There are No Islands in Cyberspace—Tasmania's Leading Role in the NBN

Invited Talk

Inaugural Joseph Aloysius Lyons Lecture

The Board of the Tasmanian Chamber of Commerce and Industry (TCCI)
Hobart, Tasmania, Australia

August 10, 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

AUSTRALIAN AMERICAN LEADERSHIP DIALOGUE

A Decade Ago, Illinois Built Out a State-Wide Optical Fiber System

Illinois has always served as a crossroads.

And for two centuries our location has helped make Illinois rich, as goods and ideas have moved faster and faster.

First by water.

Then by rail.

Today by air.

For each, in its time, Illinois was a dominant hub.

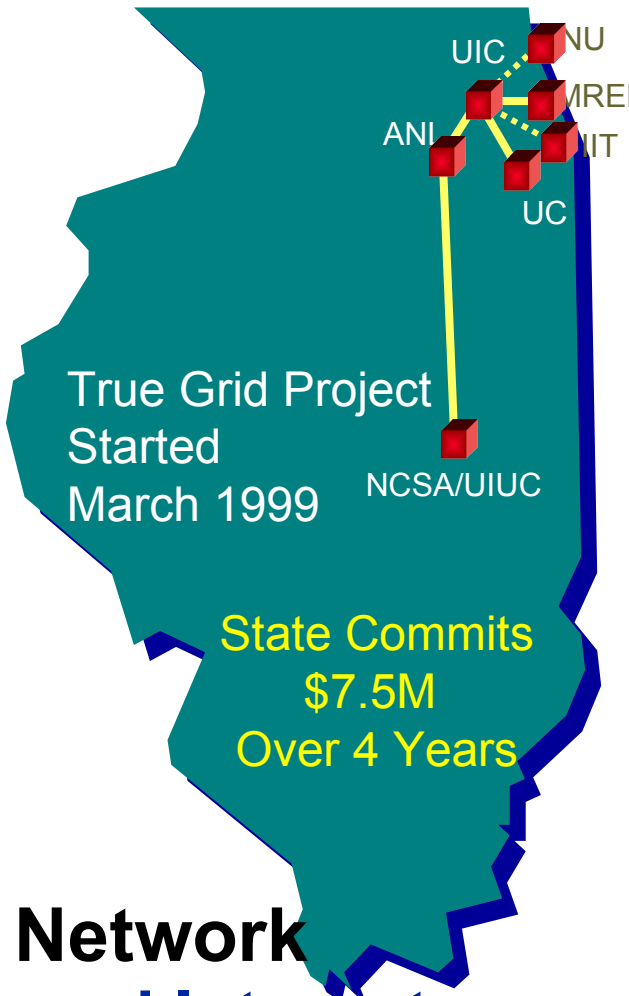
But the new medium is neither water, nor steel nor air.

It's information.

---Governor Ryan, 1999 Budget Address

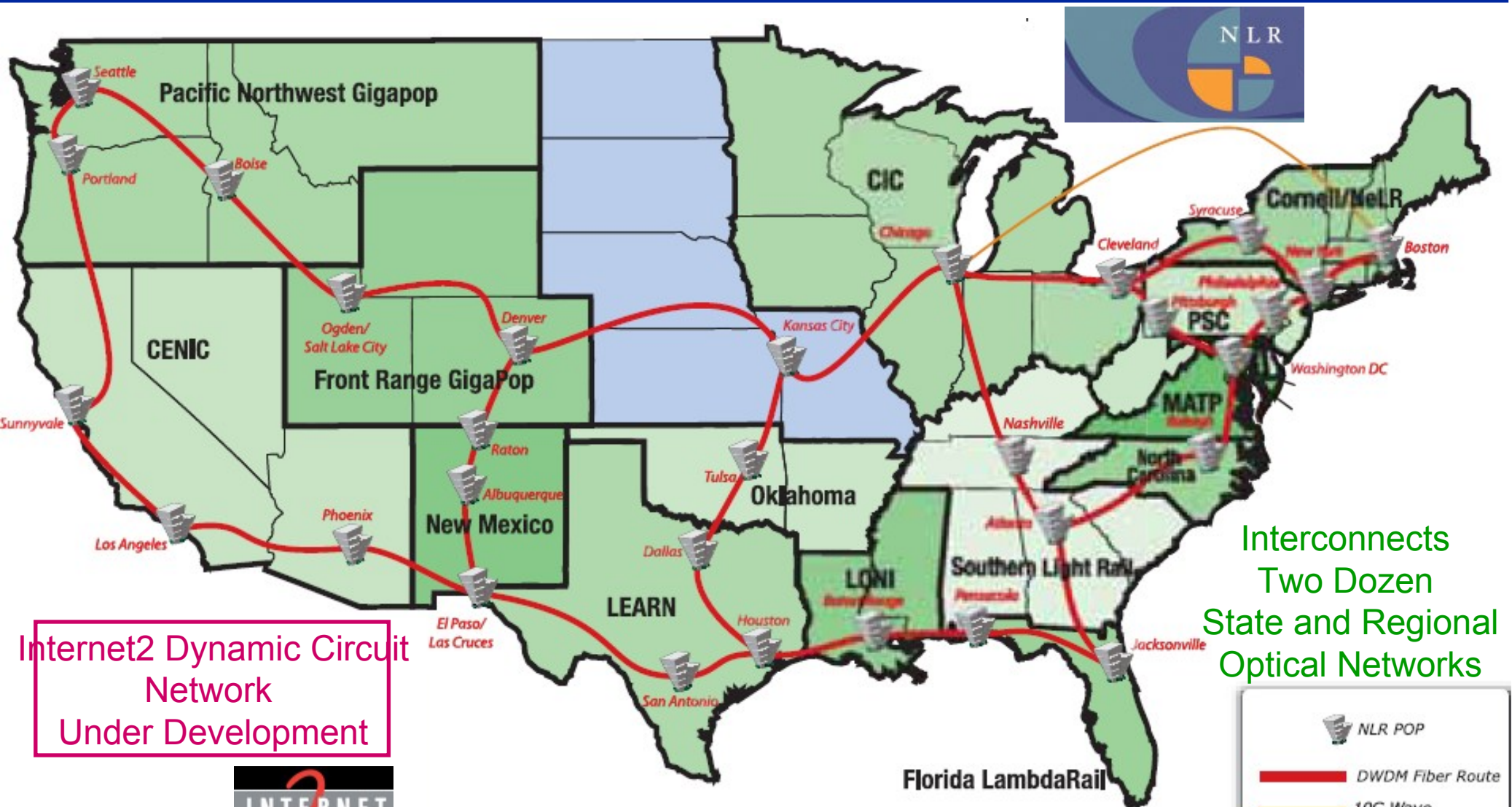
Illinois Seized National Optical Networking Leadership with I-WIRE Infrastructure Investment

