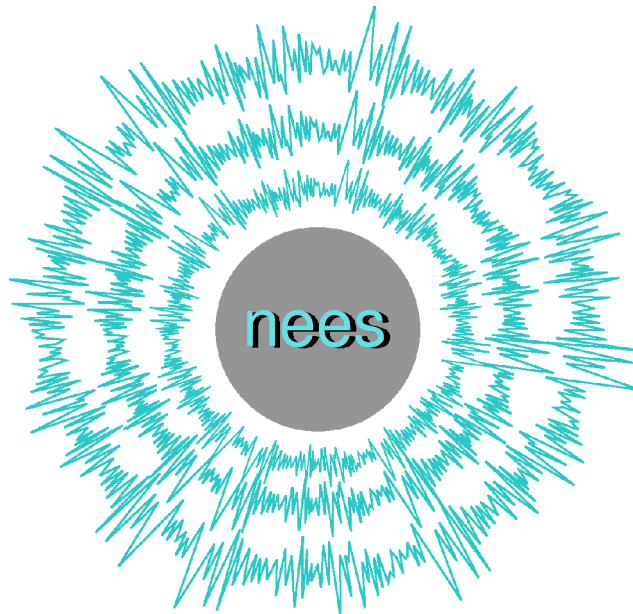


# NEES Field Sites Demonstration Project at Garner Valley, CA

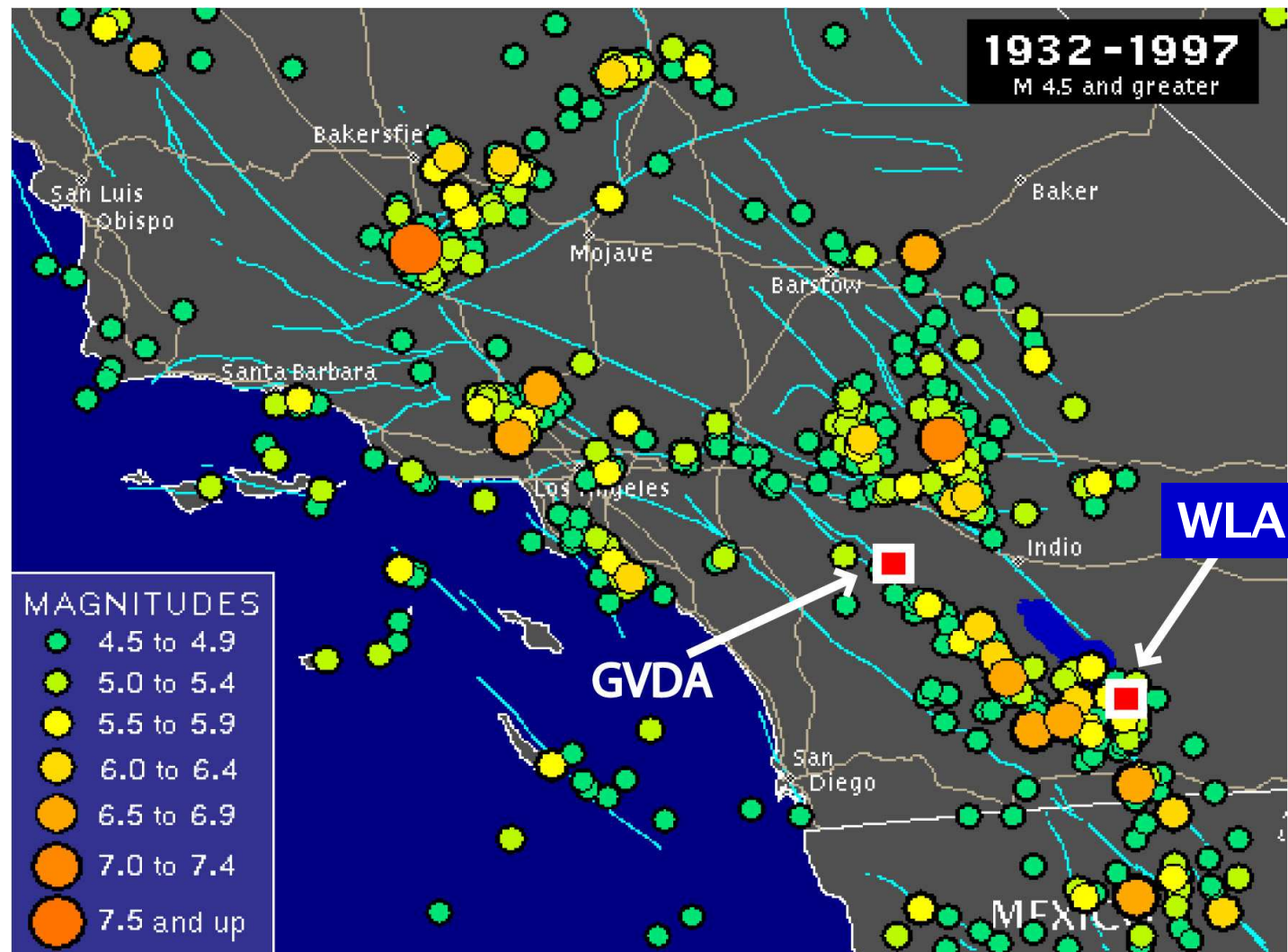
UT - BYU/UCSB/USC - UCLA



# Regional map showing location of GVDA site



# GVDA and WLA Sites Are