

Summary of Demos at Research Exhibit 6107

This flier summarizes the demos we will present in this booth during SCos, as well as a schedule of dates/times when each can be viewed. For the technical specifications of the iCluster tiled display wall, see the reverse side of this flier.

Schedule of Demo Dates/Times

Date	Time	Demonstrations
Monday, 14 November	6-8pm	All
Tuesday, 15 November	9am-1pm 1-5pm	I, II, VI, VII III, IV, V, VI, VII
Wednesday, 16 November	9am-1pm 10:30-10:45am 1-5pm	I, II, VI, VII VIII III, IV, V, VI, VII
Thursday, 17 November	9am-1pm 1-4pm	I, II, VI, VII III, IV, V, VI, VII

I. Real-time Waveforms and Earthquake Maps from Seismic Sensor Arrays

We will display real-time seismic waveforms using orbmonrtd (a tool that is part of the Antelope software suite) from more than 100 stations along the west coast of the US, information from the most recent earthquakes detected by the array, the status of equipment using Nagios status maps, and 3-D visualizations for major events such as earthquakes in Sumatra (2004) and Pakistan (2005). (anf.ucsd.edu)

II. Real-time Images from the ROADNet Sensor Network

We will demonstrate the ROADNet (roadnet.ucsd.edu) real-time image bank, and show the most recent images and time-lapse movies recorded from the Scripps Pier, the Santa Margarita Ecological Reserve, Scripps vessels (R/V's Reville and Melville) and other locations, sensor status maps, and temperature and humidity maps. We will also display time-lapse movies and animations using images from the HPWREN network collected during the October 2003 San Diego wildfires.

III. Playback of High-definition Video from Deep-sea, High-temperature Venting Systems

We will display video recorded by an HD camera on the seafloor pointed at deep-sea, high-temperature venting systems (2.2 km, ~360 degrees C.) associated with active underwater volcanoes off the Washington-British Columbia coastline. This video was transmitted from the ROV Jason on the seafloor to the Research Vessel Thompson through an electro-optical tether. An on-board engineering-production crew delivered a live HD program using both ship-board and live sub-sea HD imagery. This program was encoded in real-time in MPEG-2 HD format and delivered to shore via the Galaxy 10R communication satellite using a specialized shipboard HD-SeaVision system developed by the University of Washington (UW) and the ResearchChannel, with support from HiSeasNet (hiseasnet.net).

The MPEG-2 HD satellite signal was downlinked and decoded at UW. The resulting uncompressed HD stream was mixed in real time with live two-way discussion and HD imagery from participating, land-based researchers working in a studio with undergraduates, K-12 students, and teachers. This integrated stream was then transmitted at 1.5 Gbps to iGrid 2005 in San Diego (held September 26-30). The transmission utilized the ResearchChannel's iHD1500 uncompressed HD/IP software on a Pacific Wave lambda over National LambdaRail. Multicast HD streams of the same production were simultaneously transmitted as 20-Mbps (MPEG-2) and 6-Mbps (Windows Media 9) streams.

This work was supported by the LOOKING project (lookingtosea.org).



IV. *OptIPuter Education and Outreach Projects*

“Ship To Shore” was an event in collaboration with The Preuss School UCSD, the Scripps Institution of Oceanography Visualization Center, the OptIPuter project (optiputer.net), and NSF in which a real-time videoconference was held between a middle school class in San Diego and scientists on the SIO R/V Roger Revelle. The inquisitive middle schoolers were given the opportunity to ask questions about what life and science are like halfway around the world. We will display video recorded during this event. This work was supported by HiSeasNet and OptIPuter.

V. *3-D Interactive Visualizations of Lake Tahoe and Ridge Sites*

We will display 3-D interactive visualizations on the iCluster (siovizcenter.ucsd.edu/icluster) using data collected at various study sites such as Lake Tahoe (siovizcenter.ucsd.edu), and Ridge (ridgeview.ucsd.edu) sites such as the Lau basin.

VI. *TileViewer*

The Calitz Center of Graphics, Visualization and Imaging Technology at UC Irvine designed the Highly Interactive Parallelized Display Wall (HIPerWall: vis.eng.uci.edu/cg/projects/hiperwall) that operates at a combined resolution of more

than 200 megapixels. We will display aerial photographs of Southern California (data obtained from the USGS Eros Data Center), IKONOS satellite imagery of the Lake Tahoe region, global bathymetric and topographic maps, and other extremely large, high-resolution images.

VII. *SCCOOS Real-time Data*

The Southern California Coastal Ocean Observing System (SCCOOS: www.sccoos.org) serves real-time and archived data from . You may explore this data on a 23-inch Apple Cinema Display located at our booth.

VIII. *“Storcloud: High-Performance Computing Storage Capability” Challenge with UIC and NCMIR*

Our participation in this challenge is called “Interactive Remote Visualization of Large, High-Resolution, Time-Varying Geophysical and Biological Datasets: LambdaRAM and LambdaStream.” In this demo (which will take place at the National LambdaRail booth, #6003, across from ours), we will use the linux cluster at the NLR booth, the Mac iCluster machines, the Calitz cluster, and a cluster in Chicago to access aerial photographs of Southern California over the OptIPuter for display at the NLR booth.

About the iCluster (siovizcenter.ucsd.edu/icluster)

The iCluster is a 50-megapixel tiled display visualization system built using Apple G5s and 30-inch Apple Cinema Displays. This system is used to visualize real-time data from the USArray network of sensors (part of the NSF-funded Earthscope project) and other regional and global observing systems. The current configuration of the iCluster is housed in the Array Network Facility office at the Institute of Geophysics and Planetary Physics at SIO and is referred to as the “ANFwall.”

The iCluster is based on the design of the Geowall-2 and the OptIPuter visualization cluster. This project is funded by Calitz and the Earthscope Array Network Facility at IGPP.

Hardware Specifications:

- Seven-node Apple Power Mac G5 cluster
- Dual 2.5-GHz PowerPC G5
- 8-GB DDR400 SDRAM
- NVIDIA GeForce 6800 Ultra DDL
- Built-in gigabit Ethernet and a second PCI-X gigabit Ethernet card for cluster interconnect
- 13 30-inch Apple monitors: 12 displays are mounted on the wall as a 4x3 tiled display. Each display supports a resolution of up to 2560 x 1600 pixels. The total resolution of the tiled display is nearly 50 megapixels.

Image: The flooded condition of a small section of the Amazon River. Courtesy of Earth Sciences and Image Analysis Laboratory, NASA Johnson Space Center.

