“The UC California Institutes for Science and Innovation"

Invited Talk to
Seminar on Creating a Regional Innovation Cluster:
From Discovery to Application
UCSD
La Jolla, CA
Apr 25, 2006

Dr. Larry Smarr

Director, California Institute for Telecommunications and Information Technology

Harry E. Gruber Professor,

Dept. of Computer Science and Engineering

Jacobs School of Engineering, UCSD

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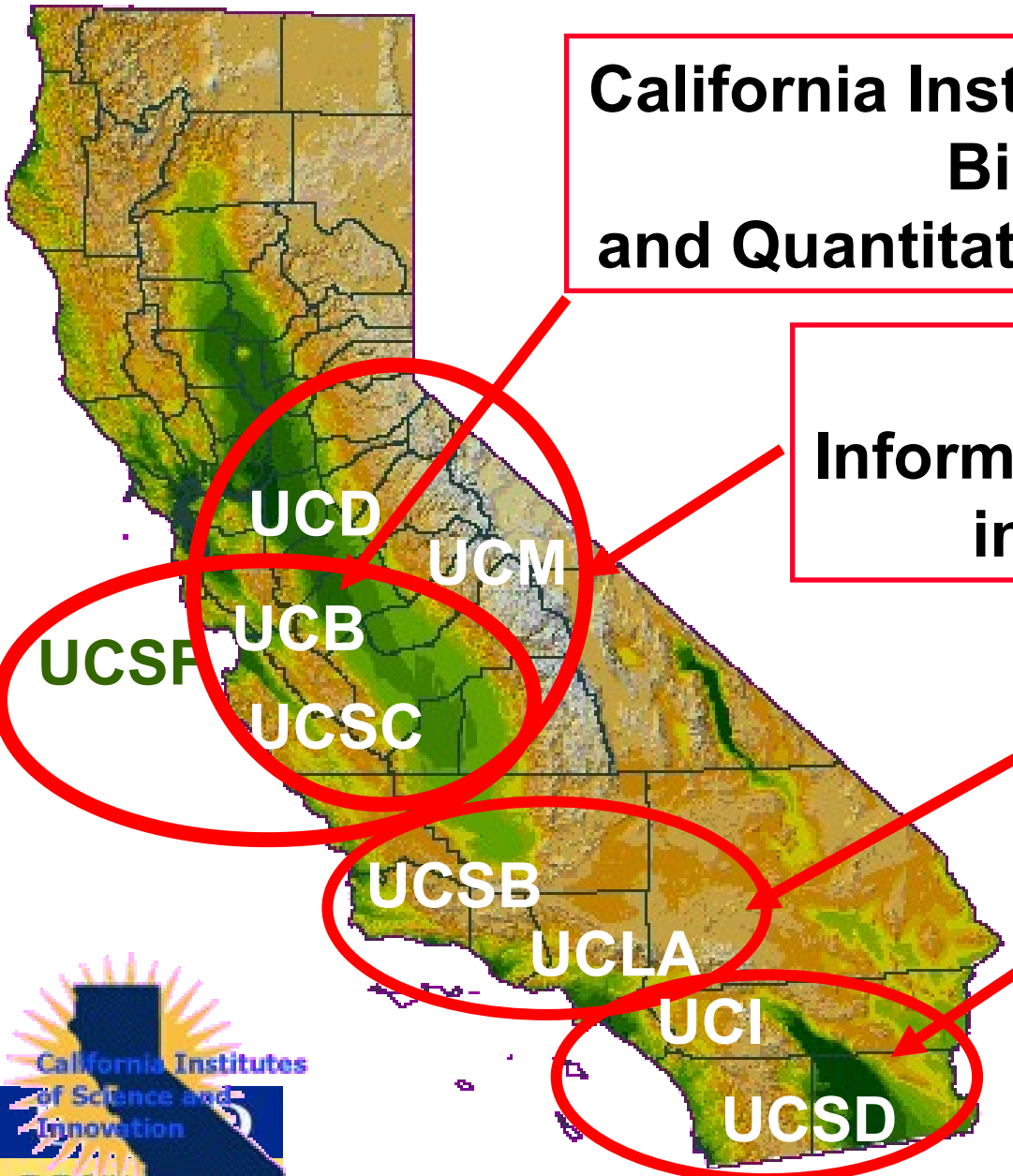
Abstract

In his January 2000 State of the State address, California Governor Gray Davis proposed an initiative, the California Institutes for Science and Innovation, in partnership with the University of California, then led by President Richard C. Atkinson. The motivation of the initiative was to create, within the University of California, "world-class centers for scientific discovery that fuel innovation, and for education integrated into the cutting-edge research that will train future scientists and technological leaders." The California legislature provided $100M in funding for new buildings and facilities to each of four multi-campus institutes, which had to be matched 2-1 by non-state funds, primarily from industry and the federal government. The four institutes were the California Institute for Bioengineering, Biotechnology, and Quantitative Biomedical Research (UC-San Francisco, UC-Berkeley, and UC-Santa Cruz; see www.qb3.org); California NanoSystems Institute (UCLA, UC-Santa Barbara; see www.cnsi.ucla.edu); Center for Information Technology Research in the Interest of Society (UC-Berkeley, UC-Davis, UC-Santa Cruz, UC-Merced; see www.citris.berkeley.edu/), and the California Institute for Telecommunications and Information Technology (UC-San Diego, UC-Irvine; see www.calit2.net). I will describe some lessons learned from the last five years of Calit2.

