Bringing Mexico Into the Global LambdaGrid

Visit by UCSD's Center for U.S.-Mexican Studies
October 9, 2009

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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What Is Calit2?

- **Research on the Future of the Ubiquitous Internet and its Transformation of Our Society**
- **Core Partnership Between UCSD and UCI**
  - **Several Hundred Faculty**
  - **Alliances With Other Campuses**
- **Prototyping Of Infrastructure Through "Living Laboratories"**
  - **From Campus to Planetary Scale**
  - **Partnerships With Multiple Levels of Government and Industry**
  - **Secret Sauce: Technical Professionals to Move Projects Forward**
- **Multidisciplinary Research *Teams***
  - **Faculty, Postdocs, Staff, Students**
  - **Industry Partners –**
    - **From Giants to Start-up Companies**
  - **Community Partners**
    - **Emergency Responders**



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



- "Convergence" Laboratory Facilities
  - Nanotech, BioMEMS, Chips, Radio, Photonics
  - Virtual Reality, Digital Cinema, HDTV, Gaming
- Over 1000 Researchers in Two Buildings
  - Linked via Dedicated Optical Networks



www.calit2.net

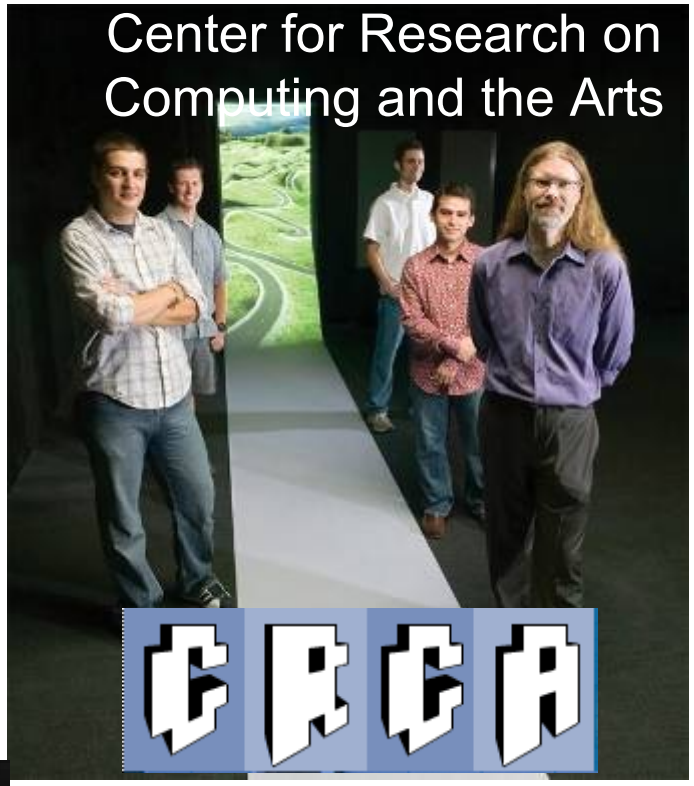
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Living Laboratories for Inventing the Ubiquitous Future

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Calit2 Was Designed with Advanced Multimedia Facilities





- Audio Spatialization
- Motion Capture
- Gaming Lab



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Calit2 Has Developed Research Partnerships with California's Major Trading Partners

- **International Commerce Drives 25% Of California's Economy**
- **Largest Export Market is Computers and Electronic Products**
- **Top Five Export Markets for California:**
  - **Mexico**
  - **Japan**
  - **Canada**
  - **China**
  - **South Kc**
- **India is a Critical Growth Market for California**
  - **California is the Top State Exporting to India**
  - **Exports Between California and India Increased ~30% from 2004 and 2005**
- **India and US Have an Action Plan to Double Bilateral Trade in 3 Years**