in Areas of High Seismicity





# Garner Valley Main Station

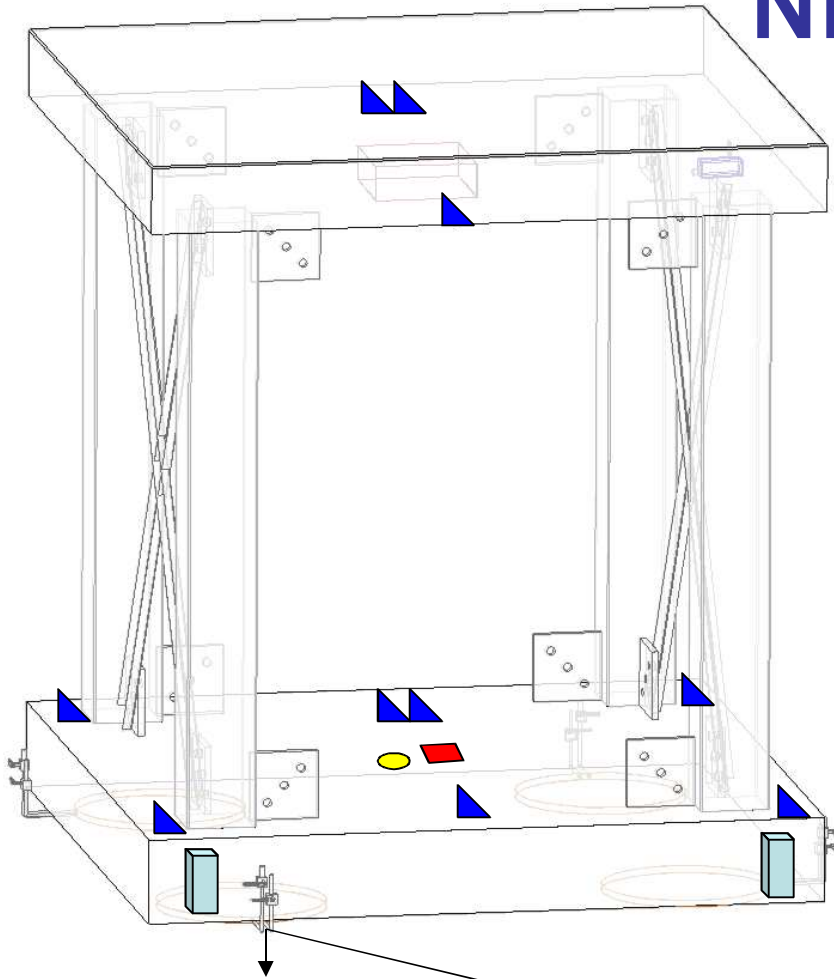


**Ancestral Lake – Soft Saturated Soil**

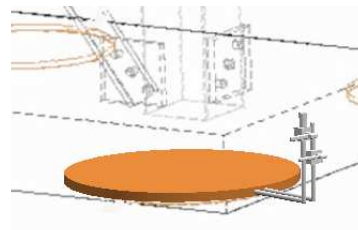
# NEES@BYU/UCSB/USC

## Permanent Field Sites

SFSI Experimental Structure at Garner Valley



