

**UNAVCO Facility Interim Report  
FY2004 (April - June) EAR-0321760**

**NSF Award Title: Support of UNAVCO Community and Facility  
Activities**

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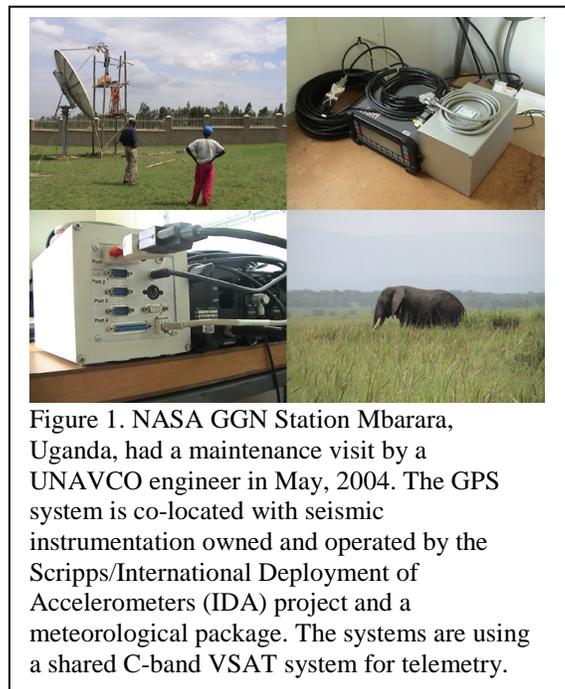
**President, UNAVCO, Inc.**

## Interim Report for FY2004 (April - June) EAR-0321760, Support of UNAVCO Community and Facility Activities

The UNAVCO Facility supported a broad range of activities this quarter including the Western U.S. Existing Networks, Plate Boundary Observatory, NASA Global GPS Network, Polar, and individual investigator projects. Additional activities this quarter meriting special mention included 1) a GPS training class for community members in Boulder, 2) completion of testing of “Campaign” GPS systems for PBO, 3) assistance with budget and technology planning for a number of new PI proposals, and 4) the arrival of UNAVCO’s new Education and Outreach coordinator, Dr. Susan Eriksson.

There has been an enthusiastic response to UNAVCO’s upcoming capabilities to provide state-of-the-art GPS equipment for longer term “Semi-Permanent” installations where the scientific goals of the project require high survey precision and installations lasting for weeks to years. These type of surveys bridge traditional Campaign-style occupations and Permanent station installations. Communications systems associated with Permanent Stations might not be available or practical, so Semi-Permanent installations need to be able to record for long periods, and possibly remain unattended for the length of the experiment. This new capability is being made possible due to improvements in technology (in particular lower power and more memory) and availability of equipment for longer term loans. Equipment cost savings associated with recent PBO permanent station and campaign procurements are allowing the Facility to significantly increase its Facility campaign pools established with NSF Instruments and Facilities and Office of Polar Programs support.

This quarter, our Project Highlight is Facility support of NASA’s Global GPS Network (GGN), funded as part of this Cooperative Agreement. For the GGN, JPL and UNAVCO operate globally-distributed stations that are among the longest running GPS stations and are a key part of the International GPS Service (IGS) network (e.g. Figure 1). This network is used to provide the highest precision orbits, clocks, Earth orientation parameters and global reference frames, which are all a critical part of scientific research using high-precision GPS. In addition to providing the data for fundamental global geodetic research, GGN and other IGS contributors also provide the key observations needed for tectonic plate motion studies (e.g. REVEL-2000, Sella, et al., 2002, and GPSVEL, Lavallee et al., 2001) and strain rate at plate boundaries (Global Strain Rate Map, GSRM, Kreemer et al., 2003). The NASA GGN is one of the larger projects supported by the Facility and involves on-going contributions from the Engineering, Data and Equipment groups.

