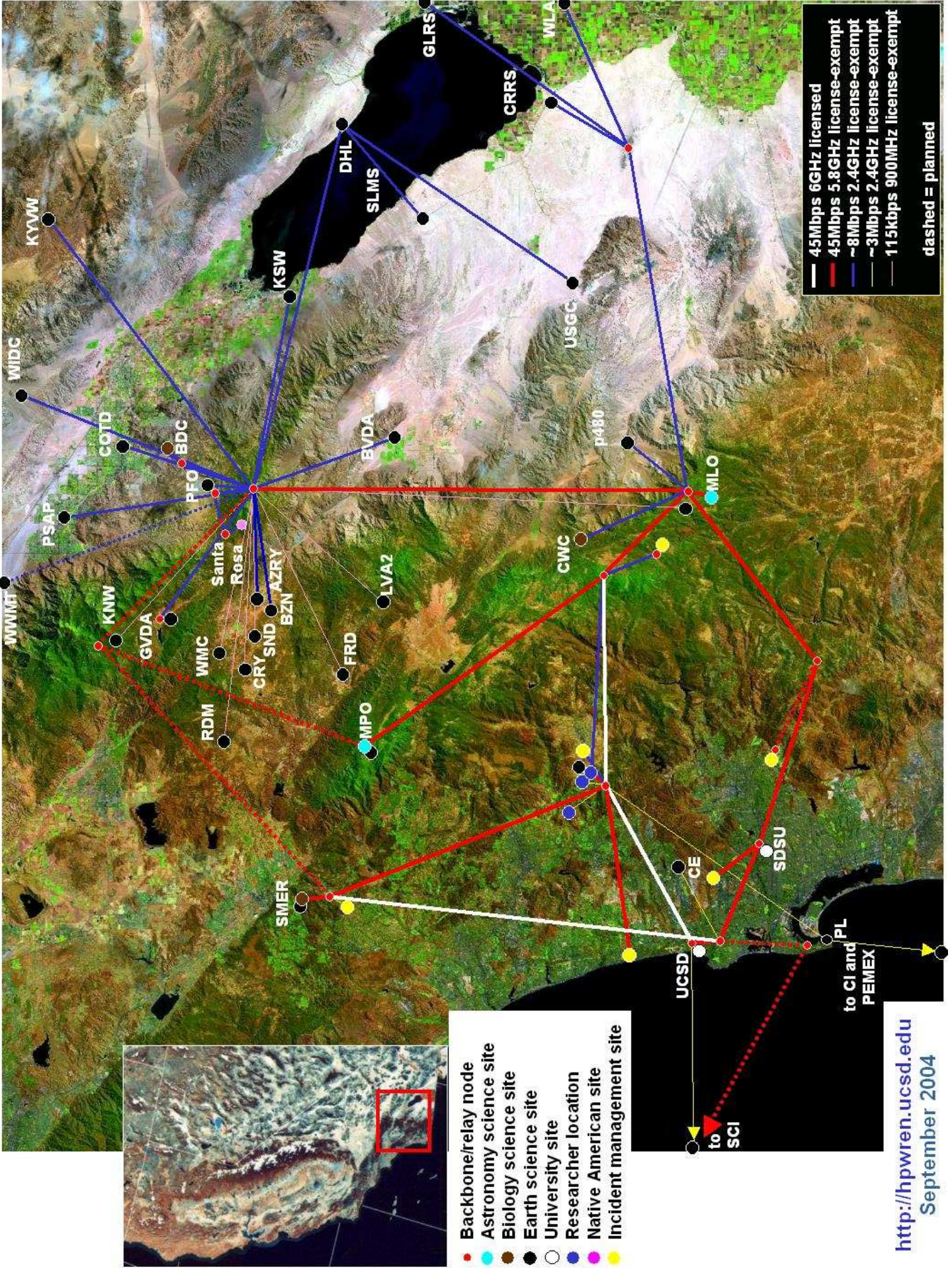# ROADNet:
New and Different Uses of Antelope