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California's Institutes for Science and Innovation: A Bold Experiment in Collaborative Research



California Institute for Bioengineering, Biotechnology, and Quantitative Biomedical Research

Center for Information Technology Research in the Interest of Society

California NanoSystems Institute

California Institute for Telecommunications and Information Technology

California Institutes of Science and Innovation

UCHV

www.ucop.edu/california-institutes

The View From Outside: "Calit2 is all about collaboration"

ECAR
EDUCAUSE CENTER FOR APPLIED RESEARCH

Calit2: A Case Study in a Next-Generation Research Environment

Donald Spicer, ECAR
Bruce Metz, ECAR

ECAR Case Study 1, 2006

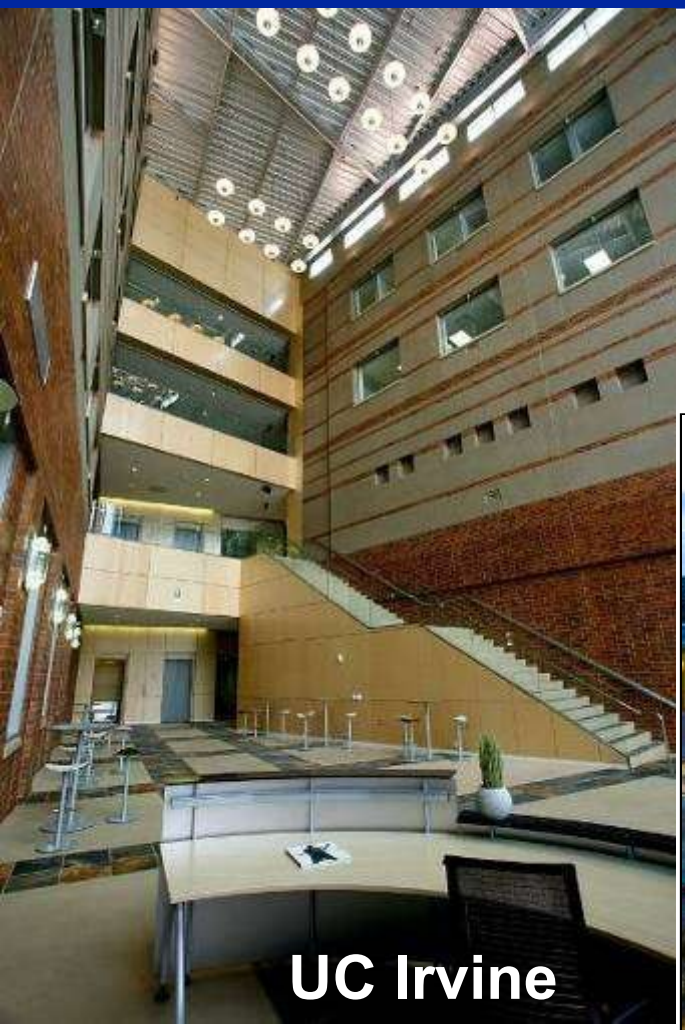
Case Study from the
EDUCAUSE Center for Applied Research

- **"Calit2 is a partnership between faculty, students, and technical professionals developing a next generation technology-enabled research environment."**
- **"Support staff enhance researchers ability to work."**

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Two New Calit2 Buildings Provide New Laboratories for "Living in the Future"



- Over 1000 Researchers in Two Buildings
  - Linked via Dedicated Optical Networks
  - International Conferences and Testbeds
- New Laboratories
  - Nanotechnology
  - Virtual Reality, Digital Cinema



www.calit2.net

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State of California Provided $100M in Capital Funds For Two Buildings and Specialized Labs

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Calit2 is Experimenting with Open Reconfigurable Work Spaces to Enhance Collaboration