Pressure Cell and Sensor



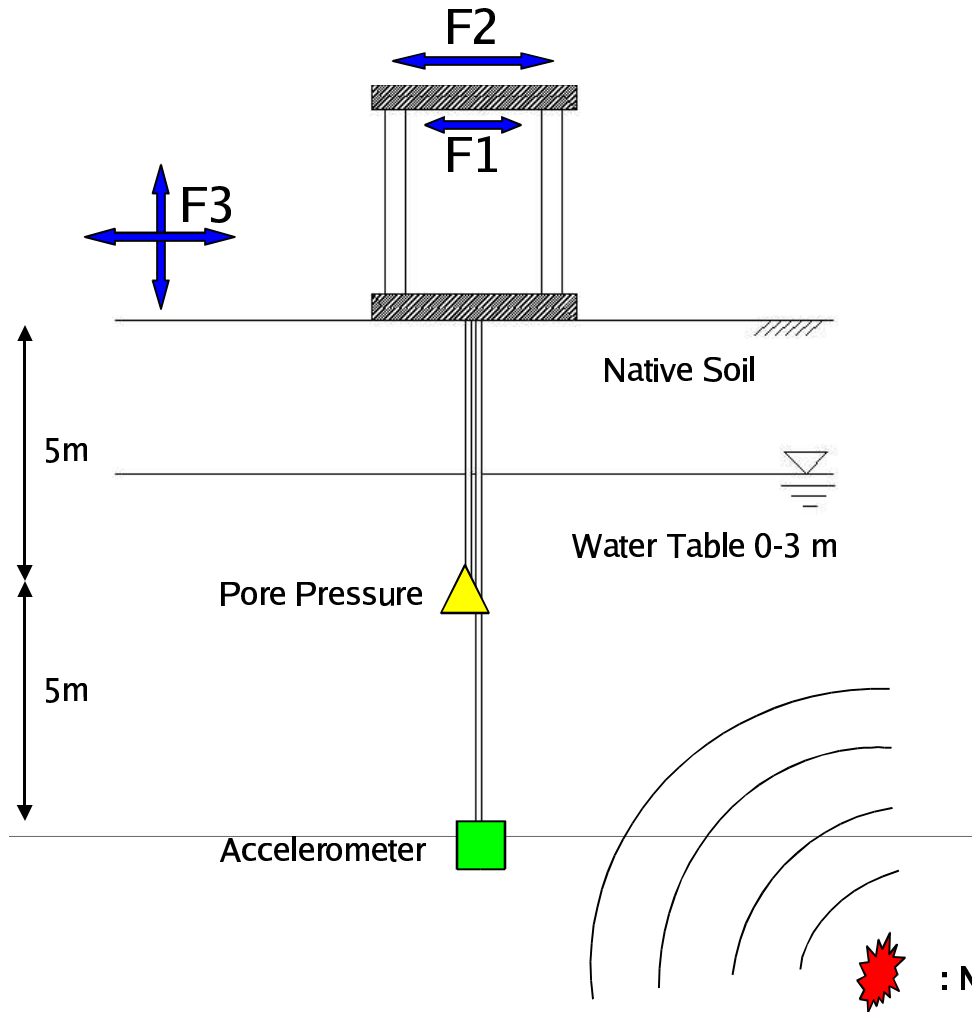
▲ Uni-axial Accelerometer

● Rotation Sensor

■ Tri-axial Accelerometer

▭ Displacement Transducer

# NEES Permanent SFSI Test Facility



F1 : Permanent Shaker