University of Trieste

Trieste, Italy

29-30 November 2004

Frank Vernon

SIO, UCSD

ROADNet

Legend

Link types:
- 45Mbps 6GHz licensed
- 45Mbps 5.8GHz license-exempt
- ~8Mbps 2.4GHz license-exempt
- ~3Mbps 2.4GHz license-exempt
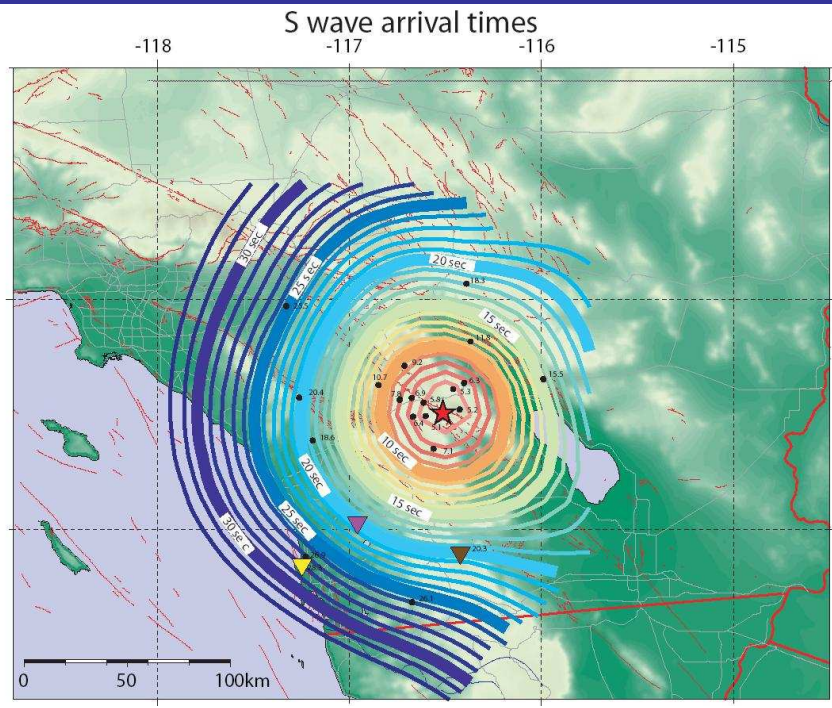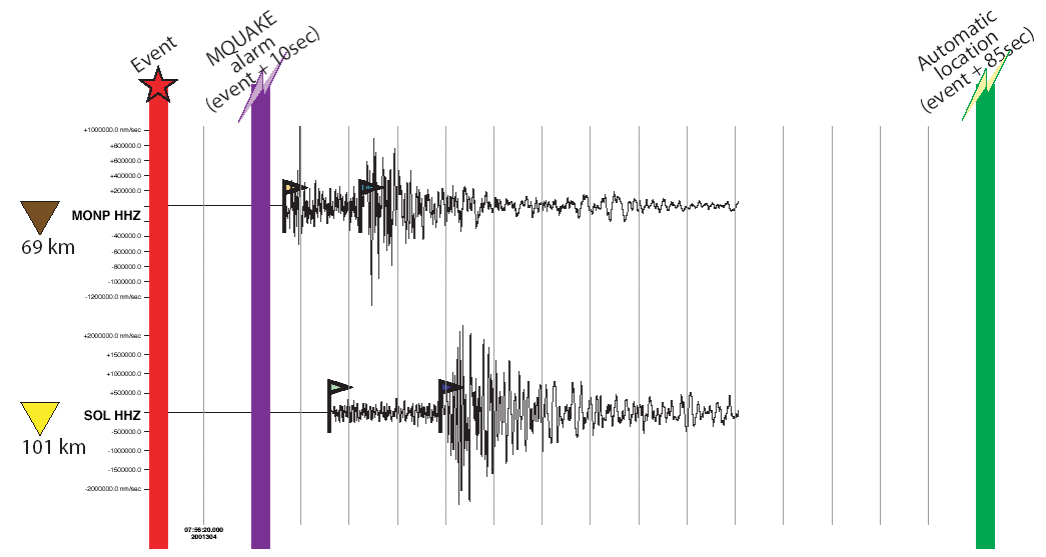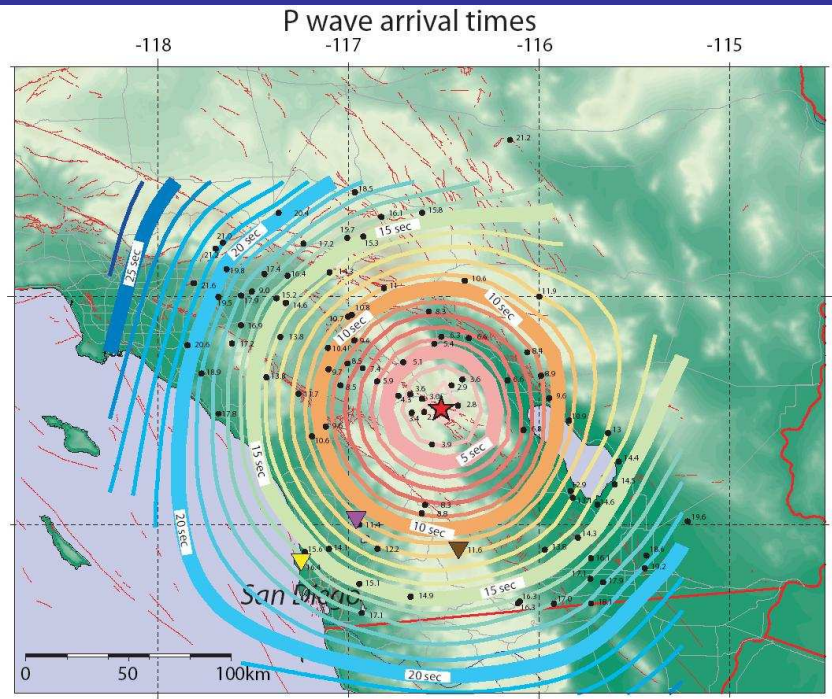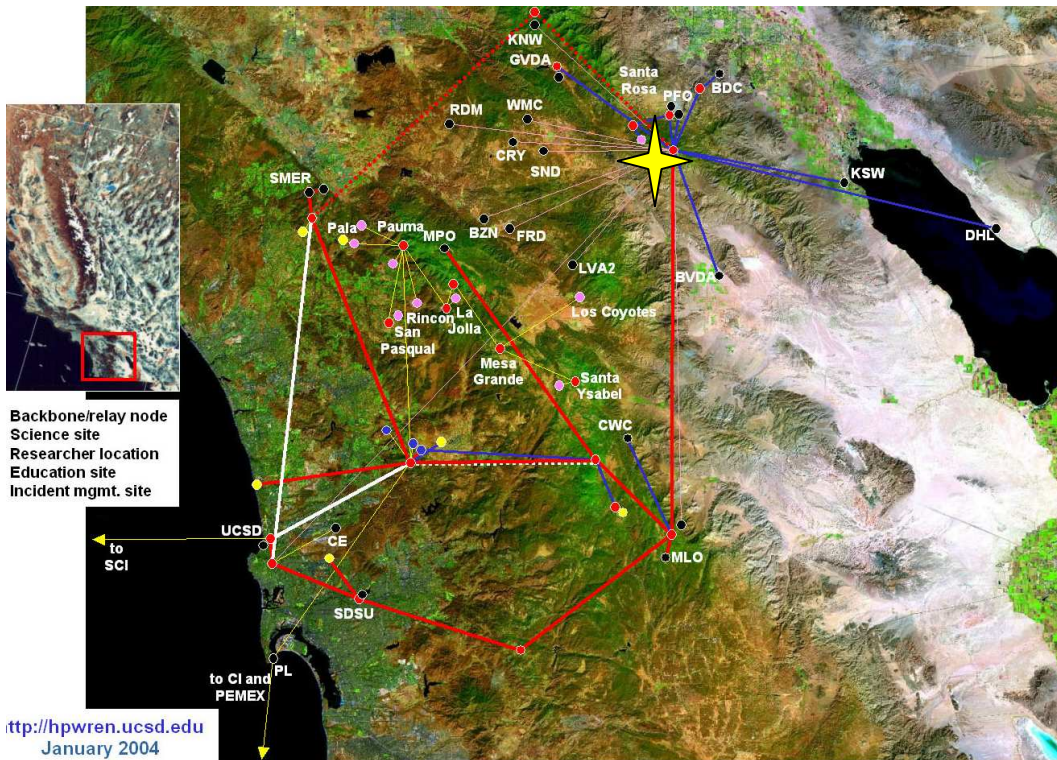- 115kbps 900MHz license-exempt