- **State-Funded Infrastructure**
  - **Application Driven**
    - **High Definition Streaming Media**
      - Telepresence and Media
    - **Computational Grids**
      - Cloud Computing
    - **Data Grids**
      - Search & Information Analysis
  - **Emerging Tech Proving Ground**
    - **Optical Switching**
    - **Dense Wave Division Multiplexing**
    - **Advanced Middleware Infrastructure**
    - **Wireless Extensions**
- **First State to Own and Operate a Fiber Network**
  - **Plan Developed In 1999 To Leapfrog Shared Internet**



Source: Charlie Catlett, ANL

Today Dedicated 10Gbps Lightpaths Tie Together State and Regional Fiber Infrastructure



AUSTRALIAN AMERICAN LEADERSHIP DIALOGUE

NLR 40 x 10Gb Wavelengths Expanding with Darkstrand to 80

it2

Premier Bartlett
On 21st Century Infrastructure

- **For most of the 20th century, Tasmania's economic development was underpinned and driven by a far-sighted investment in hydro electricity.**

- **Tasmania's future will be closely tied to our ability as a State to stay connected to a fast-paced world.**

- **Telecommunications infrastructure will be to the 21st Century what the dams, poles and wires of the Hydro were to the 20th.**

3 March, 2009

State of the State Address 2009

AUSTRALIAN AMERICAN LEADERSHIP DIALOGUE

Tasmania Has Taken the Lead for Australia in Fiber to the Premise (FTTP)

- **Tasmanian Collaborative Optical Leading Testbed**
  - Five Years of Experience Since the Proposal
  - South Hobart & New Town in the South, Devonport in the NorthWest Connected 2006-08 – 1200 Premises
  - First of Its Kind and Scale in Australia
- **Wide Range of Applications:**
  - High Speed Internet
  - Multiple Voice Lines Using Voice Over IP (VOIP)
  - Digital Broadcast TV
  - Video on Demand (VOD)
  - High Speed Data Networks/Virtual Private Networks (VPN)
  - Video Conferencing
  - Video Security

tecc.com.au
Tasmanian Electronic Commerce Centre Pty Ltd

AUSTRALIAN AMERICAN LEADERSHIP DIALOGUE

tasCOLT
Tasmanian Collaborative Optical Leading Testbed

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Tasmania the Lead for the National Broadband Network: Scale & Magnitude

- **200,000 Properties Connected by FTTP Within 5 Years**
- **Estimated:**
  - **$600 to $800M in Capital Works**
  - **$300 to $500M in Support Infrastructure**
  - **800 to 1000 Jobs Created During Construction**
  - **Hosting National and International Suppliers Leading Rollout**
- **FTTP Planned into Towns as Low as 50 People**
- **Last 10% Covered with 12 Mbps Wireless - Satellite**

Tasmania
Explore the possibilities

Source: Jim Wyatt, Department of Economic Development, Tasmania

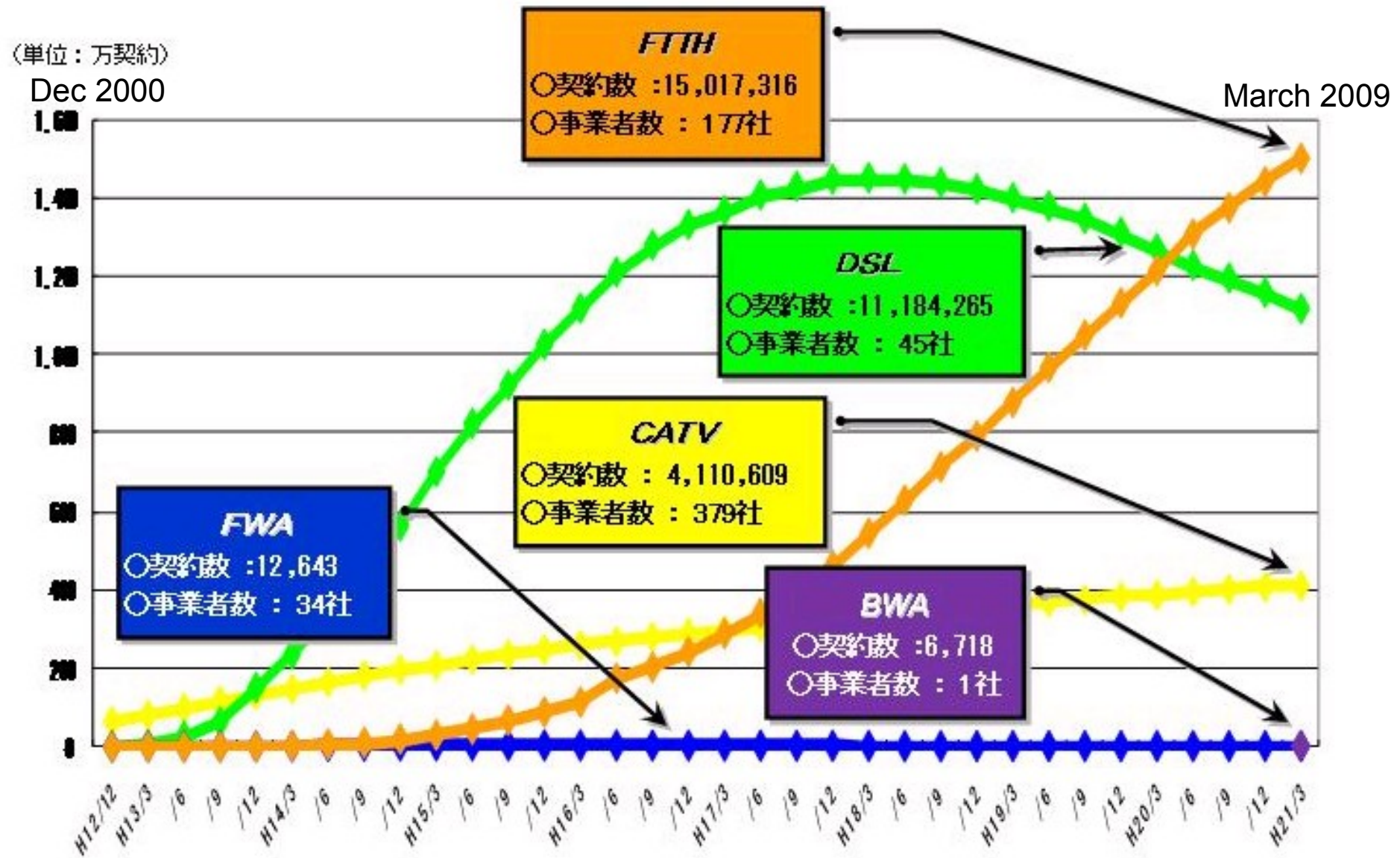
Digital Future of Tasmania--A Five Year Vision
2011 – 2012 Focus

- **Transition of Government Services to Digital Delivery**
  - Lifestyle and Economic Parity
    - Between Rural, Regional and Urban Tasmania
  - Increase Efficiency in Energy and Natural Resources Management and Consumption
- **Implement State-Wide In Tasmania:**
  - Virtual Home Care System
  - Virtual Class Rooms
  - Smart Utilities Grid
  - Virtual Management of All Irrigation/Water Systems
  - Next Generation Municipal Management
  - Services Tasmania In The Home
-

Tasmania
Explore the possibilities

Source: Jim Wyatt, Department of Economic Development, Tasmania

In Japan, FTTH Has Become the Dominant Broadband--Subscribers to "Slow" 40 Mbps ADSL Are Decreasing!

