Innovative Research Alliances

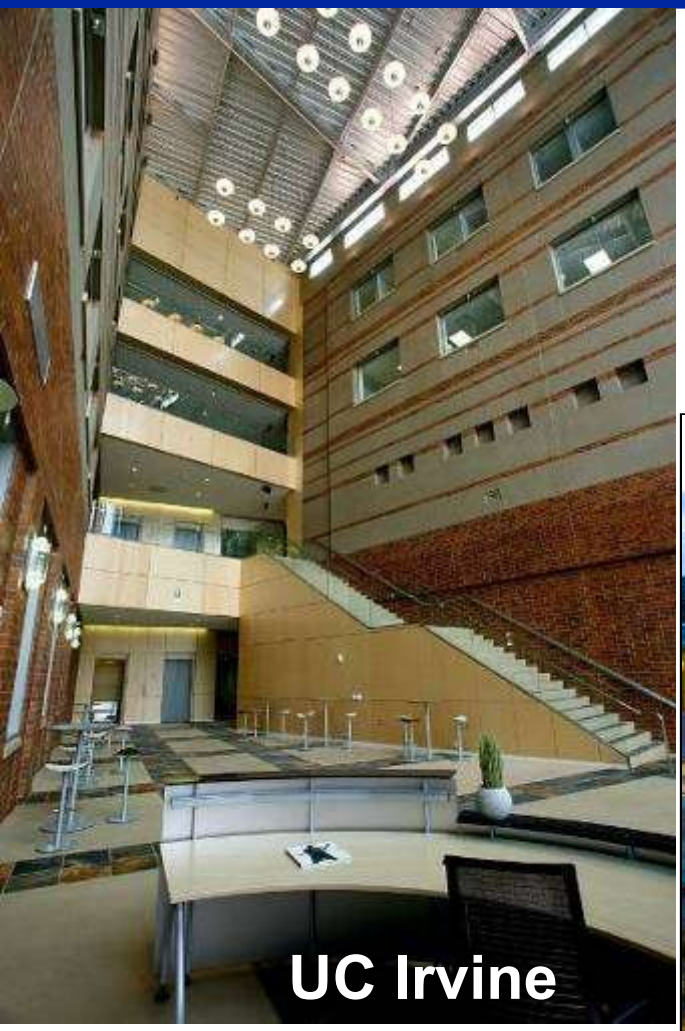
Invited Talk
IUCRP Fellows Seminar
UCSD
La Jolla, CA
July 10, 2006

Dr. Larry Smarr
Director, California Institute for Telecommunications and Information Technologies
Harry E. Gruber Professor,
Dept. of Computer Science and Engineering
Jacobs School of Engineering, UCSD

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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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$100M in Capital for Calit2 Buildings

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Calit2 Industry Partners: Driving Public-Private Innovation Throughout California