CICESE



Canada - California Strategic Innovation Partnership Summit



PRAGMA

U.S.-INDIA SUMMIT

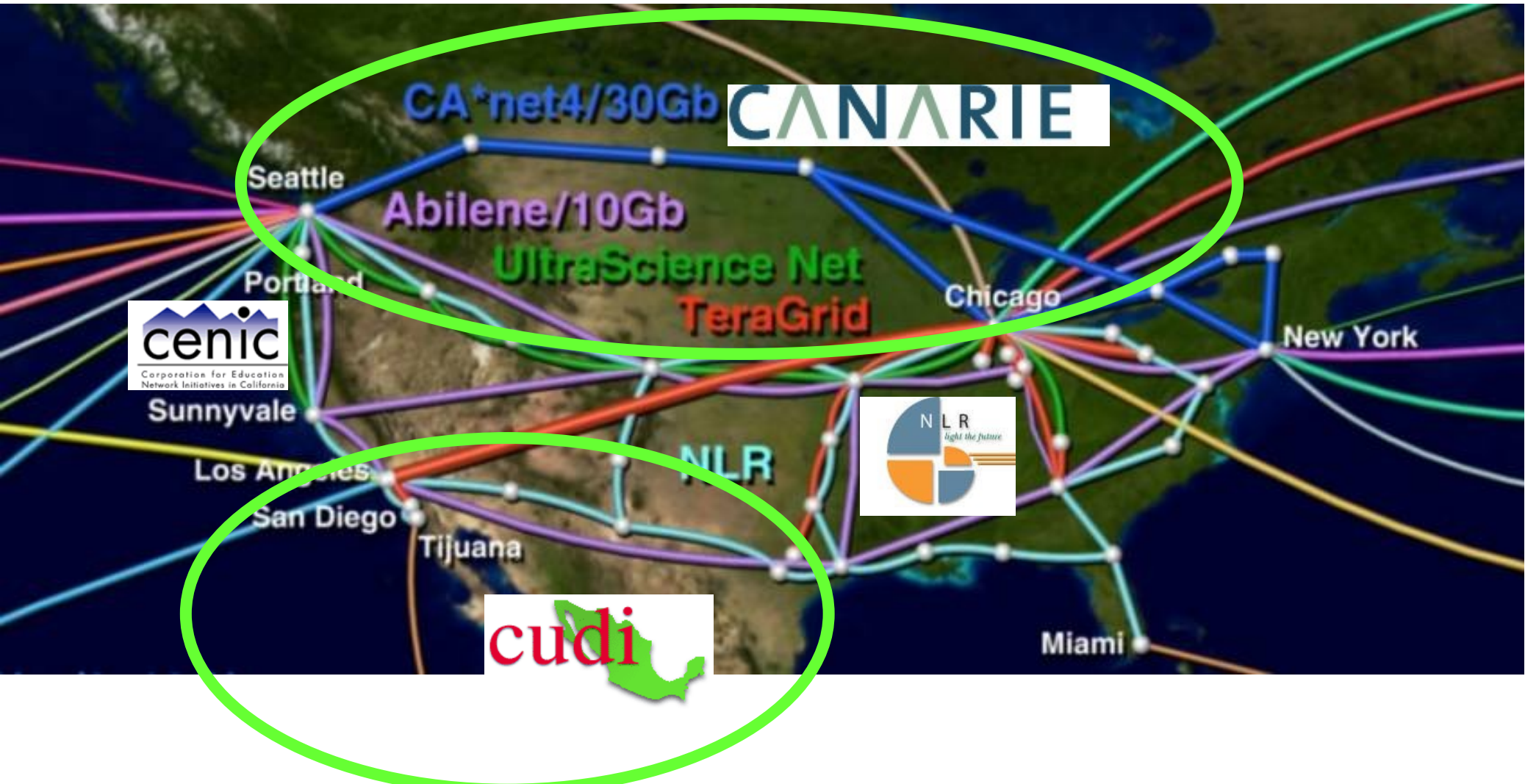
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iGrid 2005

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Toward a North American Superhighway for High Performance Collaboration