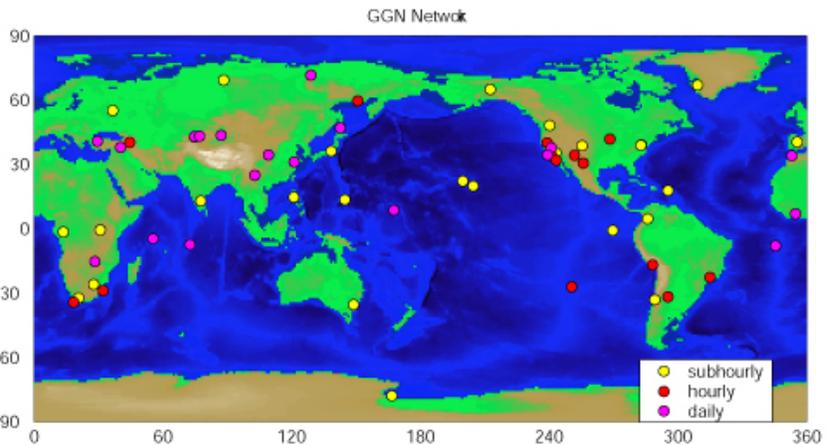


## 1.1 Quarterly Featured Project

**Project:** Global GPS Network  
**Funding Agency/Program:** NASA/Solid Earth and Natural Hazards  
**Dates:** Perpetual  
**UNAVCO Engineer:** Oivind Ruud, et al., in conjunction with JPL Project Element Manager, David Stowers

The UNAVCO Facility, working in close cooperation with the Jet Propulsion Laboratory (JPL), provides daily monitoring, troubleshooting and maintenance of 67 globally distributed permanent GPS stations that comprise NASA's Global GPS Network (GGN).

Data from GGN stations are used by agencies and institutions around the world, including many International GPS Service (IGS) participants, to produce highly accurate products that are essential for Earth science research, multidisciplinary applications, and education. Products include the following:



- GPS satellite ephemerides
- Earth rotation parameters
- Tracking station coordinates and velocities
- GPS satellite and tracking station clock information
- Zenith tropospheric path delay estimates
- Global ionospheric maps

These products support Earth science and other activities such as:

- Improving and extending the International Terrestrial Reference Frame (ITRF) maintained by the International Earth Rotation and Reference Systems Service (IERS)
- Monitoring deformation of the Earth
- Monitoring Earth rotation
- Monitoring the troposphere and ionosphere
- Determining orbits of scientific satellites such as GRACE and CHAMP
- Calibrating other instrumentation such as the Ocean Topography Experiment Satellite (TOPEX), Synthetic Aperture Radar (SAR) and Deep Space Network (DSN) communications equipment
- High-precision navigation for scientific and commercial applications

Where site and communications capabilities permit, GGN network stations are being installed or upgraded by the UNAVCO Facility to provide high-rate (1Hz) data at either hourly intervals or by real-time streams. The GGN station at Mbarara, Uganda, for example, was upgraded in May 2004 to provide streamed data via a VSAT telemetry link maintained for seismic monitoring purposes by the International

Deployment of the Accelerometers (IDA) (Figure 1). Details of this installation are highlighted at: [http://www.unavco.org/facility/project\\_support/highlights/2004/uganda.html](http://www.unavco.org/facility/project_support/highlights/2004/uganda.html)

Thirty-six of the GGN stations produce 1Hz data at hourly intervals to support the generation of low-latency products such as ionosphere activity maps. This represents approximately 50% of stations that provide data on an hourly basis to the IGS. Twenty-six of those provide near-real-time streams that are used to produce global differential corrections, or to support other navigation applications. All 67 GGN stations produce standard daily RINEX files that are used to produce traditional products such as the IGS precise orbits.

Several GGN stations have been upgraded by UNAVCO engineers during the past fiscal quarter with new GPS receivers, new site computers with latest operating system and security configurations, or new data communications methods. Also during this quarter, primary responsibility for network monitoring and first-response troubleshooting has been successfully transferred from JPL to the UNAVCO Facility. Typically over 100 trouble or maintenance issues are handled each month. The UNAVCO Facility also maintains an operational back-up capability to retrieve and provide station data to the various users in case of failure at JPL.

## 1.2 Facility Highlights

**NSF/EAR Project and Equipment Support.** Eighteen NSF projects and three NASA projects have been supported with equipment from the Facility pool and/or logistics. This includes rapid turn-around for projects in northwest Mexico, Nevada, and Idaho, and large international shipments to Italy and Easter Island. The Facility receiver pool was supplemented with ten new Trimble NetRS receivers. Six older receivers were dedicated to new permanent stations in conjunction with the new receiver purchase. Planning for an August timeframe community receiver purchase was accomplished with an anticipated early-July announcement date. New, low power PC104 technology was evaluated for future adoption at remote stations where site computers are required.

