Examples of Telescience Activities in PRAGMA

Fang-Pang Lin & Shinji Shimojo

17, July, 2012 Hong Kong

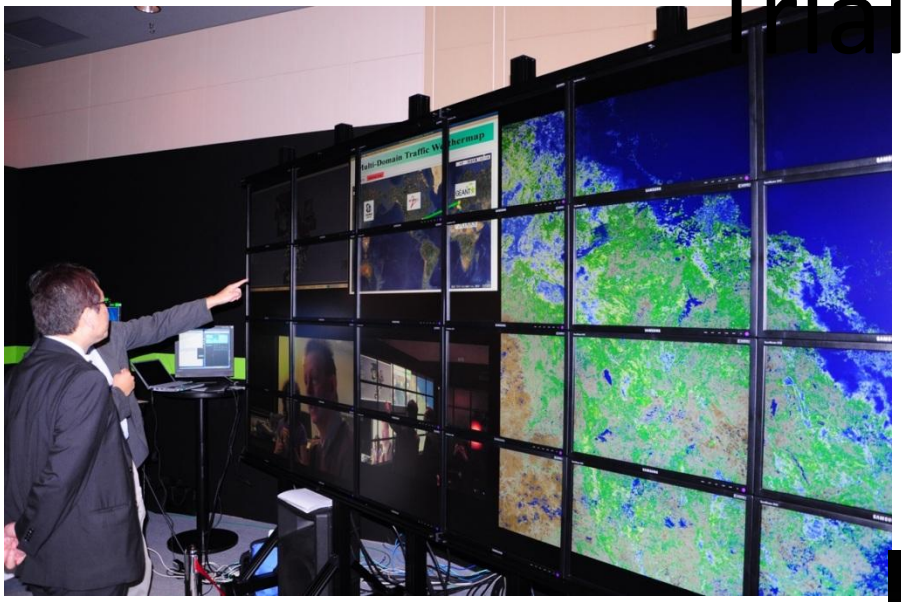
Workshop on Building Collaborations in Clouds, HPC, and Application Areas

Telescience (1987-8, Barry Leiner & Larry Young, NASA)

- Telescience is the approach and collection of tools that enable productive scientific activity to be carried out using remote resources.
- By using interactive high-performance telecommunication links between space-based laboratories and facilities, on-orbit crew, and geographically dispersed ground-based investigator groups, facilities such as Space Station become an accessible and integral part of the research environment…….
- Particular attention is given to three testbeds
  - evaluating remote instrumentation monitoring and control,
  - expert systems in support of the interaction between the principal investigator and the astronaut,
  - and telerobotics in support of fluid handling.

- education
  - prime 2010
- e-culture
  - Osaka Knowledge Capital City exhibition
  - Nara 1300th anniversary exhibition
- urban monitoring
- GLEON/CREON
- Joint working group between Telescience & Geoscience.

Trial 2010



SAGE for e-heritage Giotto+TeraHerz+TDW

Kadobayashi, Chikama, Fukunaga

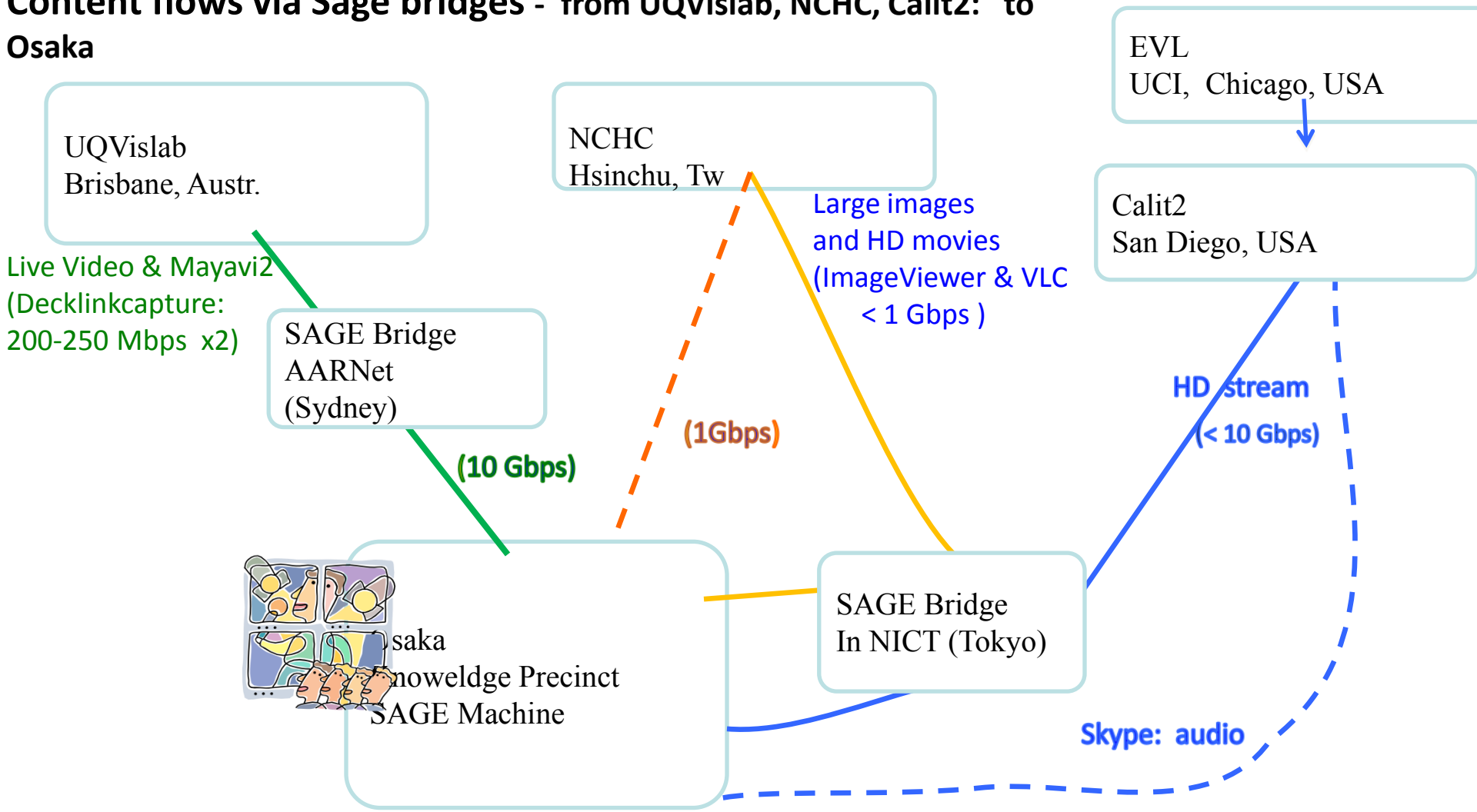
NARA 1300th Anniversary

Prime 2010 in Japan
Lex Lucson, “Interactivity with 3D Models”
Velu Ganapathy, “Visualization of Cultural Heritage”
Kevin Nguyen, “Interaction with Cultural Heritage using FTIR touch table”

