

# **Memorandum of Understanding**

**between**

**Stanford Linear Accelerator Center  
(SLAC)**

**and**

**UNAVCO, Inc.**

**Regarding Participation in**

**The Plate Boundary Observatory**

# 1 INTRODUCTION

## 1.1 General Description

Under the auspices of the PBO Nucleus Project which is funded by the National Science Foundation, SLAC and UNAVCO, Inc. will collaborate in the integration of the permanent GPS station operated by the SLAC Alignment Engineering Group into the Plate Boundary Observatory.

This collaboration will provide UNAVCO with a permanent GPS station in an area that is not well covered. It will provide SLAC with a well maintained and integrated reference station that will aid the site in outside survey projects. By having continuous computation of the station within the PBO network, SLAC will be able to regularly validate its coordinates and velocities within a well defined reference frame such as ITRF and NAD without having to fully invest its own personnel and resources.

This Memorandum of Understanding (MoU) between UNAVCO, Inc. (UNAVCO) and the Stanford Linear Accelerator Center (SLAC) is a collaborative agreement and does not constitute a legal contractual obligation on the part of either of the institutions. The objective of this MoU is to document the understandings of SLAC and UNAVCO regarding the integration of SLAC's GPS station into the Plate Boundary Observatory (PBO). The PBO is an 875 station GPS network currently under construction in the Western U.S. The SLAC GPS station will be one of the stations of the BARD network, based at the University of California, Berkeley (one of the participating institutions in the PBO Nucleus).

## 2 GENERAL AGREEMENTS

### 2.1 Equipment

Using SLAC's existing power supplies, choke ring antenna and cables, UNAVCO will replace SLAC's current GPS receiver with an IP-capable receiver that will be telemetered through a CDMA modem.

### 2.2 Operating Conditions

Data Flow: All data logged by the station will be subject to the PBO Data Management Plan (see <http://pbo.unavco.org/?pageid=16>). The receiver will be configured to log daily 24 hour files at 15 sec sampling rate, which will be automatically downloaded daily via CDMA by PBO headquarters in Boulder, CO. Raw and RINEX versions of this data will be made publicly available via anonymous ftp within 24 hours. Hourly high-rate (5 Hz) data will also be logged in a two-week capacity ring buffer on the receiver, but would only be downloaded and made available by special request or in the event of a large earthquake in the vicinity.

Once the PBO Analysis Centers are on line, Data from this station will be used to produce a variety of derived data products, including time series and velocities.

RTK Radio and Base Station Capability: SLAC's current RTK capabilities will be fully supported by the UNAVCO provided GPS receiver, a Trimble NetRS GPS, and can continue uninterrupted. SLAC's Pacific Crest radio can be plugged into one of the receiver's four serial ports, which will be configured to output RTK stream in either

RTCM 2.2 or 2.3 format, whichever SLAC selects. Access to the receiver controls will be restricted to UNAVCO personnel, however, UNAVCO will make any changes requested by SLAC as quickly as possible.

### **2.3 Costs**

Operation and Maintenance: With the exception of the RTK radios and equipment, which will continue to be the property of and responsibility of SLAC, costs to operate and maintain the equipment will be paid for by UNAVCO through the Nucleus project through its termination in 2008, after which PBO will be responsible,. Any repair or replacement of any of the existing equipment (e.g. GPS antenna, UPS, etc.) that UNAVCO assumes responsibility for at the time of upgrade, will be paid for by UNAVCO. UNAVCO will make every effort to ensure that data flow continues uninterrupted, however, in the event of equipment failures, operational constraints may require brief interruptions before repairs can be arranged. The assistance of SLAC's on-site personnel in identifying problems may further help in minimizing any outages.

## **3 SPECIFIC AGREEMENTS**

### **3.1 Statement of Work**

SLAC will work with UNAVCO to establish a PBO compliant GPS station at the location of SLAC's permanent GPS station. UNAVCO will provide, install, and maintain an IP-capable Trimble NetRS receiver with 1 GB of memory and a CDMA modem.

### **3.2 Scientific Personnel**

The point of contact for SLAC is Catherine LeCocq.  
The point of contact for UNAVCO is Dr. Frederick Blume.

### **3.3 Safety**

UNAVCO staff involved in the installation and maintenance of the GPS equipment will be expected to comply with SLAC's safety regulations, including participating in SLAC required safety training prior to performing any work on the SLAC site. The required safety training will be coordinated by the SLAC point of contact.

### **3.4 Equipment Ownership**

All equipment items bought or fabricated using DOE-SLAC funds will be the property of DOE-SLAC and will be capitalized by SLAC. Any equipment purchased or fabricated using NSF or NASA funds available to UNAVCO will be accounted for in accordance with the applicable grant or cooperative agreement.

## **4 Publications**

Should papers and publications result from this work, UNAVCO's contribution will be formally acknowledged in SLAC publications. All publications and all intellectual property developed under this MoU using SLAC funds are subject to SLAC's procedures and the Stanford contract with DOE which requires that all publications receive prior copyright and