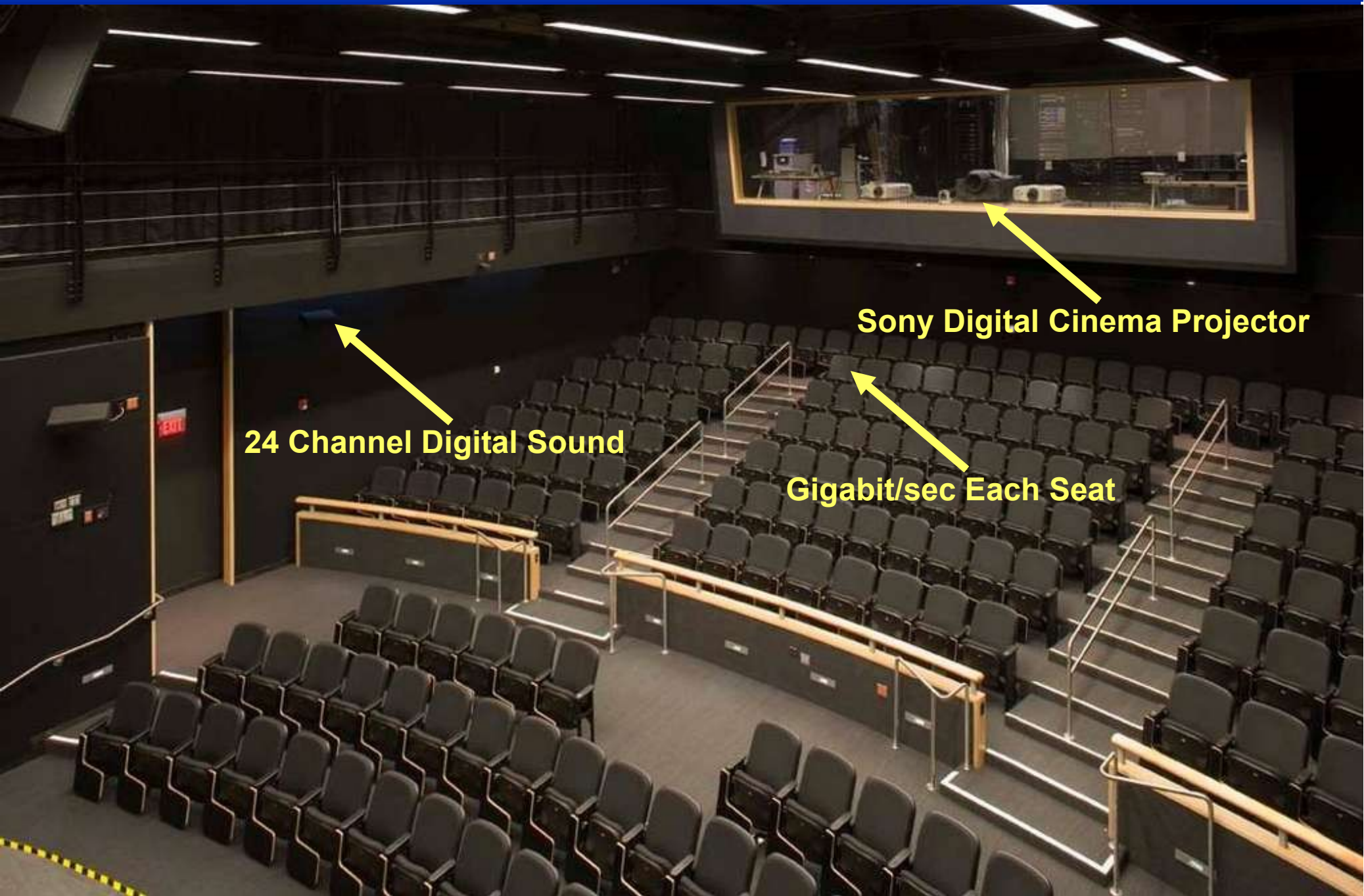


Over Two Dozen Departments in the Building

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Photos by John Durant; Barbara Haynor, Calit2