OptIPortal & SAGE Bridge joint demo in Osaka (June 10 -11, 2010 Shinji Shimojo)

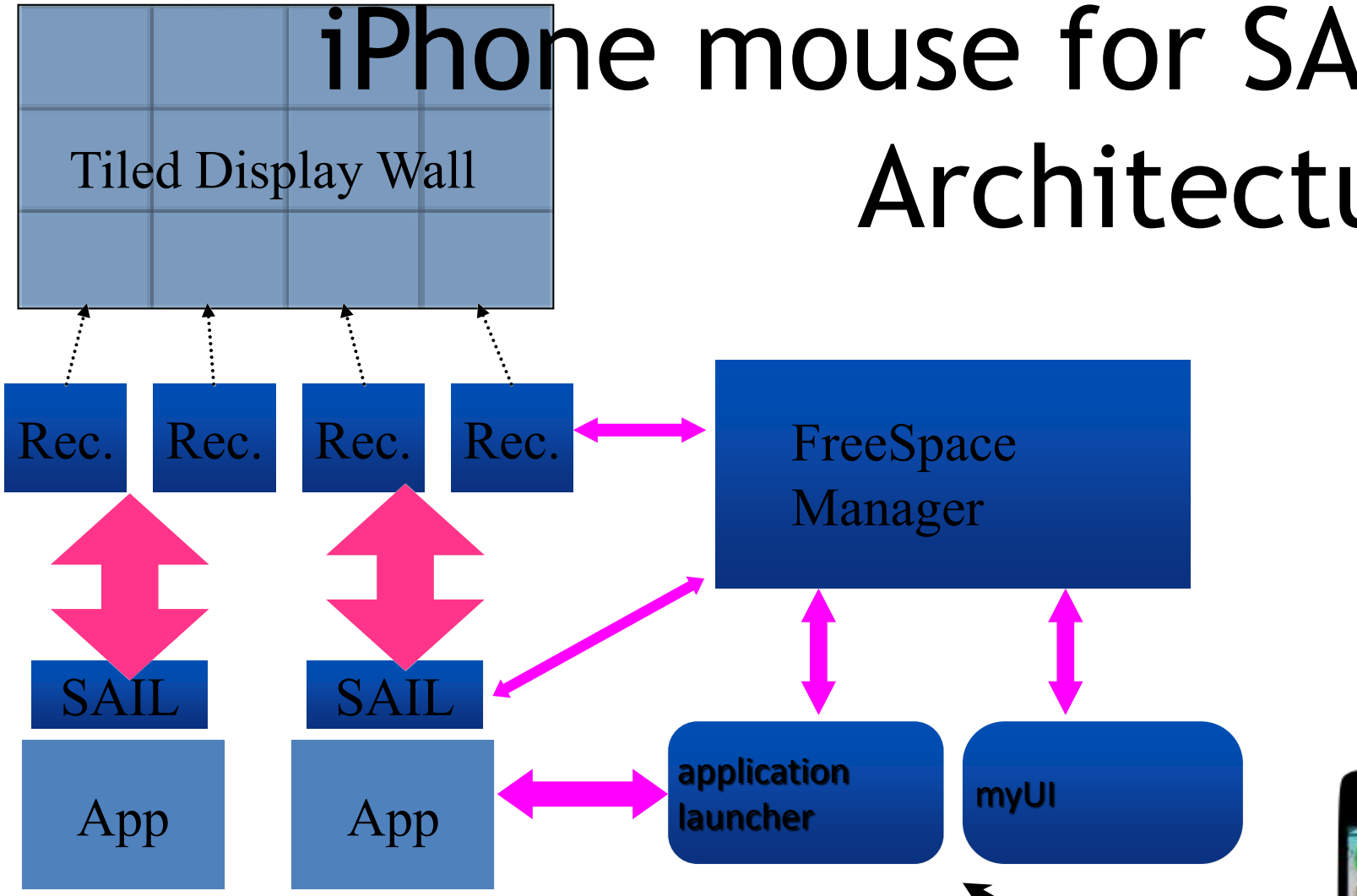
Goal is showing the interactivity of SAGE

Content flows via Sage bridges - from UQVislab, NCHC, Calit2: to Osaka



slide provided by Bernard Pailthorpe

iPhone mouse for SAGE Architecture



SAGE modification

To place application mostly outside of window area

garbage collection of unused resources

stoker robot

Adaptive monitoring and controlling DC environment

Implementation

- TurtleBot

- **ROS**(Robot Operating System)
- ロボット用メタ・オペレーティング・システム
- トピックの配信・購読を用いた通信

マップ生成
(SLAM:Simultaneous Localization and Mapping)

自己位置推定
(AMCL:Adaptive Monte Carlo Localization)

1. ROS からマップ内自己位置情報を取得

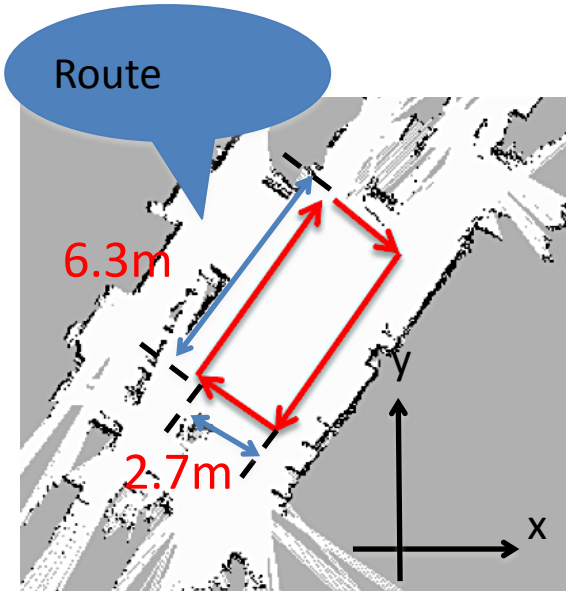
- 気象計測器から温度情報を取得
- **Pachube**へ送信

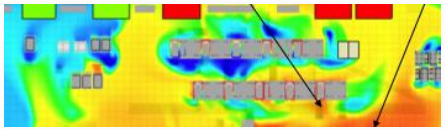
Pachube
- GPS情報に環境データを付随
- データ保管・共有
- ログを可視化

integration of ROS and **Pachube**

Experiment

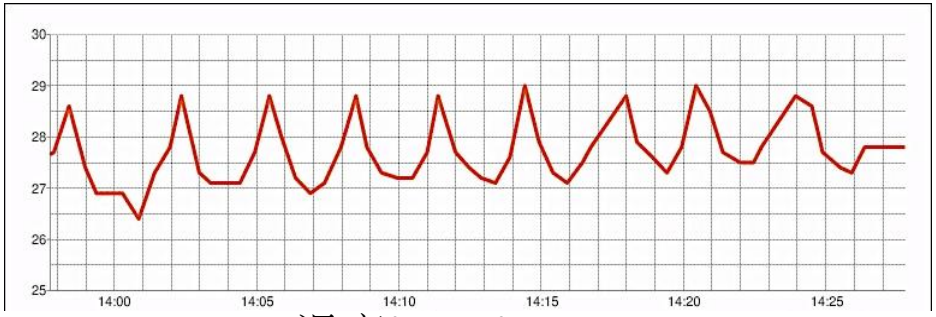
- 事前にSLAMによって生成した
  データセンター内静的マップを読込
- 遠隔操作で現実世界における
  設定ルートを周回



