

## UC San Diego and University of Melbourne Initiate Australia's Ultra-Resolution Global Collaboration Laboratory

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Members of the Australian American Leadership Dialogue (AALD) meeting at the University of California, San Diego yesterday were linked over a super-broadband network to the University of Melbourne's new OptIPortal tiled wall display -technology developed in the California Institute for Telecommunications and Information Technology (Calit2) and its partners on the OptIPuter project.

Australia's Deputy Prime Minister Julia Gillard and Victorian Premier John Brumby joined politicians, industry, science and media representatives - on both sides of the Pacific - to experience a powerful, next generation, ultra-resolution visualization carried over the super-broadband network linking the University of Melbourne and the UCSD division of Calit2.

In an Australian first, this next-generation platform - set to revolutionize the way Australia interacts with the rest of the world - allows real-time, interactive collaboration across the globe, combining high-definition video and audio with the sharing of ultra-resolution visualizations from a broad range of disciplines. The demonstration was an initiative of the Australian American Leadership Dialogue.

In the last two months, the University of Melbourne has constructed a massive 96 million pixel "OptIPortal" visualization wall - known affectionately as the 'OziPortal' - constructed from twenty-four 30-inch LCD screens. By comparison, a standard PC can show about 1-2 million pixels.

Calit2 Director Larry Smarr notes that the demonstration marks the entry of Australia into the growing OptIPlanet Collaboratory, enabling innovators around the world to work together on major data-intensive scientific, medical, and environmental challenges: "Based on today's success," said Smarr, "we will connect other Australian universities with universities in the United States and around the world using these advanced technologies in 2008."

This ultra-resolution OptIPortal visualization wall - the largest in Australia - enabled scientists, industry leaders and politicians in Melbourne to demonstrate cutting-edge medical and environmental research to participants in the AALD's West Coast Leadership Dialogue at UC San Diego using a novel interactive high-definition television stream over a 1000 megabit/sec ("gigabit/s") super-broadband optical fiber connection.

Bringing the OptIPortal and gigabit-per-second super-broadband networking together is the cutting-edge expertise of two of the world's leading telecommunications research units: the University of Melbourne School of Engineering's Centre for Ultra Broadband Information Networks (CUBIN), and Calit2, a UCSD/UC Irvine partnership.

The cross-Pacific discussion included presentations demonstrating the capacity of the OptIPortal by University of Melbourne neuroscientist Graeme Jackson, and water researcher John Langford. Participants in San Diego including Calit2 director Larry Smarr, and Australian leaders were able to quiz Langford and Jackson as if they were in the same room.

The OptIPortal facility brings together two individual concepts: ultra-resolution visualization walls and high-definition video collaboration technologies, creating a powerful new tool enabling collaborative research across great distances in real time with participants visually exploring massive data sets.

Melbourne Vice-Chancellor Glyn Davis praises the ingenuity of staff in the University's School of Engineering, Calit2 and AARNet which has made the Melbourne OptIPortal a reality. "They have used the real time and high definition visualization of the OptIPortal to build the Melbourne facility. This technology is a powerful communication tool which will push new boundaries for higher education and research in Australia."

Dean of Engineering at Melbourne, Professor Iven Mareels, says, "The 'real-time' nature of the technology means people on opposite sides of the world can work together on projects in real time. For instance, a surgeon in Australia could direct an emergency surgical intervention by operating a robot in Antarctica; scientists in Australia and Japan could share research tools such as the Synchrotron, or operate an underwater robot exploring the Great Barrier Reef - all from the comfort of an OptIPortal room."

Researchers from Falko Kuester's Calit2 Visualization Laboratory, including Kai-Uwe Doerr, So Yamaoka, Jason Kimball and Tom Wypych, developed CGLX, the visualization framework that is giving the OzIPortal its wings. CGLX, an R&D development framework for tiled display systems, provides users with a distributed and synchronized OpenGL context, and enables the transformation of OpenGL-based applications into cluster-aware visualization applications that can scale from individual laptops to networked, massively tiled display environments operating at hundreds of millions of pixels resolution (or in the OzIPortal's case, 100 million pixels). With CGLX, for many applications, cluster awareness can be achieved after adding as few as three lines of code.

Kuester's group also developed the CGLX-based applications that were demonstrated on the Australian OzIPortal, providing access to tiled image viewing capabilities that make it possible to freely migrate static images between display tiles, play back or stream HD-quality video or render full-resolution 3D computer models, concurrently.

"This is a landmark event for Australia-U.S. research communities and represents a quantum leap in broadband communications for Australia," said Chris Hancock, CEO of AARNet. "It means research teams in areas such as medicine, astronomy, science and technology can now visualize larger, more detailed, higher resolution images than ever before. This technology opens up a world of opportunities for collaboration across the Pacific and helps to ensure Australia's place at the forefront of global collaborative research."

### **Some Statistics**

OptIPortal definition: Combination of a high-definition wall (comprised of 24x30 inch ultra HD monitors) powered by 13 Quadcore PCs (which are equivalent to 52 standard desktop PCs)

The OptIPortal has 100 times more memory than the average desktop PC (104 Gigabytes)

The OptIPortal is nearly 50 times higher resolution than the highest-resolution HD TV commercially available.

The Internet connection (1 Gigabit per second) is about 250 times faster than the standard broadband connection offered in metropolitan Melbourne (4mbps)

The software that powers the OptIPortal is capable of magnifying images to a large size and still keep full clarity, for instance, a scan of the brain can be shown at to the cellular level and maintain full clarity.

The 'secret sauce' that allows Melbourne's OzIPortal to be able to show the stunning images shown today is the Cluster-GL for Heterogeneous Systems (CGLX) framework for freely scalable multi-tile visualisation and synchronization.

Melbourne's OziPortal utilizes Calit2's HIPerSpace technology for freely scalable multi-tile visualisation.

[To read the complete news release, go to <http://www.calit2.net/newsroom/release.php?id=1219>.]

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