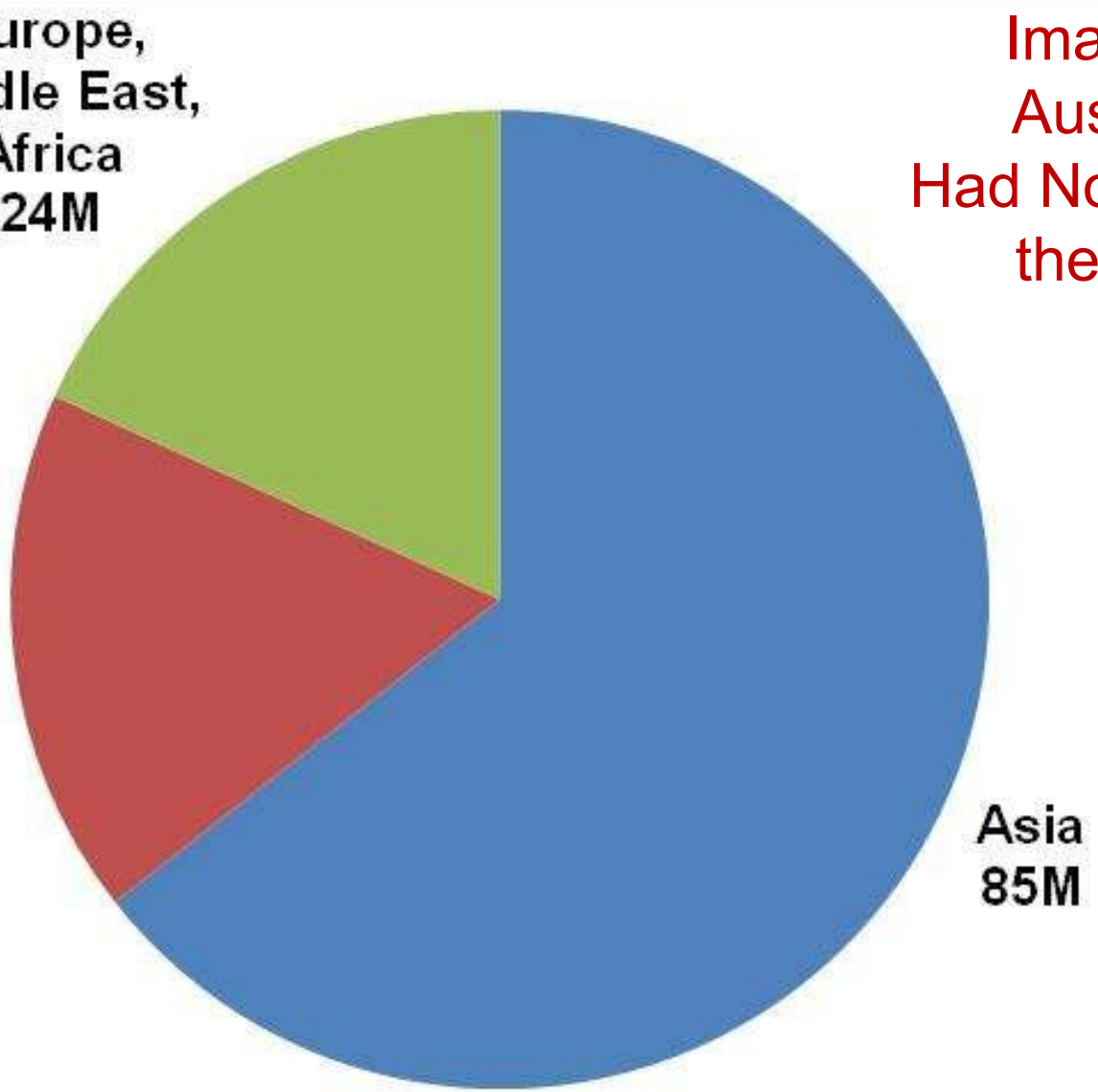


Source: Japan's Ministry of Internal Affairs and Communications
Add url

Globally Fiber to the Premise is Growing Rapidly, Mostly in Asia

FTTP Connections Growing at ~30%/year

130 Million Households with FTTH in 2013



Imagine If Australia Had Not Created the NBN!

Source: Heavy Reading (www.heavyreading.com), the market research division of Light Reading (www.lightreading.com).