One of the Most Advanced Digital Theatres in the United States



Borderless Collaboration Between Global University Research Centers at 10Gbps

Maxine Brown, Tom DeFanti, Co-Chairs

iGrid 2005

THE GLOBAL LAMBDA INTEGRATED FACILITY

www.igrid2005.org



the UC Discovery Grant

September 26-30, 2005

Calit2 @ University of California, San Diego

California Institute for Telecommunications and Information Technology

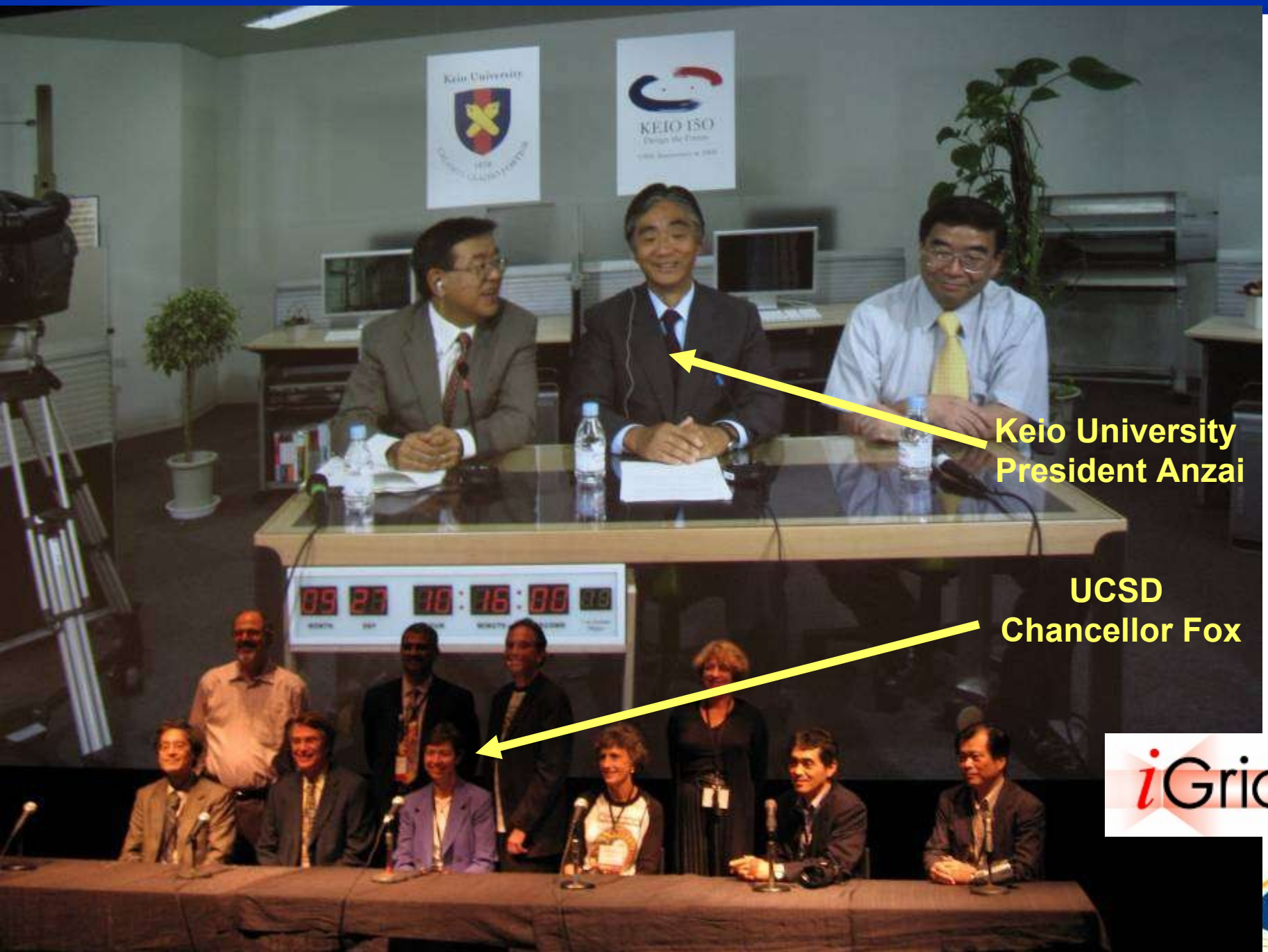


21 Countries Driving 50 Demonstrations

1 or 10Gbps to Calit2@UCSD Building

Sept 2005

First Trans-Pacific Super High Definition Telepresence Meeting in New Calit2 Digital Cinema Auditorium



Lays Technical Basis for Global Digital Cinema

Sony
NTT
SGI

iGrid 2005

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Calit2 Industry Partners: Driving Public-Private Innovation Throughout California

Draft Data Only 93 of 132 Partners Mapped



Source: Jerry Sheehan, Calit2

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Innovation Driven by Calit2 Industrial Partners Teaming with Academic Research and Education

- Providing Access to Pre-Product Equipment
- Funding Faculty Research Projects
- Supporting Graduate/Undergraduate Fellows
- Joining on Federal Grants
- Co-Sponsoring Workshops/Conferences
- Hosting Seminars or Lectures
- Endowing Chaired Professorships

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$85 Million from Industrial Partners in Matching Funds

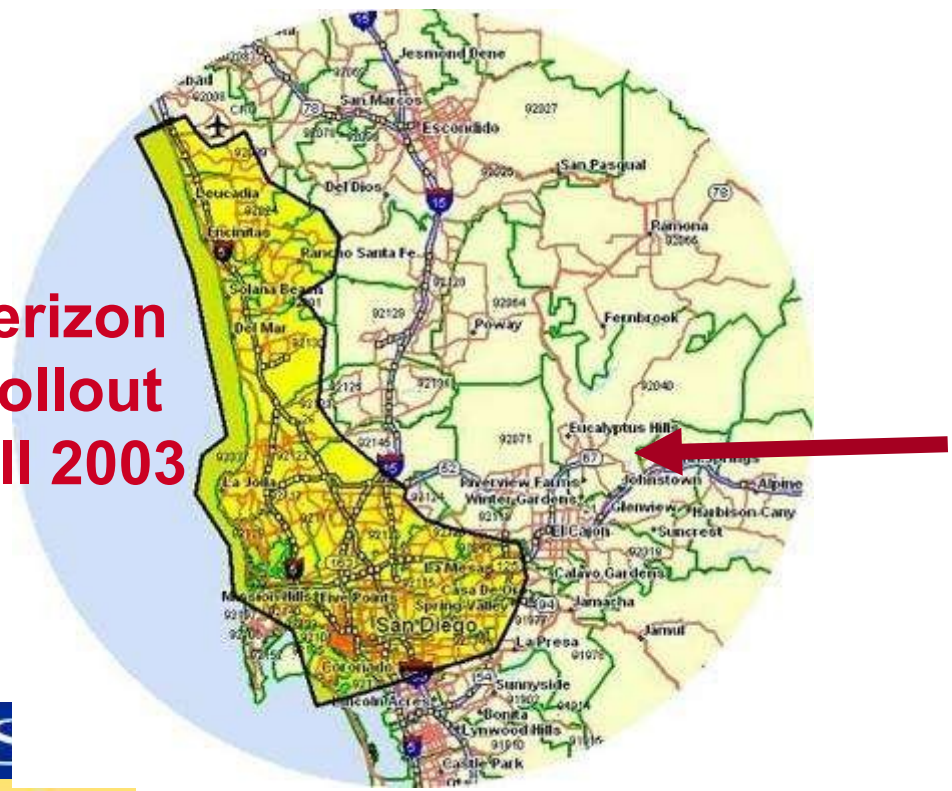
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Only Three Years From Research to Market New Broadband Cellular Internet Technology

- First US Taste of 3G Cellular Internet
  - UCSD Jacobs School Antenna
    - Three Years Before Commercial Rollout
- Linking to WiFi Mobile "Bubble"
  - Tested on Campus CyberShuttle
- Verizon Introduces in San Diego