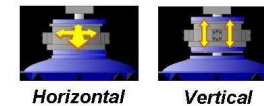
F2 : NEES@UCLA Shaker



F3 : NEES@UTexas Shaker



Performance

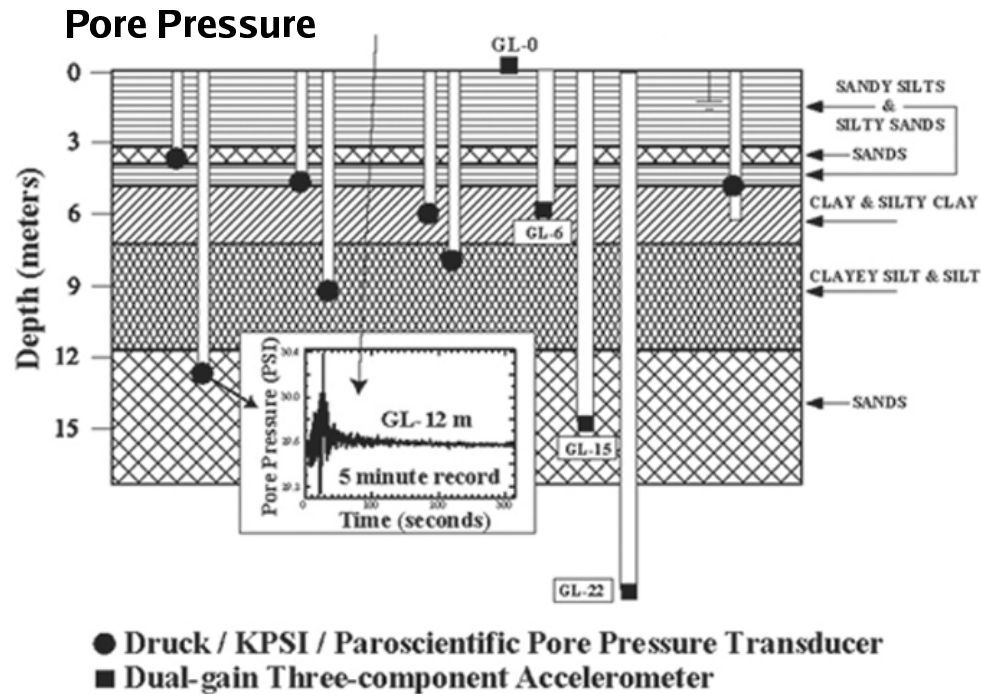
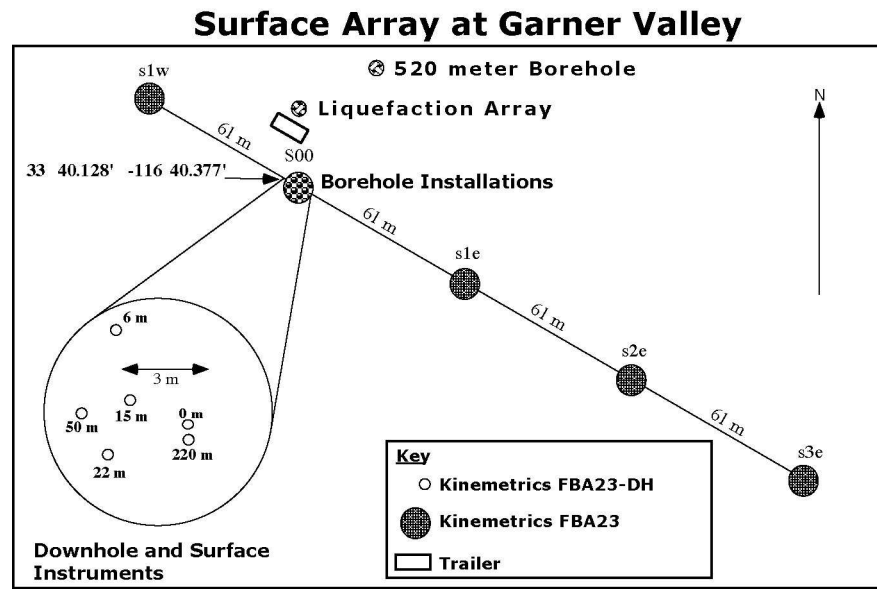
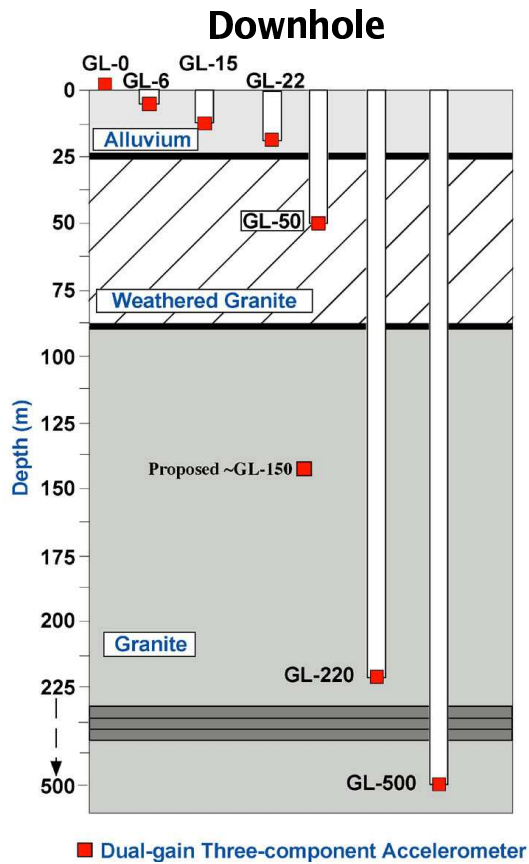