Several projects requesting support in summer/fall timeframe are being planned, scheduled and resource requirements/allocations are being made. Included are projects at locations around the world, including Mediterranean Region, Iceland Bangladesh, Alaska, Greenland Galapagos Islands, Northwest US, two locations in Mexico, Southern California, Yellowstone and others. Ten planning and budgeting requests for various new projects being submitted to NSF/EAR programs were accommodated. An introductory GPS training class for interested researchers was conducted at the UNAVCO Facility, which was fully subscribed with sixteen participants.

**NSF/EAR Plate Boundary Observatory Project Support.** Testing of the PBO campaign receivers was completed, with recommendations passed on to decision makers. Reprocessing of a subset of data was performed and recommendations on improving the selected vendor's product were passed on through established channels. Several prospective PBO stations were visited for site selection purposes. A plan for selecting and monumenting co-located GPS stations at US Seismic Array stations was developed in coordination with UGGS/ASL staff.

**NSF/EAR Western U.S. Existing Networks.** Progress has been made on both the operational and new proposal planning fronts. Eighteen NetRS receiver/antenna sets and associated communications systems, including CDMA routers and ethernet radios, have been tested and are ready for deployment. Three existing stations, in Alaska, Idaho, and Nevada, have been upgraded to PBO standards and are online as PBO backbone sites, and ten more have been planned for the first three weeks of July. The first two drafts of the 2004 proposal and budget, which will request continued funding for the 3 1/2 more years until final PBO integration, have been circulated for public comment. Final revisions will be made following the meeting of participants from collaborating institutions at UNAVCO headquarters on June 29-30.

**NASA SENH Program Support.** GGN activities are included as the highlighted project for this quarter, including a transfer of primary network monitoring responsibilities from JPL to the UNAVCO Facility. Five new global stations were submitted to the IGS Central Bureau to be considered for inclusion in IGS processing.

**NSF Polar Programs Support.** The Arctic field season is well underway with projects supported in Greenland, Iceland, and Alaska. A new RTK DGPS base station was installed at the Toolik Field Station in the Alaska Brooks Range. On-site training was provided in Barrow, Alaska to local users of the Barrow RTK DGPS system. Planning for the upcoming 2004-05 Antarctic season has begun for over 20 projects that will be supported with a pool of 75 receivers. 18 new receivers will be purchased on behalf of the NSF Antarctic Program to meet the large increase in Antarctic demand.

**Education and Outreach.** Dr. Susan Eriksson has started work in June as the UNAVCO Education and Outreach (E&O) Coordinator and initially has strategic planning for E&O as the highest priority. Eriksson

with Chuck Meertens and Lou Estey from the Facility are supporting the EarthScope funded “Collaborative Research: Map Tools for EarthScope Science and Education” (Michael Hamburger, Indiana University, PI). Eriksson also represented EarthScope at a strategic planning workshop of teachers and scientists at University of Portland, June 28-29 for an NSF-funded project “Teachers on the Leading Edge”, Robert Butler, PI.

**PBO/Warehouse Activity.** Equipment for ten new PBO stations has been assembled and shipped from the Boulder warehouse. Since the number of systems will be greatly increasing, reaching 250 systems next year, UNAVCO’s inventory control and work order scheduling system is in the process of being enhanced. The Equipment Group has also recently been given responsibility for controlling PBO design documents. The group will ensure that drawings are correct, and that changes are communicated to suppliers in a timely manner.

**Health and Safety.** UNAVCO has implemented an in-house Emergency Response Team, and it is viable, trained, and ready. The entire team, as well as UNAVCO Facility field personnel, has received three days of CPR and First Aid training. This process was initiated and completed in this quarter.

**Permanent Station Data Management and Archiving.** Data and metadata from seven more PBO sites installed since the beginning of April are being archived at UNAVCO. In addition to the new PBO sites, a total of 29 new sites from Suominet-A Network, GULFNET, Hawaii, New Zealand and Oaxaca were added for data management and archiving this quarter. This brings the total active global permanent stations archived at UNAVCO to 330.

