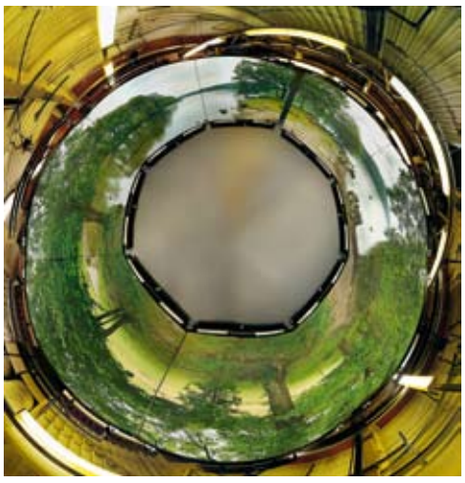
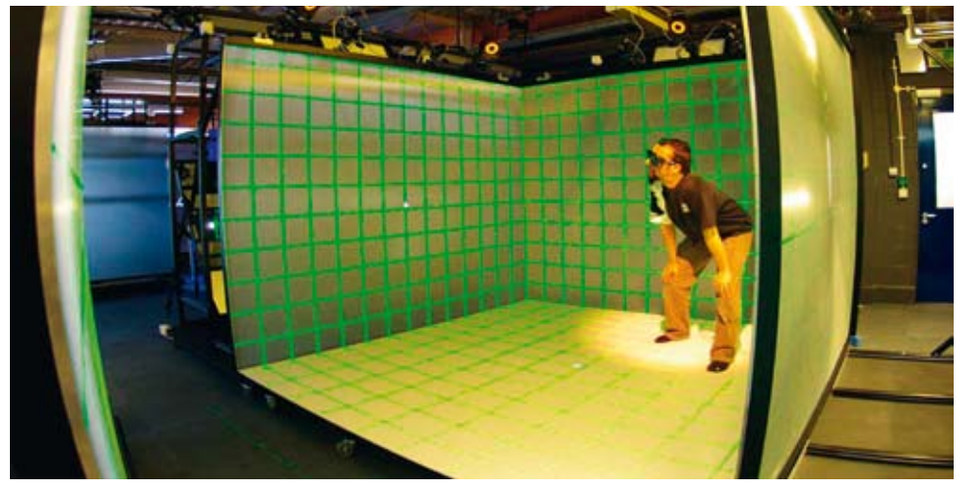
Immersive reality

The University of Salford has stretched VR boundaries by creating the Octave. *Geny Caloisi* find out more





A former undergraduate IT lab at the University of Salford has made way for the world's most flexible immersive reality environment. Known as the 'Octave,' the octagonal projection space can be reconfigured to many types of industrially familiar systems to assess best fit for emerging applications, and features a video capture system which the group hope will lead the field in tele-immersion.

The mission to move virtual reality into a realm above the standard telepresence and Access Grid videoconferencing has been led by Professor David Roberts, Scientific Director of the Centre for Virtual Environments at the University of Salford. The project is running in parallel with a new standard Access Grid Node and satellite technology nodes around the university, connected by a new bespoke 10Gb Cisco research network.

Roberts explains: 'Videoconferencing allows you to see what someone looks like but it's very difficult to align cameras so you can see where someone's looking. At the moment you can only go so far towards this with videoconferencing. The standard access grid doesn't attempt that. All you have is unaligned windows into other people's working environments.'

The £1.6m project has a number of stakeholders including Electrosonic, which successfully tendered for the integration. For its precision engineering requirements it used Paradigm Audio Visual, which constructed the rear projection rig, provided the large mirrors from which the projection beams are folded and a number of their dnp high-gain fresnel lenticular acrylic simulation grade screens.

What did it take

Electrosonic project manager Chris Ostler explained some of the complications of this project: 'The available space is restricted and Paradigm not only had to create a quickly-reconfigurable series of screens but all are built around identical core frames [measuring 2600mm x 1969mm] so that if they want to expand, they simply need to add more mirrors and projectors.'

One of Electrosonic's own biggest challenges was craning the entire system into the top floor lab by removing the roof, combining the logistical requirements of several partners and achieving the complex lifts in a single morning.

Mick Perrone, on Paradigm's management team, states: 'We worked with Electrosonic to custom-design these eight modules, and we had to create the ability for the screen frames to be moved at any time. Because the large mirrors are at the base we had to invert the rigs and place them on a movable trolley — but the most impressive part is the screen frame.'

How it works

There are a range of rear- and front-projected options and different screen grades and surfaces to fit the frames (when not used they are kept in a Paradigm slide-in/slide-out screen storage unit, complete with locking pins). The design of this unit had to take into account the significant weight and fragility of the screens and is an industry first which surpassed the expectations of the research group.

The screen surfaces combine three direct-throw rearpro modules, four twin mirror rear projection modules and a single mirror side-on rear projection module. These can be configured in one eight-sided octagon, two four-sided enclosing cubes, (one with stereo floor projection), a reality centre analogue and Powerwall options.

There are two wheelable floor projection modules which allow either the stereo floor projection or a 'silver-screen' retroflective cubic system, and scope for expansion to two fully immersive cubes running side by side.

The screen frame edges needed to butt up with minimal mullions and Paradigm were able to design the frames with 2mm mullions.

'This is the first time we have built anything like this in a mobile situation, with the screens secured to the top and bottom of the frame,' says Perrone. 'We were given the room dimensions, told what height they needed to be — and went from there.'

Addressing the screens are a combination of five Christie S+3K 3000 ANSI lumens SXGA+ Mirages and four DS+300W projectors. The four Mirages addressing the twin mirror rigs are fitted with 1.25:1 lens, and the four DS+300W devices, firing onto the single mirror and direct throw rigs, contain a 1:1 lens. The fifth Mirage, fitted with a 0.78:1 short-throw lens, is mounted on the ceiling — but the ultimate intention is to have the entire system running stereoscopic Christie projection.

Ultimately, Salford's research will support eye gaze correlation and Octave has been set up to further the University's present Eye Catcher project, creating an immersive virtual environment in which virtual characters can track the eye movement of collaborative partners. ■

KEY FACTS

The University of Salford's octave project has been supported by a team which included Electrosonic, the BBC, Sun Microsystems, Cisco Systems Inc and Vicon Motion Systems.

It is also collaborating on the project with University College London, the University of Reading, the University of Roehampton, Avanti Communications and Visual Acuity.

* www.salford.ac.uk