Rooftop Qualcomm 1xEV Access Point



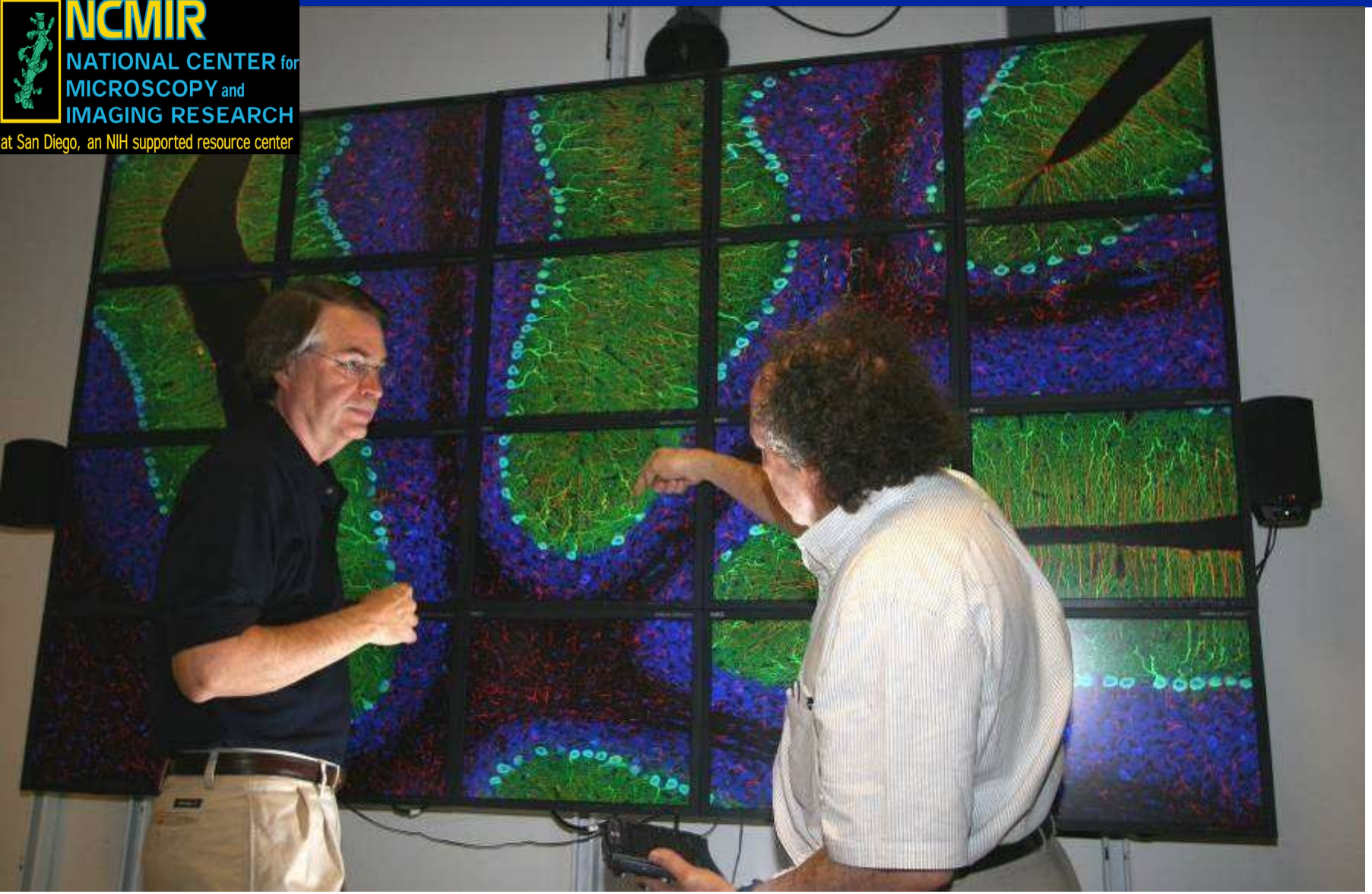


CyberShuttle March 2002

www.calit2.net/news/2002/4-2-bbus.html

The OptIPuter Project: Creating High Resolution Portals Over Dedicated Optical Channels to Global Science Data

NCMIR
NATIONAL CENTER for MICROSCOPY and IMAGING RESEARCH
at San Diego, an NIH supported resource center



NSF

$13.5M Over Five Years

Source: Mark Ellisman, David Lee, Jason Leigh

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Calit2 (UCSD, UCI) and UIC Lead Campuses—Larry Smarr PI
Univ. Partners: SDSC, USC, SDSU, NW, TA&M, UvA, SARA, KISTI, AIST
Industry: IBM, Sun, Telcordia, Chiaro, Calient, Glimmerglass, Lucent

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Calit2@UCI Has the Largest Tiled Display Wall--HIPerWall



Calit2@UCI Apple Tiled Display Wall
Driven by 25 Dual-Processor G5s
50 Apple 30” Cinema Displays
200 Million Pixels of Viewing Real Estate!