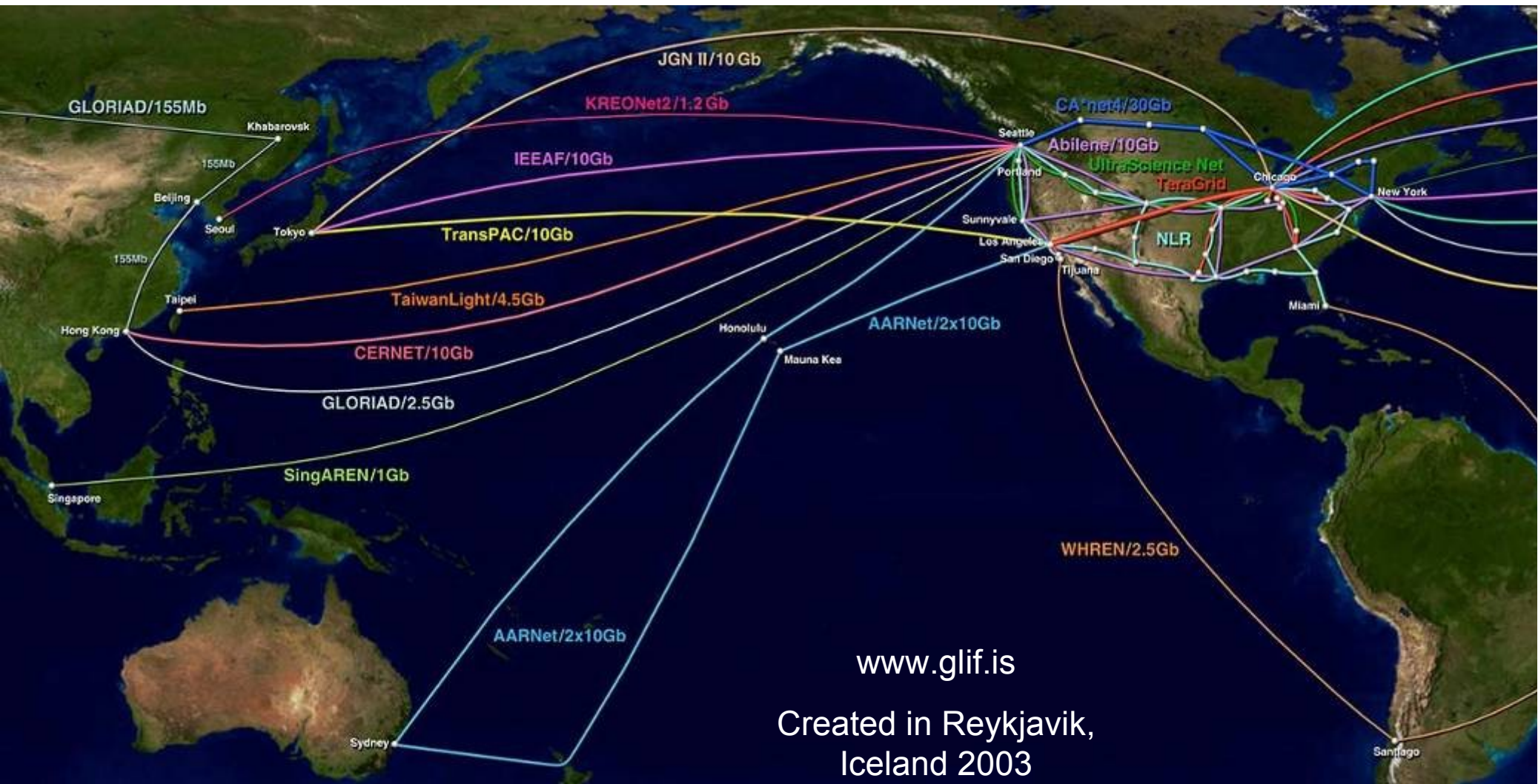


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Next Step: Adding Mexico to
Canada's CANARIE and the U.S. National Lambda Rail

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The Global Lambda Integrated Facility-- Creating a Planetary-Scale High Bandwidth Collaboratory



www.glif.is

Created in Reykjavik, Iceland 2003

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Visualization courtesy of
Bob Patterson, NCSA.

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Developing International Research Collaborations: Mexico

- UCSD Meeting on Joint CICESE/Calit2 Proposal Sept 2002
- SDSU's Eric Frost Talk at CUDI Meeting at CICESE April 2003
- Arzberger PRAGMA talk-CUDI in Puebla, Mexico October 2003
- Visit by CICESE and CONACYT to Calit2 Jan 2004
- Visit by Calit2 and OptIPuter to CICESE March 2004
- Visit by CICESE and CONACYT to Calit2 AHM April 2004





Jaime Parada, Felipe Rubio, & Carlos Duarte at the Calit2 All Hands Meeting



Maxine Brown, Larry Smarr, Javier Mendieta, Tom DeFanti



Carlos Casasús, director of CUDI, Mexico's Internet2

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CUDI-CENIC Fiber Dedication at Border Governor's Conference, July 14, 2005



US  Mexico

Torreon Conference---Fiber Dedication Linking Mexico and US, crossing at San Diego-Tijuana

- Shared Security
- Energy
- Trans-National Crime
- Education and Research
- Business Development



cudi

Culmination of Three Years of Work Between Calit2, CICESE, CENIC, and CUDI

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cenic
Corporation for Education Network Initiatives in California

LEADING THE WAY TO TOMORROW'S INTERNET

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CICESE, CONACYT, CUDI, and Telmex at iGrid2005

Opening a University Fiber Highway between Mexico and the USA

http://iGridMX.cicese.mx

contact

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CUDI, Mexico, and San Diego State University (SDSU), USA
ccasasus@cudi.edu.mx, eric.frost@sdsu.edu

collaborators

CUDI, Mexico: Carlos Casasus • SDSU, USA: Eric Frost, Bob Welty, John Graham • CICESE, Mexico: Javier Mendieta Jiménez, Luis Farfán, Edgar Pavia, Tereza Cavazos, Raúl Hazas Izquierdo, Salvador Castañeda, Julián Delgado, José Luis Rodríguez • CONACYT, Mexico: Jaime Parada, Juan Milton Garduño, Carlos Duarte • Telmex, Mexico: Benjamin Podoswa • Stanford University, USA: Milton Chen • University of California, San Diego, USA: Peter Arzberger, Cindy Zheng



Optical fiber newly installed between San Diego and Tijuana, and ultimately extending down to CICESE in Ensenada in the Baja California Peninsula, is enabling collaborative USA/Mexican research in Earth, oceanographic and atmospheric sciences. At iGrid, 3D visualizations of shared terrain enable scientists to better understand the consequences of fires, floods, and earthquakes, which have no geographical boundaries. Environmental modeling and simulation visualizations fed by real-time sensor information combined with legacy visualizations provide hybrid visualizations for situational awareness for public safety, economic effect assessment, and shared Homeland Security.