Draft Data Only 93 of 132 Partners Mapped

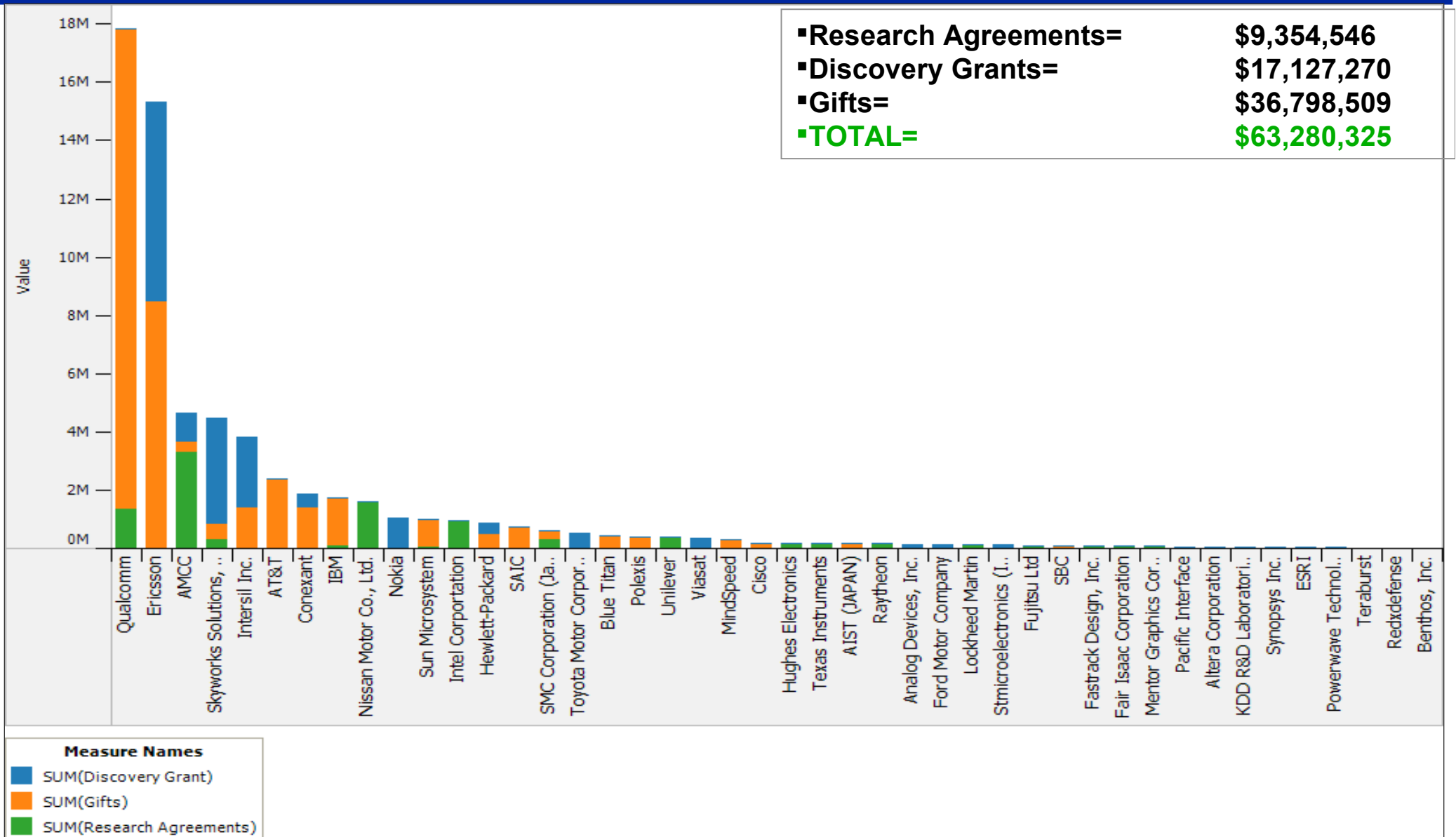


Source: Jerry Sheehan, Calit2

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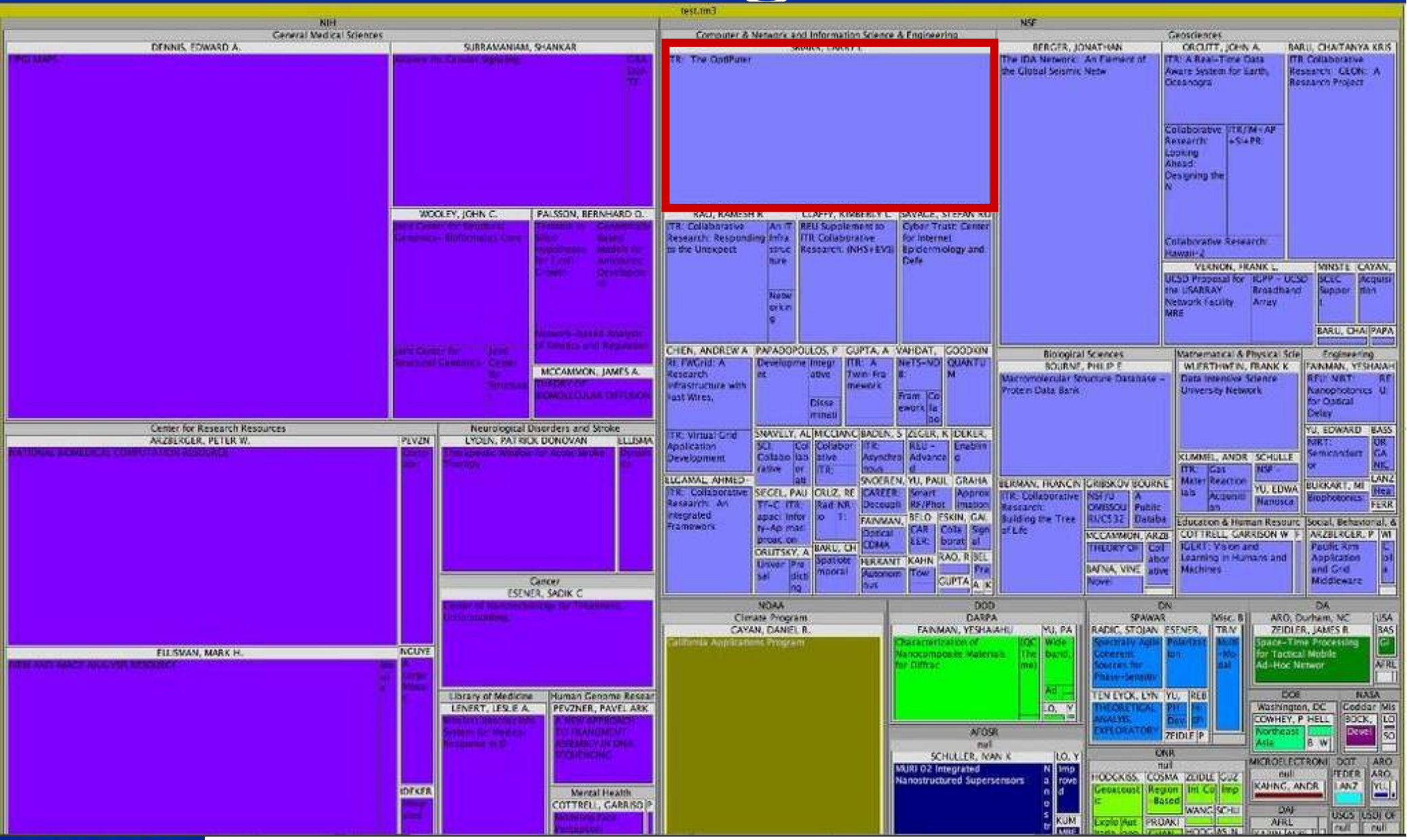
Calit2@ UCSD Industrial Partnerships



- Research Agreements= $9,354,546
- Discovery Grants= $17,127,270
- Gifts= $36,798,509
- TOTAL= $63,280,325

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Federal Research Grants Affiliated with Calit2@UCSD



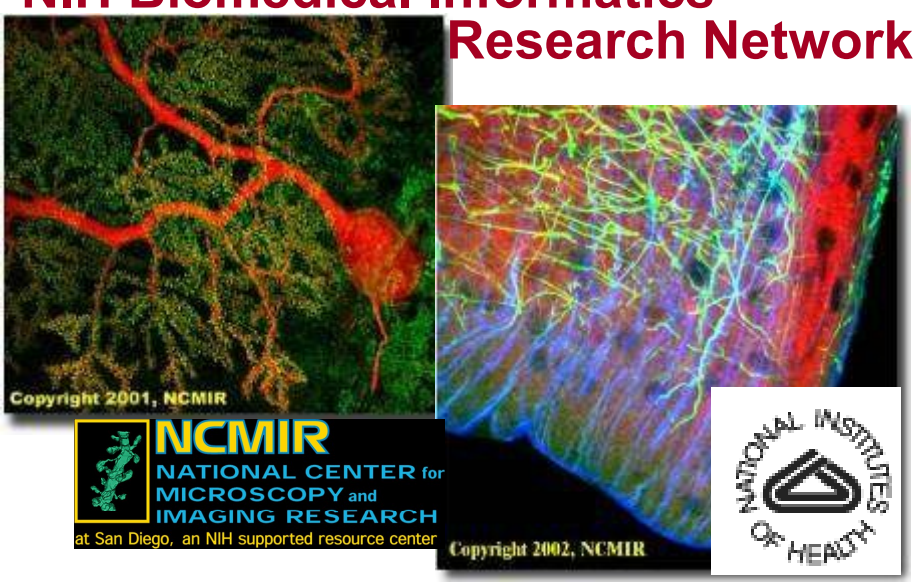
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191 Affiliated Grants
~ $270 M Since Creation