**Campaign Archiving.** Archiving was completed this quarter for 34 campaigns: AEIC 2003, Akutan/Dutch Harbor 2003, Alaska Uplift 2003, Central America 2003/2004, Central San Andreas 2002, Denali 2003, Eastern Snake River Plain 2004, Gravity 2003, Greenland Summit 2003, Guerrero 1992, 1995, 1996, Jalisco 2000, 2001, 2002, 2003, 2004, Jamaica 2001, 2002, 2003, 2004, Kenai 2003, Limestone 2003, Loma Prieta 2001, 2003, Nepal Khumbu 1997, 1999, New Hampshire 2003, Oaxaca 2001, 2002, 2003, Okmok 2003, Shumagins 2003, West Aleutians 2003.

**Strategic Planning.** Fran Boler and Chuck Meertens participated in the UNAVCO Strategic Planning Meeting held at Estes Park, Colorado as a first step in preparing a strategic plan to guide UNAVCO over the time period 2005 to 2009.

## 2.0 UNAVCO Monthly Reports

### 2.1 April 2004

#### Highlights



**Figure 1** UNAVCO Strategic Planning Meeting attendees Gilles Peltzer, Evelyn Roeloffs, Doug Burbank, Brad Hager, Mian Liu and Tim Dixon continue the discussion over dinner at Aspen Lodge.

A Strategic Planning Meeting was held at Estes Park, Colorado as a first step in preparing a strategic plan to guide UNAVCO over the time period 2005 to 2009.

A GPS training class was conducted at the UNAVCO Facility on April 6-8 to provide an overview of GPS measurement techniques and procedures for interested community members. The course was fully subscribed with 16 participants. Additional, abbreviated training was held on April 14-16 for UNAVCO staff. A summary of the community training session is included in the highlights section of the Facility web site.

April marks the end of the 2003-04 Antarctic field season, with the final equipment returned to UNAVCO and a wrap up of data processing and archiving. (See sample TIDES project highlight at [http://www.unavco.org/facility/project\\_support/highlights/2004/2004.html](http://www.unavco.org/facility/project_support/highlights/2004/2004.html).)

A plan to shift more responsibility for primary monitoring of the Global GPS Network was developed in cooperation with JPL.

The PBO Standing Committee recommended completed evaluation of existing strainmeters and made recommendations for PBO strainmeter implementation.

A draft of the UNAVCO Event Response Plan was released on the web for public comment.

#### Facility (Chuck Meertens)

##### Facility Data Group (Fran Boler)

- Routine archiving of permanent stations and campaigns proceeded, with two new permanent stations added for ongoing data management and archiving. Archiving was completed for eight campaigns this month; new data and documentation for eleven campaigns was received.
- Existing Networks support: incorporated metadata for 46 sites from PANGA and BARD into the Archive Oracle database in preparation for archiving, and tested data collection mechanism for 17 PANGA sites. System administration staff configured and installed a new 4 Tb RAID to handle future data needs, including the estimated additional 2 Tb of Existing Networks data over the next five years.
- PBO support: two new PBO sites added for interim data management and archiving for a total of six sites now available through the UNAVCO Archive and GSAC. ArcSDE was installed and configured on an intranet IIS server so that PBO siting tools could access information in the SQLServer siting information database maintained by the Facility.

## **Engineering Group (Steve Fisher)**

### **NSF/EAR Project Support**

- A GPS training class was conducted at the UNAVCO Facility on April 6-8 to provide an overview of GPS measurement techniques and procedures for interested community members. The course was fully subscribed with 16 participants. Additional, abbreviated training was held on April 14-16 for UNAVCO staff. A summary of the community training session is included in the highlights section of the Facility web site.
- Technical support with data processing was provided to the Mississippi River Delta project.
- Planning and budgeting support was provided for several projects, including revising the Southern Salton Trough plan and budget for resubmission to NSF, development of a plan and budget for the Calabrian Arc project and continued consultation and planning for the Northern Thailand project.
- A request to support establishing three more stations around the Denali Fault during the June-September period was evaluated and accepted.