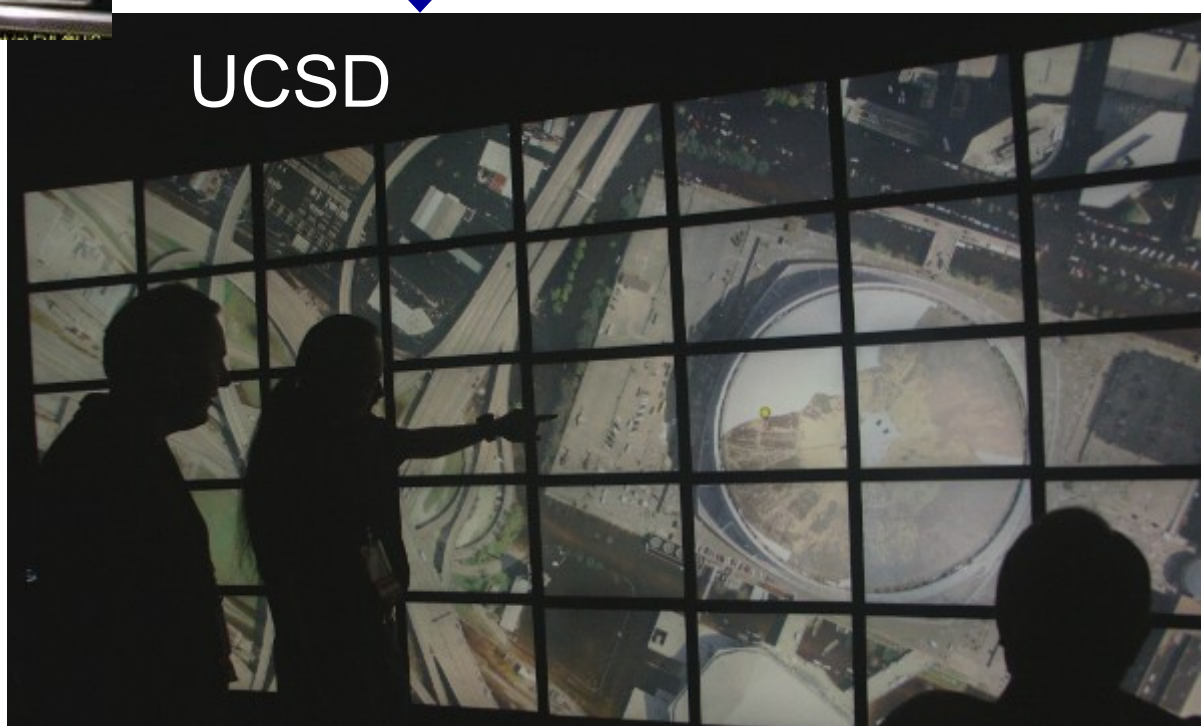
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Dedicated Optical Fiber Collaboratory: Remote Researchers Jointly Exploring Complex Data



Deploy Throughout Mexico
After CICESE Test

OptIPuter



Proposal:

Connect OptIPortals
Between CICESE
and Calit2@UCSD
with 10 Gbps Lambda

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Success in First Phase—
OptIPortal is Installed in CICESE—First in Mexico