dashed = planned

Site types:
- Backbone/relay node
- Astronomy science site
- Biology science site
- Earth science site
- University site
- Researcher location
- Native American site
- Incident management site

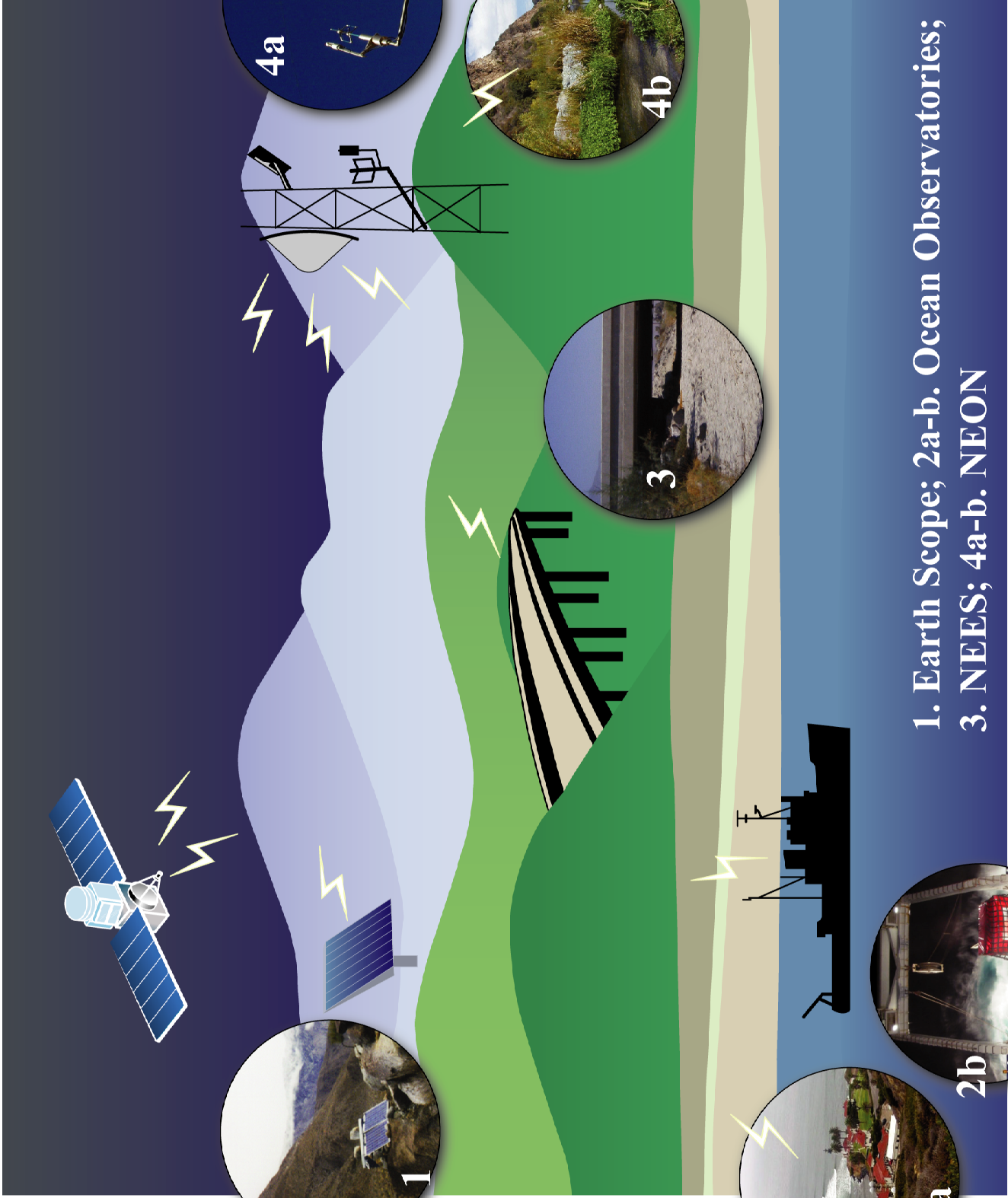Site labels: GLRS, WLA, CRRS, DHL, SLMS, KSW, KYVW, WIDC, COTD, BDC, PFO, BVDA, USGC, p480, MLO, PSAP, Santa Rosa, AZRY, CWC, WVMT, KNW, GVDA, WMC, SND, BZN, LVA2, CRY, FRD, RDM, MPO, SMER, CE, SDSU, UCSD, PL

to CI and PEMEX

to SCI

http://hpwren.ucsd.edu
September 2004

Backbone/relay node
Science site
Researcher location
Education site
Incident mgmt. site

to SCI

to CI and PEMEX

KNW
GVDA
Santa Rosa
PFO BDC
RDM WMC
CRY SND
KSW
SMER
Pala Pauma
MPO BZN FRD
DHL
Rincon La Jolla
San Pasqual
LVA2
Los Coyotes
BVDA
Mesa Grande
Santa Ysabel
CWC
UCSD
CE
MLO
SDSU
PL

http://hpwren.ucsd.edu
January 2004

P wave arrival times

S wave arrival times

orbmonrtd: replay

File View Amp Time

AZ_TRO_EHZ

P

Event

MQUAKE alarm (event+10sec)

