Getting Real with AR and VR

Enter the Virtual Reality Crime Scene

To experience virtual reality I visited a stand featuring a system presented by RiVR. Although the area was decorated as a crime scene, the real business was virtual. You enter the 'room', which is just a space with nothing physical in it. Put on some goggles, headphones and a back pack, press a button and a virtual world opens up. You can't see the real world at all. The virtual world was a burnt-out building. I was given controls to hold in each hand. The scene was divided into blue rectangles. I was in one of them and could walk anywhere within it. You are prevented from straying outside the physical space by what are called 'guardians', who urge you not to go further, but you can move into another blue rectangle by holding down a button on one controller and aiming it to where you want to go. Instantly, you are 'teleported' to your new location. I aimed for a door way and I could see outside and down from the first floor into the street below, where there was a body and two fire engines. I teleported down into the street, and then again to stand next to one of the fire engines, where I could hear the engine ticking over, in stereo.

How to set up the VR room

For surveyors the answer is straight-forward. The fire service wanted to create an exercise, so they set fire to a building, then captured the scene with thousands of overlapping photographs and used digital photogrammetry to create a photo-realistic model which was then transferred to the backpack. OBJ and FBX format files are supported.

To set up the room, you need two 'lighthouses'. These are infrared sensors located diagonally opposite each other at corners of the rectangular physical space, marking the limits within which the player can roam. The model is registered to the lighthouses. The player can pick up tagged objects in the scene but it is also possible to tag physical objects, such as a fire extinguisher which the player can then use within the virtual world.

A Bit of AR in VR

For a taste of Augmented Reality, I visited the Daqri stand. With Augmented Reality glasses on you can see and move freely around in the real world but with the virtual world superimposed. So, if you have a 3D model of a steel frame building which includes the building's structural elements, you can enter the physical building and see both the cladding around columns (in the real world) and the steel structure (from the virtual world). This requires the virtual world to be registered to the real world, which means recognising features that appear in both the real world and the virtual world to determine position and orientation. To help with this the Daqri glasses have visual sensors (similar to Xbox) and an IMU. The glasses need a starting point and from there they can continuously determine their position using the sensors in the glasses. The glasses can also be used to build 3D models as the player walks around.

Until recently, AR/VR has been arguably the stuff of movies. But the technology is now entering the mainstream and surveyors need to understand the basics, and particularly, how to supply 3D models in a form that the technology can use. Look out for next year's show!

TechXLR8 took over half of the Excel centre in London for a three day show in June. Richard Groom took the chance to get to see AR/VR in action. This article was published in Geomatics World September/October 2018