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United States Geological Survey
Earthquake Hazards Program

<http://earthquake.usgs.gov>



Proposals for Support of
Seismic and Geodetic Network Operations
Cooperative Agreements

Fiscal Years 2010- 2014
Program Announcement 10HQPA0007
Closing Date: October 19, 2009

PAPERWORK REDUCTION ACT STATEMENT: The Paperwork Reduction Act says that the agency must tell you why we are collecting this information, how we will use it, and whether you have to give it to us. This information is being collected to determine the eligibility of the applicant and as a basis for approval or disapproval of the proposed work. The purpose of the funding is to support network operations related to the issuance of public earthquake warnings. Your response is required to receive funding. A Federal agency cannot conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. Public report burden for this collection is estimated to average 45 hours per application and 9 hours to prepare a final technical report (OMB 1028-0051). Direct comments regarding this collection of information to the Bureau Clearance Officer, U.S. Geological Survey 2150-C Centre Avenue Fort Collins, CO 80525.

APPLICATIONS MUST BE SUBMITTED IN ACCORDANCE WITH THE INSTRUCTIONS SET FORTH IN SECTIONS 3 & 9 OF THIS ANNOUNCEMENT

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Announcement 10HQPA0007

1. Opening Statement

USGS Earthquake Hazards Program issues this Announcement for assistance to support the operation of regional seismic and geodetic monitoring to contribute to USGS's Advanced National Seismic System (ANSS). This activity is authorized by the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended, and Related Authorities as of June 2007. ANSS is a component of the USGS's Earthquake Hazards Program, which is authorized by the Earthquake Hazards Reduction Act of 1977 (Public Law 95-124, 42 U.S.C. 7701 et. seq.), as amended by Public Laws 101-614, 105-47, 106-503, and 108-360.

2. Application Submission Opening Date: September 3, 2009

Application Submission Closing Date: October 19, 2009

3. Electronic Application Requirement

All proposals shall be submitted electronically via Grants.gov (<http://www.grants.gov>).

Hard/paper submissions or electronic copies submitted via e-mail will NOT be accepted under any circumstances. All proposals must be submitted electronically through Grants.gov on or before:

October 19, 2009, at 3 pm, Eastern Daylight Time

Please be aware that the electronic submission process requires first time users to register using an e-Authentication process. This registration process can be somewhat complex and can take up to 3 weeks to complete. Be advised that it is virtually impossible to begin the process of electronic submission for the first time if you start just a few days before the due date. If you are from a university, contact your Office of Sponsored Programs. They may already have completed the registration process and should work with you to submit the application.

Once at the website, click "Get Registered" under the "For Applications" heading and follow the instructions provided. In order to complete the SF 424 forms, **everyone** must use the Adobe Reader version which is available for download from the grants.gov site at:

http://www.grants.gov/help/download_software.jsp#adobe811. To ensure that you have the correct version of Adobe Reader, you can use the versioning test located at:

<http://www.grants.gov/applicants/AdobeVersioningTestOnly.jsp>. Any and all edits made to the application package must be made with the Adobe Reader version specified on Grants.gov.

Grants.gov does not guarantee to support other versions of Adobe Reader released prior to version 8.1.1. For more information on Adobe Reader, please see:

http://www.grants.gov/applicants/applicant_faqs.jsp#adobe-reader-error. Please note that there is an underscore between "applicant" and "faqs" in the URL. If you have any questions regarding the registration process, please contact the Grants.gov help desk at 1-800-518-4726.

In the Grants.gov forms, floating your mouse over a field will provide instructions for completing that field. You can also click on the Check Package for Errors button to check the entire application for validation errors (incomplete fields, etc.)