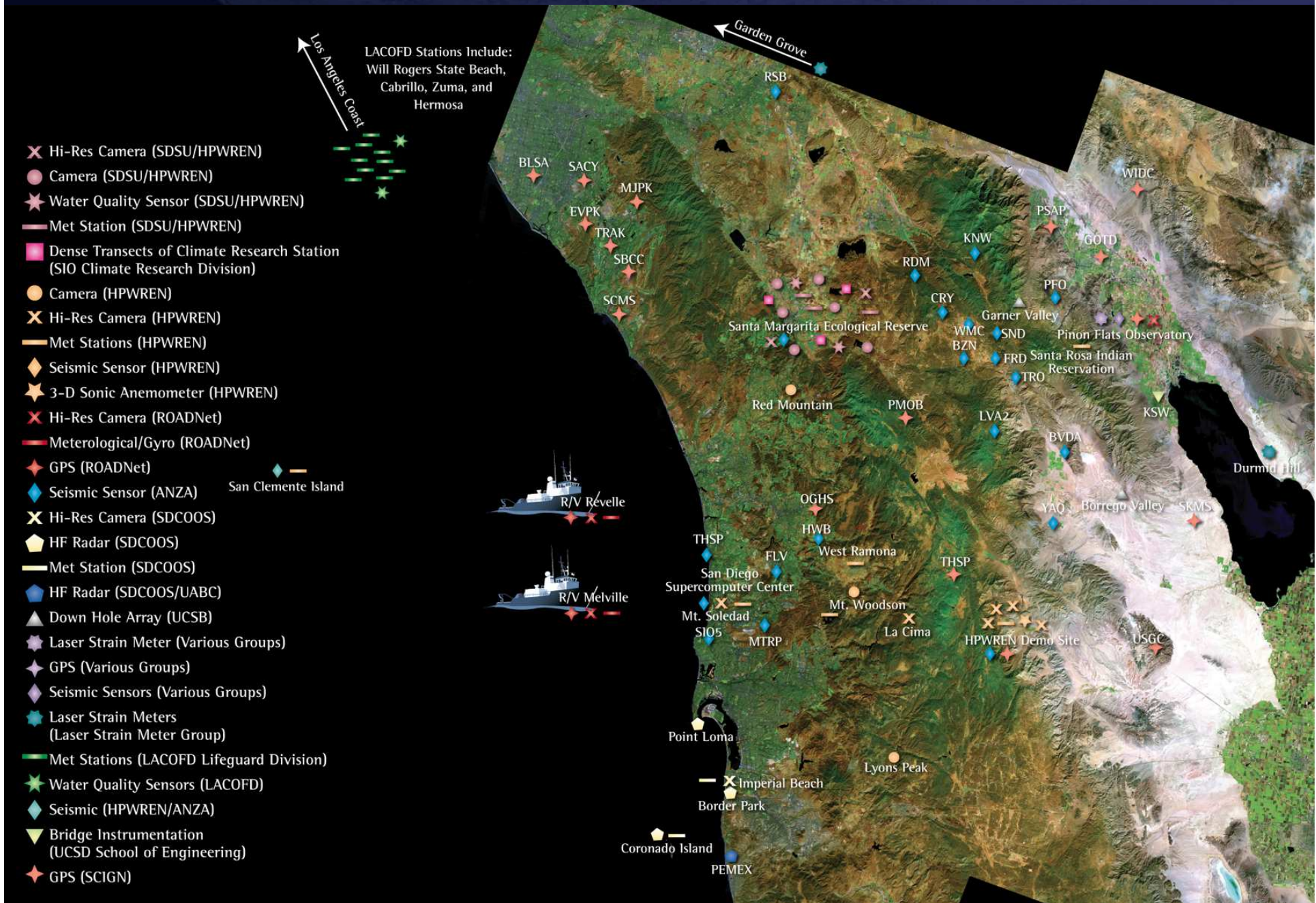Automatic location (event+85sec)