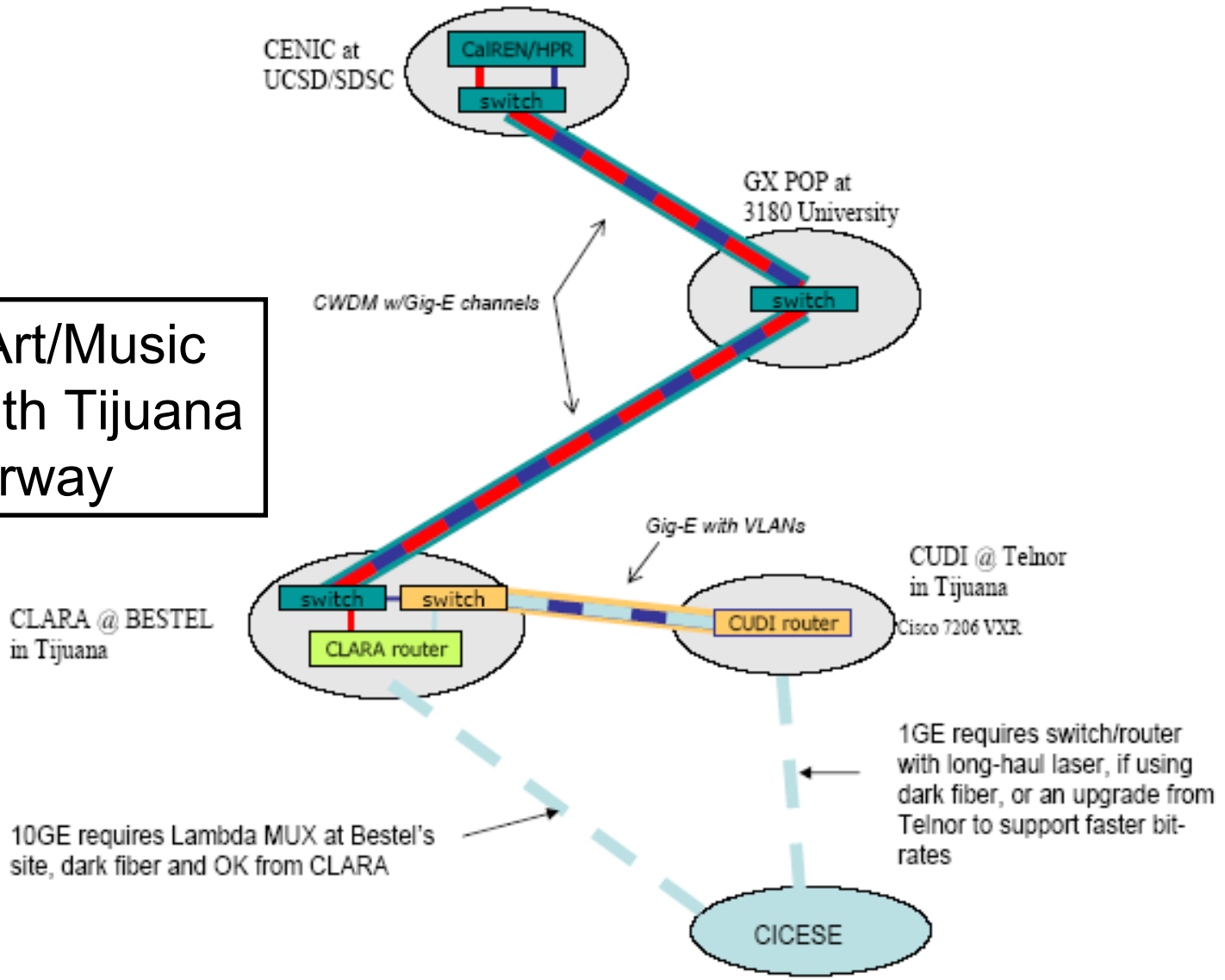
CICESE, Mexico

September 19, 2008

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We are Very Close to Setting Up a Gigabit Lambda Between Calit2 and CICESE

Various Art/Music Projects with Tijuana Underway



Source: Raúl Hazas, CICESE

Collaboration Between CICESE and UCSD in Ocean Microbe Genomics

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Departament of
BIOLOGICAL OCEANOGRAPHY

Dedicated to Biologican and Fisheries Oceanography

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Biological Oceanography
- Home
- Mission & vision

Directory
- Scientific staff
- Research assistants
- PhD students
- MSc students

Productivity

WELCOME



Related sites
- Oceanology Division
- Marine Sciences
- Societies
- IMECOCAL
- FLUCAR
- Agenda 21 Local
- CICESE magazine
- Books & journals

Ecology of Marine Plankton

Phytoplankton and bacteria culture; photosynthesis, respiration, in vivo fluorescence and absorption of phytoplankton; inorganic carbon and oxygen in seawater. [ext. 242-86]



UCSD and CICESE Have 30-Year History of Collaboration

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Disseminating Calit2 Research to the Spanish-Speaking World



CALIFORNIA INSTITUTE FOR TELECOMMUNICATIONS AND INFORMATION TECHNOLOGY

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»News Releases
Web Articles
In The News
Multimedia
Resource Center
Presentations

Newsroom > Web Articles

Spanish translation provided by Cicese.

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National LambdaRail Cumple Seis Años y Calit2 Celebra, Otros Temprano Adoptadores

San Diego and Cypress, CA, October 1, 2009 -- Para celebrar su sexto aniversario de que su dorsal a nivel nacional estuvo operable, la National LambdaRail (NLR), publicó esta semana un reprte especial en-línea remarcando a los primeros adoptadores de esta red. De acuerdo con el, ya casi, saliente CEO de NLR Tom West, estos primeros adoptadores son: "grupos de investigación e instituciones que apreciaron muy temprano como redes-dedicados de alto-rendimiento pueden auxiliar y acelerar los descubrimientos científicos y la investigación de redes." West está programado que a mediados de mes, deje la presidencia-ejecutiva (CEO) y el consejo de asesores de NLR.

En particular, West destacó los primeros usuarios de NLR: el Pittsburgh Supercomputing Center, y otras tres instituciones que recientemente celebraron cinco años de utilizar el ancho-de-banda de NLR: el California Institute for Telecommunications and Information Technology (Calit2) de la University of California, San Diego; y su asociado el proyecto OptIPuter, la University of Illinois at Chicago's Electronic Visualization Laboratory (EVL); y el Texas Advanced Computing Center (TACC).