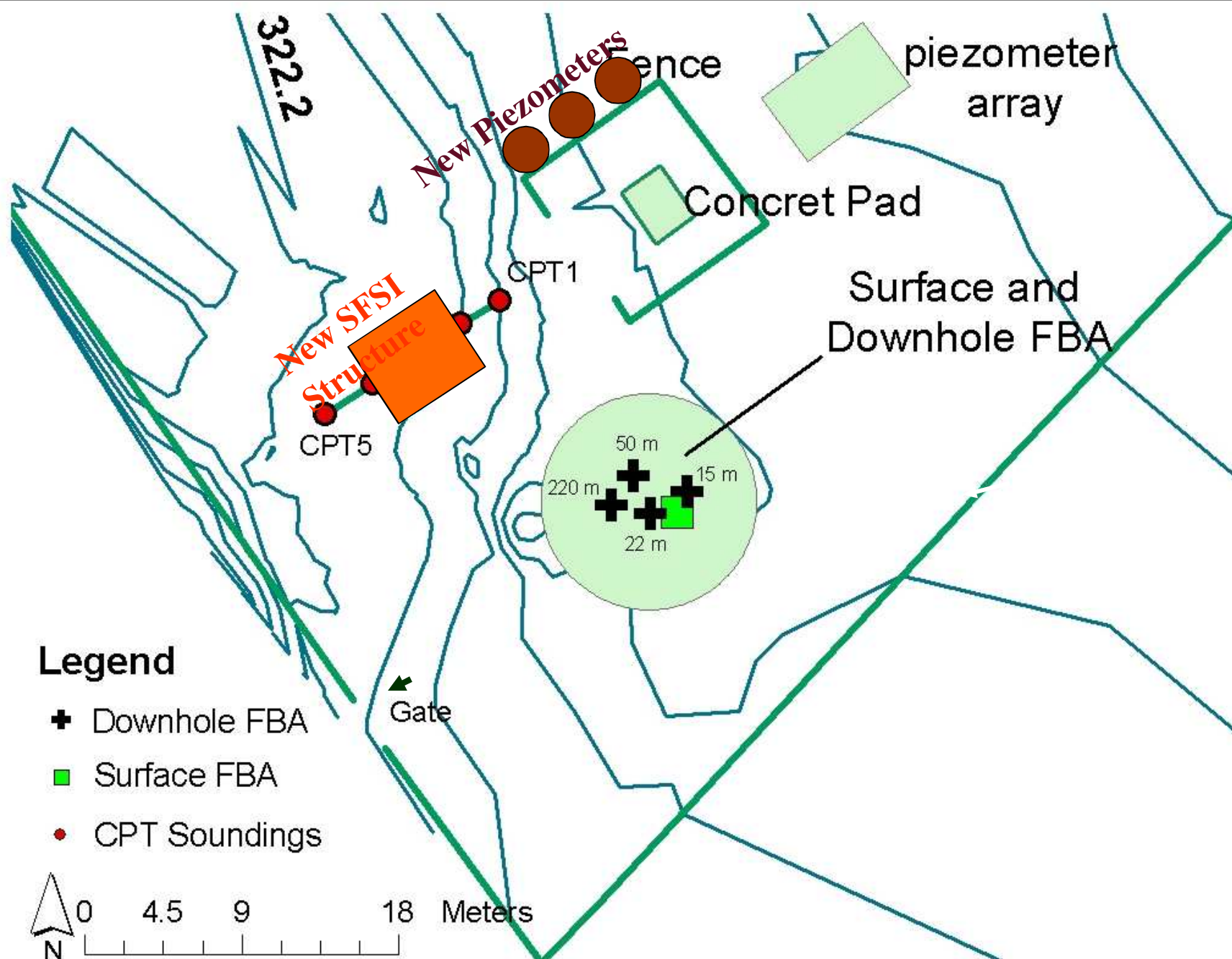
: Natural Earthquake



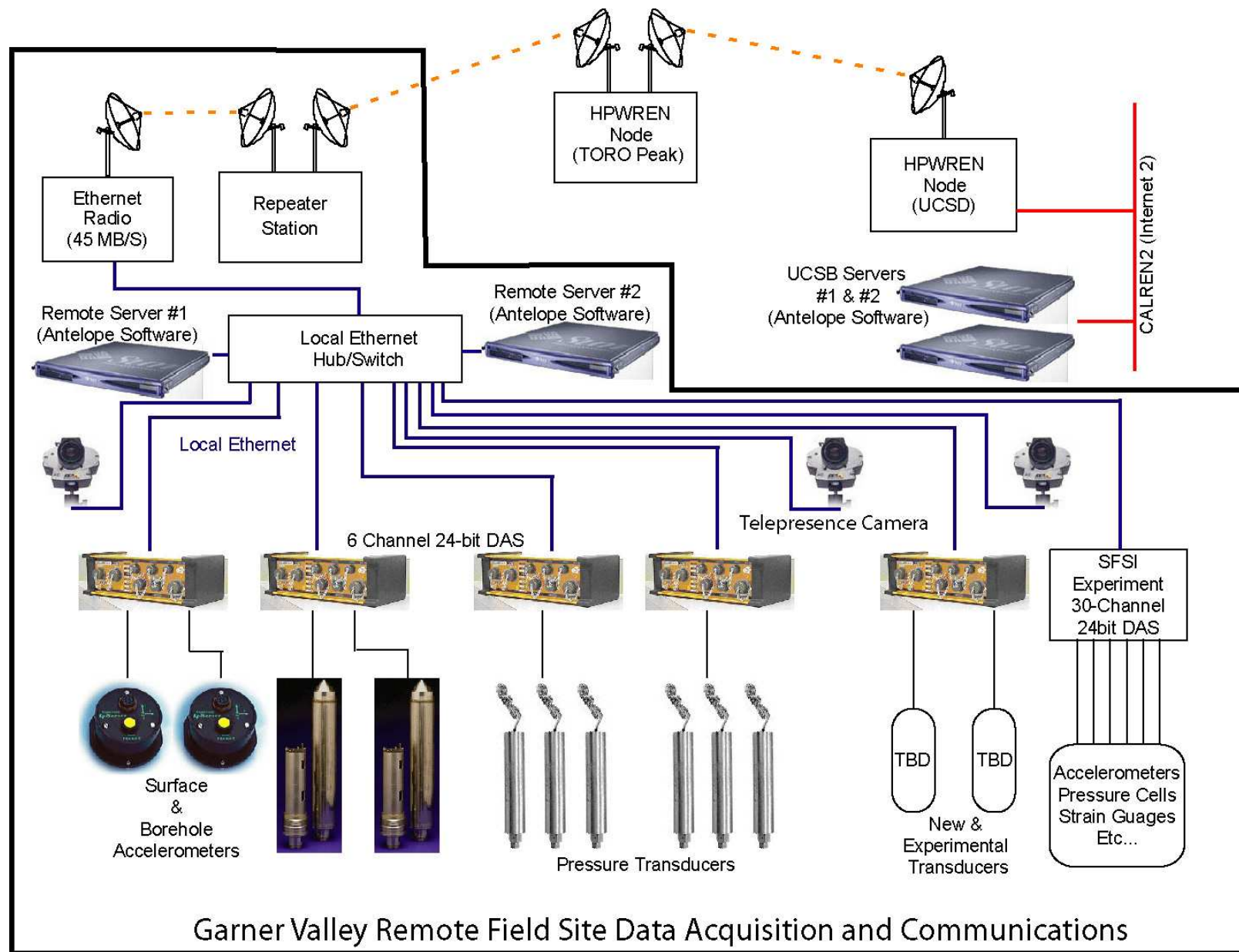


# Existing GVDA Arrays





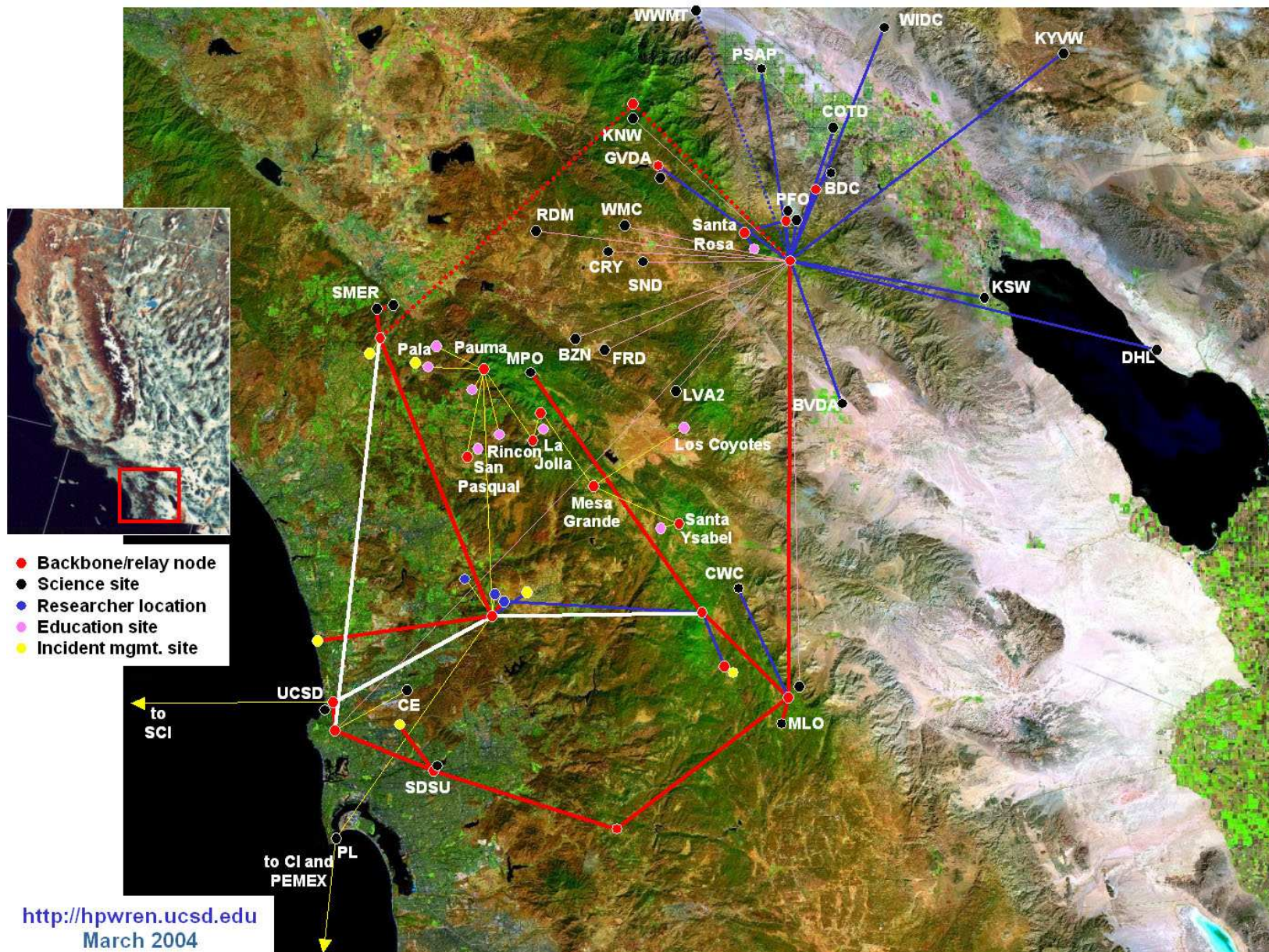






# HPWREN and GVDA

## Teleparticipation, Teleoperation, Real-time Data and Video Feeds



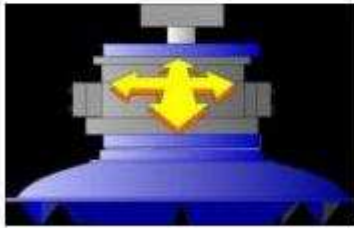


# UT T-Rex Tri-Axial Vibrosies

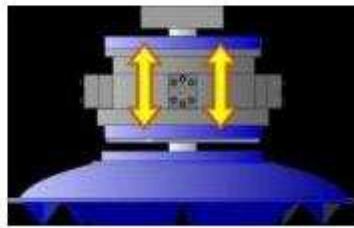


- Buggy-mounted vibrator
- Total weight: 64,000 lbs (29,030 kg)
- 32 ft (9.8 m) long
- 8 ft (2.4 m) wide
- Hydraulic drive system (<15 mph)
- Articulated body
- 3 Vibration orientations
  - \* Vertical
  - \* Horizontal in-line
  - \* Horizontal cross-line
- Modified Pelton 3-Axis digital control system
- Push-button transformation of shaking orientation
- Internal sweep options
  - \* Internal sweep options Steady state
  - \* Chirps
  - \* Programmable flash card
- External analog control
- Ground force control