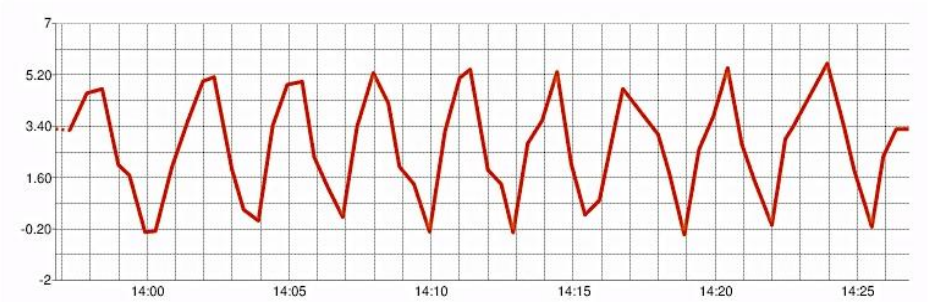


Comparison with Fluid Dynamic Simulation

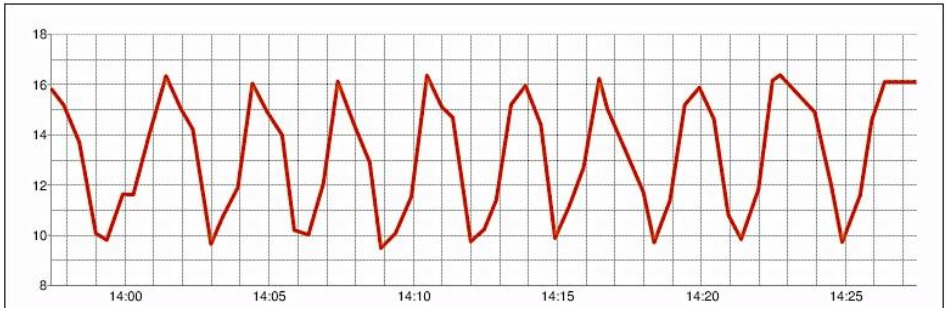
- Pachubeへのロギング結果



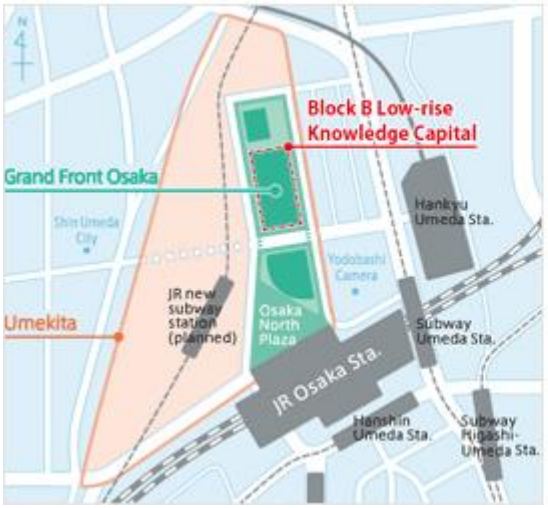
温度(temp)

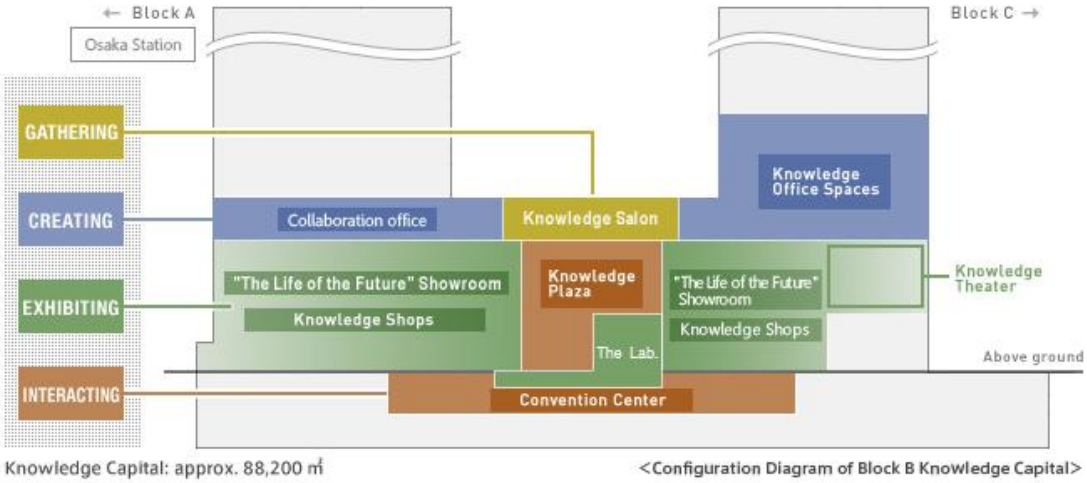


Location(x)



Location(y)





Knowledge Capital: approx. 88,200 ㎡

<Configuration Diagram of Block B Knowledge Capital>

Knowledge Captial - A smart building to Encourage people to interact & collaborate.
-- KC & NICT

Visited NCHC & NPM for joint demo

Why?

Fresh water lakes and reservoirs provide drinking water, recreation, fisheries, carbon sequestration, and a host of other ecosystem services. Yet increasingly, their ability to provide these services is under stress. Better understanding of lake ecosystems is essential for sustaining these resources.

Network activities

Conduct and publish research

Lead innovation of cyber infrastructure tools for streaming data from sensors to databases, assuring data quality, and conducting analyses

Deploy instrumented buoys on ecologically and societally important lakes around the world

