# 2000 SCEC Annual Progress Report

## Portable Broadband Instrument Center

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Project: Portable Broadband Instrument Center (PBIC)
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Field activities were somewhat slow after the Hector Mine RAMP deployment, but picked up over the course of the year. General equipment usage was extensive and mainly split between several large projects. A large portion of the PBIC effort has been in the development of an online database of the PBIC's equipment. The database will simplify management of the PBIC following the completion of this phase of the SCEC program.

## Equipment Usage

After the dust settled from the Hector Mine RAMP deployment. Some of the PBIC equipment was used for some noise test projects in March. At the end of March, Dr. Steidl (UCSB) re-deployed two stations for his portable borehole project. In mid April, Javier Favella (Caltech) ran a second phase of the Millikan shake project, utilizing most of the PBIC equipment until mid July. For about the same period, several recorders, including two of the CMG 40Ts, were used by Peter Adams (UCSC) for a cliff shaking project on the UCSC campus. After those projects were completed, Ralph Archuleta (UCSB) used a large portion of the equipment for the Santa Barbara Array project aimed at characterizing shaking in the Santa Barbara area. Individual pieces of equipment were also used frequently throughout the year in both PBIC and UCSB Geological Sciences outreach presentations.

The following table summarizes the projects that used PBIC equipment this year.

| **Dates** | **Institution** | **PI(s)** | **Experiment** |
|---|---|---|---|
| 3/30/00-current | UCSB | Steidl | Portable Borehole Study |
| 02/08/00-03/08/00 | GeoVision Inc | Rob Steller | Noise Test |
| 04/19/00-07/12/00 | Caltech | Favella/Heaton | Millikan Shake |
| 04/20/00-06/01/00 | UCSC | Anderson/Adams | UCSC Cliff Shaking |
| 07/25/00-current | UCSB | Archuleta | Santa Barbara Array |
| 09/09/00-01/18/01 | USC Civil Eng | Bob Nigbor | Urban Microtremors |

## Telemetry

The ARGOS satellite telemetry system proved its value during the Hector Mine Ramp deployment. It was used to monitor event counts and battery usage. It provided a useful tool for gauging when batteries would need to be replaced on all stations in the array. When Dr. Steidl re-deployed his stations for the portable borehole study, the ARGOS was re-deployed as well. The web interface (http://www.crustal.ucsb.edu/~argos) to the ARGOS data has been slightly improved, to provide some additional information and better presentation of errors related to transmission failures.

## Hardware: Management, Development, Repair and Quality Control

Hardware failures were pretty minimal this past year. We saw some timing errors related to the GPS upgrades that are still being investigated. There were several instances of GPSs that had reported locks, but never really synchronized the DAS timing. This is speculated to be a failure of the DAS/GPS combination to lock to the 1.0 Hz timing signal that is produced at lock time.

A current inventory of PBIC equipment is shown in Table 1.

## Computational Support: Web and Software Development

The PBIC web page access nearly doubled this past year, being accessed 30946 times by 2215 users in the year 2000.

Web page development was extensive this year. The static web pages containing instrument history and specs were quickly outdated by a database driven system that provides more information and is much more expandable. The main page available to users, http://www.crustal.ucsb.edu/scec/pbic/equip/hist (Figure 1), provides a table of the serialized equipment sectioned into separate categories and color coded by the current project they are on. Summary links in the section headers lead to tables summarizing the specifications of the equipment of that category. Links from each of the table cells on the main page lead to specification sheets for individual pieces of equipment that list repair and deployment histories. There is still quite a bit of data entry and data validation to complete, but that is already underway.

The database administration is web based as well, but is accessible only with a password validation. This provides a possible means of updating the database from a remote location. The administration interface provides facilities for equipment tracking, shifting equipment from one project to another. This information will be used for creating timelines of equipment usage. This timeline generation is already developed, but there is still some data entry to complete before it will be of much use. The database will help automate equipment check out and check in and provide instant access to the information once its entered. It has been used for the past several months for logging and tracking equipment and seems to be working very well.

Major software development was not very heavy this year. The assc program for performing event association from the reftek log files was modified. User specified begin and end dates can be specified within which to associate the data. This is of use for large datasets where the SEGY format files cannot all fit on a single filesystem. Additionally some new scripts for getting statistics from the association were added in the forms of some scripts to be run on assc output files.

There were many other minor refinements to existing software and scripts.

## Outreach

The PBIC remained active in outreach programs, giving two presentations to local schools in association with ICS personnel in the past year, and providing additional resources for many other presentations by UCSB Geology personnel.

Another outreach program, run in conjunction with the SCEC Borehole Initiative, has proven very popular. PC-compatible computers running RedHat Linux were placed in three schools where borehole seismometers have been installed. The program's web site (http://www.crustal.ucsb.edu/scec/outreach), maintained at the Institute for Crustal Studies, has had 7416 accesses by 1200 different users.