### **NSF/EAR Western US Networks Project Support**

- Five new Trimble NetRS GPS receivers were delivered to UNAVCO and are currently being used for evaluation and staff familiarization before being configured and deployed to Western US Network stations.
- A detailed outline of the new proposal has been completed, several sections have been provisionally drafted and an annual budget target has been established.
- A status briefing was provided at the SCIGN Governing Board meeting where input was solicited on the plan and draft proposal.
- A plan has been established to transfer the flow of raw GPS data from the stations directly to the UNAVCO archive for the PANGA network stations, eliminating the need to perform that task from Central Washington University.
- BARGEN dataflow was monitored and maintained.
- Approximately 60 individual trouble or maintenance incidents were handled during the month on the various NSF networks.

### **NSF/EAR Plate Boundary Observatory Project Support**

- Testing of the PBO campaign GPS equipment was completed. A summary of technical recommendations and report were provided to the PBO decision makers for final evaluation and selection.
- Ten potential new GPS stations in the Northern California region were evaluated for PBO use by Facility engineering staff. Station selection reports have been filed with the Northern California regional office.

### **NASA SENH Program Support**

- A plan to shift more responsibility for primary monitoring of the GGN was developed in cooperation with JPL.
- Several new site computers have been purchased and are being configured for upgrades at GGN stations.
- IGS logs for five new stations were drafted and submitted to the IGS Central Bureau to be considered for inclusion in IGS processing.
- A revised Statement of Work and associated budget for fiscal year 2005 was submitted to NSF to help facilitate a timely transfer of funding from NASA.
- Approximately 105 individual trouble or maintenance incidents were handled during the month.

## **NSF Polar Programs Support**

- April marks the end of the 2003-04 Antarctic field season, with the final equipment returned to UNAVCO and a wrap up of data processing and archiving. (See sample TIDES project highlight at [http://www.unavco.org/facility/project\\_support/highlights/2004/2004.html](http://www.unavco.org/facility/project_support/highlights/2004/2004.html).)
- Planning for the 2004-05 Antarctic field season has begun in cooperation with Raytheon Polar Services Company.
- The 2004 Arctic field season is also underway, with current projects supported in Greenland, Iceland, and Alaska. In addition, field team training is being conducted at the University of Delaware for the upcoming Kugaruk 2004 project, a long term permafrost study on the Alaska North Slope.

## **Community/Outreach**

- Engineering staff helped evaluate support requirements and costs for several new projects that plan to utilize GPS measurements being proposed under a new NASA Research Announcement called Oceans and Ice.
- A site visit to Kennedy middle School was conducted by engineering group staff to provide an overview of GPS Earth science applications to interested students.

## **Infrastructure**

- We welcome our new Engineering Group staff member, Dave Phillips, who began working on April 26. Dave is assigned to the Engineering Support Section, reporting to Jim Greenberg, to provide technical support to GPS investigations and permanent networks.

## **Equipment Group (Chuck Kurnik)**

### **Equipment Support**

- Five NSF-OPP and NSF-EAR projects shipped in April, as well as one GGN and one community support project.
- GPS measurements are being made on Taku Glacier for the second year in a row. Four Trimble 5700 systems were shipped for this project this month. Tilt sensors dug into the sediments, together with the GPS measurements are expected to provide a spatial and temporal picture of proglacial sediment deformation that is unprecedented.

### **Warehouse activity**

- The second shipment of PBO Trimble Net RS receivers has been received. Several have been configured and tested.
- Most material for Year 1 sites has been ordered, and several shipments have been received.

## 2.2 May 2004

### Highlights

- EarthScope/PBO status: As of the end of May PBO has a total of 227 station sitings, 102 station reconnaissance, 82 permits submitted, 32 permits accepted, 19 stations installed, and two stations providing automated data.
- A proposal supplement has been submitted to NSF/OPP for 15 additional receivers and ancillary gear to be added to the OPP equipment pool.
- Western Networks–Existing Networks-GeNiUS proposal has been drafted and circulated for community review.