Build human networks across national and disciplinary borders

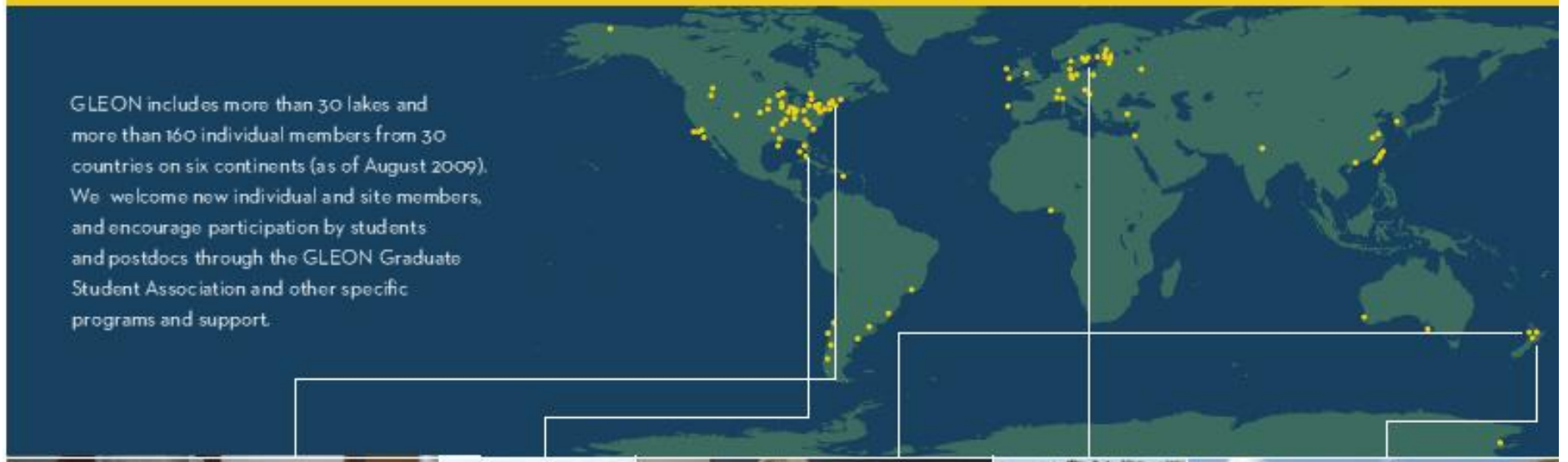
Train students to be future leaders in aquatic ecology and international network science

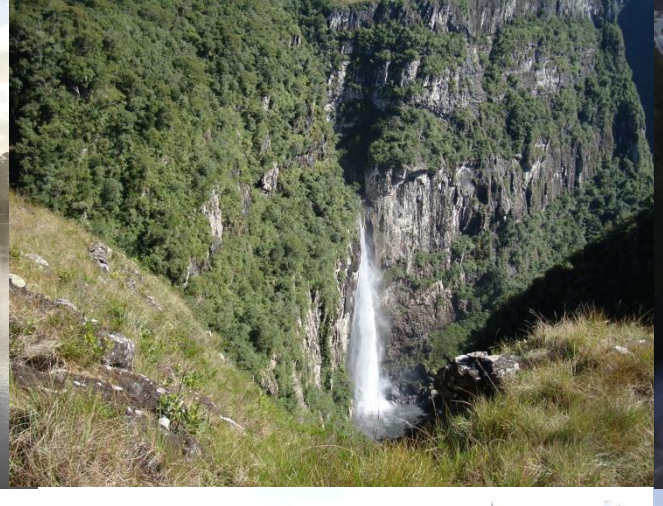
Engage citizen groups such as lake associations in lake research

Disseminate information about lakes to the public

GLEON is an international grassroots network of limnologists, ecologists, information technology experts, and engineers. We have a common goal of building a scalable, persistent network of lake ecology observatories in order to improve understanding and management of lake ecosystems.

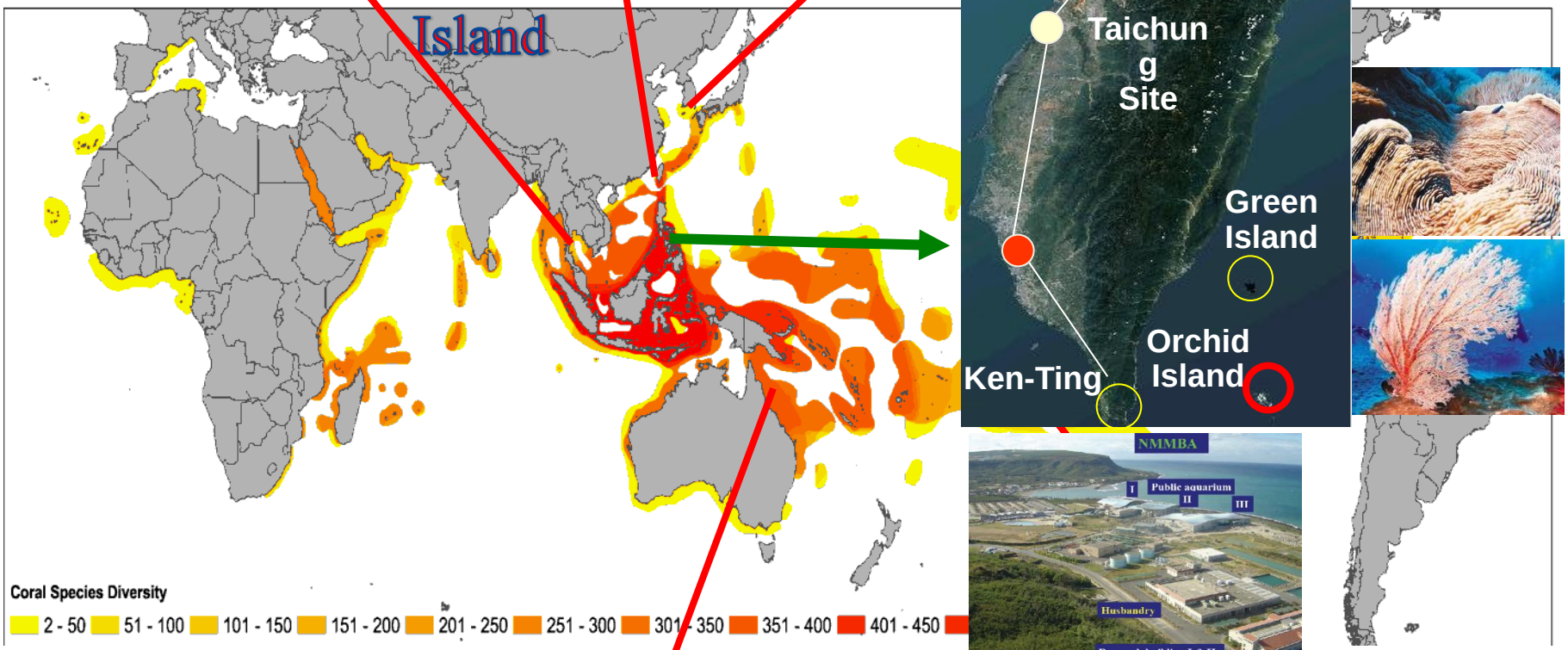
GLEON includes more than 30 lakes and more than 160 individual members from 30 countries on six continents (as of August 2009). We welcome new individual and site members, and encourage participation by students and postdocs through the GLEON Graduate Student Association and other specific programs and support.

