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# Virtual reality: A whole new world

18 March 2016 | By Amanda Birch

Convincing virtual reality used to be the stuff of science fiction but now the technology is catching up. With Oculus Rift and PlayStation releasing home devices, VR is finally going mainstream. Could it be a useful tool for architects?



I'm

walking through an office space among desks and PCs and along a hallway into an art gallery. But, really, I'm sitting comfortably in a chair in the studio of AVR London, a visualisation firm with studios in London's Shad Thames area, trying out an example of 3D immersive technology in real time. It's amazing, disorientating and induces a strong feeling of motion sickness.

The technology may have been driven by the entertainment industry – PlayStation is bringing out its own virtual reality (VR) kit later this year – but this is not some game, where I've been transported into a dystopian world, armed with a machine gun to take on enemy warlords. AVR London is part of a new wave of firms adapting VR for architects to use as part of the design process.

The hardware needed to experience this immersive technology includes an Oculus Rift Development Kit 2

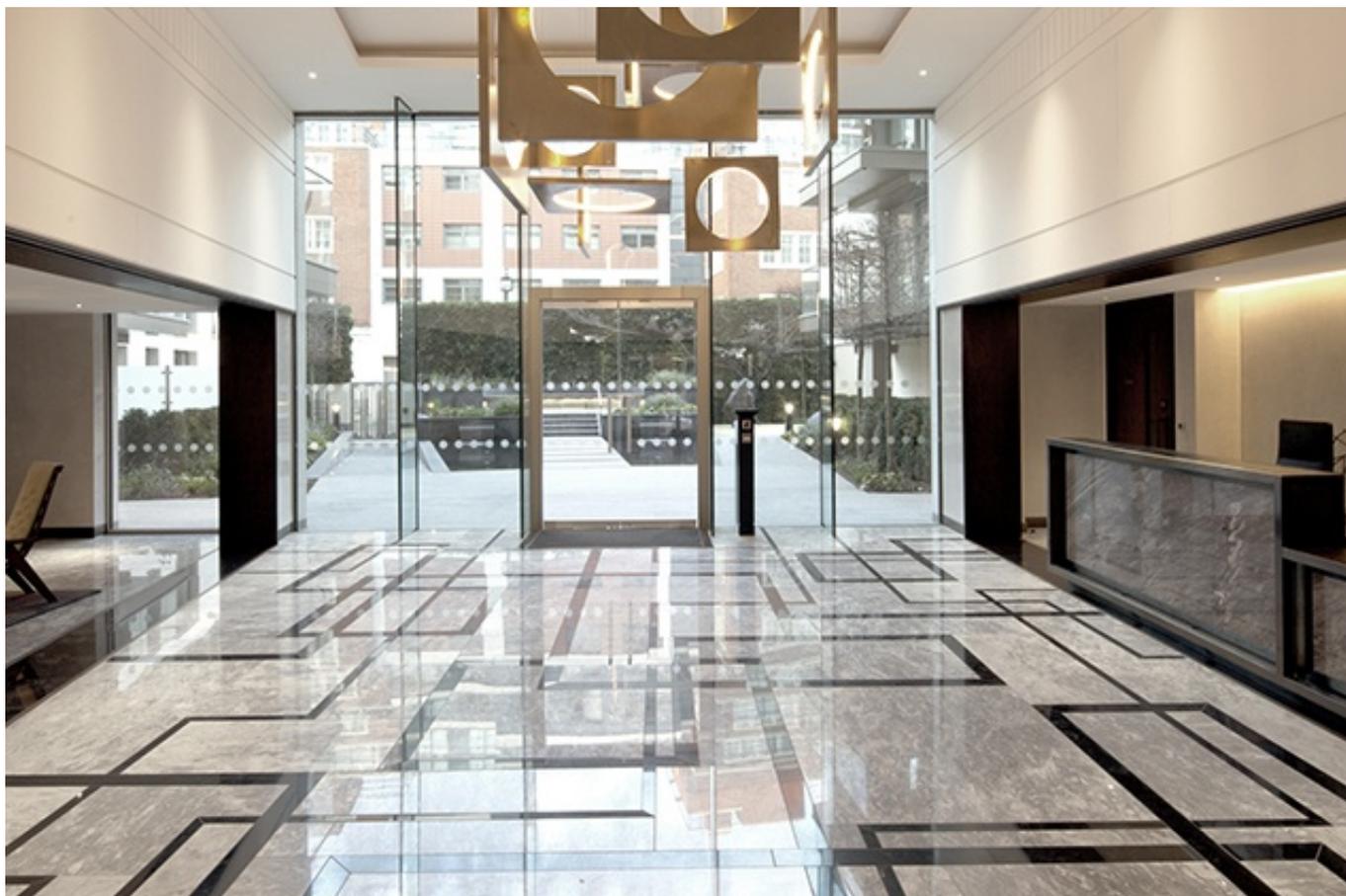
(DK2) headset, a hand-held device with joysticks to enable movement around the virtual world, and a fairly powerful computer installed with a good graphics card.