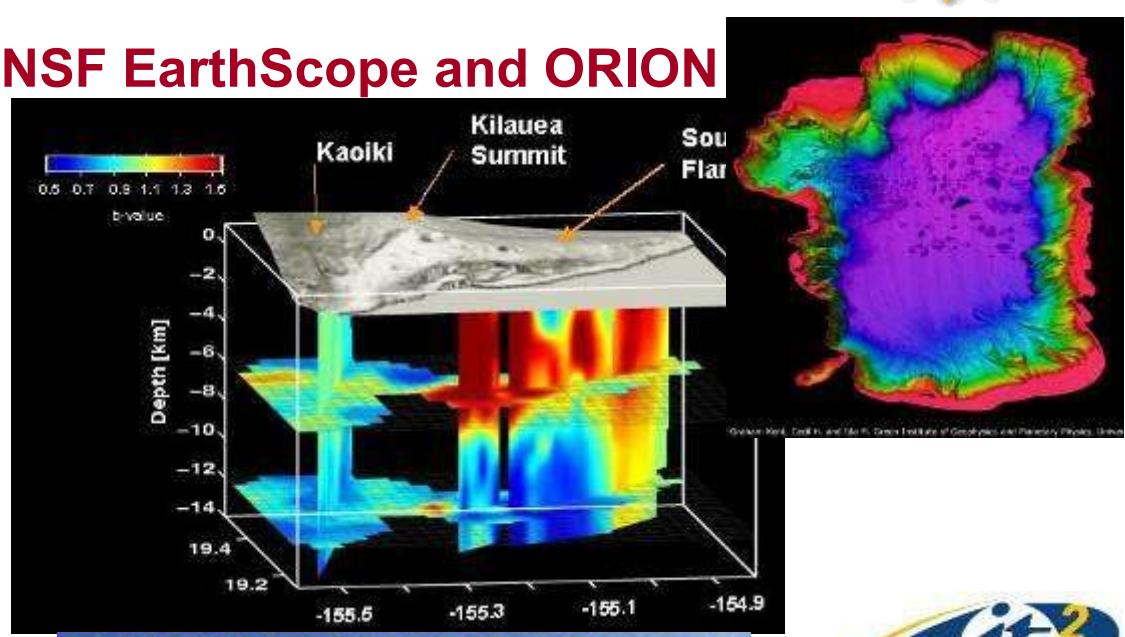
The OptIPuter Project – Creating High Resolution Portals Over Dedicated Optical Channels to Global Science Data

- **NSF Large Information Technology Research Proposal**
  - Calit2 (UCSD, UCI) and UIC Lead Campuses—Larry Smarr PI
  - Partnering Campuses: SDSC, USC, SDSU, NCSA, NW, TA&M, UvA, SARA, NASA Goddard, KISTI, AIST, CRC(Canada), CICESE (Mexico)
- **Industrial Partners**
  - IBM, Sun, Telcordia, Chiaro, Calient, Glimmerglass, Lucent
- **$13.5 Million Over Five Years—Now In the Fourth Year**

NIH Biomedical Informatics Research Network



NSF EarthScope and ORION



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SCRIPPS INSTITUTION OF OCEANOGRAPHY

CAMERA: Community Cyberinfrastructure for Advanced Marine Microbial Ecology Research and Analysis



National LambdaRail Direct Connect Computation and Storage Complex

PI Larry Smarr

Funded by: Gordon and Betty Moore Foundation

Joint Partnership of:

UCSD UCIrvine

Announced January 17, 2006
$24.5M Over Seven Years

Marine Genome Sequencing Project
Measuring the Genetic Diversity of Ocean Microbes



Sorcerer II Data Will Double Number of Proteins in GenBank!

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MARINE MICROBIOLOGY INITIATIVE

Gordon and Betty MOORE FOUNDATION

J. Craig Venter INSTITUTE

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Calit2's Direct Access Core Architecture Will Create Next Generation Metagenomics Server

Sargasso Sea Data

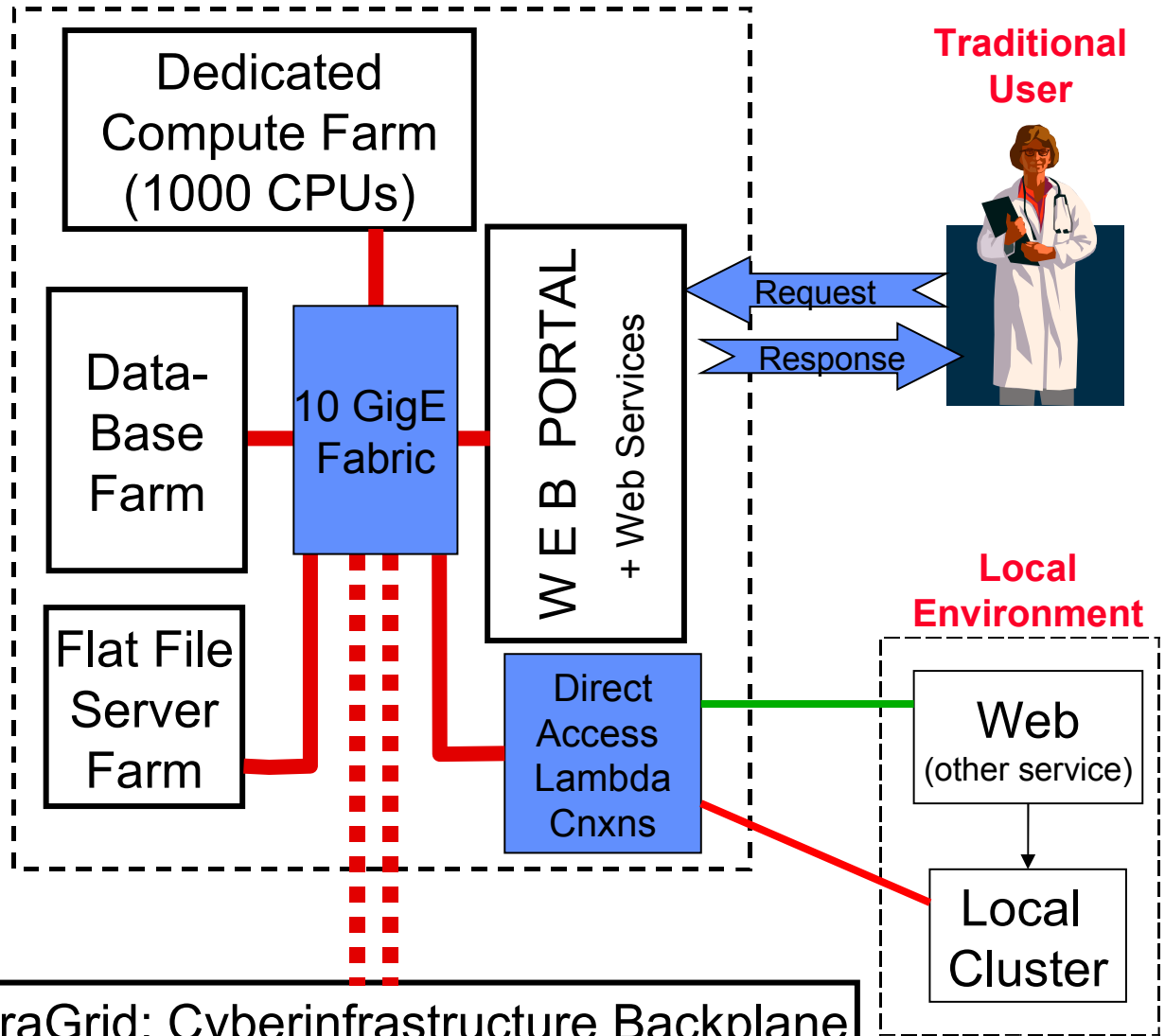
Sorcerer II Expedition (GOS)