MONP HHZ
69 km

SOL HHZ
101 km

1. Earth Scope; 2a-b. Ocean Observatories;
3. NEES; 4a-b. NEON

ROADNet Sensors

Water Quality Station

River Camera Station

Weather And Fuel Moisture/Temperature Data
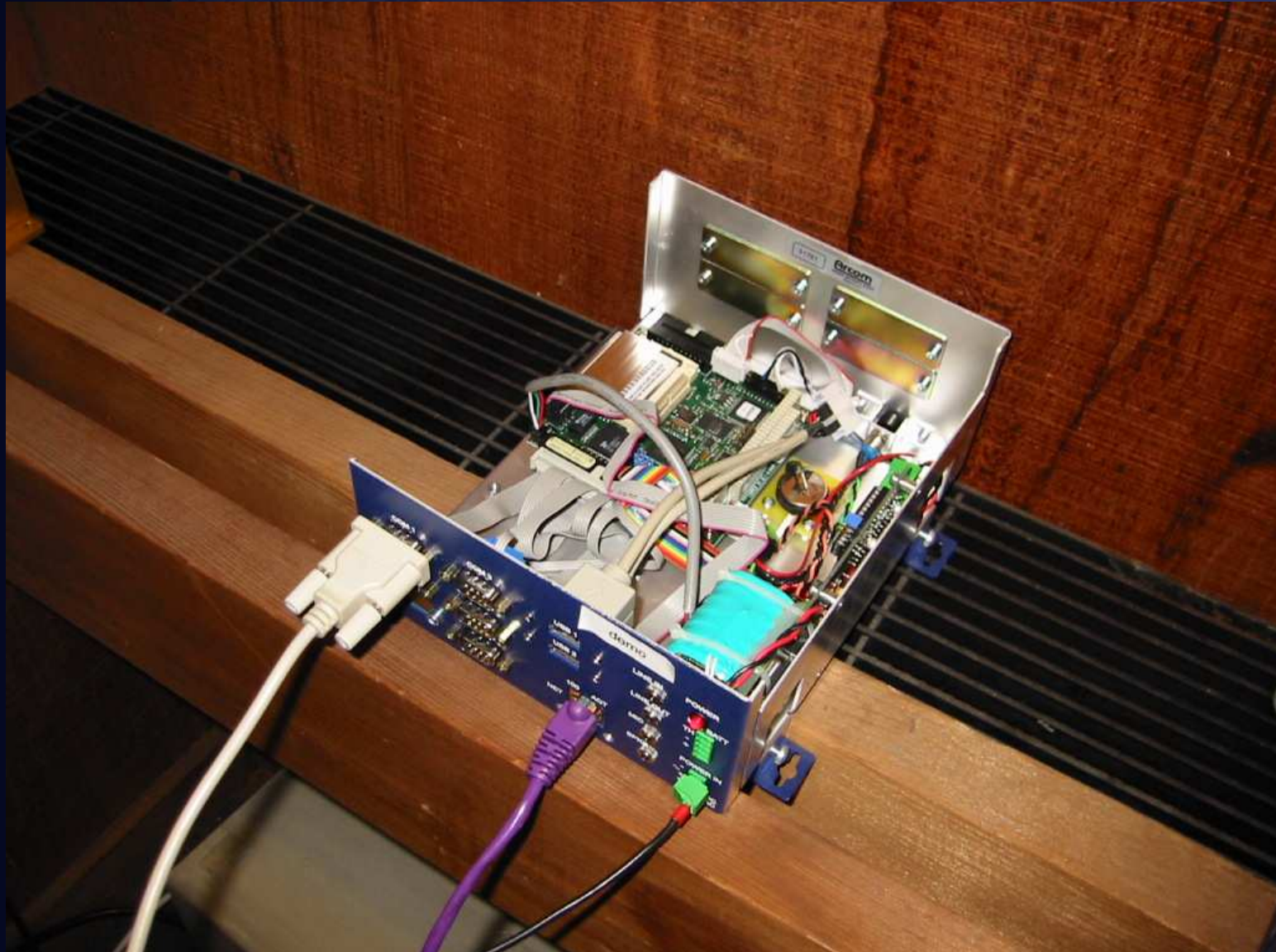

ROADNet

HiSeasNet - RV Revelle

Jason Dives to retrieve the H20 Jbox

QuickTime™ and a
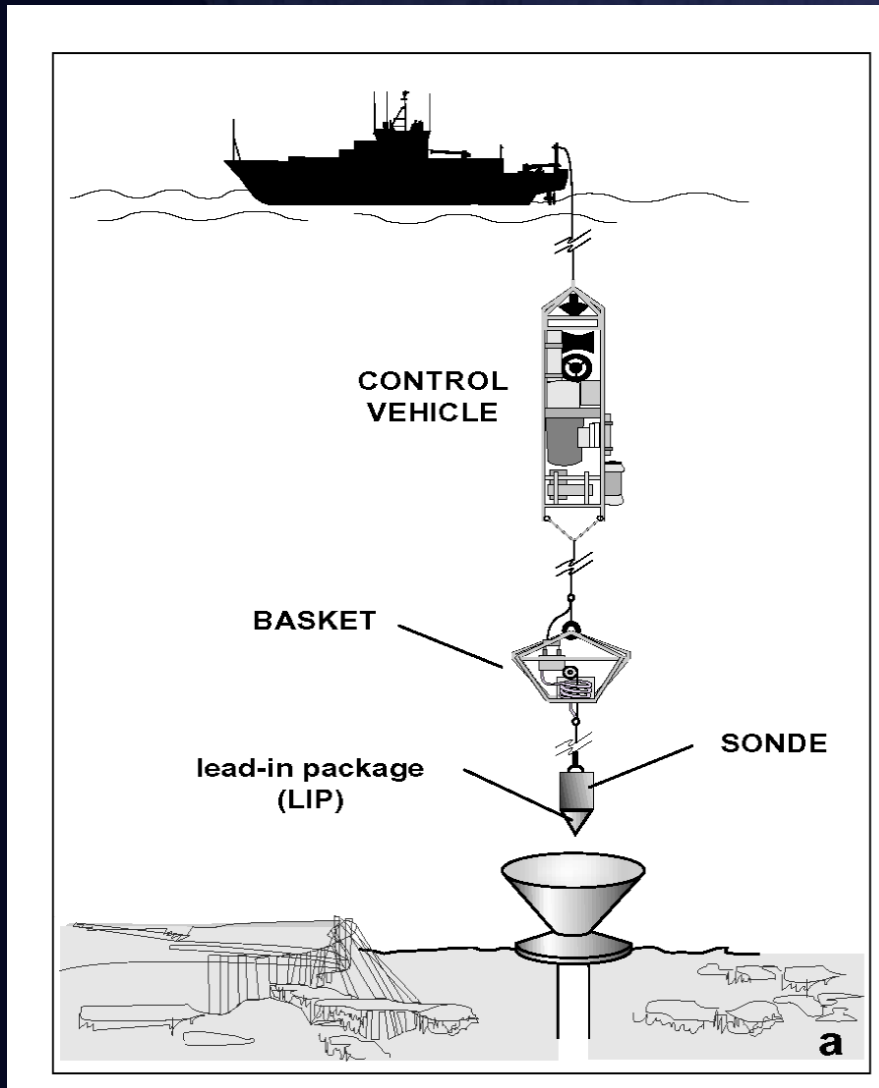Video decompressor
are needed to see this picture.