Australian American Leadership Dialogue

Verizon's Home Multimedia Ecology

Source: Verizon



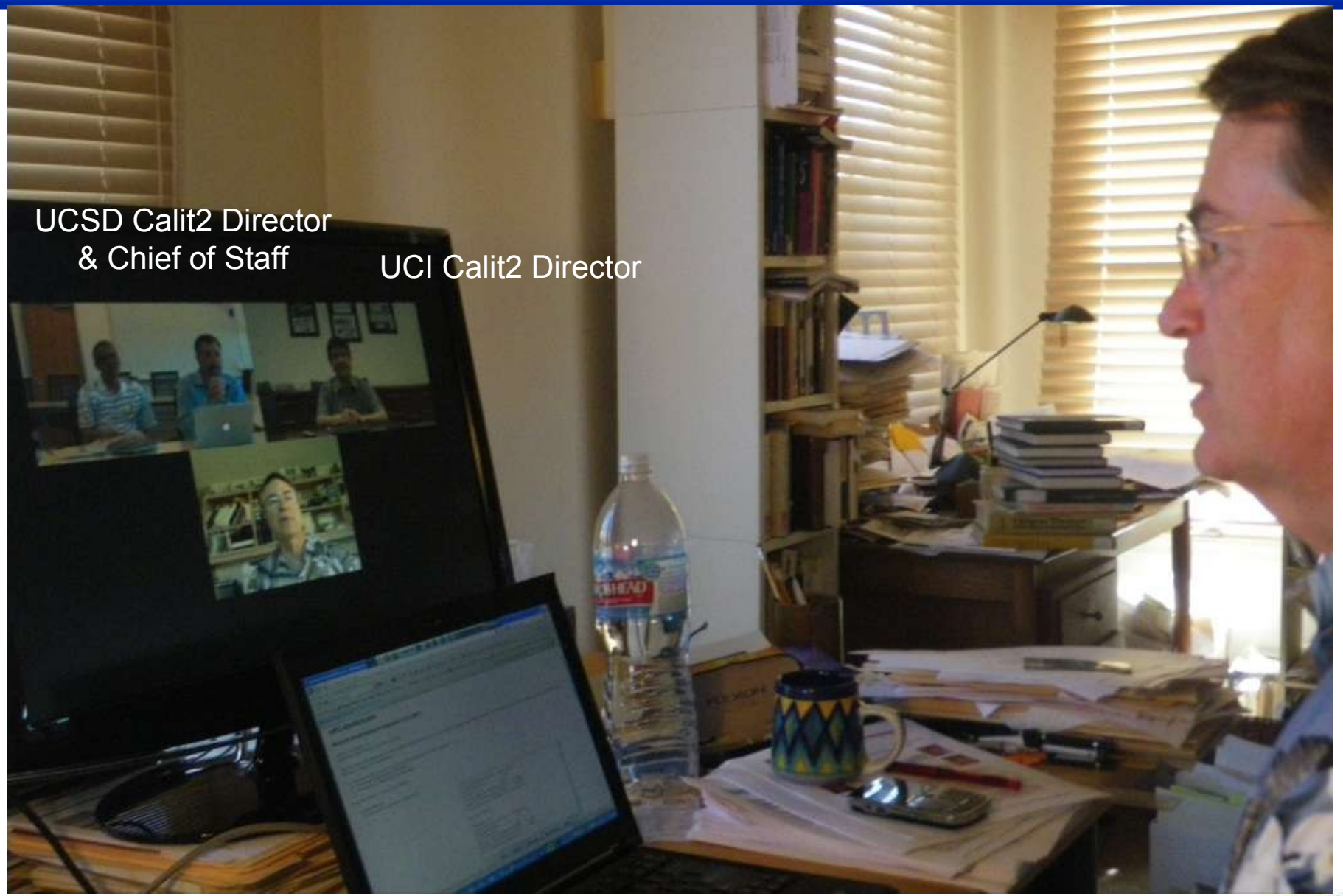
AUSTRALIAN AMERICAN LEADERSHIP DIALOGUE

How Broadband Changes Work From Home

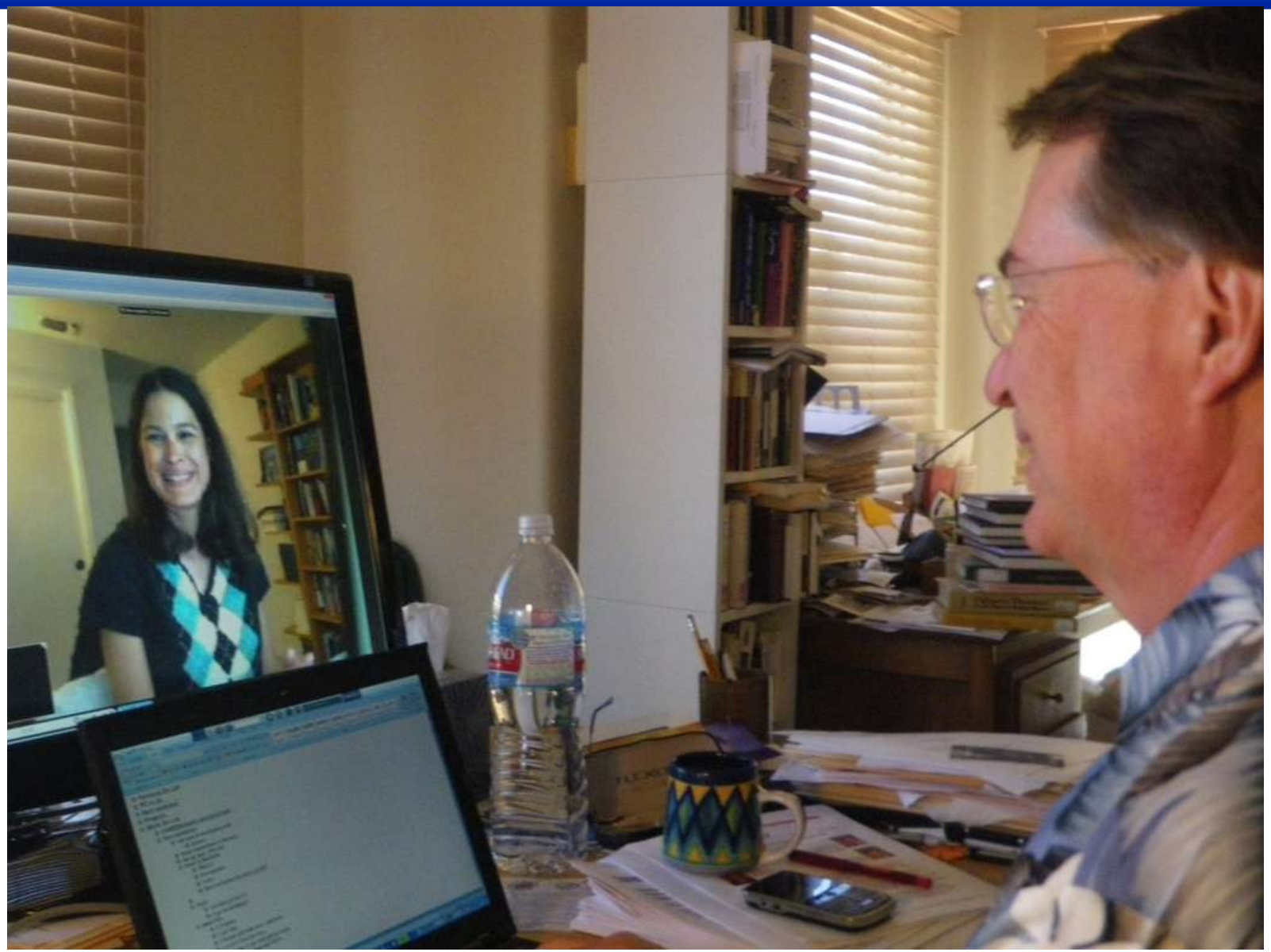


Discussing Topics with the UC Irvine Director
From My Home in San Diego

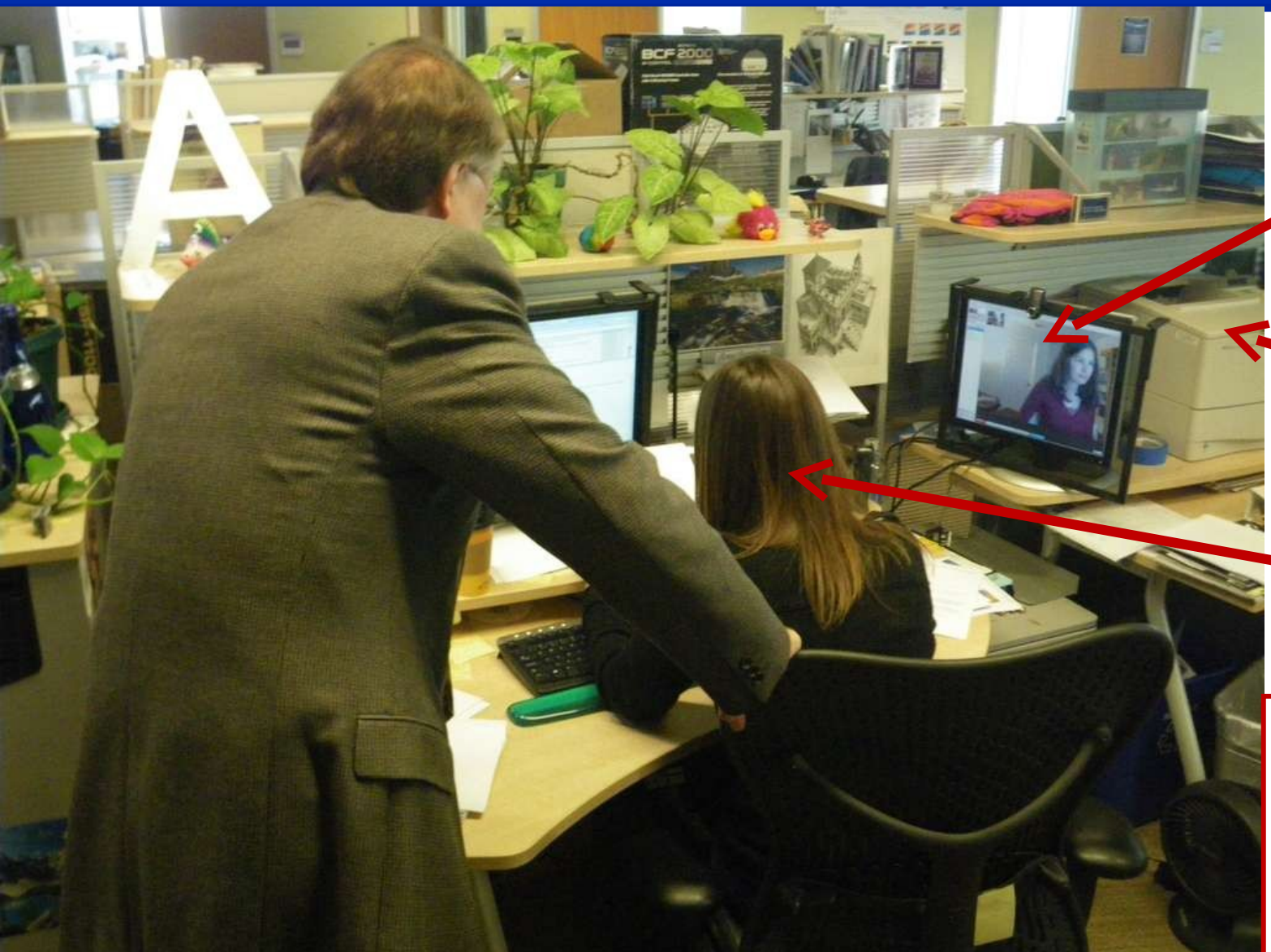
I Link Into Commercial H.323 Videoconfernces From My Laptop at Home



Your Work Team Can Be Anywhere: My Virtual Assistant Kristen 300 Miles North in California



Work at Home is the Same As at the Office



Virtual Kristen

Kristen Prints Here For Amy

Real Amy

Kristen Reads My Email, Sets My Calendar. Works With Amy on My Trips

We Run Video Sykpe Continuously During Office Hours

AUSTRALIAN AMERICAN LEADERSHIP DIALOGUE

It Doesn't Matter Where in the Broadband World The Other Person Lives



David Abramson, Monash University, and Me
Discussing My Upcoming Trip to Melbourne

AUSTRALIAN AMERICAN LEADERSHIP DIALOGUE

HD Talk to Australia's Monash University from Calit2: Reducing International Travel



Qvidium Compressed HD ~140 mbps

Source: David Abramson, Monash Univ

AUSTRALIAN AMERICAN LEADERSHIP DIALOGUE

President Kalam of India Gives Interactive Talk to Calit2 On Nanobioinfotech as the Future for 600,000 Villages

