim of working on my own projects on the side, but it’s a lot more draining than I expected”, he says. “One of my problems is that I come up with a lot of ideas that are too far outside my skill level and can’t get motivated to work on smaller projects that don’t interest me quite as much.” Despite this, he tell us that he has no regrets. “When I’m working on my own projects I have a much better idea of what I’m doing and can more easily identify the strengths and weaknesses of what I’ve made a lot earlier in the process. I have significantly more confidence in my games writing and my own creations because I’m coming from a much more informed position than I used to.”



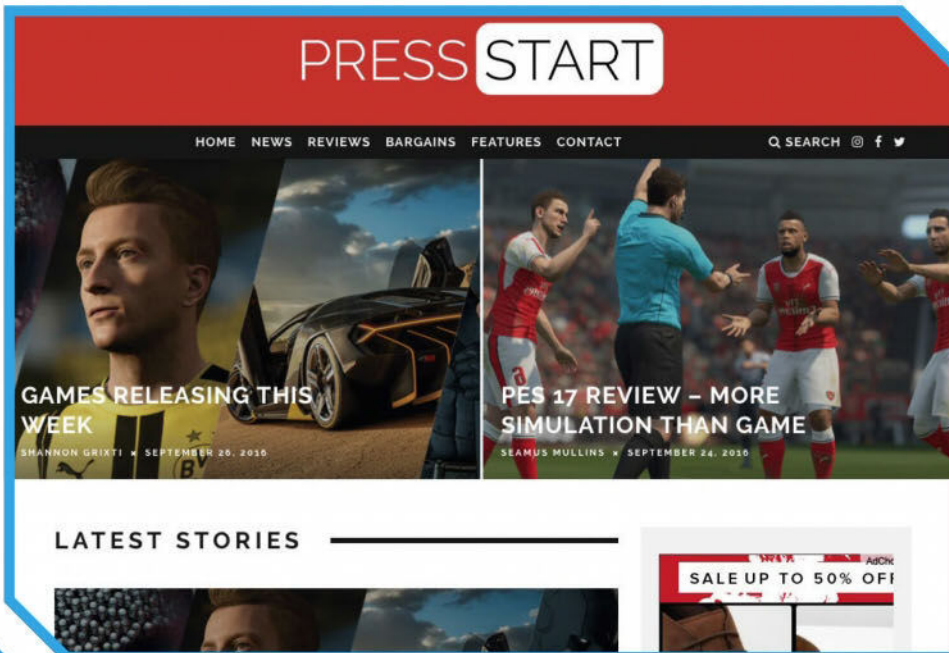
SHANNON GRIXTI
Bachelor of Creative Media (majoring in Graphic Design), QANTM Sydney.
Graduated: 2013

◆ It’s important to note that not everyone emerges from their degrees with entirely positive experiences. Shannon Gixti, who now heads up gaming website PressStart, is glad that he studied what he did, but is also wary of “getting sucked into the marketing”



offered by some institutions. “I paid a lot of money and I’m sure that a lot of people haven’t been as lucky in finding steady work as I

have”, he says. “I felt that the education was very self-motivated, and there were definitely times that I felt that I wasn’t getting adequate feedback.” He doesn’t feel like he was being prepared to work in the industry, necessarily. “The one thing that I’m thankful for is that my course leader was honest in the sense that a lot of us probably wouldn’t end up working in the games industry. This is what lead me to make the change from Interactive Entertainment to Graphic Design”. Although the degree may not have had the desired impact, the education he received helped. “I believe that my passion, as well as aspects that I picked up in my studies, lead me to be successful, and led to the website being acquired by Southern Cross Austereo, meaning I was able to go forward in the games industry full-time.”



“I’M SURE THAT A LOT OF PEOPLE HAVEN’T BEEN AS LUCKY IN FINDING STEADY WORK AS I HAVE



It Belongs In a Museum!

DANIEL WILKS looks beyond the game

Because of the way my eyes work, or to be precise, due to the way my eyes don't work, VR (or really anything that fakes 3D in some manner, making going to the movies nowadays a real crapshoot) is very difficult for me. Any movement that causes me to change focal depth quickly in VR causes serious eye strain and plays havoc on my balance and ability to keep down my lunch. As such, for the most part VR gaming is not something that I am too enthused about, but that doesn't mean that I'm not excited about VR in other avenues.

What excites me most about VR is the potential to experience things that I may never get a chance to see in real life. Imagine a VR tour of an otherwise closed archaeological dig, or the inside of a space shuttle, or hell, even a VR experience of a NASA launch. Sure, you wouldn't get the force of gravity pushing you back into your seat as the massive thrust takes you outside the atmosphere,

but just seeing it through the eyes of an astronaut would be amazing enough. Imagine being able to go to any museum in the world and being able to look at the exhibits not as a visitor but as a curator, up close and personal, hands on without the actual physical sensation.

It's these experiences, rather than gaming, that make me look forward to VR becoming commonplace, and due to the nature of these experiences being more tailored to the passive than the interactive, of all things it's mobile VR, like Samsung Gear, that excites me the most. There are no wires to get stuck in and the price point is much lower than any other VR format, with most modern smart phones capable of running VR apps and there are literally hundreds of different enclosures (look at GearBest or any other giant Chinese shop if you don't believe me) available to fit nearly any sized handset. Simply playing VR footage is a lot less

processor intensive than any game, so the barrier for entry should be – relatively speaking – quite low.

Mobile VR also has something else going for it that gives it a leg up as far as potential goes. Any phone capable of running VR will also feature a decent camera, making mobile AR all but a certainty. Maybe it's just my love of cyberpunk (the Talsorian RPG as well as the SF genre), but the potential to have a real time HUD strapped to my head is far too appealing to pass up. Of course, there are numerous, arguably better applications for mobile AR as well. Going back to the museum tours I was talking about earlier, imagine having extra information pop up depending on what you look at and where you direct your gaze, or an RPG that takes place in the real world and used pattern and colour recognition from the background to generate encounters and events. So many possibilities. «

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