### Facility (Chuck Meertens)

- Chuck Meertens and Corne Kreemer presented the new Global Strain Rate Map project model results and interactive model website at the Spring, 2004, AGU meeting in Montreal. This website, hosted by UNAVCO, allows users to view and download sample maps of strain rates and velocity fields. [www.world-strain-map.org](http://www.world-strain-map.org)

### Facility Data Group (Fran Boler)

#### NSF/EAR Data Support

- Routine archiving of permanent stations and campaigns proceeded, with two new permanent stations added for ongoing data management and archiving. For permanent stations, auto-gipsy processed coordinates have been incorporated into the archive database, site logs, and RINEX headers. Obtaining coordinates by this method will be standard procedure for all new permanent stations coming online.
- Archiving was completed for 23 campaigns this month; new data and documentation for 17 campaigns was received.
- Top to bottom redesign of Perl code that performs permanent station automated data handling, archiving, QC and RINEXing is underway

#### NSF/EAR Western US Networks Data Support

- Due to a site-name conflict, the BARGEN NEWP was renamed to NEWS, necessitating database changes and re-rinexing of all NEWS holdings on the ftp pickup area.

#### NSF/EAR Plate Boundary Observatory Data Support

- Added one site (AV09) for interim data management and archiving.
- Draft BINEX definition for PBO completed after numerous discussions with Trimble.
- Data Group members attended a meeting with Greg Anderson and the PBO Data and Data Products staff and SOPAC Archive staff to discuss the draft Statement of Work for the PBO Archives.

#### NASA SENH Data Support

- Systems testing to determine if JPL's data flow software could be installed on an existing UNAVCO system. It was determined that new system will be needed for this function.

#### Community/Outreach

- Update of the Global Strain Rate Map Project site completed for version 1.2. This version was incorporated into a Spring AGU poster and demonstration using IDV.
- Extensive redesign of the online "Plate Motion Calculator".

## **Engineering Group (Steve Fisher)**

### **NSF/EAR Project Support**

- Supported planning and budgeting for 6 new proposals submitted to NSF-EAR on June 1 deadline.
- Helped PI plan establishment of several new permanent stations in Northern Baja California, Mexico. Deployment was delayed due to lack of funding.
- Preliminary planning was begun for a July/August field trip to upgrade several Denali GPS network stations and to install three new ones.

### **NSF/EAR Western US Networks Project Support**

- GeNiUS proposal has been drafted and circulated for Community review.
- New NetRS receivers have been tested. Two have been deployed for upgrading two field stations in the existing networks.
- Field engineering and proposal development schedules have been revised based on new NSF proposal deadline.
- Mt. Lewis and Battle Mountain (BARGEN Network) GPS and/or telemetry repeater stations were visited for maintenance purposes.
- Approximately 50 individual trouble or maintenance issues were handled during the month.

### **NSF/EAR Plate Boundary Observatory Project Support**

- Participated in evaluation of test results and purchase contracts for campaign receivers.
- Initial planning for selecting and installing site infrastructure at collocated US Seismic Array/GPS stations was begun in coordination with USGS/ASL staff.
- Reconnaissance at two prospective stations in Alaska was performed.

### **NASA SENH Program Support**

- First month of transferring the additional network monitoring responsibilities from JPL was successful. A JPL site visit is being scheduled in June to review the transition and plan to shore up any remaining issues.
- A site visit to the Mbarara, Uganda GGN station to upgrade the PC104 site computer, perform VSAT maintenance and reestablish communications was performed in cooperation with IDA staff on May 8 – 18<sup>th</sup>.
- Procedure for rapid set-up/configuration of GGN site computers has been put into operation and six new computers were prepared for deployment to upgrade various GGN stations in the near future.
- A plan to reestablish the Riobamba, Ecuador, GGN station was developed. Telemetry will be provided by the Ecuador Seismic Network.
- Three IGS logs were revised and submitted to the Central Bureau (MBAR, YKRO, and KOKB).
- Approximately 99 individual trouble or maintenance issues were handled during the month.

### **NSF Polar Programs Support**

- A DGPS base station has been installed at the Toolik field station in the Brooks Range, Alaska.
- Field support is ongoing on a mass balance survey of the McCall Glacier in the Brooks Range, Alaska.

- Planning for an early June training and maintenance visit to the Barrow field station was completed. Support will also include a receiver upgrade and tie survey at the Alaska deformation network station that is located there.
- FY2003 Arctic Program report has been drafted and circulated for review.
- Review of 2004-2005 Antarctic work requests is being conducted. Planning for the next season support has begun.
- A proposal supplement has been submitted to NSF/OPP for 15 additional receivers and ancillary gear to be added to the OPP equipment pool.