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Interacting Virtual Spaces
Sheldon Brown's "Mi Casa Es Tu Casa"





1997

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First Tri-Continental Premier of a Streamed 4K Feature Film With Global HD Discussion



CRCA

CISCO
C-wave
CineGrid

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4K Transmission Over 10Gbps--
4 HD Projections from One 4K Projector

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Calit2 Researchers to Model Ancient Maya City in Google SketchUp

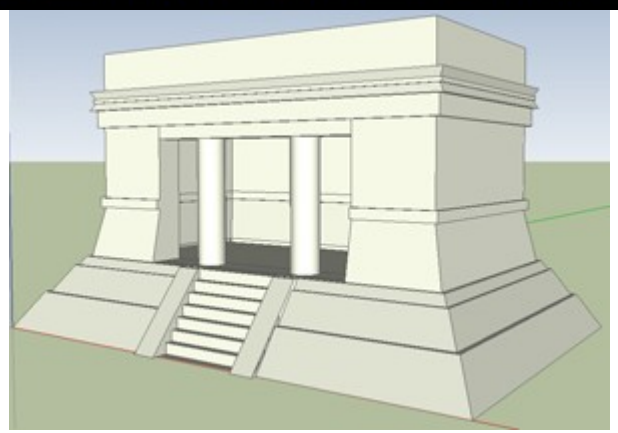
CISA3

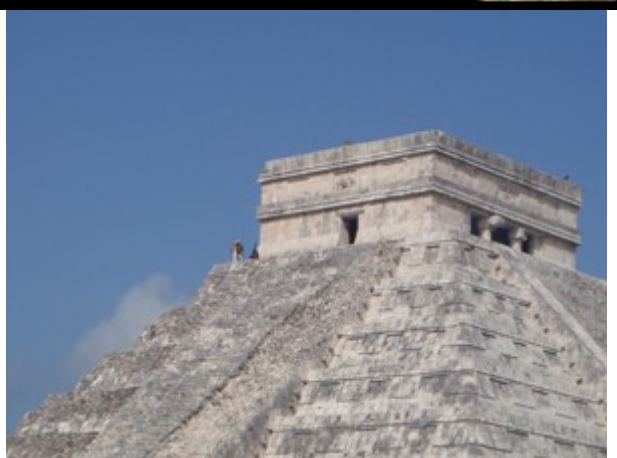
Center of Interdisciplinary Science for Art, Architecture, and Archaeology

UC San Diego Division, California Institute for Telecommunications and Information Technology

DAH UCSD Jacobs Calit2











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www.calit2.net/newsroom/article.php?id=1596

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Using Advanced Info Tech and Telecommunications to Accelerate Response to Wildfires



Early on October 23, 2007, Harris Fire San Diego

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Photo by Bill Clayton, http://map.sdsu.edu/

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NASA's Aqua Satellite's MODIS Instrument Provided "Situational Awareness" of the 14 SoCal Fires

Calit2, SDSU, and NASA Goddard Used NASA Prioritization and OptIPuter Links to Cut time to Receive Images from 24 to 3 Hours



Moderate Resolution Imaging Spectroradiometer (MODIS)

