

Mobile Virtual Reality Technology

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



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.



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

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 Wii mote, 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



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

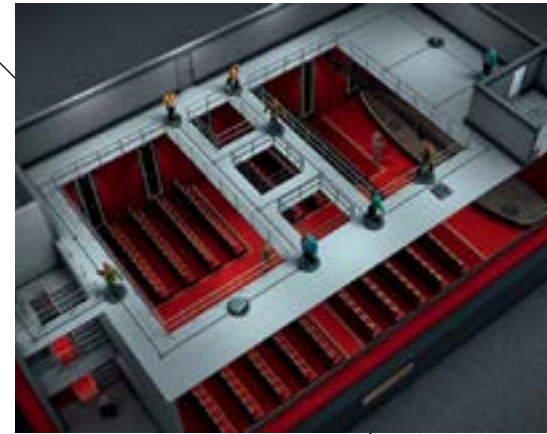
in training medical students in real practices using a three-hour demonstrative operation in 360 degree film with Virtual Reality in Operation Room (VRinOR). Additionally, The House of Languages teaches some European languages using mini-games testing your knowledge, such as finding objects in a house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

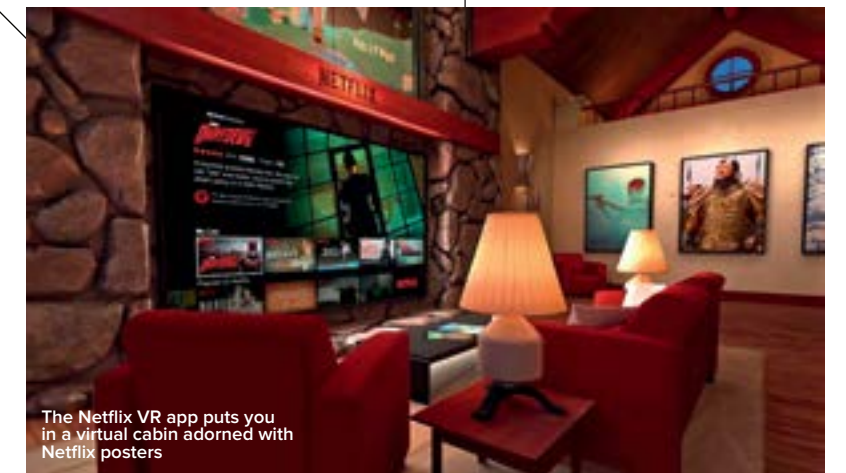
In 2012, Niantic, Inc. created Ingress, a location based augmented reality game for mobile devices. A take on the classic capture the flag mode, Ingress used real world locations based on Google Maps' map interface, to create markers known as portals, which players would visit to capture for their team.

"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.