### **Infrastructure**

- Purchased 10 NetRS receivers for community use and began defining accessories and packaging suitable for long-term, unattended deployment.
- Researching newer PC104 technology for upgrading several remote stations requiring low power onsite data processing.

## **Equipment Group (Chuck Kurnik)**

### **NSF/NASA Equipment Support**

- Seven NSF projects shipped in May, two OPP-Arctic, and five EAR. This includes continued support to the Denali Earthquake Response, and eight receivers for RETREAT, a large-scale campaign studying deformation in and around the Apennine Mountains in Italy.

### **NSF Plate Boundary Observatory /Warehouse Activity**

- Ten PBO sites have shipped from the Boulder Warehouse, including four to Rocky Mountain, four to No. California, and two to So. California regions.

### **Information Technology**

- The Equipment and Accounting groups are developing implementation plans for the Solomon Inventory module. This tool will be used to manage inventory flowing through the Boulder Warehouse.

### **Health and Safety**

- Seventeen UNAVCO employees received three days of First Aid and CPR training from the National Outdoor Leadership School (NOLS). This will prepare the field staff for emergencies in the field, as well as the UNAVCO in-house Emergency Response Team.

## 2.3 June 2004

### Highlights

#### Education and Outreach (Susan Eriksson)

- Susan Eriksson has started work as Education and Outreach (E and O) Coordinator and brings significant capability and focus to UNAVCO's Facility and PBO efforts in this areas. Strategic planning for E and O is the highest priority, and Eriksson has discussed past and present E and O activities and future E and O directions with key personnel within Facilities.
- A brochure to present UNAVCO's services in the Polar Program will be prepared for the August NSF New Investigators Workshop.
- A plan is in place to revise the UNAVCO booth for the fall AGU annual meeting.
- Eriksson is working on the currently funded "Collaborative Research: Map Tools for EarthScope Science and Education" and represented EarthScope at a strategic planning workshop of teachers and scientists at University of Portland, June 28-29 for an NSF-funded project "Teachers on the Leading Edge."
- Represented EarthScope at a strategic planning workshop of teachers and scientists at University of Portland, June 28-29 for an NSF-funded project: Teachers on the Leading Edge".

#### Facility (Chuck Meertens)

#### Facility Data Group (Fran Boler)

##### Campaign archiving support

- Archiving completed for 3 campaigns: (Greenland Summit 2003, Guerrero 1992, New Hampshire, 2003)
- Data from 7 campaigns received, archiving initiated. (Nicaragua 2003, Costa Rica 2000, Costa Rica 2003, Carrizo 2003, ECSZ/Mammoth 2003, Baja North 2001, Baja South 2001).
- Supplied data for 14 requested campaigns (1.7 Gb).

##### Permanent station archiving support

- Two new permanent added for ongoing data management and archiving (Hawaii GPS Network: WAPM; SAGE New Zealand GPS Network: MCKE). Due to interest on the part of Giovanni Sella for data from Suominet -A (atmospheric sites), 26 sites from Suominet-A GPS Network have been added for archiving.
- 104,000 files and 15.3 Gb of data picked up via anonymous ftp during the period May 1 2004 – May 31, 2004.
- To improve documentation of certain permanent station and survey mode metadata. Data Group and Engineering Group staff formulated a comprehensive list of attributes of antenna mounts, monuments and survey points to replace existing, somewhat outdated descriptors in our databases.

##### NSF/EAR Plate Boundary Observatory

- Added four sites (P037, P036, P034, P026) for interim data management and archiving.
- The Data Systems Engineer completed in-depth training and has taken on interim data management and data archiving tasks for PBO sites, including GSAC publication.

## **NSF/EAR Existing Western U. S. Networks**

- Data management changes were made to accommodate two sites that have been upgraded to NetRS receivers.

### **Infrastructure support**

- Migration of the offsite SQLServer database /IIS server to the secure, inhouse system is about 70% complete, with the migration of the Permanent Station section remaining.
- Switchover to new 4 Tb RAID completed for production archiving.
- Migrated Oracle Forms tool for metadata entry to Oracle 9iAS. Continued fixing problems with current Forms software.

### **Software Development**

- Redesign of Perl code for permanent station automated data handling, archiving, QC and RINEXing is progressing (see May 2004 Monthly Report).
- During a visit to UNAVCO, Leica personnel held discussions with UNAVCO staff on translator development and possible output of BINEX by certain Leica receivers.