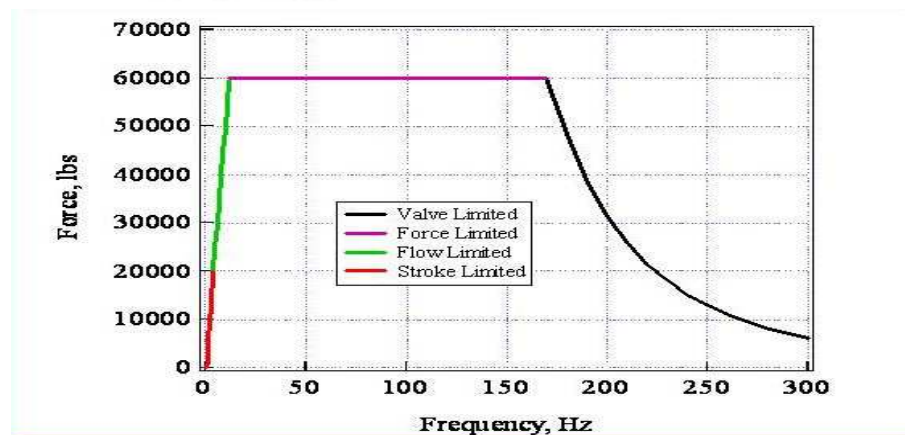
## Performance



**Horizontal**

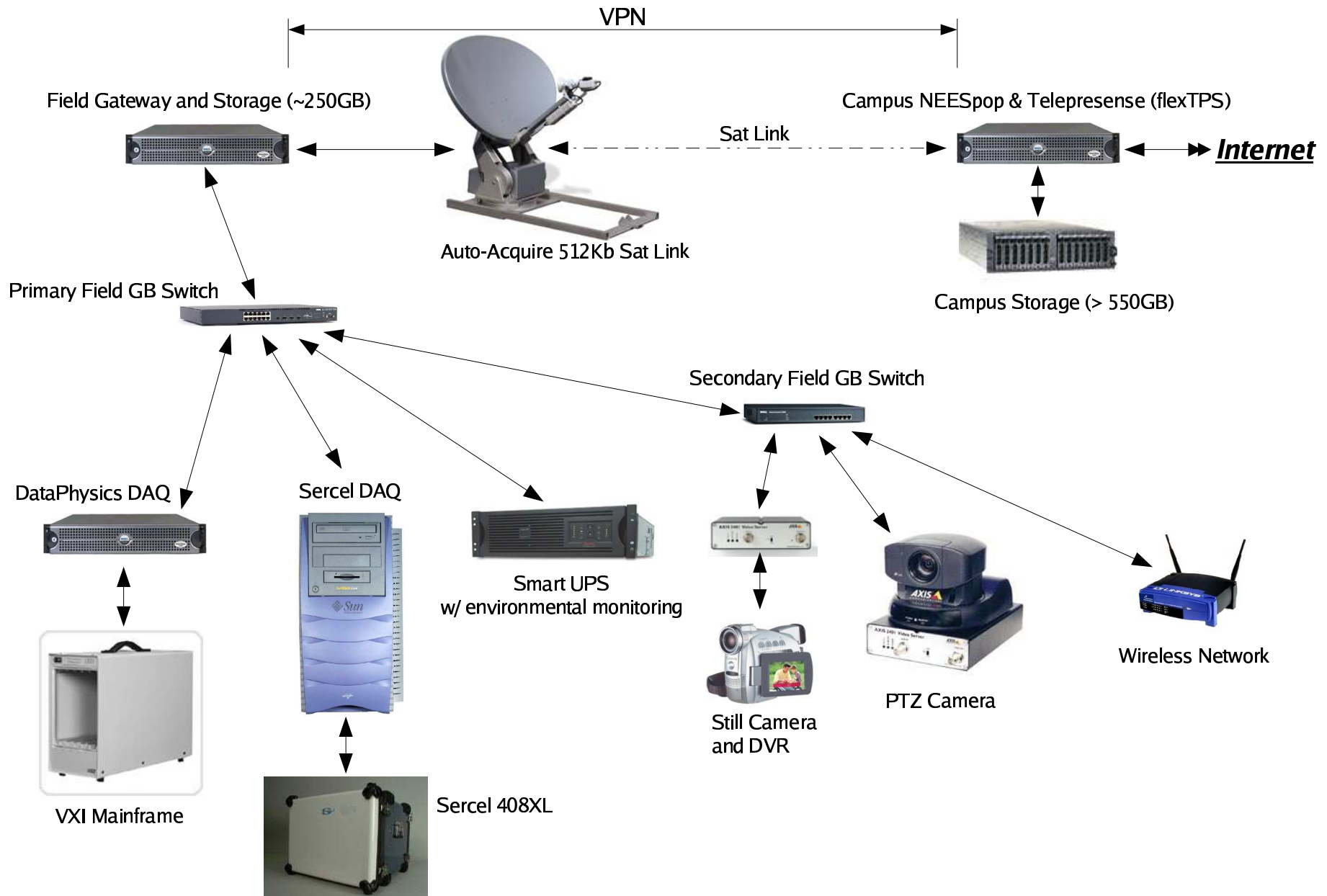


**Vertical**





# UT Mobile Data Acquisition Network



## GVDA Tests

Use the T-Rex to shake the DVDA site at multiple frequencies and orientations to:

- 1) study near area non-linear sediment response (1.8, 3.0, and 11.0Hz inputs)
- 2) quantify and understand ground motion site response and basin effects
- 3) load the SFSI Building

Data will be recorded independently during each run by both UCSB and UT.

UCSB will be recoding with their permanently deployed instruments as well as a temporary array of K2 seismographs to measure surface strains.

UT will deploy an array of three component 1Hz geophones connected to the DataPhysics/VXI DAQ for additional site characterization.

The data will be streamed and uploaded to each site's NEESpop, respectively.

Telepresence video will be available at both the UCSB and UT Telepresence sites (both using flexTPS).

# GV Basin Characterization

Use the T-Rex to shake multiple sites throughout the Garner Valley basin.

Incorporating UCSB, UCLA, UT, and the USGS.

Deployment of an array of 20 real-time telemetered seismic stations (Q330s) spanning several kilometers from the center to the edge of the Garner Valley basin.

This will enable high-resolution profiling and will provide a wide range of propagation azimuths and distances.

The sensor array will be left in place for several weeks so that earthquake signals may also be recorded to validate extrapolating the results generated from the artificial surface source, to those generated by natural earthquakes.

In addition to these, the ANZA network (nearest station is 5 Km) and the California Integrated Seismic Network will both be active during the experiment. Data from these networks will enable us to assess the distances to which signals from artificial sources such as the T-Rex may be observed. This will assist in assessing the T-Rexes potential for deep imaging.

UCSD operates the ANZA network and the USGS operates the CISEN network.