- **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**

Half Hour Lecture
Plus 15 Minutes of Questions
155 Mbps Link via Reliance

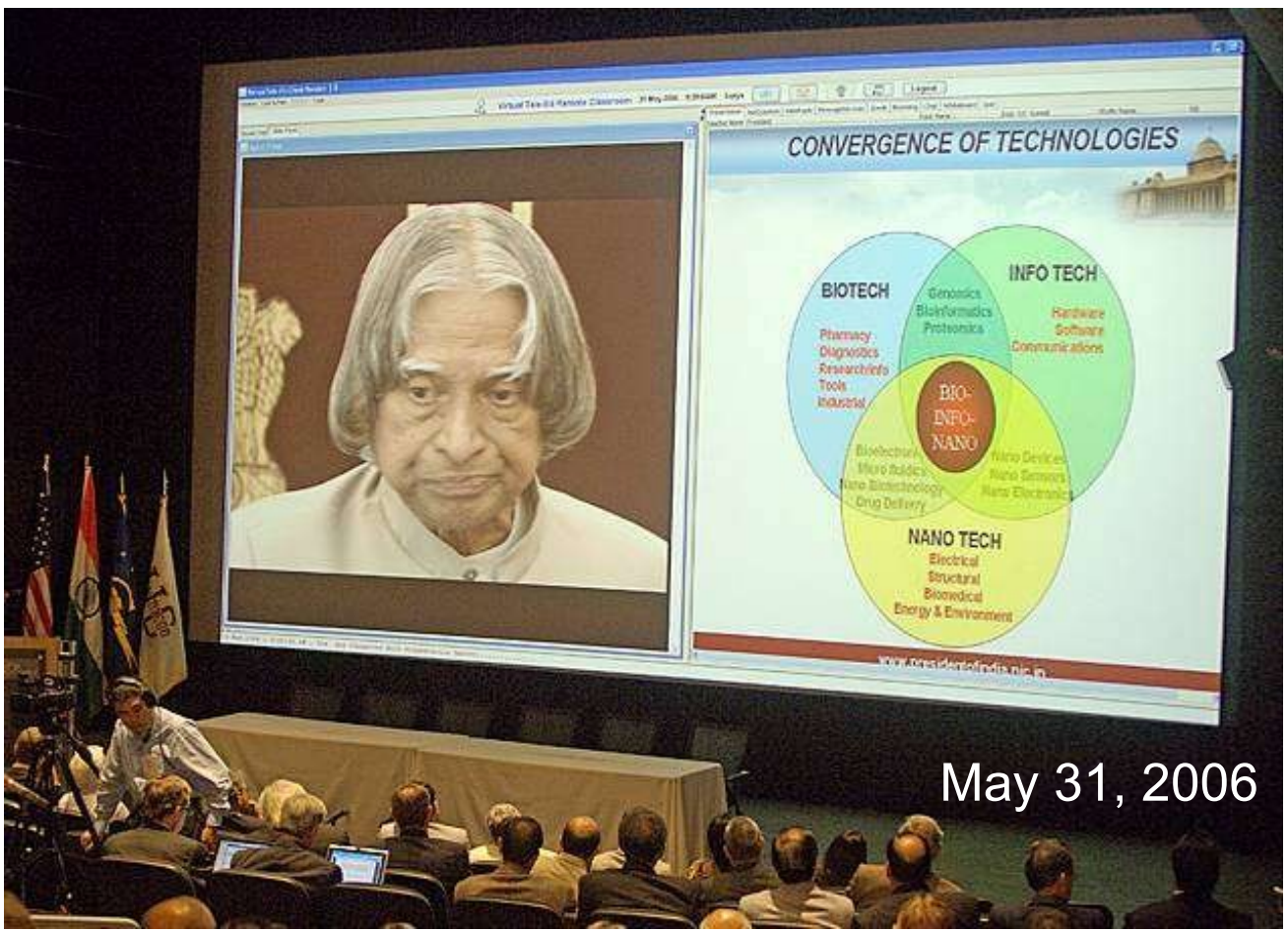
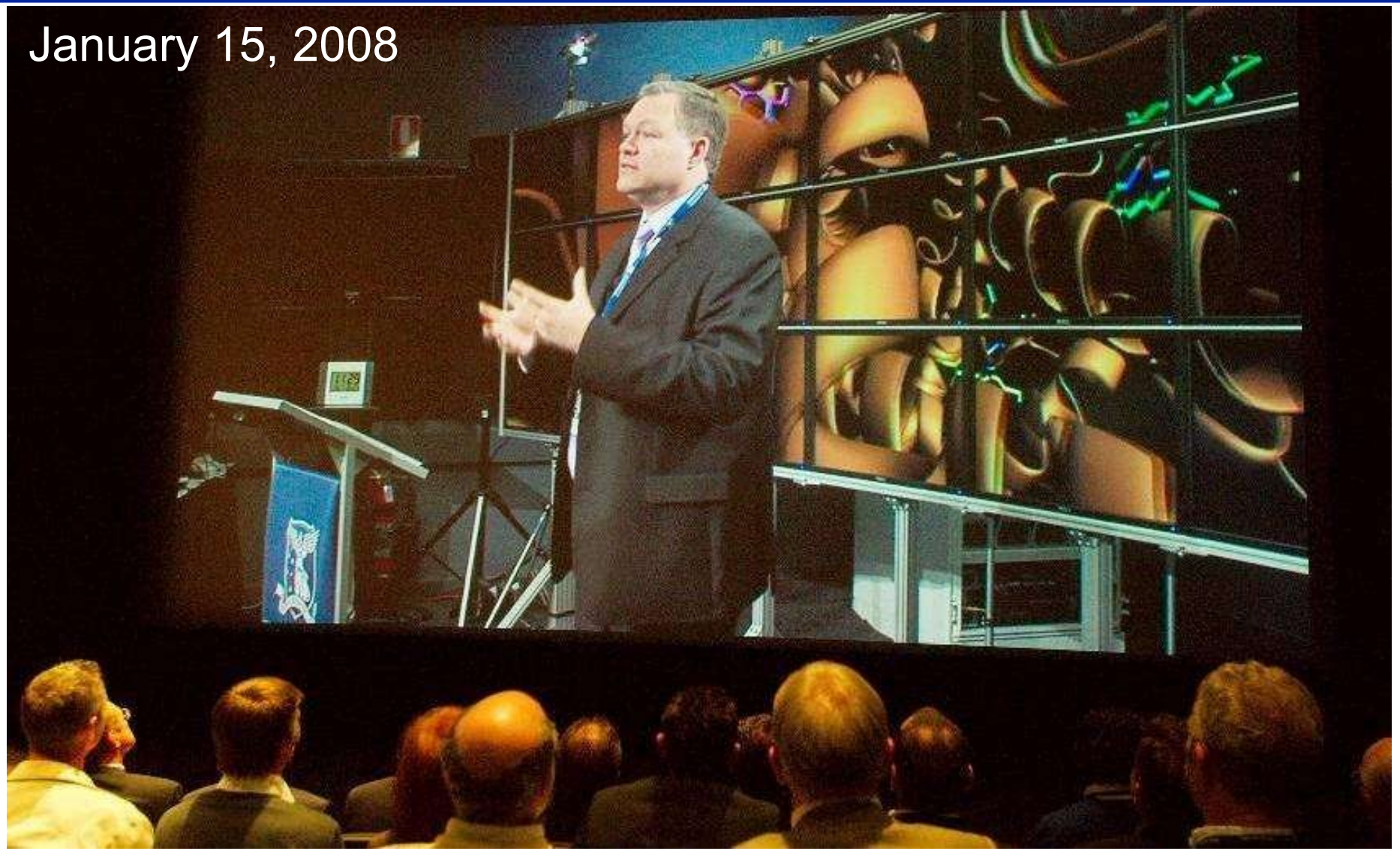


Photo: Alan Decker, UCSD

AUSTRALIAN AMERICAN LEADERSHIP DIALOGUE

Launch of the 100 Megapixel OzIPortal Over Qvidium Compressed HD on 1 Gbps CENIC/PW/AARNet Fiber



No Calit2 Person Physically Flew to Australia to Bring This Up!

AUSTRALIAN AMERICAN LEADERSHIP DIALOGUE

Covise, Phil Weber, Jurgen Schulze, Calit2
CGLX, Kai-Uwe Doerr , Calit2
www.calit2.net/newsroom/release.php?id=1219

Victoria Premier and Australian Deputy Prime Minister Asking Questions



AUSTRALIAN AMERICAN LEADERSHIP DIALOGUE

www.calit2.net/newsroom/release.php?id=1219

University of Melbourne Vice Chancellor Glyn Davis in Calit2 Replies to Question from Australia