## **Engineering Group (Steve Fisher)**

### **NSF/EAR Project Support**

- Several projects requesting support in summer/fall timeframe are being planned, scheduled and resource requirements/allocations are being made. Includes projects at locations around the world, including Mediterranean Region, Iceland Bangladesh, Alaska, Greenland Galapagos Islands, Northwest US, two locations in Mexico, Southern California, Yellowstone and others.

### **NSF/EAR Western US Networks Project Support**

- Community review of GeNiUS proposal has been integrated into second draft, which has been re circulated to project participants.
- A two-day working meeting was conducted at the UNAVCO Facility to discuss remaining issues and further revise the proposal. The meeting was attended by ten interested participants from the Existing Networks.
- New CDMA modems have been tested and deployment has begun (first at Slide Mountain, NV).
- Three stations have been upgraded with NetRS receivers in EBRY, BARGAN and AKDA networks.
- Site visits have been conducted at 10 EBRY Network stations for pre-upgrade suitability analysis.
- Planning for July AKDA network upgrades is underway. Two stations are slated for upgrade in July.
- Planning and cost estimating for BARGEN/Yucca Mountain networks is underway in cooperation with Caltech, Harvard/Smithsonian and UNR.
- Approximately 60 individual trouble or maintenance issues were handled during the month.

### **NSF/EAR Plate Boundary Observatory Project Support**

- Suggestions for refinements to PBO campaign equipment were developed to be submitted to winning vendor.
- A meeting was held at USGS/ASL to plan selecting and installing site infrastructure at collocated US Seismic Array/GPS stations.

### **NASA SENH Program Support**

- A JPL site visit was conducted to review the transition and plan to shore up remaining issues.

- A site visit at Pie Town, NM, was conducted to upgrade the site with a new receiver and RTNT system. The old and new sites are being run in parallel for an initial evaluation phase.
- Approximately 80 individual trouble or maintenance issues were handled during the month.

#### **NSF Polar Programs Support**

- On-site training provided in Barrow, Alaska to local users of the DGPS system at the Barrow Arctic Science Consortium.
- Field engineer support to the McCall Glacier mass balance survey in the Alaska Brooks Range.
- Equipment support provided to Columbia Glacier, Alaska and Breidamerkurjokull, Iceland projects.
- The 2003 annual Arctic report was completed and is available at [http://www.unavco.org/facility/project\\_support/polar/reports/reports.html](http://www.unavco.org/facility/project_support/polar/reports/reports.html).
- Planning individual project requirements for the upcoming 2004-05 Antarctic season with over 20 projects that will be supported with a pool of 75 receivers.
- Reviewing 2005-06 Antarctic proposal GPS requirements.
- Several technical issues are being addressed, including developing ethernet radio links for remote receiver downloads, researching Iridium satellite system data modems for specific project applications and upgrading solar power systems for long-term continuous data collection applications.

#### **Infrastructure**

- A visit by Leica Geosystems, Inc. was hosted by the group to familiarize staff with latest Leica receivers. Minimal data quality evaluation was conducted and plans for Leica participation in Community pricing program were made.
- Began organizing community receiver purchase to be announced in Early July.
- Ordered equipment for prototyping new receiver accessory requirements.

### **Equipment Group (Chuck Kurnik)**

#### **NSF/NASA Equipment Support**

- The UNAVCO Facility is in the early stages of retiring older GPS receivers and replacing them with newer, low-power/high-memory receivers. To this end, three Trimble 4000's were shipped to be installed in permanent stations in Turkey. In addition, five other NSF projects and two NASA projects shipped this month.

#### **NSF/EAR Plate Boundary Observatory/Warehouse Activity**

- The Basin and Range Region and the Pacific Northwest Region are beginning to install their first round of sites, and equipment has been shipped to support this activity. The kitting, tracking, and procurement processes are being refined in this "prototype" year.

#### **Information Technology**

- Work is proceeding to integrate the PBO Operational Database into the procurement and scheduling system. A hitch has been encountered with using the Solomon Inventory module, and options are being investigated.

#### **Health and Safety**

- The Facility's and PBO's International health and Safety plans have both been received, and they are under review.