Xscale Viper

HOBO GSN System for H2O

- KS54000
- CMG-3TB
- 2 - Q330s
- 2 - XScale Vipers w/ Orb middleware

Design Goals for ROADNet

- provide scalable networked architecture out to sensor interface
- dynamically reconfigure with the addition or removal of observational equipment and/or scientific instrumentation
  - self-healing topology
  - decentralized resource registration
- provide Internet access to integrated data collections along with visualization, data mining, analysis, and modeling capabilities

ROADNet

Design Goals for ROADNet

- capture, process, control for quality, and integrate real-time data streaming from different sources-- collected for different purposes, on different time and spatial scales, and measured by different methods;

- make heterogeneities in platforms, physical location and naming of resources, data formats and data models, supported programming interfaces, and query languages *transparent* to the user;

- adapt to new and changing user requirements for data and data products;

ROADNet Real-Time Data Communication System

- built on BRTT Antelope software
- data flow, buffering and distribution (ORB)
- data acquisition
- real-time data processing
- embedded relational database management system (Datascope)
- data archiving
- data import/export
- off-line data processing
- metadata, real-time (prototype) and archive

Antelope Real–Time System
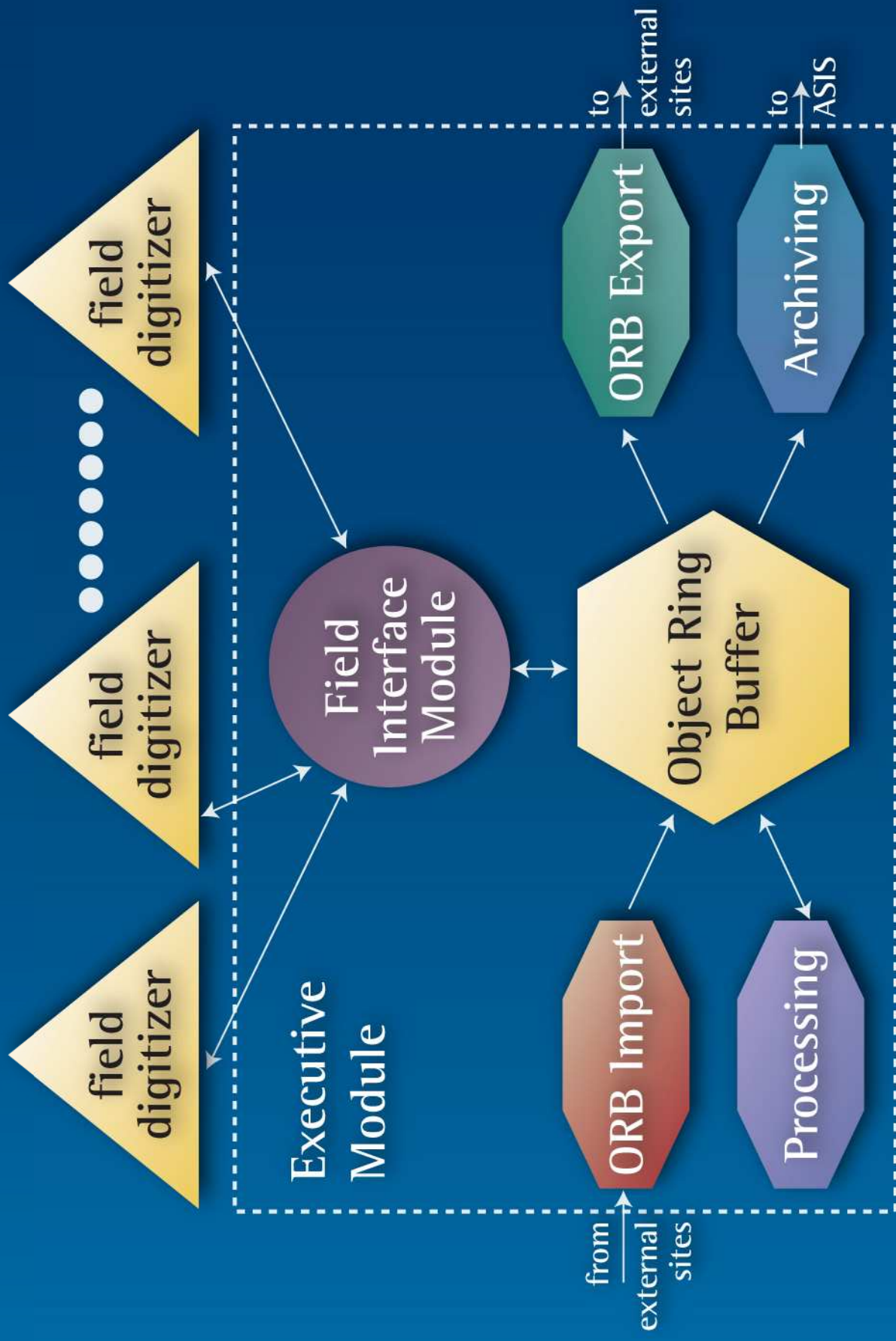
SRB Features

- Resource Transparency
  - Local or Remote, Resource Type & Access Method
- Location Transparency
  - Path Names, Schemas, Containers
- Cross-Domain Authentication
- Rich Access Control
- User Transparency

  - Uniform User Name Space

- Uniform Data Name Space
- Segmented & Replicated Data Management
- Data Discovery