JGI Community Sequencing Project

Moore Marine Microbial Project

NASA Goddard Satellite Data

Community Microbial Metagenomics Data



Source: Phil Papadopoulos, SDSC, Calit2

CENTER FOR EARTH OBSERVATIONS & APPLICATIONS

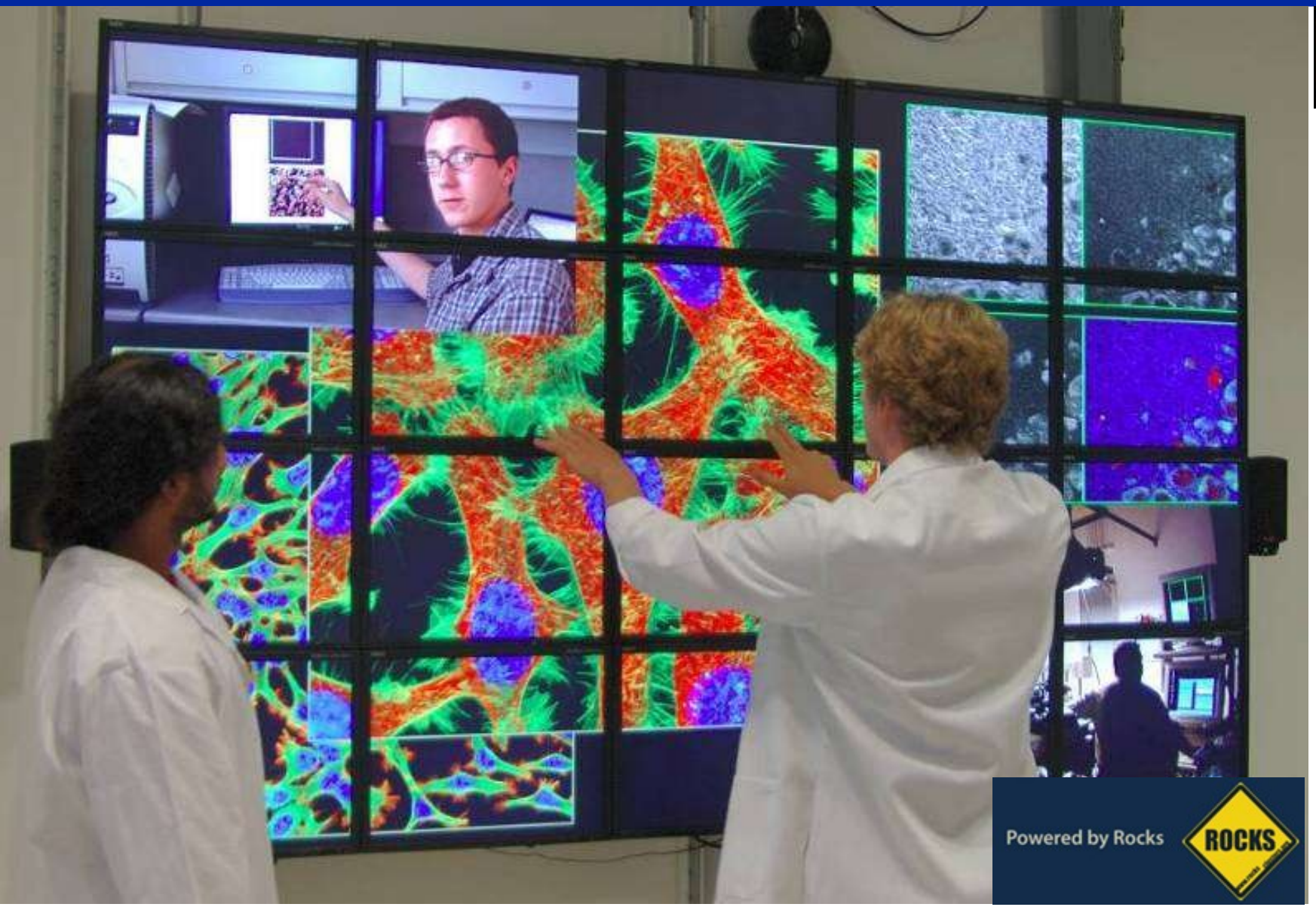
J. Craig Venter INSTITUTE

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SDSC SAN DIEGO SUPERCOMPUTER CENTER

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Combining High Definition Video Streams with Large Scale Image Display Walls



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

NSF

OptIPortal– Termination Device for the OptIPuter Global Backplane

evl electronic visualization laboratory

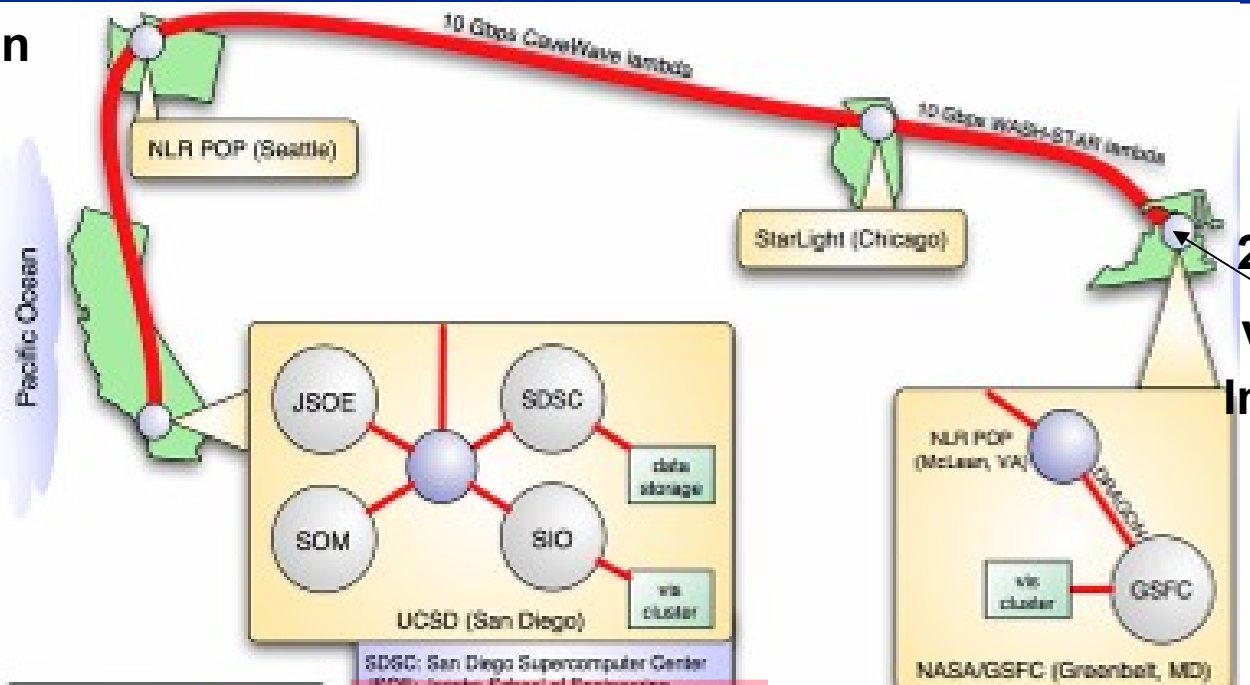
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Calit2 and the Venter Institute Will Combine Telepresence with Remote Interactive Analysis