Zeiss Scanning Electron Microscope in Calit2@ UCI

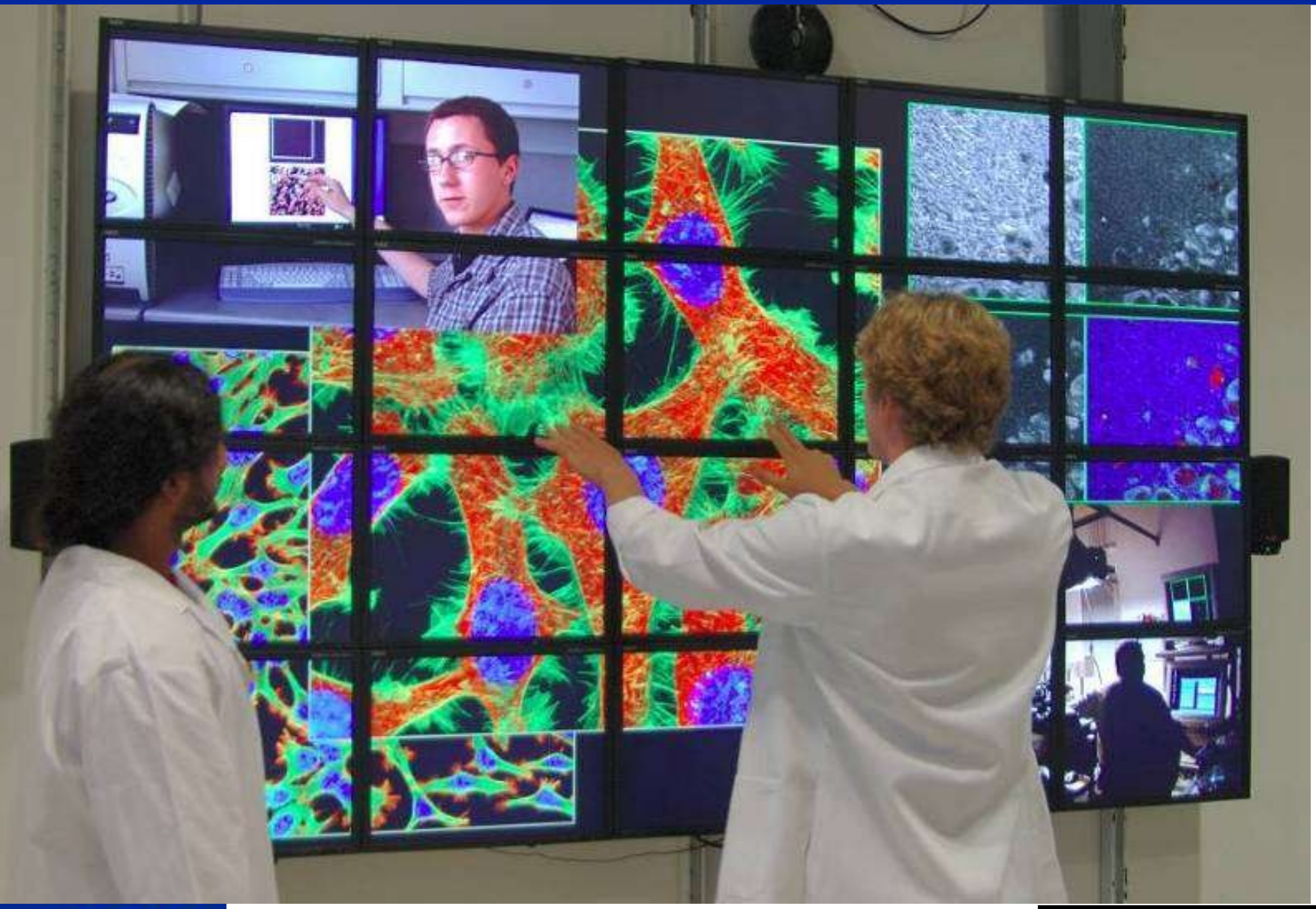


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it² Center of GRAVITY
Center of Graphics, Visualization and Imaging Technology

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Combining High Definition Video Streams with Large Scale Image Display Walls



Large Scale Images of Cancer Cells

UCSD UCIrvine

evl electronic visualization laboratory

Source: David Lee, NCMIR, UCSD

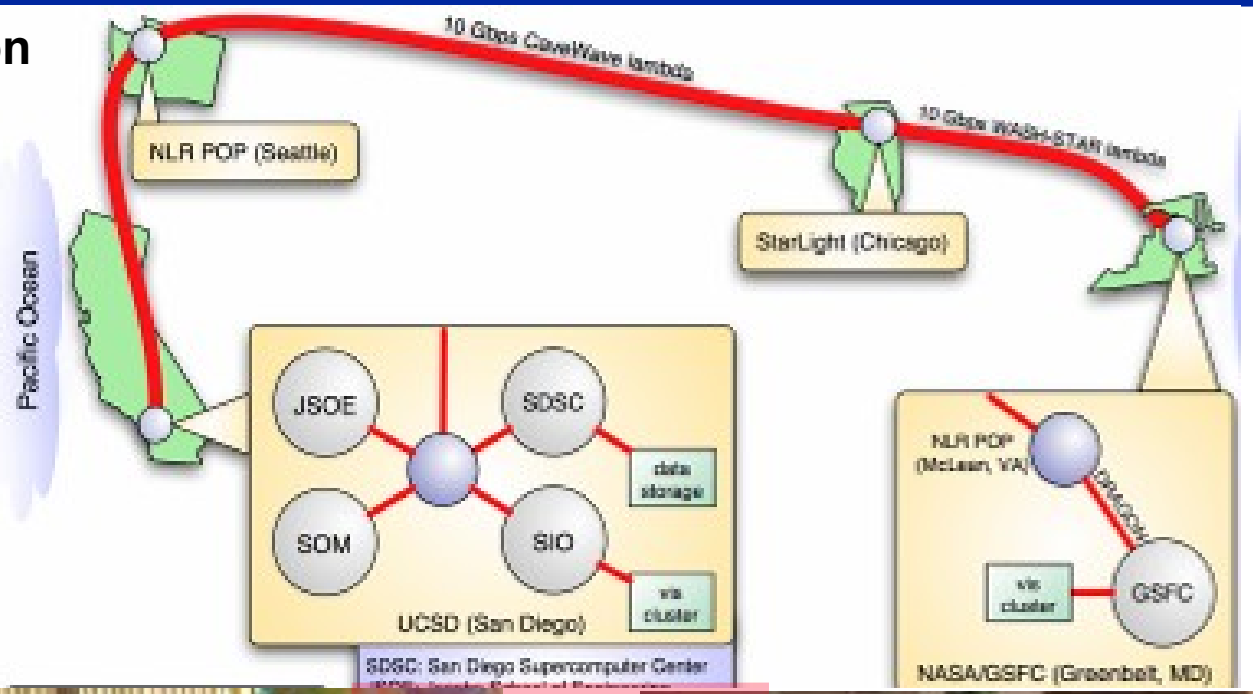
NCMIR NATIONAL CENTER for MICROSCOPY and IMAGING RESEARCH at San Diego, an NIH supported resource center