  - User-defined Metadata

Storage Resource Broker
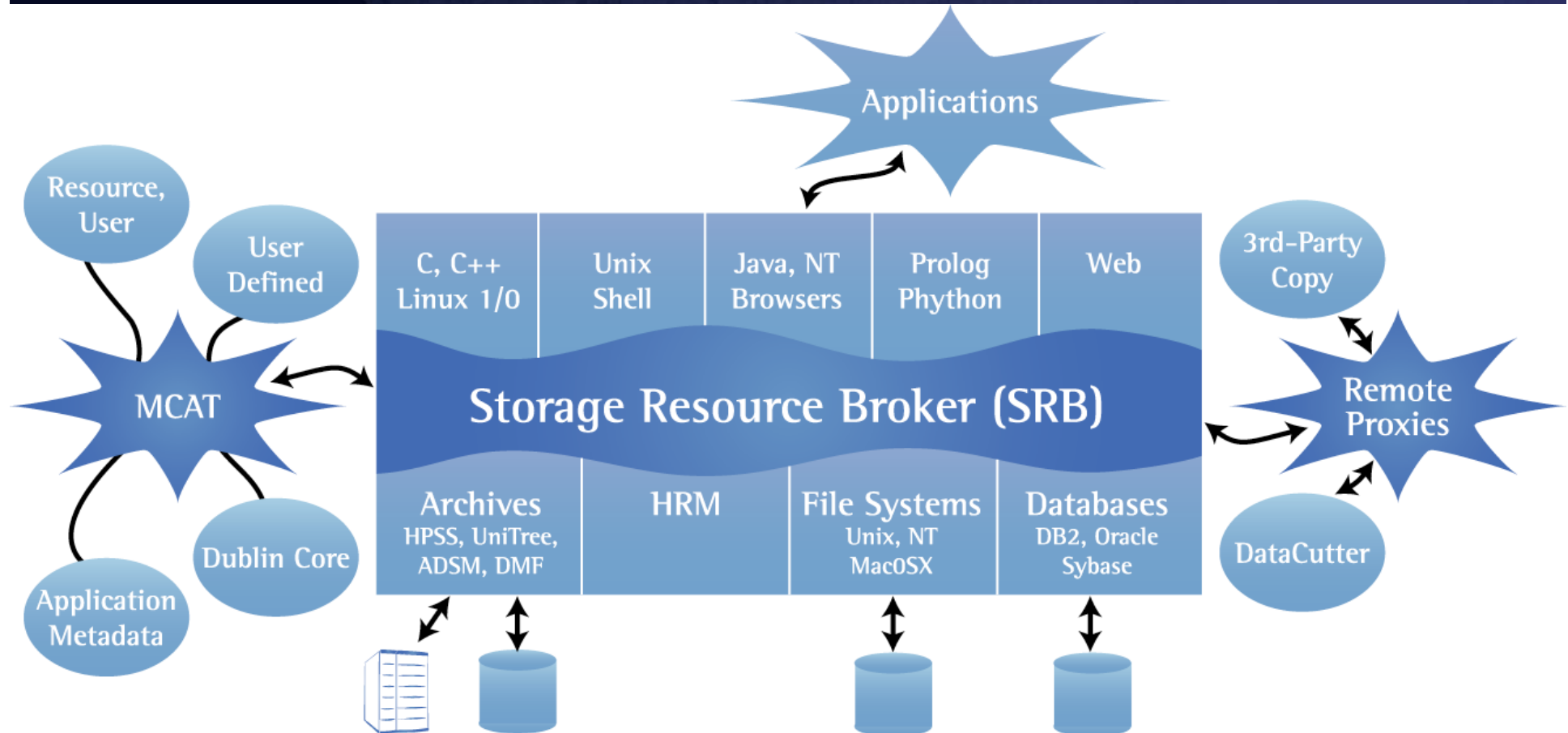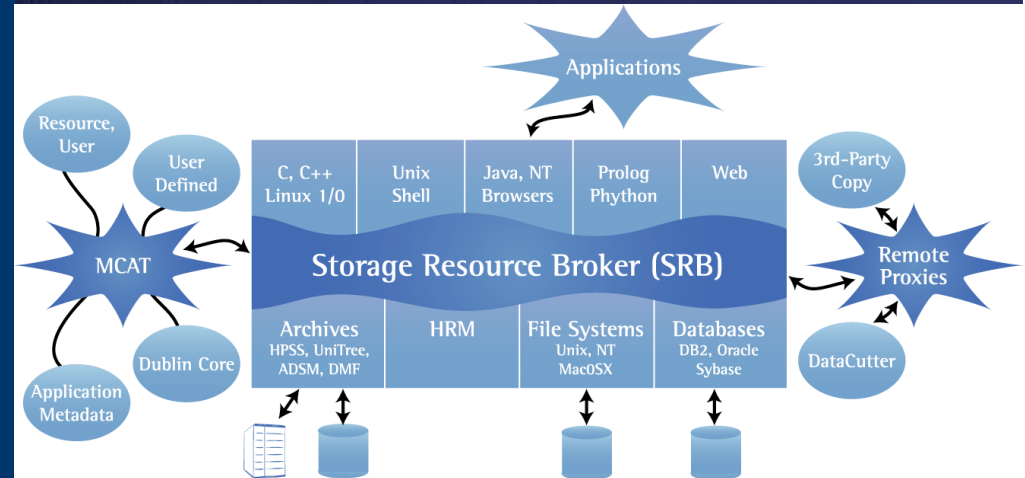
VORB

- Aims
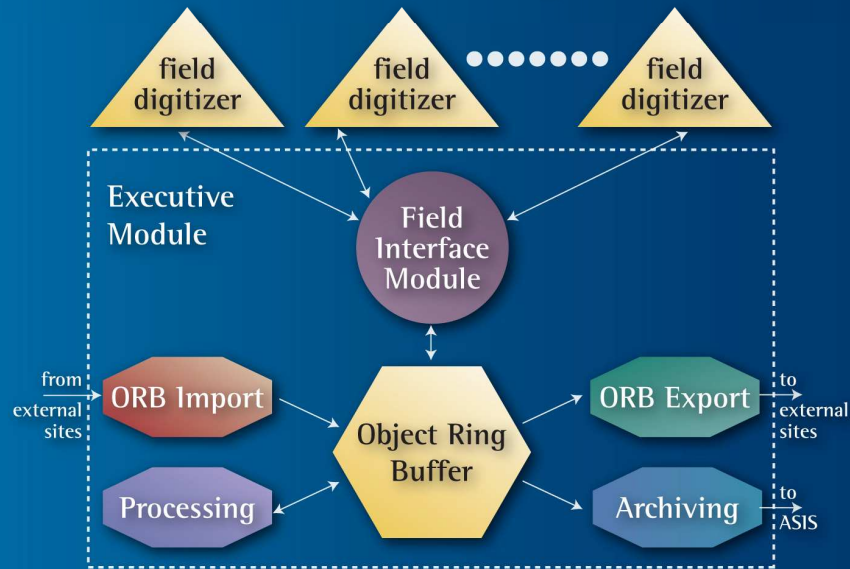 - Virtualized Access to Real Time Data Streams
    - VORB
  - Virtualized Integration of Real Time Data
    - Multiple VORBs
  - Private Virtual Real Time Data Management
    - Private VORBs
  - Rapidly Configurable RT Data Networks
    - Demand-driven Reconfigurable VORB