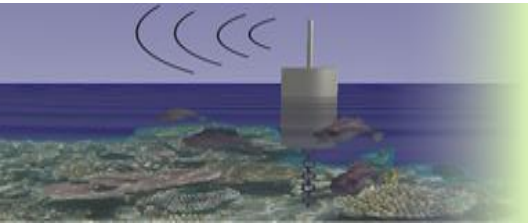





LSP4

More sites are joining from Asia





GBR

NSF collaboration:

UCSB and AS/NMMBA

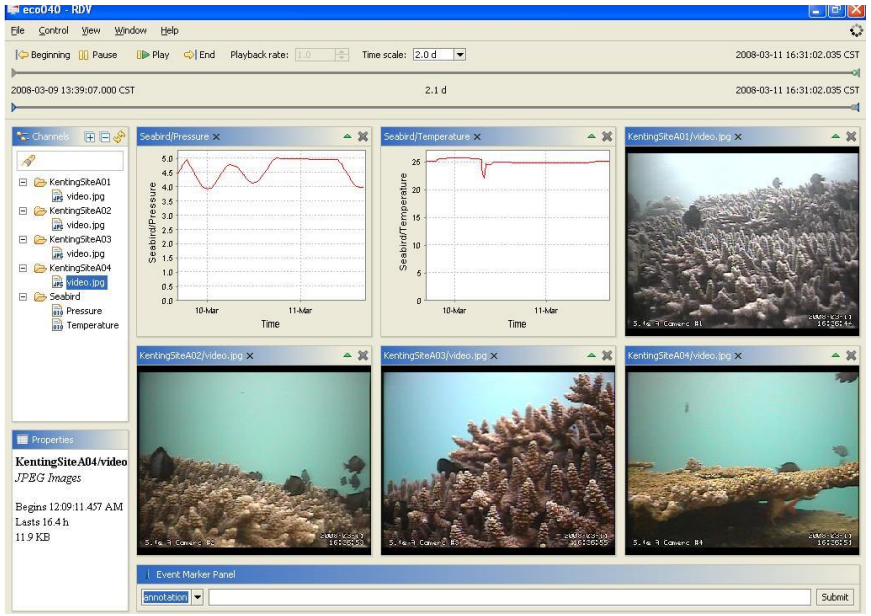
Moorea Island

Source: Stuart Kininmonth, AIMS

Source : Fang-Pang Lin, NCHC

http://www.coralreefeon.org/

Web-based: http://hddv.nchc.org.tw
Developed by Jazz Wang, NCHC



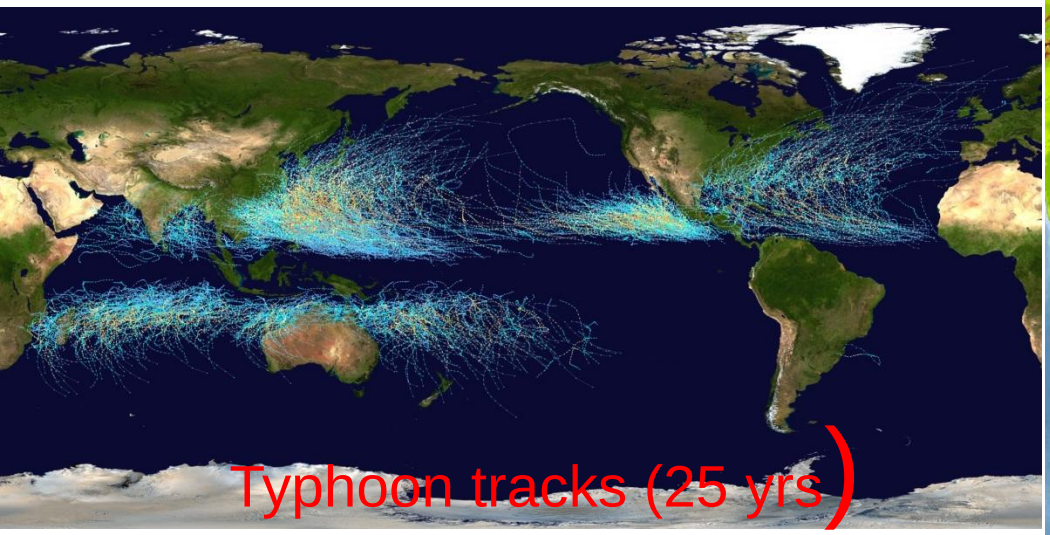
Real-time Data Viewer, NEES IT
http://it.nees.org/software/rdv/

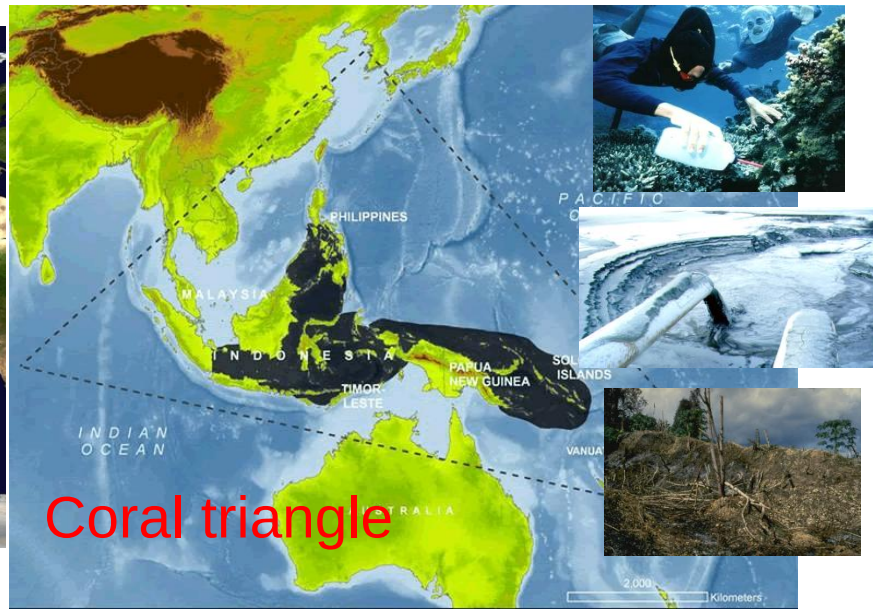
Live @ 4k TDW. NMNS, TaiChung.