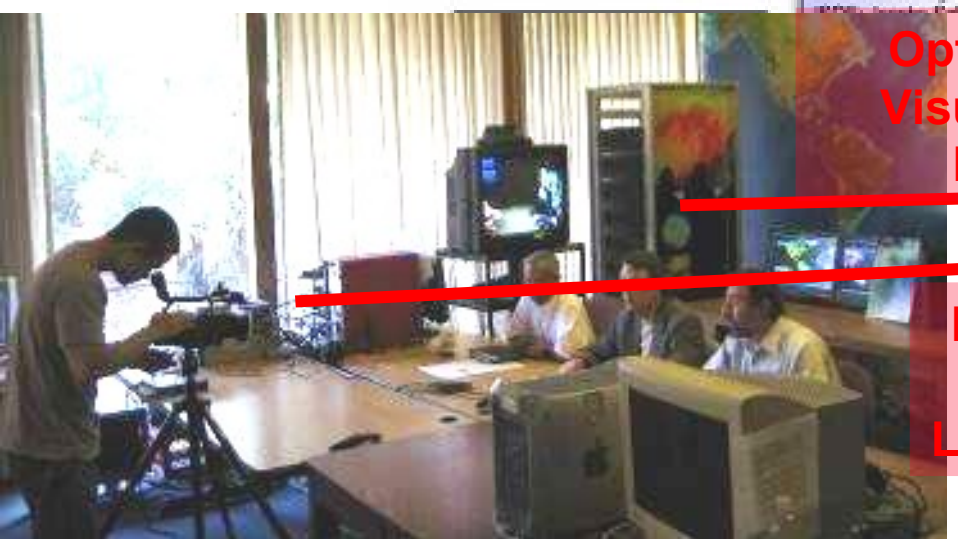
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Calit2 is Combining Telepresence with Remote Interactive Analysis

Live Demonstration

of 21st Century National-Scale Team Science





OptIPuter Visualized Data

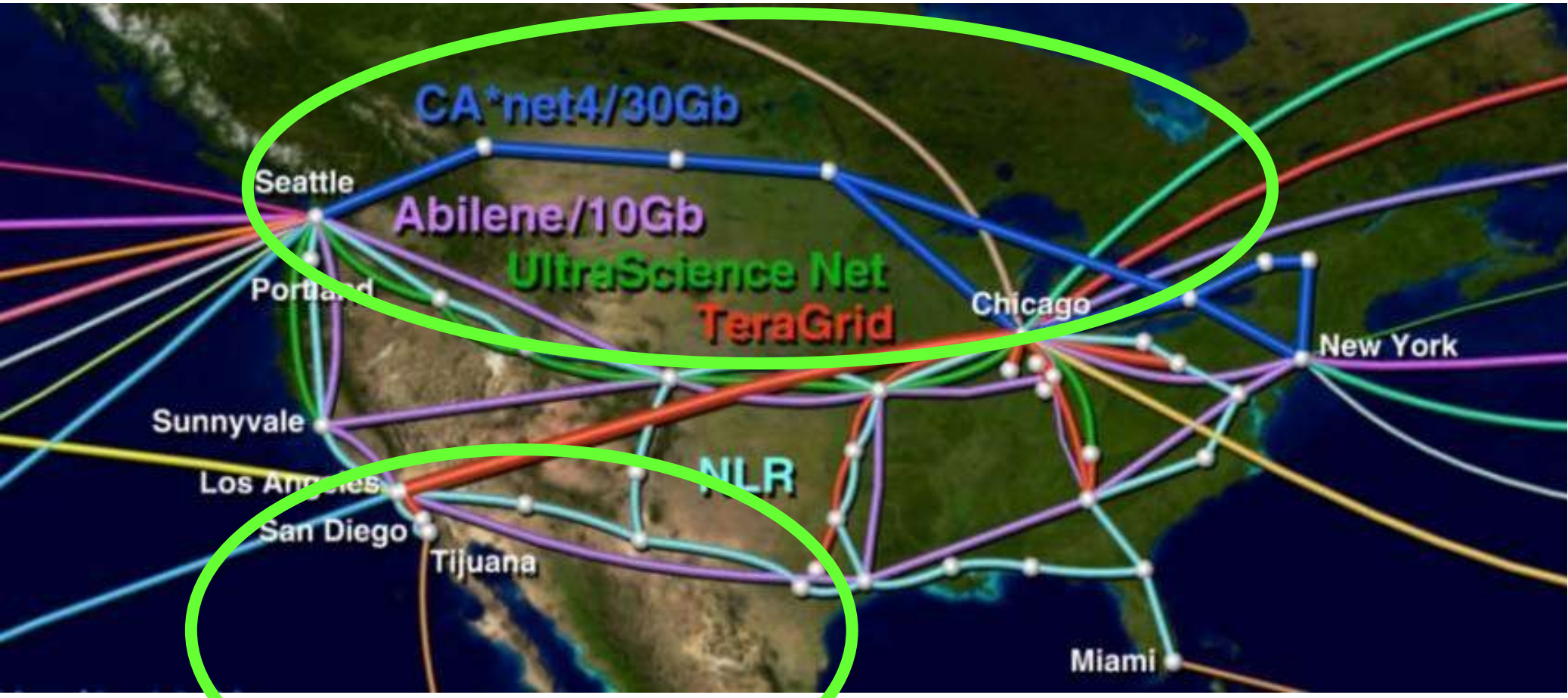
HDTV Over Lambda



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August 2005

Creating a North American Superhighway for High Performance Collaboration



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Next Step: Adding Mexico to Canada's CANARIE and the U.S. National Lambda Rail