- Requirements
  - Federated Resource Brokering
  - Metadata Catalog
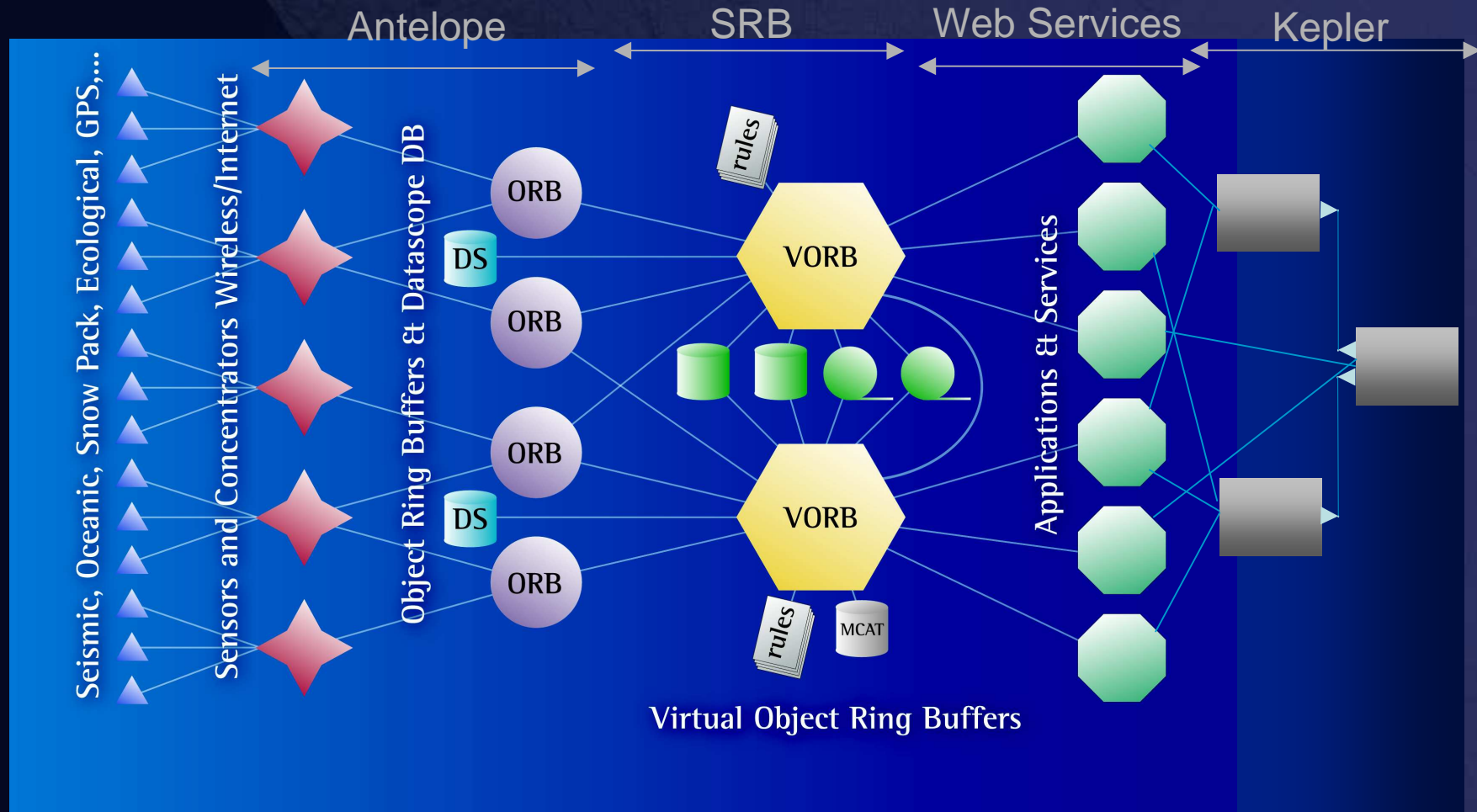 - Rule-driven Data Aquisition and Integration
  - Extensible ORBs

ORB + SRB

Antelope Real-Time System

field digitizer • • • • • • • field digitizer field digitizer

Executive Module

Field Interface Module

from external sites → ORB Import

Processing

Object Ring Buffer

ORB Export → to external sites

Archiving → to ASIS

ROADNet

Storage Resource Broker (SRB)

Applications

Resource, User — User Defined

C, C++ Linux 1/0 | Unix Shell | Java, NT Browsers | Prolog Phython | Web

3rd-Party Copy

MCAT

Remote Proxies

Dublin Core

Archives HPSS, UniTree, ADSM, DMF | HRM | File Systems Unix, NT MacOSX | Databases DB2, Oracle Sybase

DataCutter

Application Metadata

= VORB

ORB Topology Monitoring

- Based on pforbstat data catalog (next generation)
- Allows topology based monitoring, info gathering and eventually data access
- http://mercali.ucsd.edu/orbtopo.cgi

QuickTime™ and a
TIFF (LZW) decompressor
are needed to see this picture.

ROADNet

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ROADNet