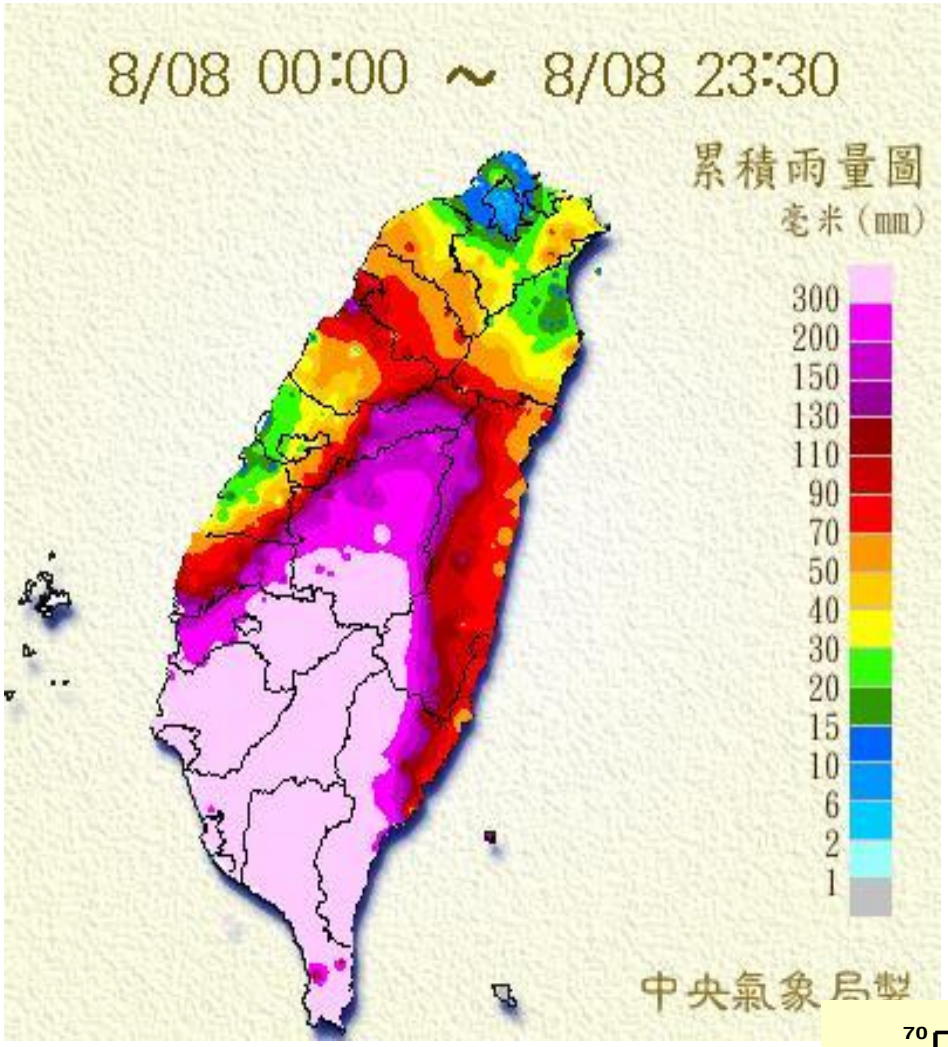
Live @ TDW in Calit2, UCSD.
Rigged by: Sameer Tilak & Raj Singh

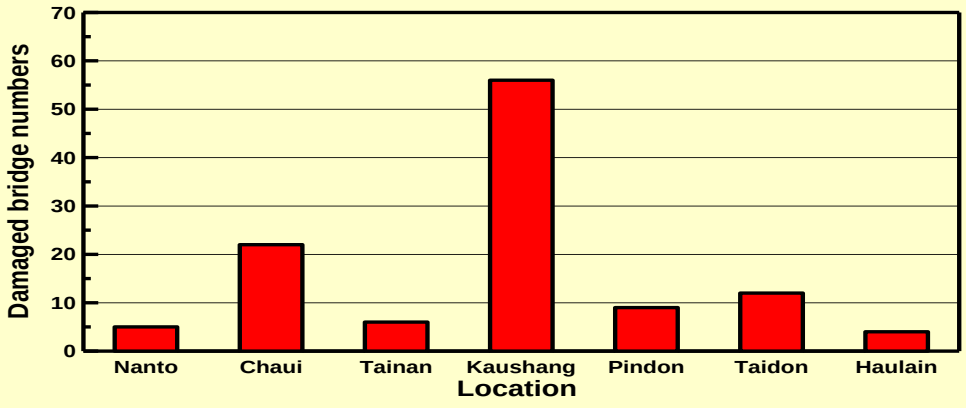
SEAIP- PRAGMA

- PRAGMA Family as core
- Research Collaboration and Education in Applications, Systems
- Connecting Sciences







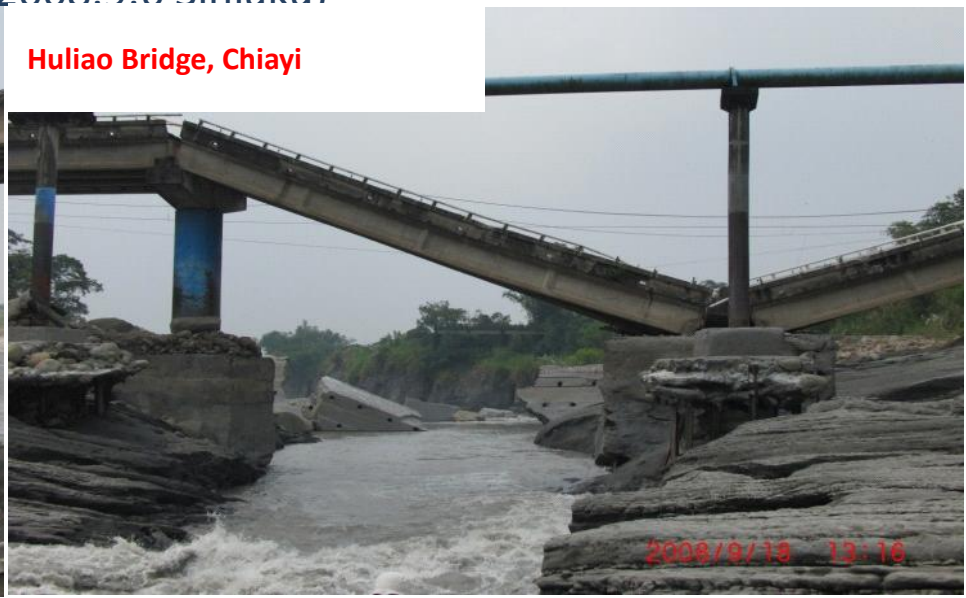


Source: NCREE

Cases (2008.9.6 Sinlaku)