There are several steps of the submission process that require careful attention by applicants in order to assure that the application has been fully accepted. It is suggested that applicants read the document available at

<http://www.grants.gov/assets/TrackingYourApplicationPackage.pdf>

For more information on the Grants.gov registration and submission process, please see <http://www.usgs.gov/contracts/grants/grantsgov.html>

During the application period an applicant may submit a revised or corrected proposal through grants.gov. Include a cover letter as the first page of the proposal stating that the proposal is revised and indicating that the previous submittal is to be withdrawn from consideration. Such submissions must be completed by October 19, 2009 at 3:00 pm Eastern Daylight Time.

See Section 9, Application Preparation Instructions, which describes requirements for the proposal and other application components.

Please allow sufficient time for the proposal to be submitted electronically through Grants.gov and allow time for possible computer delays. Applicants are strongly advised not to wait until the last minute for submission. A proposal received after the closing date and time will not be considered for award. If the USGS determines that a proposal will not be considered for award due to lateness, the applicant will be notified immediately.

4. Funds and Start Dates

Approximately \$6.5 million will be available in FY2010 for support of regional seismic networks, as part of the Advanced National Seismic System (ANSS); it is assumed that this same amount will also be available for fiscal years 2011 through 2014. Approximately \$470,000 is being made available in FY2010 for funding long-term geodetic monitoring networks; it is assumed that this same amount will also be available for fiscal years 2011 through 2014. These estimates do not bind the USGS to a specific number of awards or to the amount of any award. Congress has not yet authorized FY2010 funds for the Earthquake Hazards Program. Start dates for seismic networks will be February 1, 2010, and start dates for geodetic networks will be March 1, 2010. Cooperative agreements will be for one year plus four renewal years.

5. Application Requirements

A. Only those applications that respond to and meet the criteria of this announcement will be considered for funding. Applications that do not meet the criteria of this announcement will be returned to the applicant.

B. The length of the project period will be a maximum of 5 years.

C. Network operations activities (see Attachment A) shall be conducted by the applicant. Proposed funding for activities other than those outlined in the application will not be considered.

D. USGS personnel are prohibited from assisting any organization in preparing its proposal for competitive funding.

6. Network Objectives and Requirements

See Attachment A (There are two sections, one for Geodetic Networks and one for Seismic Networks)

7. Multi-year Proposals

It is anticipated that most network operations proposals will be funded for one year plus four renewal years. Beyond year one, each subsequent year of funding will be contingent upon the availability of funds and satisfactory submission of required reporting and satisfactory network operations by the Recipient, to be determined through review of regular

electronic submissions and Progress Reports as specified in the attached Special Terms and Conditions, to include meeting ANSS Performance Standards (available at: <http://earthquake.usgs.gov/research/monitoring/anss/documents.php>).

8. Unsuitable Proposals

Applications that do not address the application instructions in section 9 (below), or the requirements within the Network Objectives and Requirements (Attachment A), or do not indicate compliance with the Special Terms and Conditions (Attachment D) will not be considered for funding and will be returned to the applicant.

9. Application Preparation Instructions

Your electronic submission shall consist of forms SF-424, SF-424a, and SF-424b, plus the items described below. No additional documents or materials may be submitted. Failure to comply with the required application components listed below may result in the proposal being rejected. To view complete forms instructions, please visit the Grants.gov Forms Repository at http://www.grants.gov/agencies/aapproved_standard_forms.jsp#1

Items A through E as described below shall be combined together, in the order noted below, and submitted through Grants.gov in either MS Word or PDF format. **The application shall not exceed 25 single-spaced pages** (including figures, supplemental tables, references, appendices, curriculum vitae, etc.), and the **type size shall not be smaller than 11 point**. All pages of the application shall be numbered. All text, figures, and tables shall be sized to fit on 8½" by 11" paper. The SF forms, negotiated rate agreement, required tables, and letters of support do **not** count toward the 25-page limit. The application shall be in color as needed for review by peer review panel members.

In the Grants.gov forms, floating your mouse over a field will provide instructions for completing that field. You can also click on the Check Package for Errors button to check the entire application for validation errors (incomplete fields, etc.)