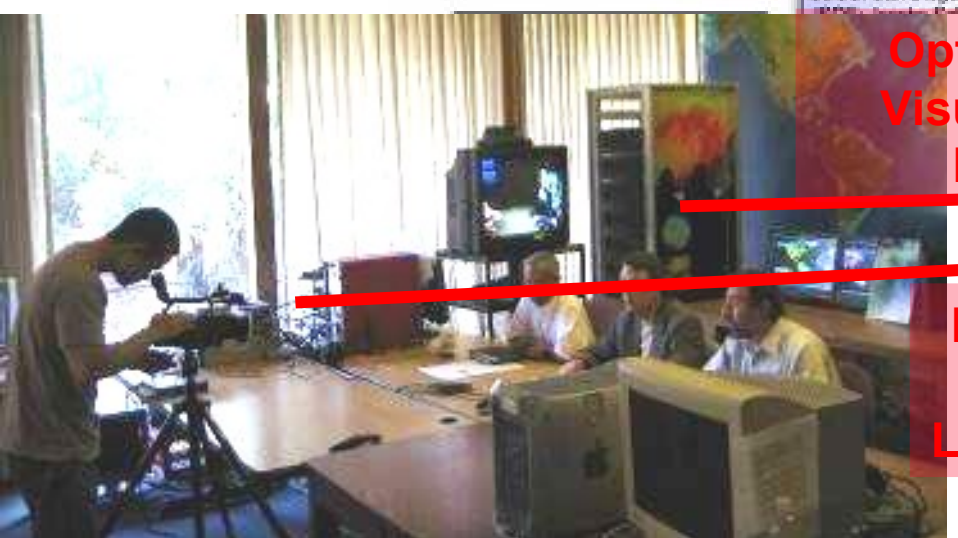
Live Demonstration

of 21st Century National-Scale Team Science



25 Miles

Venter Institute



OptIPuter Visualized Data

HDTV Over Lambda



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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



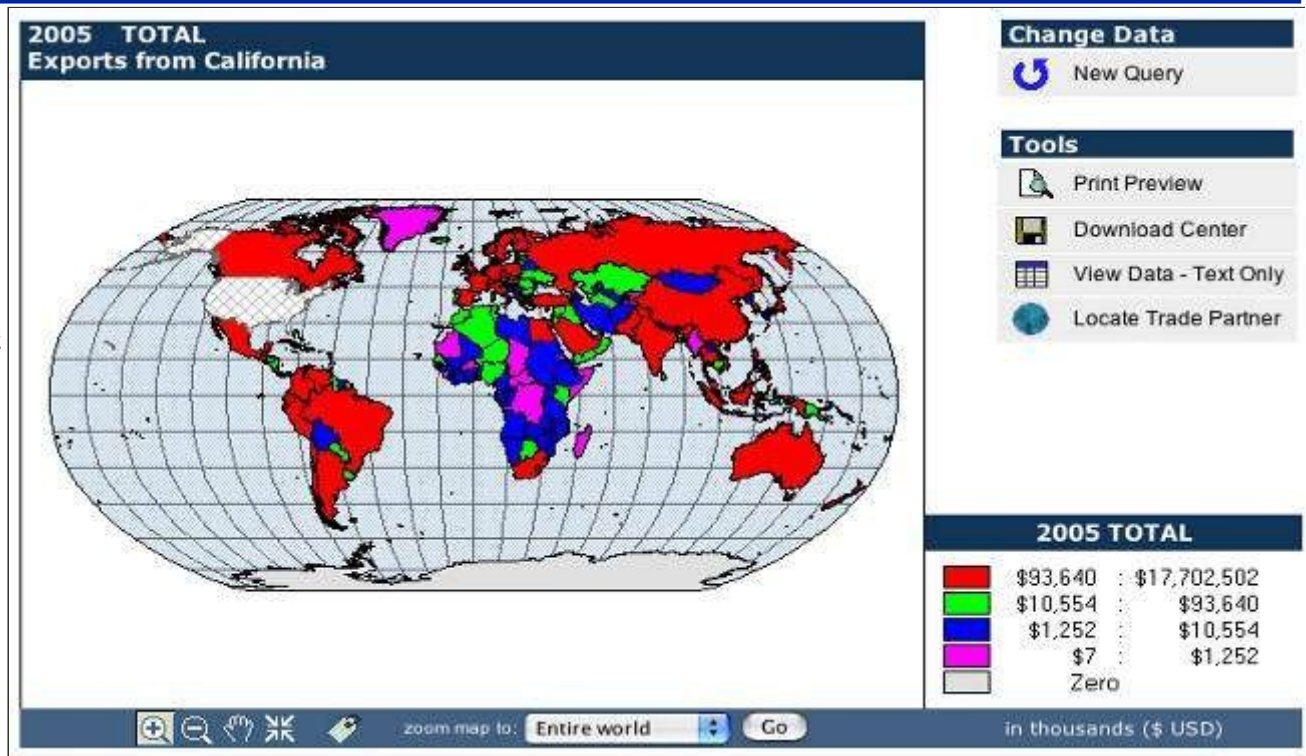
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it² Center of GRAVITY
Center of Graphics, Visualization and Imaging Technology

it²

International Trade is Vital to California

- **International Commerce Drives 25% of the Economy of California**
- **Largest Export Market is Computers and Electronic Products**
- **Top Five Export Markets for California:**
  - **Mexico**
  - **Japan**
  - **Canada**
  - **China**
  - **South Korea**



Exports of TOTAL from California in thousands ($ USD)

Partner	2000	2001	2002	2003	2004	2005
World Total	119,640,424	106,776,963	92,214,292	93,994,882	109,967,840	116,818,585
Mexico	17,515,500	16,343,059	16,076,279	14,871,836	17,239,379	17,702,502
Japan	16,444,070	14,635,142	11,105,481	11,754,708	13,323,182	13,497,848
Canada	14,075,923	11,815,998	10,075,349	11,231,567	12,111,166	13,212,516
China	3,546,021	4,676,056	4,482,407	5,465,042	6,841,775	7,850,001
South Korea	6,917,400	5,034,854	4,711,814	4,833,318	5,912,142	6,344,767
Taiwan	7,362,505	5,664,474	5,391,410	4,443,027	5,362,409	5,383,280
United Kingdom	5,984,509	5,588,784	4,347,289	4,359,964	5,206,036	5,029,139
Hong Kong	4,148,008	3,933,958	3,684,088	4,178,866	5,117,384	4,900,793
Germany	5,263,094	4,657,435	3,480,146	3,559,740	3,682,868	4,266,112