Ho-Fon Bridge, Taichung

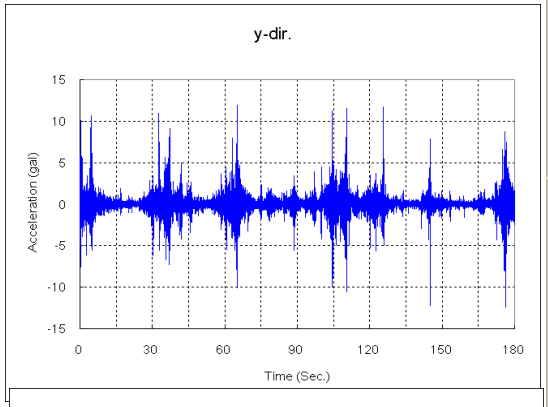
Huliao Bridge, Chiayi

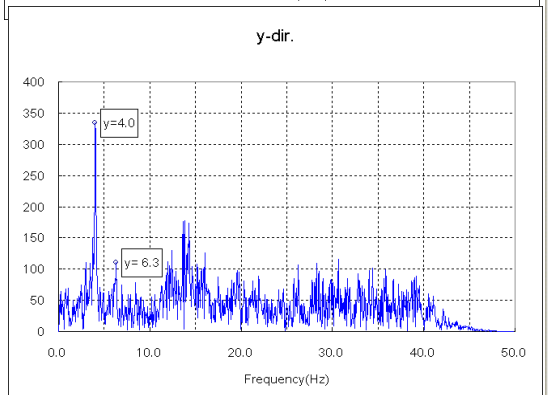


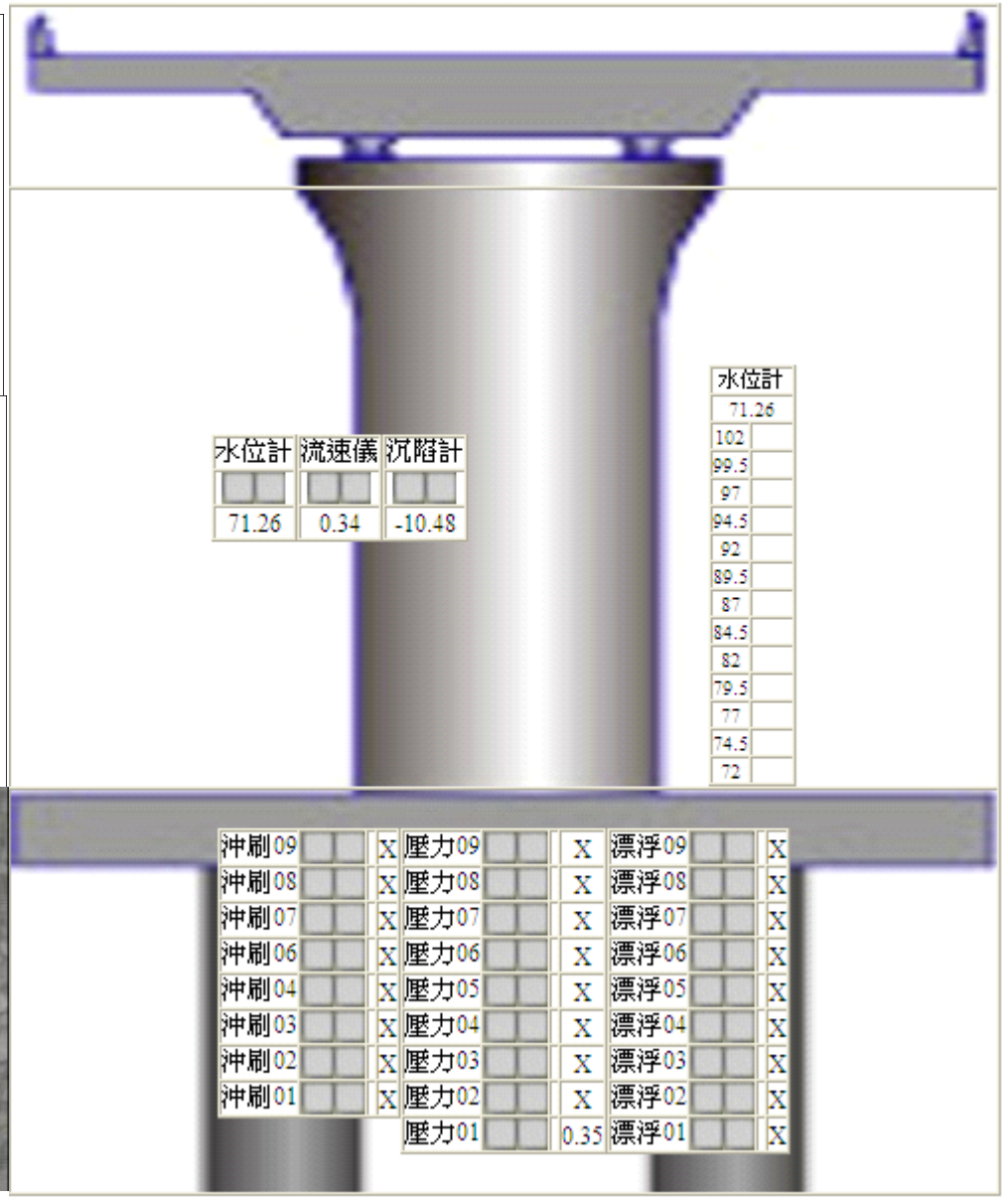
Jiashian Bridge Kaoshiung

Niumeng Bridge, Nantou

Source: NCREE

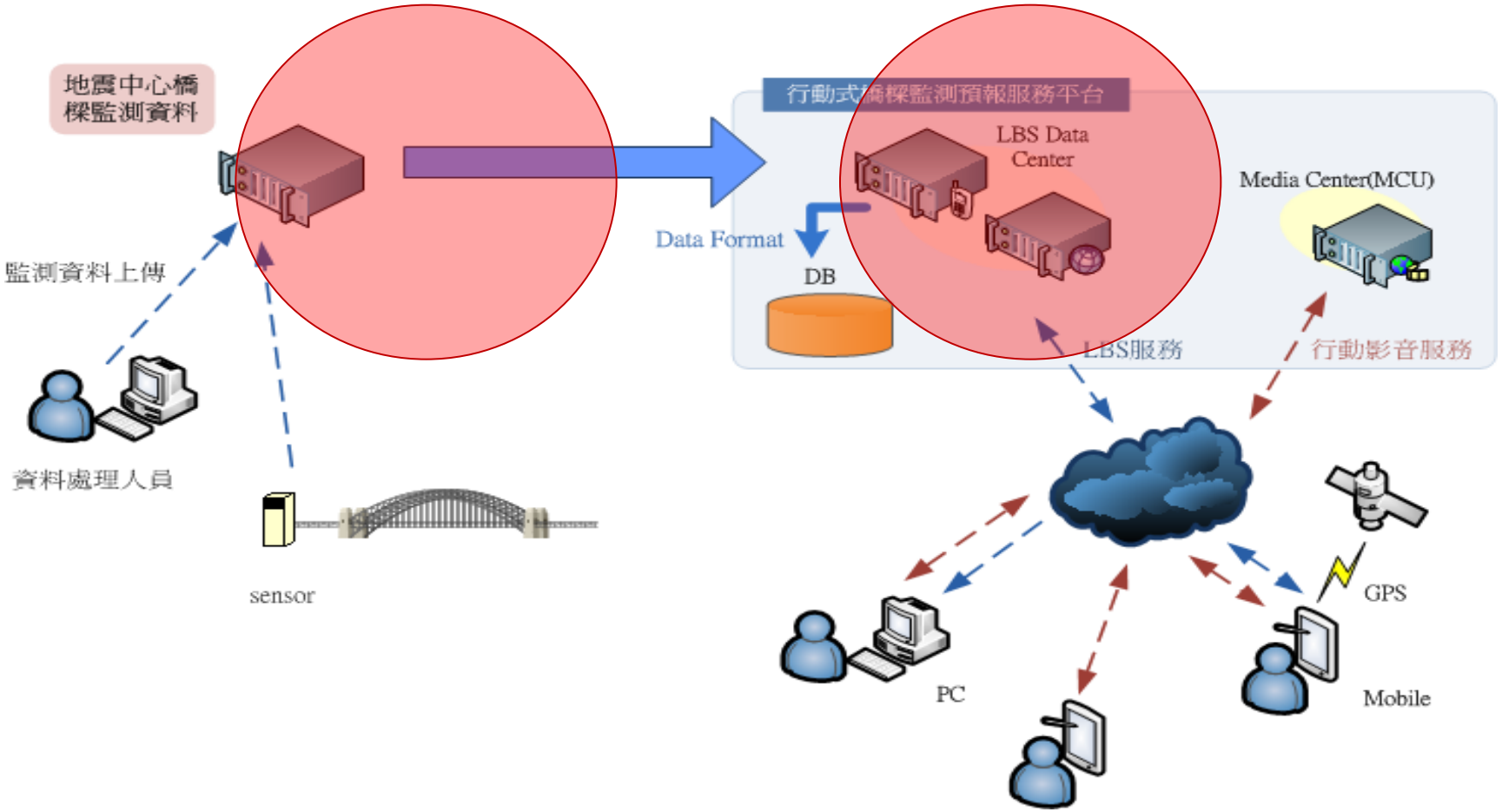






Source: NCREE

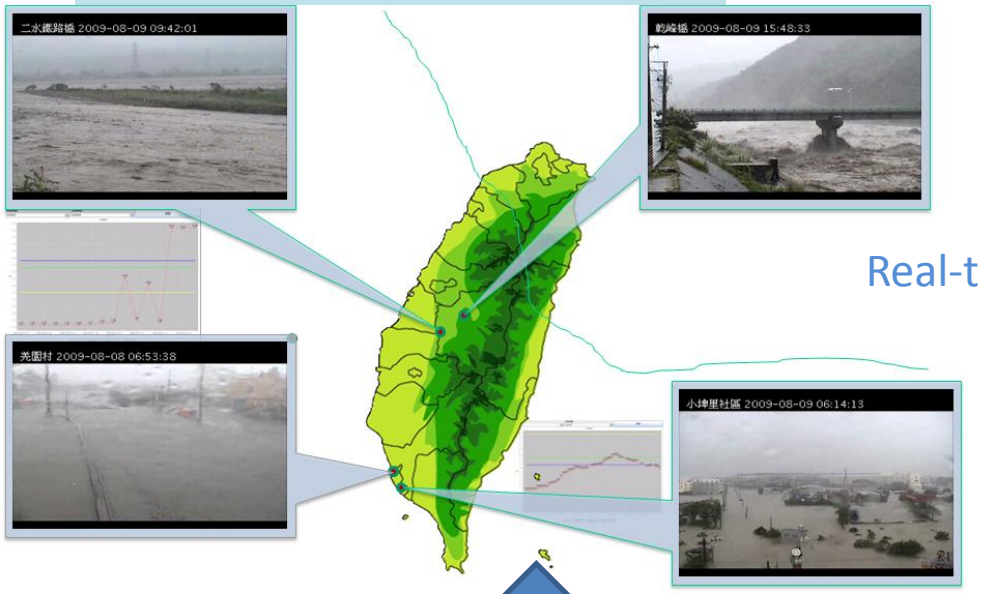
System Architecture



Hazard mitigation GRID System

Applied Android-based Mobile device

Hazard mitigation GRID system



Real-time monitoring

Flood watching and remote device control

LBS for disaster warning system. Earthquake, flood, and dangerous bridges, etc.

Disaster report

GPS + Video Stream

3D GIS Taiwan PI: Whey-Fone Tsai

Multiscale Observation

- Large-scale (~100KM²)
  - -Formosat-2 satellite image, NSPO
  - -Others (such as Aster etc.)
- Meso-scale airborne image (10KM²)
  - -ITRC

The advanced optomechanical system design and assembly of airborne imager, VCDi-660 (Vegetation and Change Detection imager) is developed by ITRC.