The application submitted through grants.gov as the Project Narrative Attachment Form (in MS Word or PDF format) shall be **assembled in the following order**:

A. Proposal Information Summary. This summary is mandatory for all proposals and shall follow the same format as shown in Attachment B. The two-letter panel designation (SN or GN) shall be indicated in Item 1.

B. Table of Contents.

C. Budget Summary. The proposed budget shall be presented in two parts: a one-page summary, which shall be in the format shown in Attachment C. Please note that Publication Costs will not be allowed. The detailed budget is described item D below.

D. Detailed Budget. The detailed proposed budget shall be keyed to the Budget Summary included as Attachment C. Non-federal funds available to support the project may be reflected in the detailed budget or the SF 424, as appropriate.

The budget shall be **divided into two sections** (see Attachment C). Section 1 shall be network operations expenses and Section 2 shall be data processing expenses. For each section, the detailed budget must include the amount proposed for each of the following items in this order:

1. *Salaries and wages*. Identify individuals or categories of salaries and wages, estimated hours or percent of time, and the rate of compensation proposed shall be identified for each person or category. Include an explanation of the amounts included for projected increases if the rate of pay shown is

higher than the current rate of pay. Identify each person with an objective in the project. Principal Investigator time should be limited with the majority of salary for students. Note: Tuition remission and other forms of compensation paid as, or in lieu of, or in addition to wages to students performing necessary work are allowable; provided that the student(s) are contributing directly to the operations and maintenance of the network and/or earthquake product generation, and the tuition or other payments are reasonable compensation for the work performed and are conditioned explicitly upon the performance of the work.

2. *Fringe benefits/labor overhead.* Indicate the rates/amounts in conformance with normal accounting procedures. Explain what costs are covered in this category and the basis of the rate computations. Indicate whether rates are used for proposal purposes only or whether they are also fixed or provisional rates for billing purposes. Include a copy of the indirect negotiated cost agreement with the Federal Government to support the proposed rate(s).

3. *Equipment.* Show the cost of all special-purpose equipment necessary for achieving the objectives of the project. "Special-purpose equipment" means scientific equipment having a useful life of more than 1 year and having an acquisition cost of \$5,000 or more per item. Each item shall be itemized and include a full justification and a dealer or manufacturer quote, if available. General-purpose equipment must be purchased from the applicant's operating funds. Title to non-expendable personal property shall be vested solely with the Recipient. Under **no** circumstances shall property title be vested in a sub-tier recipient. Title to GFE property shall be vested with the USGS.

4. *Supplies.* Enter the cost for all tangible property. Include the cost of office, laboratory, computing, and field supplies separately. Provide detail on any specific item, which represents a significant portion of the proposed amount. If fabrication of equipment is proposed, list parts and materials required for each and show costs separately from the other items.

5. *Services or consultants.* Identify the objectives or problems for which such services would be used. List the contemplated sub-recipients by name (including consultants), the estimated amount of time required, and the quoted rate per day or hour. If known, state whether the consultant's rate is the same as she/he has received for similar services or under Government contracts or assistance awards.

6. *Travel.* State the purpose of the trip and itemize the estimated travel costs to show the number of trips required, the destinations, the number of people traveling, the per diem rates, the cost of transportation, and any miscellaneous expenses for each trip. Calculations of other special transportation costs (such as charges for use of applicant-owned vehicles or vehicle rental costs) should also be shown.

7. *Other direct costs.* Itemize the different types of costs not included elsewhere; such as, shipping, telemetry, computing, equipment-use charges, age dating, or other services. Provide breakdowns showing how the cost was estimated; for example, computer time should show the type of computer, estimated time of use, and the established rates.

8. *Total direct costs.* Total items 1 through 7.

