

## Case study

### The Cube

#### **The problem**

Queensland University of Technology (QUT) in Brisbane, Australia, were in the process of building a \$230 million state-of-the-art Science and Engineering centre at Gardens Point campus. As an education provider, QUT wanted a digital installation that would form the heart of the new centre, deliver knowledge, and provide an engaging visitor experience. A building that could reach out and showcase science and technology to the broader Brisbane and perhaps the world community was foreseen. Pro AV, the Australian member for the Global Presence Alliance, and the company charged with creating the installation was faced with the question of how to create a feature exciting enough to draw people in.

#### **The initial idea**

The answer lay in some form of high impact audiovisual experience which visitors could not merely see and hear but could actually have some control over. The Cube, as it was named, was to be a purpose built interactive video wall space that engaged people to touch content and discover facts on ocean life, or physics with wooden blocks, or learn about the Brisbane floods and where social media had played its part.

#### **Enter MultiTouch Ltd**

For the installation to make an impact, it was going to have to be big, and if it was to be operated by dozens of visitors at a time, it was going to take some amazing tech to make it work. Pro AV already knew lots about MultiTouch, a company that could boast a huge portfolio of stunning interactive installations specifically designed to accommodate any number of people. A raft of big-name clients including Siemens, Lincoln, Audi, and NASA have had installations built using MultiTouch products so Pro AV could be sure it would be in good company.

Philip Holtum of Pro AV comments: "The way we saw it, we were creating the ultimate scholastic tool and a new cultural icon. When you look at it from that angle, there's no room for shortcuts. The finished piece was going to have to be the best it could possibly be and that means using the best technology and the best brains in the industry. MultiTouch has an unsurpassed reputation for creating cutting-edge interactive technology for multi-user applications and we knew from the start that we wanted these guys on our side."

MultiTouch creates LCD screens, known as MultiTaction Cells, which can be stacked together in any configuration to create giant interactive walls that work like single displays. MultiTaction Cells are truly multi-touch because they can process an unlimited number of simultaneous touches. So it's feasible that a stacked display that is big enough for a hundred people to stand in front of could be built and each of those hundred people could work on the display at the same time using all their fingers.

MultiTouch has enhanced the appearance of stacked or tiled arrays with the development of the ultra-thin bezel display which reduces the seam between adjoining MultiTaction Cells to a barely discernible 6mm. Such attention to detail made MultiTouch the only sensible choice of partner for The Cube installation.

#### **About The Cube**

Comprising 1,400 cubic metres, The Cube is one of the biggest spaces of its kind in the world and utilises 48x 55" MT553 MultiTaction Cells – the world's first and only interactive displays with an

ultra-thin bezel LCD. The two-storey high Cube is dedicated to providing an inspiring, explorative and participatory experience of QUT's Science and Engineering research. Part science lab, part digital engagement, The Cube will be the hub of scientific exploration for high school students, the QUT community and the wider public.

The 48 MultiTaction Cell displays are used across five zones. The displays are complemented with edge-blended projection to provide a spectacular, fully immersive experience. Processing an unlimited number of concurrent touches, MultiTaction Cells boast a tracking speed of 200+ frames per second while MultiTouch's proprietary Hybrid Tracking technology renders the displays immune to ambient lighting conditions.

The touch screens allow visitors to interact with and control the single giant image that spreads seamlessly across the monitors and projectors. The images are real-time animations, created by a metric tonne of custom-built servers housed two floors above. Break out areas are placed all around the building with a common view to content giving more visual impact from a distance.

Gavin Winter, QUT's Cube project manager, comments: "The best way of thinking about it is as a giant, \$3.5 million multiplayer video game that's capable of absorbing busloads of school students at a time and switching them on to science and engineering."

A video of this magnificent installation can be seen [here](#).

Currently on display in each of the five zones are the Virtual Reef, CubIT, ECOS, Flood Wall, and Physics Playroom.

### **Virtual Reef**

The virtual reef, which is so lifelike it gives the impression one could dive straight in, gives visitors the chance to interact with and find information on various fish species, corals, and other marine life. It is even possible to rotate creatures in any direction to investigate them fully.

### **CubIT**

In another area called 'CubIT', the general public can collaborate with and access research content shared by QUT's students and academics. The Community Science wall, in yet another part of this amazing installation, allows the public to connect with Queensland stories and experiences as told through a large-scale interactive map and timeline. For the Cube's launch, Community Science is showcasing Flood Wall, a virtual and interactive storytelling of the 2011 Brisbane floods.

### **ECOS**

Inviting play and reflection on the role of 'green' buildings, the ECOS area presents data on the Cube using a simple and interactive game-like application. The data shows how energy consumption and generation impacts people in a variety of climates within a five-star rated green building like the Science and Engineering Centre, where The Cube is located.

### **Physics Playroom**

Finally, the Physics Playroom is a game-like environment where people of all ages can engage in learning about physics. Objects in the virtual playroom can easily be found in any child's bedroom - from blocks, to wooden horses and trains. Each of the objects is characterised by real-world properties, such as mass and friction. Additionally, the state of the room as a whole is governed by the laws of physics such as gravity and wind velocity.

### **Behind the scenes**

An audio matrix manages 96 x 80 audio paths for localised audio at LCD's and immersive audio for the projection zones. Video signal management is provided with five 32x32 matrix switchers and three videowall processors. Touch panel control in the main server room and through an iPad docked in the wall structure allows management of signals from either within the installation or from the main rack.

There are no less than four separate cat6 networks connecting the custom built SGI servers to the displays. Video and multi-channel audio comes via cat6 transmitter/receiver pairs, there is a separate network to handle just the touch commands between panel and server, A third network allows the servers to communicate with each other to synchronise the animation elements as they pass between screens and a fourth network, the QUT LAN, provides overall communication and control. Nine km's of structured cable were installed in total, and the entire installation was successfully completed within a compressed 6 week program.

“We’re delighted that MultiTaction Cells have been used in such an original and captivating installation,” explains Petri Martikainen, CEO of MultiTouch. “The Cube is a monument to learning and collaboration between academics and the general public, and we could not be more proud to put our name on it.”

Philip Holtum adds: “The interactive aspect of The Cube was always crucial to the end product. MultiTouch offers superior interactivity backed up by a raft of technologies that make them the number one choice for a project of this magnitude.”

The Centre was opened on the 28th of February 2013 by the Australian Prime Minister and Queensland Premier, using the Cube as the venue centrepiece.

You can find out more about The Cube at <http://www.thecube.qut.edu.au/>