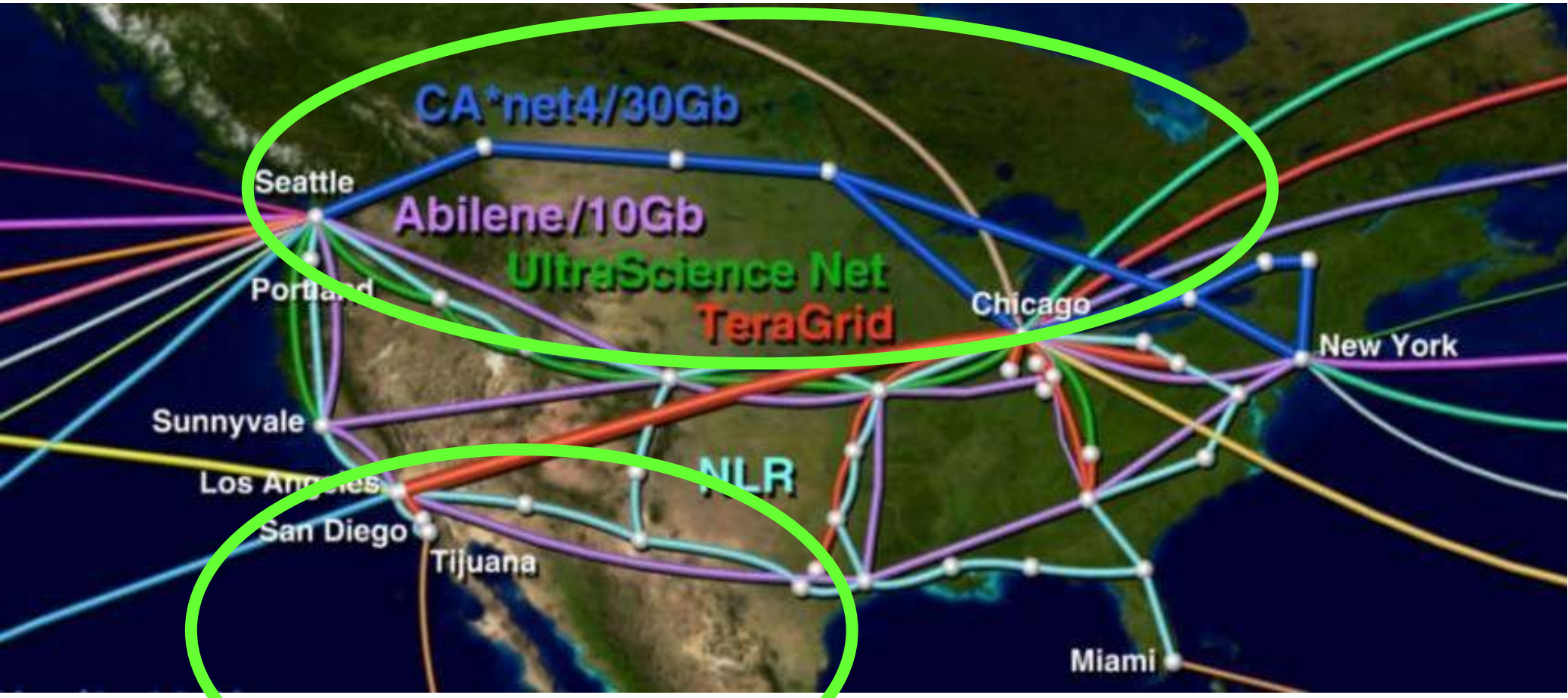
US Trade Department, National Trade Data, July 2006

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Source: Jerry Sheehan, Calit2@UCSD

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Creating a North American Superhighway for High Performance Collaboration