9. *Indirect cost/general and administrative (G&A) cost.* Show the proposed rate, cost base, and proposed amount for allowable indirect costs based on the cost principles applicable to the Applicant's organization. G&A should not be calculated for any tuition remission. If the Applicant has separate rates for recovery of labor overhead and G&A costs, each charge should be shown. Explain the distinction between items included in the two cost pools. The Applicant should propose rates for evaluation purposes, which they are also willing to establish as fixed or ceiling rates in any resulting award. Include a copy of the indirect negotiated cost agreement with the Federal Government to support the proposed rate(s).

10. *Amount proposed.* Total items 8 and 9.

11. *Total project cost.* Total Federal and non-Federal amounts, if any.

E. Proposal: The description of the proposed work shall consist of the following parts:

1. *Significance of the project.* Discuss the specific problem addressed and its importance. Include a discussion of the significant contribution the project will make to the ANSS goals.

2. *Project plan.* Discuss the specific operational objectives, data collection and management plans,

product development and distribution plans, and other efforts. Attachment A describes Network Objectives and Requirements relevant to each network's project plan. For seismic networks, these efforts must include a comparison to the ANSS Performance Standards (see the self-rating questions in Table A-SN-1 in Attachment A). Plans should describe how each objective will be accomplished.

3. *Reports and dissemination of information and data.* The USGS considers dissemination of earthquake data and products to potential users of those results to be an integral and crucial aspect of the networks funded by the Earthquake Hazards Program. Describe your plan for dissemination to users of network data and products, including how your users will likely contribute to earthquake hazards awareness and risk reduction. Indicate the customers to whom the network results are directed and how specifically you are addressing their needs. It is **essential** that the reporting requirements described in section 3 of Attachment D be thoroughly addressed in each proposal; Attachment D is the Special Terms and Conditions that will be incorporated into the award documents for each cooperative agreement.

4. *Related efforts.* Describe significant related studies conducted by members of the network operations team and discuss any planned coordination with other workers in the field.

5. *Project personnel and bibliography of directly related work.* Provide one-page curriculum vitae for the professional staff, summarizing education, experience, and the last five years' bibliographic information related to the proposed work; a length of one-page is recommended. Curriculum vitae for post-doctoral researchers, who contribute significantly to the project, must also be included.

6. *Institutional qualifications.* State the resources available at, and the relevant experience of, the institution. Resources include personnel, computer and library facilities, and ties to both sources of data and potential users of the results.

7. *Project management plan.* The Project Management Plan must include all Tables from Appendix A. Include project milestones and related due dates for the proposed work and required progress reports.

8. *Current support and pending applications.* List all sources of support (in addition to the proposed effort) to which the senior staff have committed a portion of their time for the period covered by the proposal. The information should account for 100 percent of the work time of each investigator and include titles, annual budget levels, period of the awards, and the person-months committed in each case. This section must also list research and other technical proposals being considered by, or that will be submitted to, other possible sponsors. This information will not affect the evaluation of the proposal; however, if identical or similar work is also proposed to another institution (e.g., National Science Foundation), an explanation of the relationship of such work to this proposal should be provided.

9. *References.*

10. Evaluation of Applications

A. Evaluation of proposals is through peer review by a panel of experts who read all the proposals assigned to their panel prior to meeting and discuss each proposal according to the evaluation criteria. The Panel members are scientists drawn from Federal, State, local, and regional agencies; universities; non-profit organizations; and private industry. Each criterion (or factor) carries equal weight in the evaluation. Separate panels will evaluate the geodetic and seismic proposals.

B. All proposals are considered in accordance with the criteria set forth below:

1. **Responsiveness to Program Objectives and Requirements.** This factor considers the overall responsiveness of the proposal to USGS needs for quality monitoring, appropriate improvements, and timely reporting as detailed in Attachment A and Attachment D.

2. **Technical quality of the proposal.** This factor considers the scientific merit of the proposed approach, the USGS's need for the level of monitoring proposed to be provided and the probability of

achieving positive results and performance improvements within the designated period.