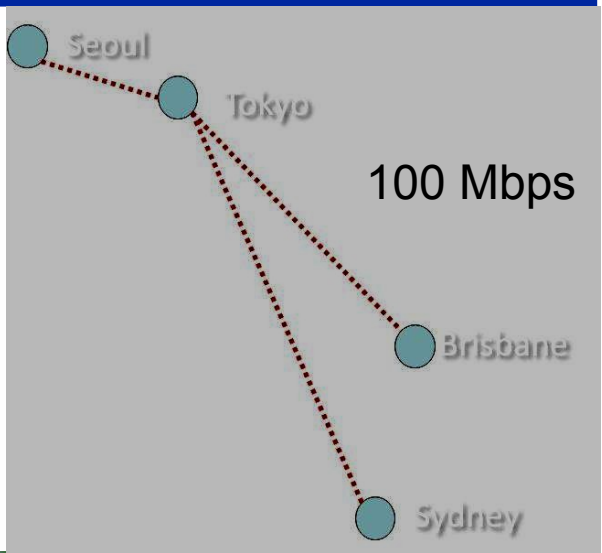
AUSTRALIAN
AMERICAN
LEADERSHIP
DIALOGUE

AARNet Gigabit Medical Videoconference

aarnet
Australia's Academic and Research Network

Live Surgical Demonstration Performed at Kyushu University (Japan) Aug-08





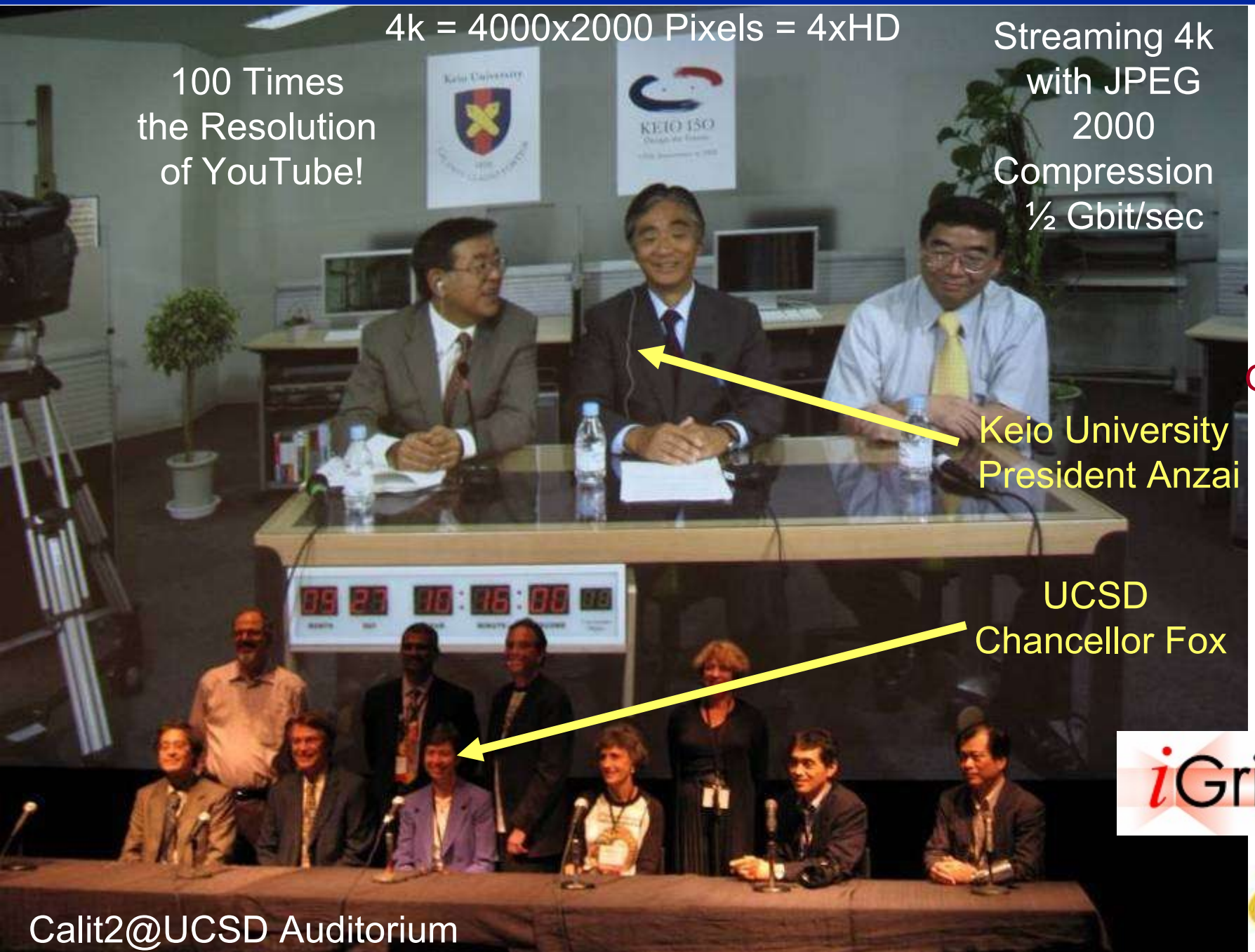




AUSTRALIAN AMERICAN LEADERSHIP DIALOGUE

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Telepresence Meeting
Using Digital Cinema 4k Streams



CineGrid

Lays
Technical
Basis for
Global Digita
Cinema

Sony
NTT
SGI

iGrid 2005

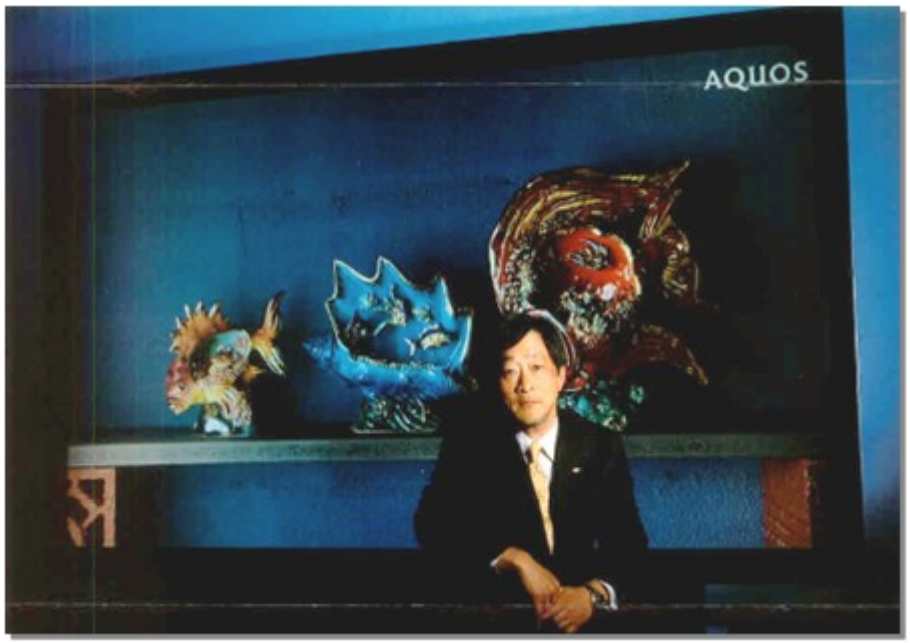
it²

CineGrid @ Holland Festival 2007
As Seen in the Calit2@UCSD Auditorium Live!



Era la Notte, June 2007

In the Near Future, Walls of Homes and Offices will be Electroactive



Chairman of Sharp

"In Ten Years' Time
Entire Walls
Could Be Screens"