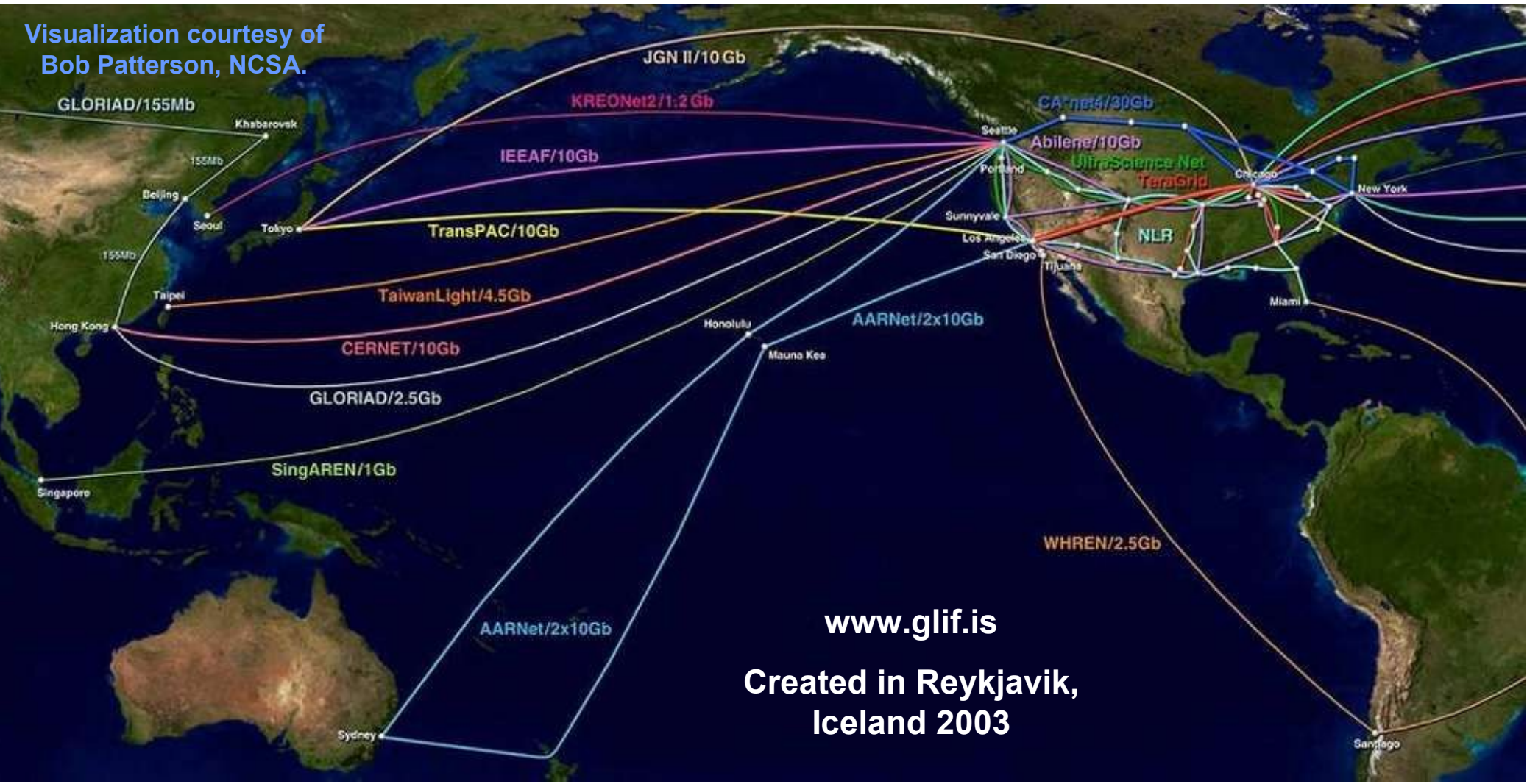


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Next Step: Adding Mexico to Canada's CANARIE and the U.S. National Lambda Rail

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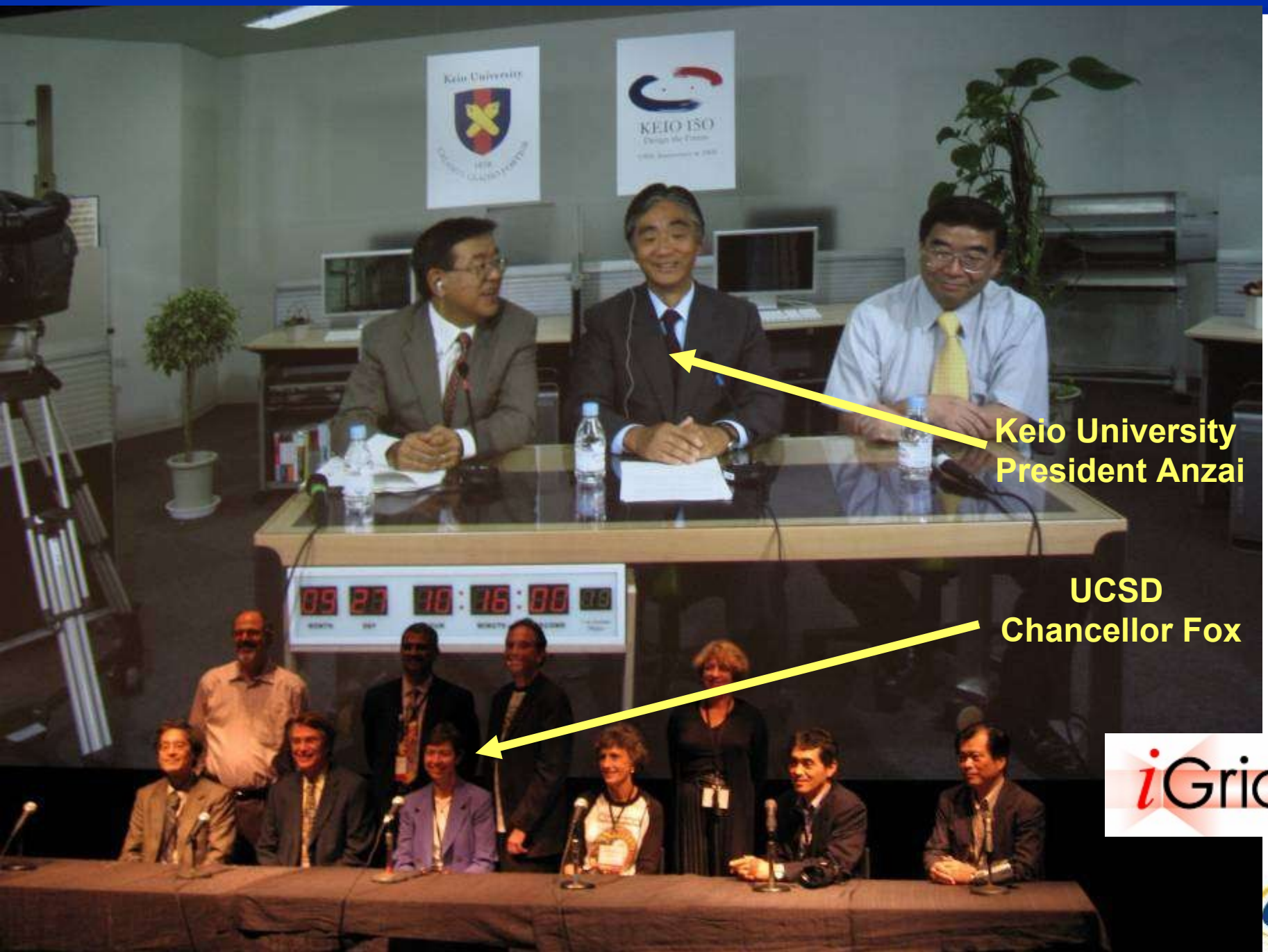
Countries are Aggressively Creating Gigabit Services: Interactive Access to CAMERA Data System