Users of the Development Kit have been reporting problems back to the manufacturer to improve its performance. Joseph Robson, architect and director of AVR, admits that the headset produces a very pixelated blurry image and can induce motion sickness. Current Oculus Rift kit has only been available to developers in prototype version but a consumer version can now be pre-ordered with shipments made to the UK from the end of March. Robson hopes this new model will resolve these issues.

AVR is a 16-strong firm of architects, photographers and experts from film and games industries that was founded by Robson in 2006. Most of the studio's work includes computer generated images (CGIs) and animations, but they are now venturing into the world of VR.

"We had been working for lots of architects doing great visualisation projects and it had always been about achieving photo realism, but advances in software resolved this some years ago," says Robson. "I then began to wonder what would be the next stage. Would it be interactivity? You have to always think outside your own industry and find ways of doing your own research."

To date, AVR's experimentation with 3D virtual technology has been self-funded. The first piece of research involved CGIs of an entrance lobby AVR had created for The Courthouse, a residential scheme on London's Horseferry Road, designed by Conran & Partners. When told that the project was complete and that the entrance lobby looked just like the CGIs, AVR visited the scheme and took video clips. They then put their original CGI model into an interactive environment and compared the two. The two videos looked very similar. "This gave us the confidence to explore the idea further," adds Robson.



A photo of the lobby...



... and the computer rendered version

The second project involved AVR's own gallery, which shares the same space as their studio. The gallery was chosen because it was built, easy to resource, and an exhibition was planned. AVR's proposal was to have, alongside the real exhibition next door, a virtual version of the same exhibition operating inside.

"The idea is that you sit with a headset on looking around the gallery and then you take the headset off and see the same artwork on the walls in the same space with the same arrangement of furniture," says Robson.

The project was a steep learning curve for AVR, and Robson admits they are still developing the technology. "We are at a stage where we're approaching the Holy Grail," he says. "The software that runs the computer game is now very sophisticated. The quality of the lighting and the materials, which is how it looks on screen, is really superb and allows us to make 3D models look more realistic. We are now at a point where getting these 3D models into an interactive platform is a good thing to pursue."

3D virtual immersive technology is still cutting-edge. Robson suggests that perhaps only a small percentage of visualisation companies in the UK have the hardware and knowhow to create these virtual 3D models.

### Hanging on the telephone

James Thomas, managing director of Agency Forty, an advertising firm in Harrogate, North Yorkshire, agrees that it's a developing area. His company spent six months getting to grips with the virtual reality kit.

"It's only been in the last two years that the technology has really advanced and that's been largely due to the processing power of computers and screen capabilities," says Thomas.

Unlike AVR, Agency Forty use a Samsung S6 mobile phone and a Samsung headset plugged into the phone

for their 3D virtual reality experience. The mobile rests inside the headset and the user looks at the phone screen. The headset has a built-in fan, a sensor in the eye space, a touchpad and volume control.