Forbes, June 4, 2007

Sharp Labs of America / EVL
Public-Private Partnership

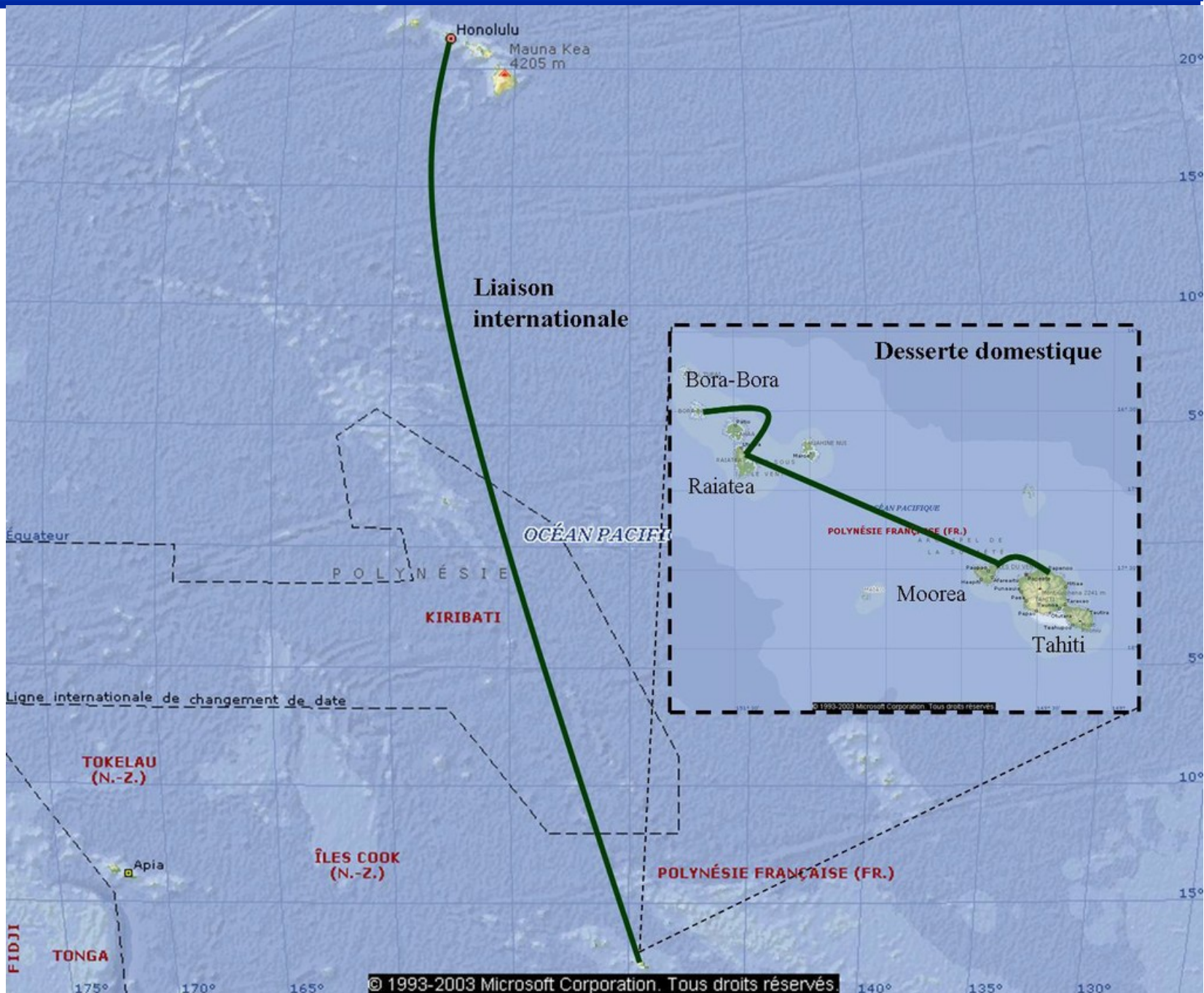


Studying User-Interaction Issues and Moving Image Synchronization Issues in Future Ultra High Resolution Environments

electronic visualization laboratory, university of illinois at chicago

AUSTRALIAN AMERICAN LEADERSHIP DIALOGUE

The Hawaii to French Polynesia Fiber Optic Cable



AUSTRALIAN AMERICAN LEADERSHIP DIALOGUE

New Year's Challenge: Streaming Underwater Video From Taiwan's Kenting Reef to Calit2's OptIPortal

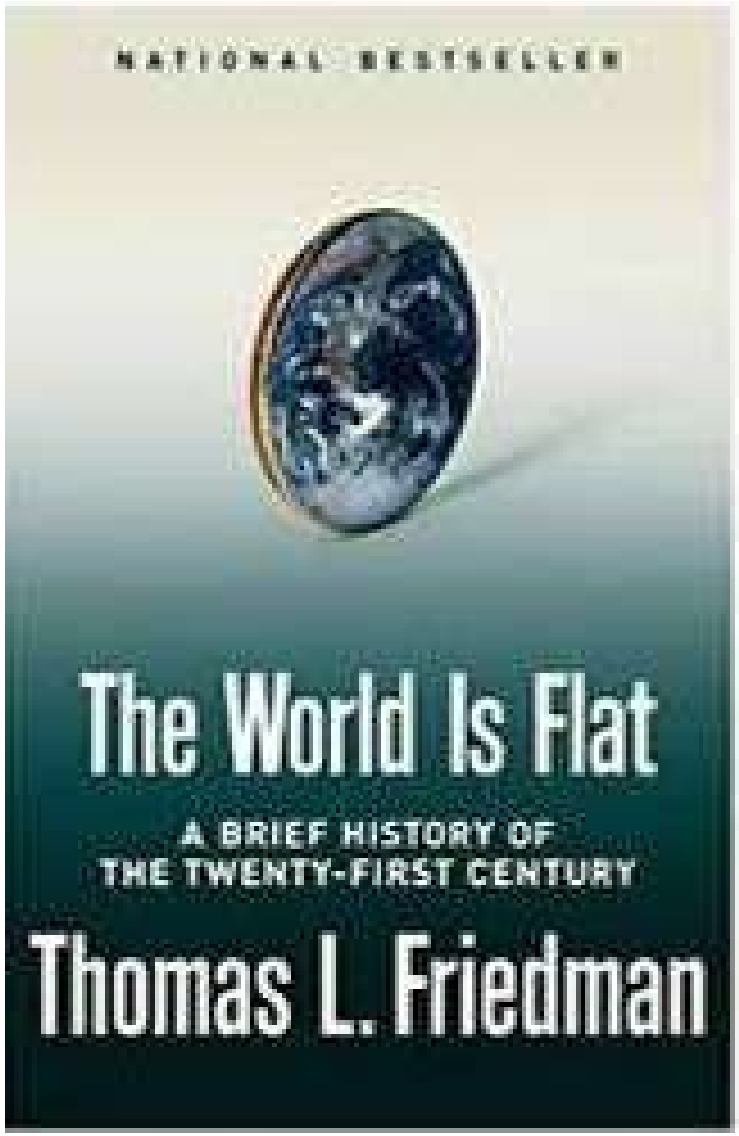


OPEN SOURCE DATA TURBINE INITIATIVE
Empowering the Scientific Community with Streaming Data Middleware

AUSTRALIAN AMERICAN LEADERSHIP DIALOGUE

UCSD: Rajvikram Singh, Sameer Tilak, Jurgen Schulze, Tony Fountain, Peter Arzberger
NCHC : Ebbe Strandell, Sun-In Lin, Yao-Tsung Wang, Fang-Pang Lin

The Technology Innovations of Ten Years Ago-the Shared Internet & the Web-Have Been Adopted Globally



- **But Today's Innovations**
  - **Dedicated Fiber Paths**
  - **Streaming HD TV**
  - **Ubiquitous Wireless Internet**
  - **Location Aware Software**
  - **SensorNets**
- **Will Reduce the World to a "Single Point" in Ten Years**