## Publications

The following publications reference data collected using the PBIC equipment.


Davis, P. M., S. Baher, and M. D. Kohler, Seismic anisotropy of the Southern California uppermost mantle across the San Andreas fault, Eos, Trans., AGU (abstract), 81(48), F862, 2000.

Fuis, G.S., Criley, E.E., Murphy, J.M., Perron, J.T., Yong, A., U.S. Geological Survey, Menlo Park, CA 94025, fuis@usgs.gov; Benthien, M.L., Baher, S.A., Clayton, R.W., Davis, P.M., Godfrey, N.J., Henyey, T.L., Kohler, M.D., Mcraney, J.K., Okaya, D.A., Southern California Earthquake Center, University of Southern California, Los Angeles, CA 90089-0742, benthien@terra.usc.edu; SIMILA, G., California State University, Northridge, CA 91330-8266, gsimila@csun.edu; Keller, G.R., University of Texas, El Paso, TX 79968-0555, keller@geo.utep.edu; Prodehl, C., Karlsruhe University, Karlsruhe, 76187 Germany, cprodehl@gpiwap1.physik.uni-karlsruhe.de; Ryberg, T., GeoForschungsZentrum, Potsdam, 14473 Germany, trond@gfz-potsdam.de; Thybo, H., University of Copenhagen, Copenhagen, DK 1350, ht@seis.geol.ku.dk; Tenbrink, U.S., U.S. Geological Survey, Woods Hole, MA 02543, The Los Angeles Region Seismic Experiment, Phase II (LARSE II)--A Survey to Identify Major Faults and Seismic Hazards Beneath a Large Urban Region. Seismological Research Letters, in press, 2000.

Kohler, M. D., B. C. Kerr, and P. M. Davis, The 1997 Los Angeles Region Seismic Experiment - a dense, urban seismic array to investigate basin lithospheric structures, U.S. Geological Survey Open-File Report, submitted, 2000 SCEC contribution number 498.

Lewis, J., S.M. Day, H. Magistrale, J. Eakins, and F.L. Vernon (2000). Crustal thickness of the Peninsular Ranges, southern California, from teleseismic receiver functions, *Geology*, Vol 28, 303-306

Lewis, J. (2000). Regional crustal thickness variations of the Peninsular Ranges and Gulf Extensional Province, southern Alta California and Northern Baja California, M.S. Thesis, San Diego State University.

Lewis, J.L., S.M. Day, Magistrale, H., R. Castro, L. Astiz, C. Rebollar, J. Eakins, F. Vernon, and J.N. Brune (2000). Crustal thickness of the Peninsular Ranges and Gulf Extensional Province in the Californias, submitted to *J. Geophys, Res*.

Rebollar, C.J., L. Quintanar, J. Madrid, R. Castro, L. Astiz, F. Vernon, S. M. Day, and J. N. Brune (2000), Source characteristics of a 5.5 Magnitude earthquake that occurred in a transform fault of the Delfin Basin in the Gulf of California, submitted to *Bull. Seism. Soc. Am*.

Martin, A., J. H. Steidl, E. Cochran, and R. J. Archuleta (2000). The SCEC Hector Mine portable Deployment, *EOS, American Geophysical Union Transactions*, **81**, p. 841-842.

Zhu, L., and M. D. Kohler, Preliminary results of crustal structure from the LARSE II passive recording experiment using teleseismic P-to-S converted waves, Eos, Trans., AGU (abstract), 81(48), F850, 2000.

## Table 1:

### Equipment Inventory

The following table outlines the PBICs current major equipment inventory. Various subsystems, such as AC power and solar power, are not listed.

| Qty. | Model | Description |
|---|---|---|
| 9 | 72A-02 | 16 bit data acquisition system (DAS) |
| 13 | 72A-08 | 16/24 bit data acquisition system (DAS) |
| 28 | 72A-05/PBIC | External hard disk subsystems (1Gb) |
| 22 | 111A | GPS units |
| 18 | L4C3D | 1Hz velocity transducer |
| 18 | FBA23 | Force Balance Accelerometer |
| 5 | CMG40T | Intermediate period 3 component sensor |
| 5 | CMG40T Interface | CMG40T Break out box interface |
| 2 | CMG40T Calibration | CMG40T interface/calibration unit |
| 2 | 72A-03 | Portable exabyte tape system |
| 2 | | 2-4 Gb Portable Data transfer disk |
| 31 | Charge Controllers | Photovoltaic charge controllers |
| 33 | Solar Panels | Photovoltaic solar panels |
| 4 | | HP style palmtop computer |