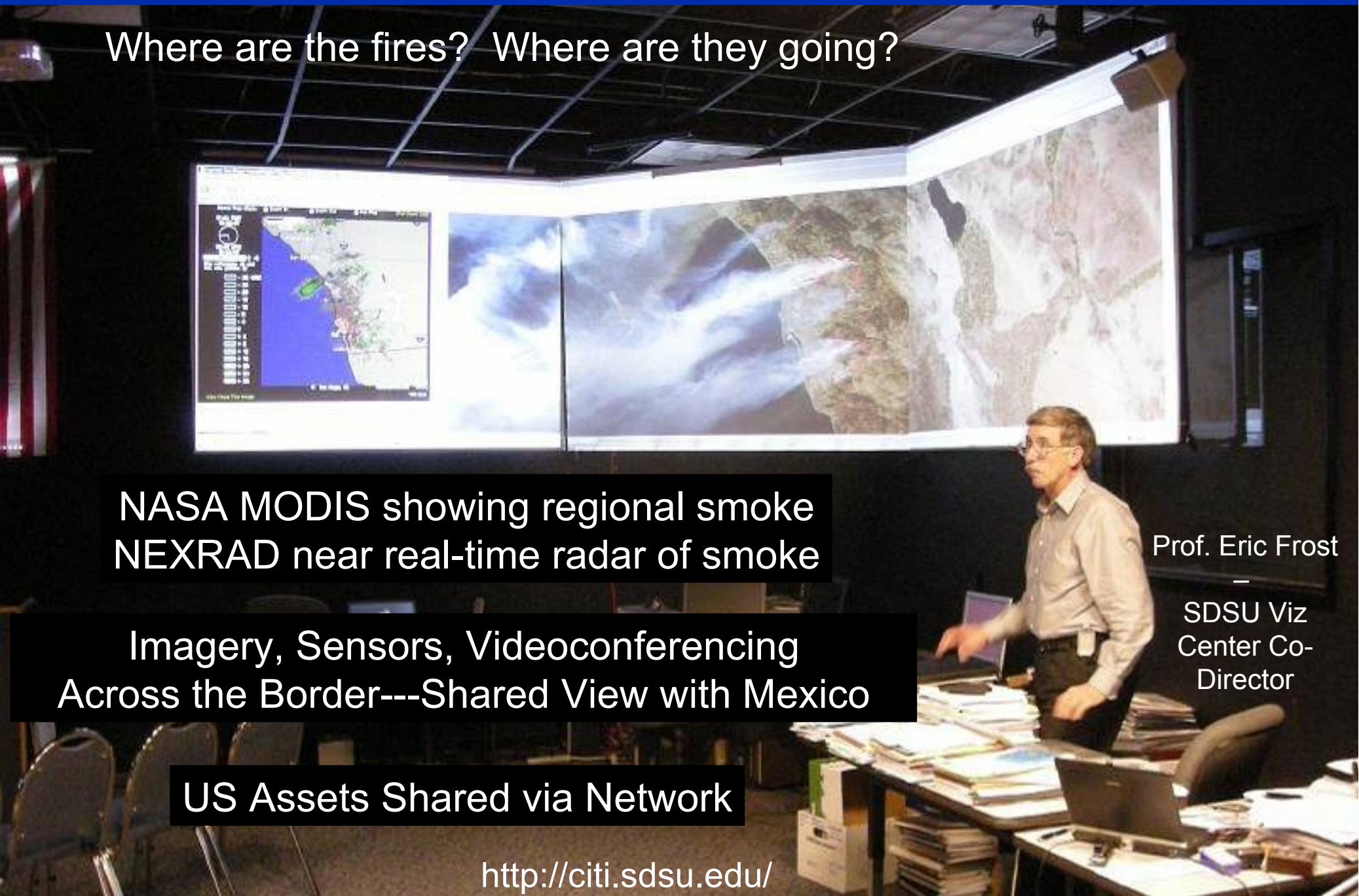
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NASA/MODIS Rapid Response

www.nasa.gov/vision/earth/lookingatearth/socal_wildfires_oct07.html

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Prototyping Future Knowledge Integration Center for Emergency Response



High Resolution Aerial Photography Generates Images With 10,000 Times More Data than Landsat7

Landsat7 Imagery
100 Foot Resolution
Draped on elevation data





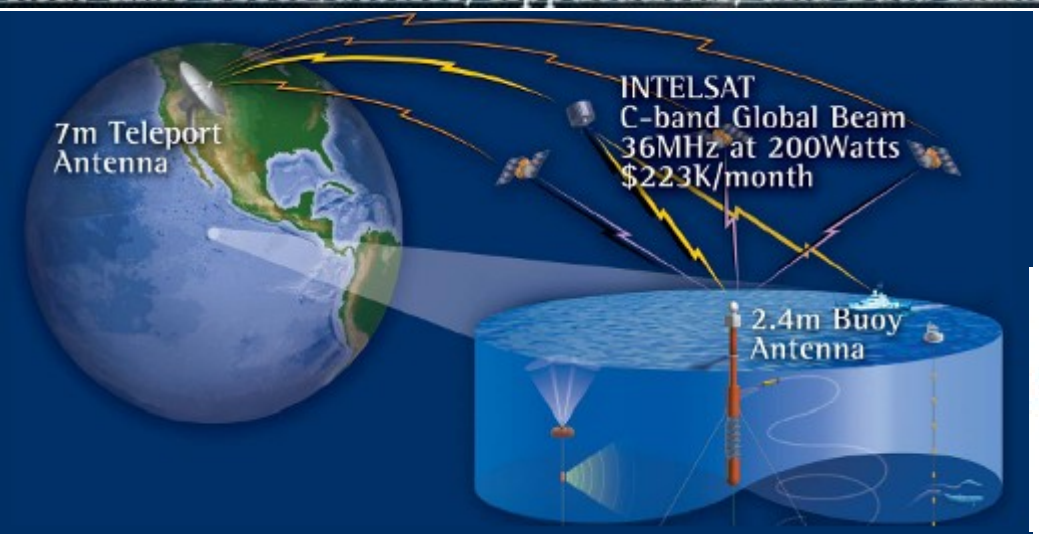
New USGS Aerial Imagery
At 1-Foot Resolution

~50,000 x 50,000 Pixel Images of 350 US Cities
Over One Billion Pixel Images!