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Dedicated Optical Fiber Collaboratory: Remote Researchers Jointly Exploring Complex Data



Deploy Throughout Mexico After CICESE Test

OptIPuter

Proposal:
Use OptIPuter to Connect a Tiled Display at CICESE to the 100M-Pixel Display at Calit2@UCSD With Shared Storage



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Collaborating with City, County, State Agencies
A Classic "One-Institute, Two-Campus" Grant

- **Project RESCUE**
  - **Five-Year $12.5 Million Award-Started Oct 1, 2003**
- **Transforming Data Collection, Management, Analysis, Sharing, and Dissemination to Improve Crisis Response**
  - **Twenty-Five Researchers and Professors**
    - **UCI PI: Sharad Mehrotra, ICS**
    - **UCSD PI: Ramesh Rao, ECE**
    - **Univ. Maryland, Univ. Of Illinois, BYU, Univ. Colorado**
  - **Industrial Partners**
    - **ImageCat, Ericsson, HNS, HP, Intersil, Parity, SAIC, SBC, Symbol, Qualcomm**





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RESCUE Community Advisory Board

Ellis Stanley – Chair
General Manager, City of Los Angeles
Emergency Preparedness Department

Jim Watkins (retired)
Governor's Office
Emergency Services

Bob Garrott
Los Angeles County
Office of Emergency Mgmt.

Paulette Murphy
Space and Naval Warfare
Systems Command
(SPAWAR)

Dawna Finley
Tom Hume
Eileen Salmon
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Karen Butler
Program Manager
Communications Division
San Diego Police Department

William Maheu
Assistant Chief of Police
City of San Diego

David Rose
Lieutenant Officer
UC San Diego Police Department

Linda Bogue
Emergency Mgmt. Coordinator
Environmental Health and Safety



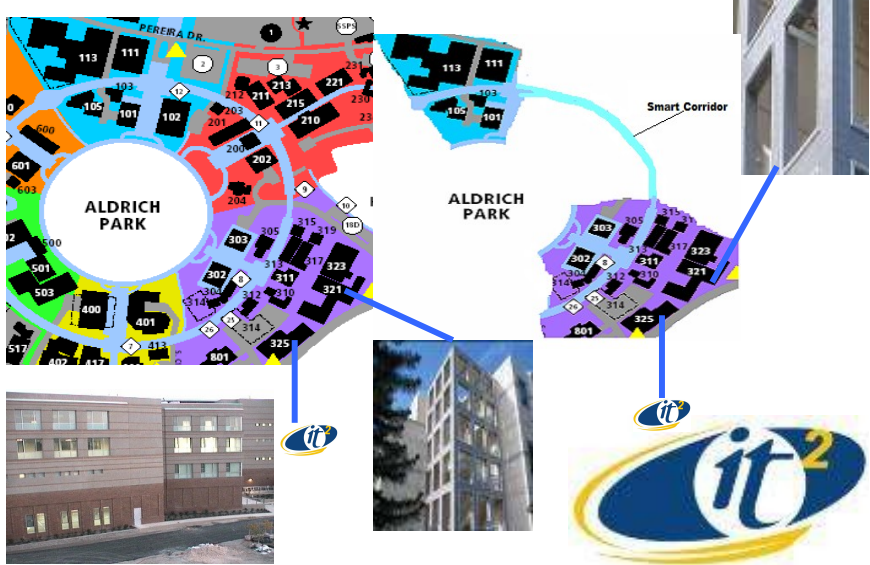
NSF-Funded ResponSphere Establishes Calit2 Project Rescue Testbeds in Irvine and in San Diego

- ***Gaslamp Quarter*, San Diego/UCSD**
  - **Ubiquitous Wireless Coverage in Downtown San Diego**
  - **Test Network Architecture Enhancement and New Applications**

- ***Crisis Assessment, Mitigation, And Analysis* – UCI Campus**
  - **Field-Test and Refine Research on Information Collection, Analysis, Sharing, and Dissemination in Controlled yet Realistic Settings**







rescue

NSF

responsphere

bren:school
information and computer sciences

UCSD
UCIrvine

PI: Magda El Zarki, ICS, UCI
www.responsphere.org

NSF RESCUE Strongly Coupled with NIH WIISARD Grant

Wireless Internet Information System for Medical Response in Disasters

Calit2 is Working Closely with the First Responder Community



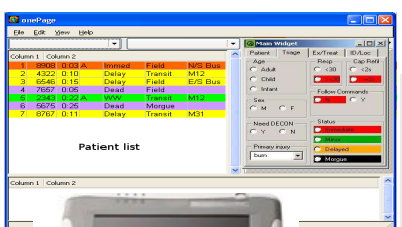




Triage

First Tier





Patient list



802.11 pulse ox







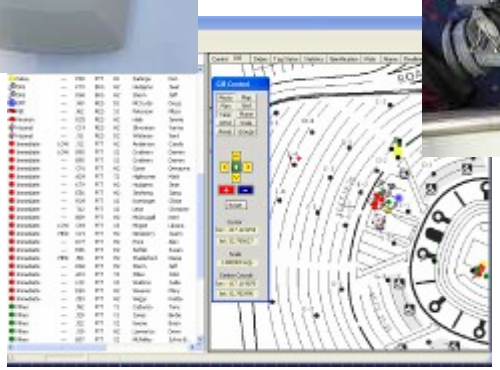
Reality Flythrough
Mobile Video



Mid Tier



Wireless Networks



Command Center