**Figure 1:**

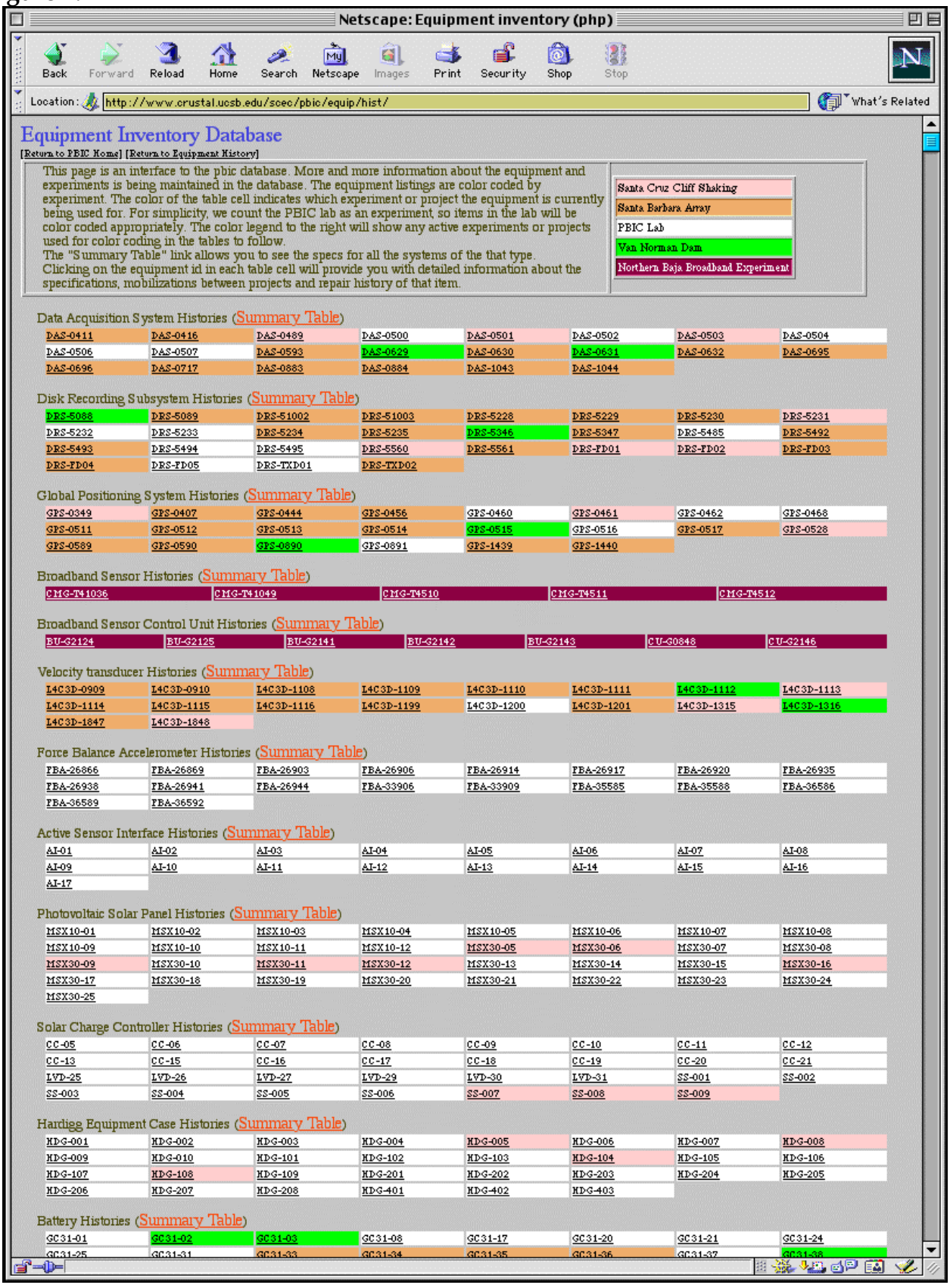
Netscape: Equipment inventory (php)
Back
Forward
Reload
Home
Search
Netscape
Images
Print
Security
Shop
Stop
Location: http://www.crustal.ucsb.edu/scec/pbic/equip/hist/
What's Related
Equipment Inventory Database
[Return to PBIC Home] [Return to Equipment History]
This page is an interface to the pbic database. More and more information about the equipment and experiments is being maintained in the database. The equipment listings are color coded by experiment. The color of the table cell indicates which experiment or project the equipment is currently being used for. For simplicity, we count the PBIC lab as an experiment, so items in the lab will be color coded appropriately. The color legend to the right will show any active experiments or projects used for color coding in the tables to follow.
The "Summary Table" link allows you to see the specs for all the systems of the that type.
Clicking on the equipment id in each table cell will provide you with detailed information about the specifications, mobilizations between projects and repair history of that item.
Santa Cruz Cliff Shaking
Santa Barbara Array
PBIC Lab
Van Norman Dam
Northern Baja Broadband Experiment
Data Acquisition System Histories (Summary Table)
DAS-0411 DAS-0416 DAS-0489 DAS-0500 DAS-0501 DAS-0502 DAS-0503 DAS-0504
DAS-0506 DAS-0507 DAS-0593 DAS-0629 DAS-0630 DAS-0631 DAS-0632 DAS-0695
DAS-0696 DAS-0717 DAS-0883 DAS-0884 DAS-1043 DAS-1044
Disk Recording Subsystem Histories (Summary Table)
DRS-5088 DRS-5089 DRS-51002 DRS-51003 DRS-5228 DRS-5229 DRS-5230 DRS-5231
DRS-5232 DRS-5233 DRS-5234 DRS-5235 DRS-5346 DRS-5347 DRS-5485 DRS-5492
DRS-5493 DRS-5494 DRS-5495 DRS-5560 DRS-5561 DRS-FD01 DRS-FD02 DRS-FD03
DRS-FD04 DRS-FD05 DRS-TXD01 DRS-TXD02
Global Positioning System Histories (Summary Table)
GPS-0349 GPS-0407 GPS-0444 GPS-0456 GPS-0460 GPS-0461 GPS-0462 GPS-0468
GPS-0511 GPS-0512 GPS-0513 GPS-0514 GPS-0515 GPS-0516 GPS-0517 GPS-0528