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ROADnet and HiSeasNet are Prototypes of the Future of *In Situ* Earth Observing Systems





Office of Naval Research

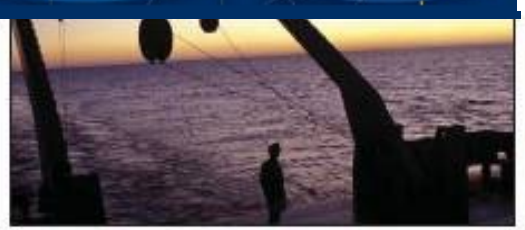
NSF

SDSU

SDSC
SAN DIEGO SUPERCOMPUTER CENTER

IGPP







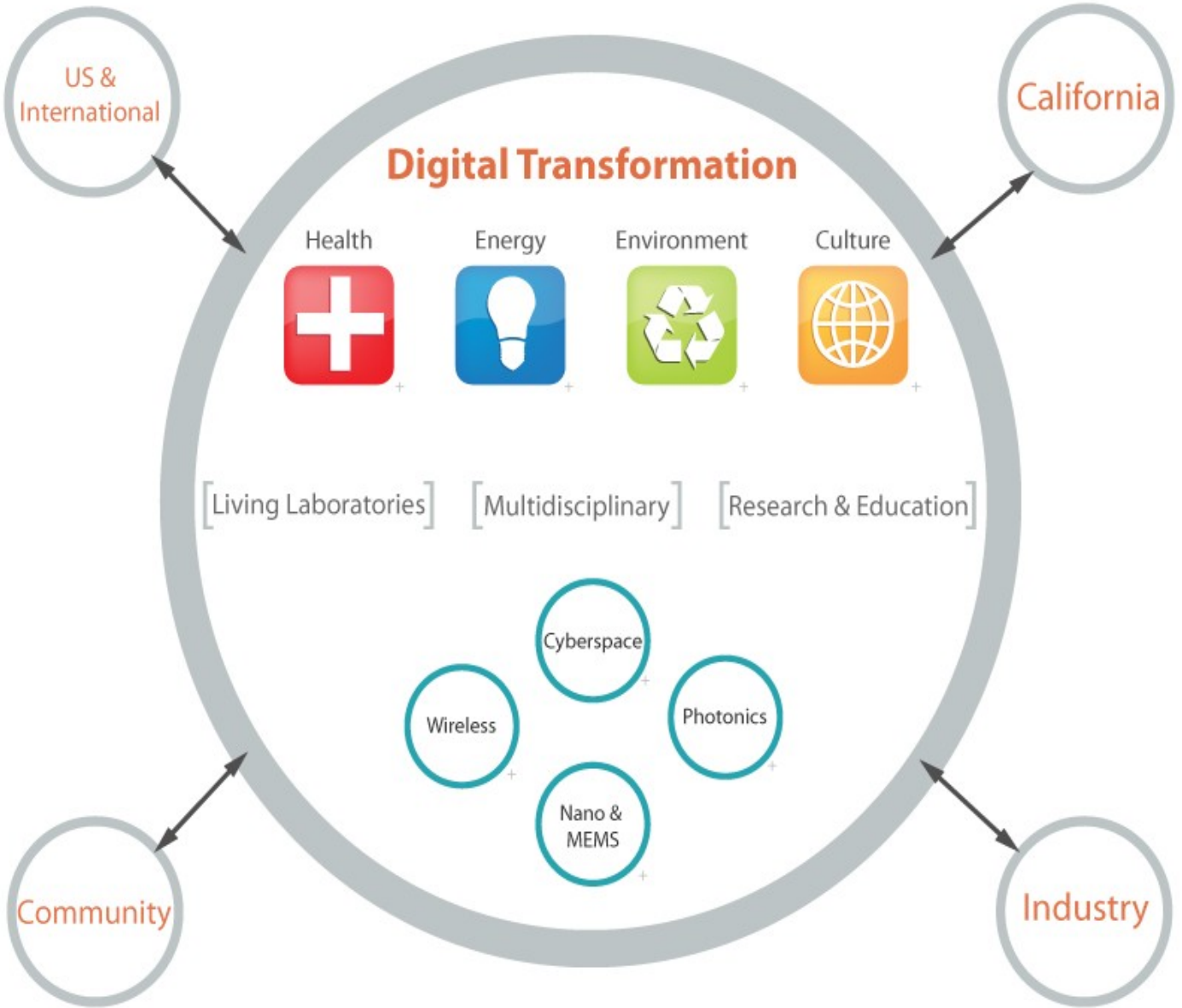


HiSeasNet

The Real-time Observatories, Applications and Data management Network is an interdisciplinary collaboration funded by the National Science Foundation and the Office of Naval Research. Participating institutions include Scripps Institution of Oceanography and the San Diego Supercomputer Center at the University of California, San Diego.

PROVIDING COMMUNICATIONS AND NETWORKING FOR THE ORION FLEET OF MOORED OCEAN OBSERVATORIES

Calit2's Path Forward
For the Next 5-10 Years



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