3. Competence and recent contract performance of Principal Investigator(s) and network operations team. This factor considers experience and competence of the PI and coworkers and the quality of network operations achieved with previous funding. This factor includes performance records and capability to provide the necessary facilities and support that will insure satisfactory completion of the proposed work. The recent performance aspect is primarily concerned with network reliability and performance, integration with USGS goals and objectives for the monitoring system, participation in system development coordination, and whether reporting requirements from previous USGS awards have been satisfied.

4. Appropriateness and reasonableness of the budget. This factor considers whether the proposed budget is commensurate with the level of effort needed to accomplish the project objectives and whether the cost of the project is reasonable relative to the value of the anticipated results.

C. The assembled panels make recommendations and provide advice by ranking proposals into priority groupings and appropriate funding levels. Panels include USGS personnel to provide coordination with internal USGS/ NEHRP elements. The results of the review will assist the USGS in making final award determinations under this Announcement.

11. Rejection of Applications after Initial Review

If an application does not meet all requirements specified in the Announcement, as determined by the Contracting Officer in consultation with the External Research Support Manager, the institution and principal investigator will be promptly notified that the proposal will not be reviewed indicating the reason for its rejection.

12. Involvement of Federal Employees

Federal employees, including USGS employees, are prohibited from serving in any capacity (paid or unpaid) on any application submitted under this Announcement. Proposals that have a real or apparent conflict of interest related to Federal employees will not be processed for evaluation. This does not prohibit cooperation or collaboration between USGS and non-USGS scientists once a cooperative agreement is in place. Section 6 describes collaborative proposals.

13. Award Terms and Conditions

Award Recipients must comply with award Special Terms and Conditions (Attachment D) and Cost Principals, Audit, and Administrative Requirements (Attachment E). Submittal of an application constitutes the applicant's acceptance of the terms and conditions for inclusion in any award resulting from their application. Any concerns with the requirements of the Special Terms and Conditions shall be presented to the Contracting Officer at least three (3) days prior to the closing date of the Announcement.

A. No pre-award costs are authorized.

B. No-Cost Extensions to the Project Period: No-cost extensions are discouraged and will be granted only in unusual circumstances. Applicants should supply documentation supporting their request for an extension, as described in Attachment D.

C. Supplemental Funds: Increases in funds beyond the amount awarded are also discouraged. The peer review panels recommend funding at a rate commensurate with their judgment of the scientific merit of a proposal and their expert knowledge of the expenses likely to be incurred in the conduct of

the work. The USGS is aware that the course of any project cannot always be predicted. Should the ANSS Performance Standards change markedly during the course of an award, requests for supplemental funds to accommodate meeting the revised standards will be considered based on available Earthquake Hazards Program funds. However, the bulk of the funds available for grants and cooperative agreements are expended early in the fiscal year and little is retained for expenses beyond emergencies or special opportunities for the program. Requests for increased funding will be considered on a case-by-case basis. Applicants should supply documentation supporting their request for increased funding.

D. Dissemination of Results: When award recipients have completed their studies, a Final Technical Report must be submitted within 90 days; these reports will be posted at <http://earthquake.usgs.gov/research/external>.

14. Payment to Foreign Recipients

The USGS requires that all financial assistance payments be made using the Department of Health and Human Services (DHHS) Payment Management System (PMS). Paper based claims for reimbursement are no longer acceptable. In order to receive payment, Recipients will be required to establish an account with PMS. With the award of each grant, a sub-account will be set up from which the Recipient can draw down funds. It should be noted that foreign recipients will only be permitted to draw down funds if a U.S. corresponding bank is linked to their account (i.e., the recipient must bank directly with a US bank or their foreign bank must have a corresponding US bank). It is the responsibility of the applicant to verify that, in the event they receive a grant, they can meet this condition of the award. It is strongly recommended that foreign applicants make any necessary banking arrangements prior to submitting their applications. Applicants who are recommended for funding who cannot meet this condition may not receive an award.