- -Others (Arial Survey Office)

- Small-scale High-precision in-situ 3D photography (1 KM²)
  - -NCHC
  - -Others

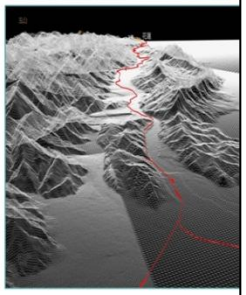
Visualization & Applications

LCD iZ3D
(2-5 persons)

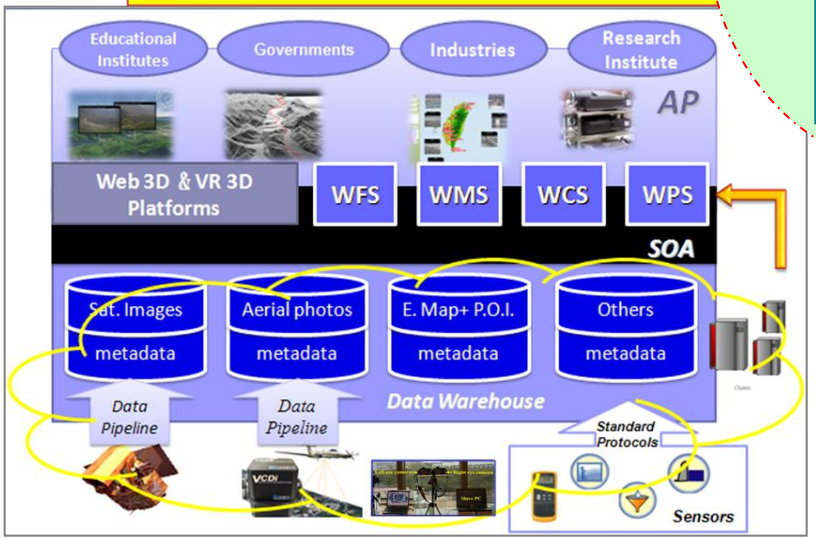
The 3D active ViewSonic projector displays images on a white wall
(5-10 persons)

4K High-resolution VR
(50-200 persons)

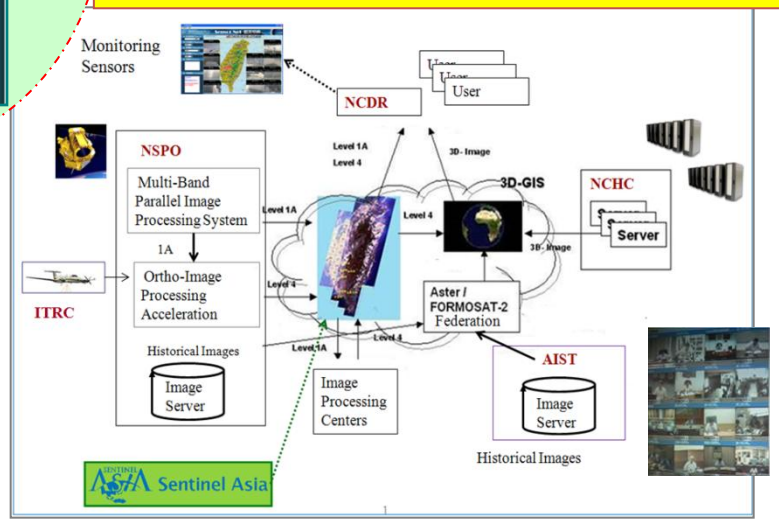
Tile Display Wall



3D GIS Cloud Servcies



Near-real time data processing & Decision support



Enable CI Collaboration in Southeast Asia:

NSC SEAIP support to BioCI

- Common Interests and threats in the region
- Provide a Conduit for the most updated ICT development.
- Share Experiences & Incubate Collaboration.
- Connect ICT & Science
  - Common problems in the region, such as problems in Natural Disasters , Biodiversity & many others.
- Build Trust: Rich and diverse cultures that can be shared to enhance the mutual understanding.