“The user can either be taken on a journey, similar to a walk-through, or the user can choose their own journey and provided with directions,” says Thomas. “They could look at an object and walk towards it and then stop and look around 360 degrees in this fully immersive environment and get different perspectives. The user is seeing everything with a true sense of scale; something a computer screen can’t replicate.”

The technology’s ability to replicate light and materiality to make it look realistic means that it’s currently more suitable for interiors. Using the technology for exterior environments is very time-consuming. For example, just taking a journey down a street requires a huge amount of detail. With interiors, the spaces are much smaller – it’s one box instead of a massive environment.

“When you’re putting a 3D model into a game environment you need to build it from scratch because it needs to be optimised so you can move it around quickly. That optimisation of a model takes a long time and you have to almost wallpaper all the different objects and materials. In the virtual reality world you need a very fixed set of information and a thorough brief,” says Robson.

Both Robson and Thomas suggest that the technology could greatly benefit architects, not only when pitching projects, but also during the design process. For example, a client could put the headset on to explore their building, enabling tweaks to be made to the design if they’re not happy with certain details. The technology makes it easier for those who find drawings and 3D images difficult to understand.

They also agree that 3D immersive technology is well suited to Building Information Modelling (BIM).

“With BIM everything is generated from that 3D model and information so therefore everything is consistent, which is great. To put all that information into an interactive environment is probably quite straightforward and sensible next step,” says Robson. “Those involved in the building process could go into the model and explore it and find potential problems.”

## Sound and vision

Cundall, an international multi-disciplinary engineering consultancy, also uses the Oculus Rift DK2. But the practice has added another dimension to the technology. Called Cundall Virtual Acoustic Reality, users go into a virtual world and still see the visual aspects to a building, but they can also hear while in the space.

The Cundall team has achieved this by combining the Rift DK2 with Unity, a powerful 3D gaming programme, and CATT high-quality acoustic software. Users operate an X-Box controller to move forward, backward and side to side within the 3D model.

“We’ve built the technology around an acoustic model,” says Andrew Parkin, acoustics partner at Cundall. “We subdivide a building into a grid and for each node in that grid we run a calculation for how the space will sound. Users can traverse across the grid and as they go to each new node it sounds different. We’ve evolved from a very boring static numerical prediction through to something which is based on an audio visual experience that is now dynamic, immersive and can be taken around the world to clients.”

Parkin and his team currently use the technology to enable clients or designers to make informed decisions on a project. “We believe the more people that can be engaged in the design and decision process, the better the end result of a project will be,” says Parkin.

The user looks at a 3D representation of an interior and simultaneously hears whatever noise sources are inputted into the model. For example, this could be a piano within a recital hall, to judge the level of clarity and listen to the effects of reverberation and echoes within the space. These spaces can be experienced both visually and aurally to assess the impact of the different options and predict how different internal

finishes will affect the sound.

“It’s about the control of sound,” says Parkin. “Being able to experience what a space will sound like is more relatable and people can appreciate that rather than a more traditional way of expressing ideas.”

Parkin believes his team are the first to have developed this link between virtual reality and acoustic modelling. But the challenge in achieving this development has been making the different bits of software talk to each other in real time.

Do the experts anticipate the technology taking off as the technology becomes more widely available? Parkin believes it will proliferate, but Robson is more cautious, although he agrees that 3D virtual technology offers great potential. Thomas argues that not only architecture could benefit. He believes VR will take off in social media, the entertainment industry, and medicine.

It’s clear that 3D virtual reality technology is here to stay and just needs refining. As Robson says, “It’s an exciting time.”



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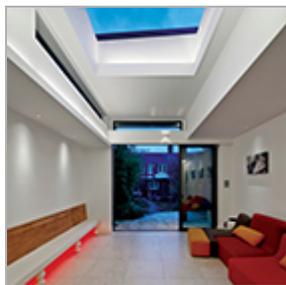
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