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



Lays Technical Basis for Global Digital Cinema

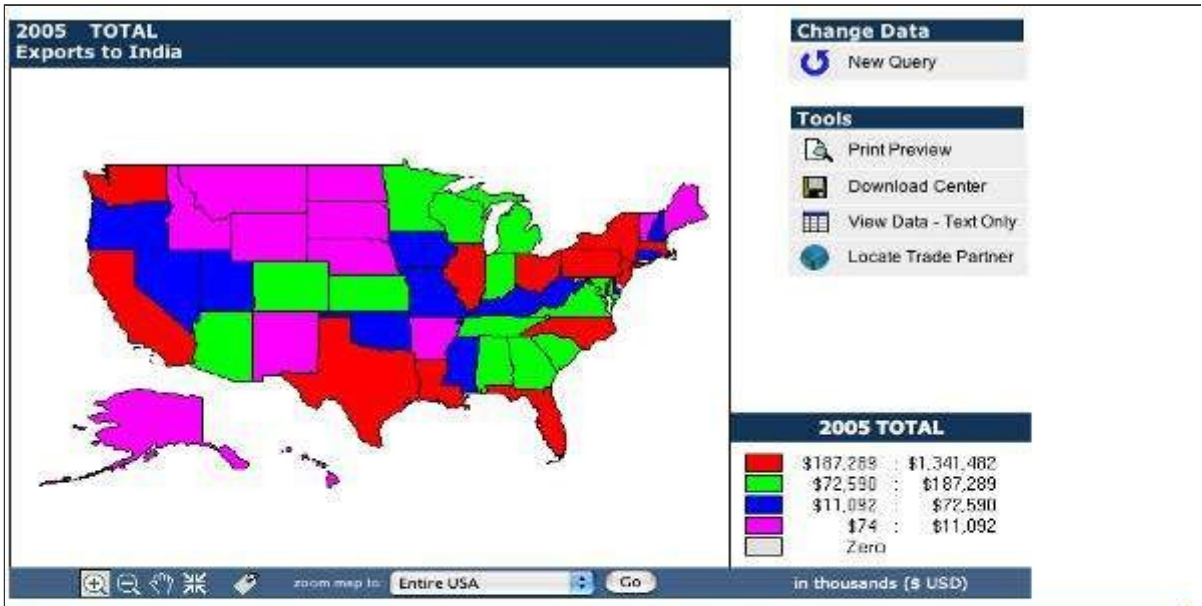
Sony
NTT
SGI

iGrid 2005

it²

India is a Growth Market for California

- California is the Top State Exporting to India in The United States
- Exports Between California and India Increased ~30% Between 2004 and 2005
  - Growth Trend Is Continuing In 2006
- India and &US Have an Action Plan to Increase Bilateral Trade In Three Years
  - Goal Is To Double From $20 Billion To $40 Billion.



Exports of TOTAL to India in thousands ($ USD)

State	2000	2001	2002	2003	2004	2005	2005 thru March	2006 thru March
U.S. Total	3,662,817	3,764,199	4,097,912	4,986,294	6,095,001	7,958,010	1,792,507	2,123,312
California	596,344	635,820	674,262	850,404	1,026,057	1,341,482	286,263	501,088
New York	518,525	525,810	547,562	660,547	812,349	1,038,946	256,133	247,032
Texas	339,204	364,704	408,154	568,779	783,666	967,982	239,080	258,572
Illinois	168,099	138,028	265,947	230,124	274,888	437,873	63,102	85,060
Washington	230,618	315,995	259,091	228,712	306,941	424,547	91,846	94,200
Florida	120,643	117,461	90,885	150,723	157,312	335,863	55,911	43,551
Ohio	82,056	105,598	110,317	140,161	172,868	229,376	50,408	70,462
North Carolina	73,037	75,965	71,320	81,567	159,048	219,829	95,924	36,377
Pennsylvania	90,547	101,619	100,603	124,042	146,227	218,541	50,801	70,002

US Trade Department, National Trade Data, July 2006

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Source: Jerry Sheehan, Calit2@UCSD

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Collaboration Goals from President Kalam of India

- Interactive Knowledge System
- Convergence of Info- Nano - Bio
- Make the Bandwidth Available with No Limits
- PURA--Societal Grid With Electronic Connection of a Billion People

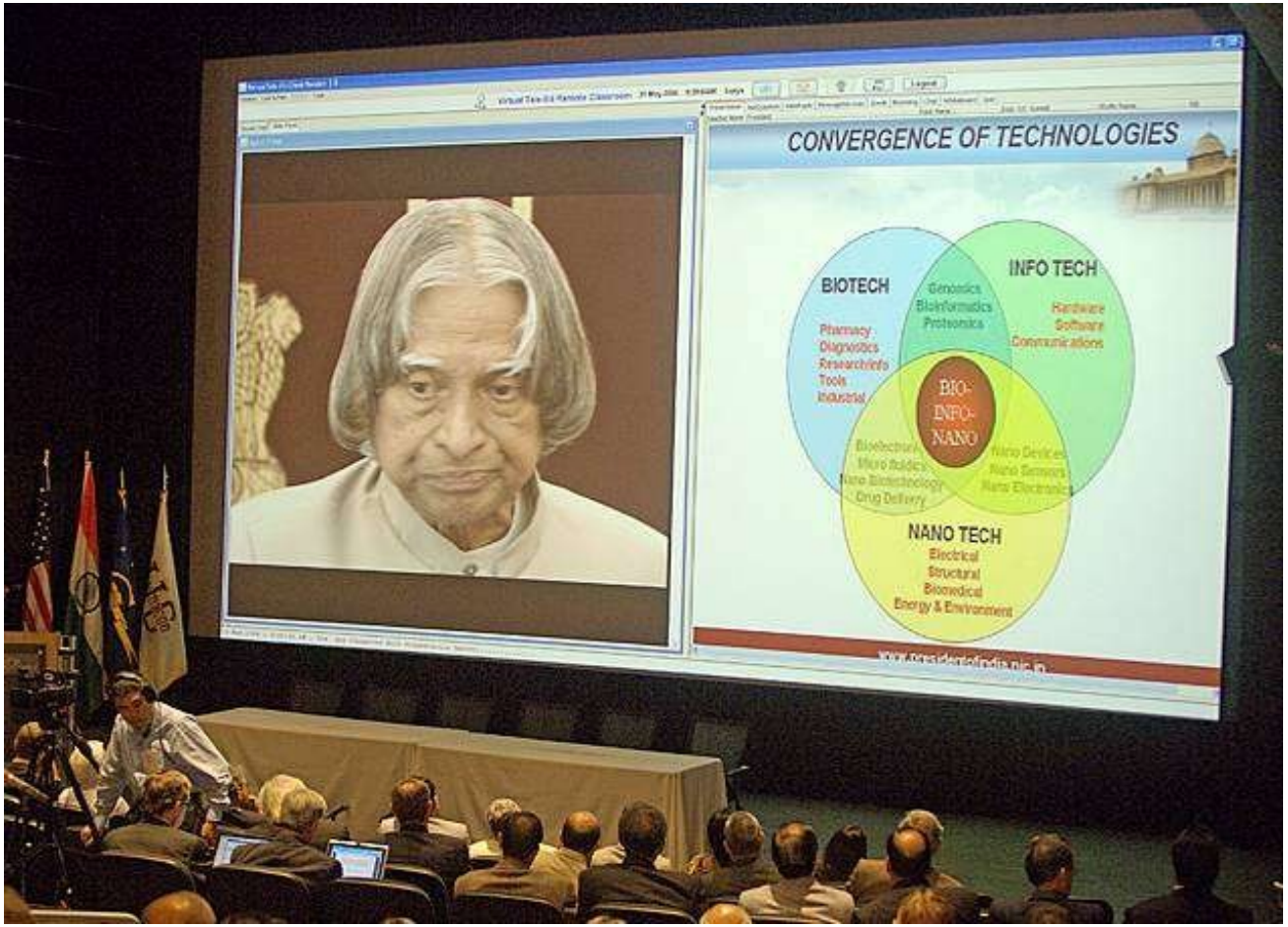


Photo: Alan Decker, UCSD

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