GPS-0589 GPS-0590 GPS-0890 GPS-0891 GPS-1439 GPS-1440
Broadband Sensor Histories (Summary Table)
CMG-T41036 CMG-T41049 CMG-T4510 CMG-T4511 CMG-T4512
Broadband Sensor Control Unit Histories (Summary Table)
BU-G2124 BU-G2125 BU-G2141 BU-G2142 BU-G2143 CU-G0848 CU-G2146
Velocity transducer Histories (Summary Table)
L4C3D-0909 L4C3D-0910 L4C3D-1108 L4C3D-1109 L4C3D-1110 L4C3D-1111 L4C3D-1112 L4C3D-1113
L4C3D-1114 L4C3D-1115 L4C3D-1116 L4C3D-1199 L4C3D-1200 L4C3D-1201 L4C3D-1315 L4C3D-1316
L4C3D-1847 L4C3D-1848
Force Balance Accelerometer Histories (Summary Table)
FBA-26866 FBA-26869 FBA-26903 FBA-26906 FBA-26914 FBA-26917 FBA-26920 FBA-26935
FBA-26938 FBA-26941 FBA-26944 FBA-33906 FBA-33909 FBA-35585 FBA-35588 FBA-36586
FBA-36589 FBA-36592
Active Sensor Interface Histories (Summary Table)
AI-01 AI-02 AI-03 AI-04 AI-05 AI-06 AI-07 AI-08
AI-09 AI-10 AI-11 AI-12 AI-13 AI-14 AI-15 AI-16
AI-17
Photovoltaic Solar Panel Histories (Summary Table)
MSX10-01 MSX10-02 MSX10-03 MSX10-04 MSX10-05 MSX10-06 MSX10-07 MSX10-08
MSX10-09 MSX10-10 MSX10-11 MSX10-12 MSX30-05 MSX30-06 MSX30-07 MSX30-08
MSX30-09 MSX30-10 MSX30-11 MSX30-12 MSX30-13 MSX30-14 MSX30-15 MSX30-16
MSX30-17 MSX30-18 MSX30-19 MSX30-20 MSX30-21 MSX30-22 MSX30-23 MSX30-24
MSX30-25
Solar Charge Controller Histories (Summary Table)
CC-05 CC-06 CC-07 CC-08 CC-09 CC-10 CC-11 CC-12
CC-13 CC-15 CC-16 CC-17 CC-18 CC-19 CC-20 CC-21
LVD-25 LVD-26 LVD-27 LVD-29 LVD-30 LVD-31 SS-001 SS-002
SS-003 SS-004 SS-005 SS-006 SS-007 SS-008 SS-009
Hardigg Equipment Case Histories (Summary Table)
HDG-001 HDG-002 HDG-003 HDG-004 HDG-005 HDG-006 HDG-007 HDG-008
HDG-009 HDG-010 HDG-101 HDG-102 HDG-103 HDG-104 HDG-105 HDG-106
HDG-107 HDG-108 HDG-109 HDG-201 HDG-202 HDG-203 HDG-204 HDG-205
HDG-206 HDG-207 HDG-208 HDG-401 HDG-402 HDG-403
Battery Histories (Summary Table)
GC31-01 GC31-02 GC31-03 GC31-08 GC31-17 GC31-20 GC31-21 GC31-24
GC31-25 GC31-31 GC31-33 GC31-34 GC31-35 GC31-36 GC31-37 GC31-38

**Figure 2:**