15. Questions?

For Grants.gov issues, see:

http://www.grants.gov/applicants/app_help_reso.jsp

<http://www.usgs.gov/contracts/grants/grantsgov.html>

Laura Mahoney, (703) 648-7344, lmahoney@usgs.gov

For Contracting Officer issues, contact Maggie Eastman, (703) 648-7366, mrussell@usgs.gov

For External Research Support Manager issues, contact Elizabeth Lemersal, (703) 648-6701, gd-erp-coordinator@usgs.gov

Network Objectives and Requirements: Geodetic Networks

Introduction

The USGS Earthquake Hazards Program (EHP) promotes the development and operation of networks that monitor crustal deformation in regions prone to earthquakes. The primary EHP contact for geodetic network operations for purposes of this announcement is Nancy King (nking@usgs.gov). These networks include continuously operating Global Positioning Systems (CGPS), strainmeters, creepmeters, and traditional survey methods that measure fault slip. The CGPS and strainmeter networks supported by the USGS complement those being installed and operated under the Plate Boundary Observatory (PBO) component of the National Science Foundation's (NSF) EarthScope initiative. Many (but not all) CGPS sites installed and operated with funding under EHP's External Research Support are now being operated by PBO. For CGPS networks, this announcement is for continued operation of those sites that are not being supported by PBO.

CGPS is primarily used to estimate positions once per day in order to determine site velocities over periods of months to years. Recent developments in both hardware and software indicate that real-time high-rate GPS data streams can be used to measure positions at much higher rates that extend into the seismic frequencies. These position estimates are of sufficient precision to be useful in measuring seismic displacements and monitoring rapid postseismic deformation. Research and development efforts are currently underway to determine whether GPS is sufficiently precise and robust for real-time estimation of coseismic displacements or for Earthquake Early Warning.

Support for Geodetic Networks

Proposals are requested from the established CGPS, strain, and creep network operators for the following efforts.

- Continued measurements of fault slip in the San Francisco Bay area through creepmeters
- Continued measurements of fault slip in the San Francisco Bay area through alignment arrays.
- Continued operation of the Bay Area Regional Deformation Network (BARD) CGPS network.
- Continued operation of the CGPS network along the Wasatch Front region in Utah.
- Continued operation of the Pacific Northwest Geodesy Array (PANGA) CGPS network.
- Continued operation of borehole strainmeters in California, including Parkfield.
- Continued operation of long-base strainmeters in California.
- Expansion of GPS operations in the Basin and Range and Intermountain West.

Network Operations

Proposals for the operation of EHP-supported geodetic networks must be described in terms of these three (3) broad objectives:

- 1) Continued network operations including field maintenance, measurements, and, where applicable, central data recording systems,
- 2) For GPS, providing RINEX data and station metadata via the UNAVCO GPS Seamless Archive,
- 3) Processing those data into meaningful, geophysical quantities, and
- 4) Providing processed results, in graphical and numerical form, to all via the Web.

Proposals must include a table of USGS-supported stations, as shown below with all noted data provided (enter "planned" if station has not yet been installed)

Station	Longitude, deg E	Latitude, deg N	Instrument type	Strain- or creep-meter model	GPS receiver model	GPS antenna model	Sample rate	Telemetry	Install date

USGS-supported networks shall provide full metadata for all stations within 60 days of award (by April 30, 2010). See the metadata tables within the Progress Report template Attachment D-GN-2 following Attachment D for the required data.

Operators shall maintain a website and include the link in the proposal. The website will contain Station Information with data as in the table above and a link to time series of processed results in graphical and numerical form (requirements for network cooperative agreements are described in section 3 of Attachment D).

Operator website shall have links to time series for each station. Time series shall be available in graphical form, with a link to download results in numerical form. Contact information must be provided for users having difficulty downloading the time series. Time tags will be provided in both date/time (UTC) and decimal year; dates may be calendar date, year and Julian day, modified Julian day, or other common format. Date/time formats must be clearly labeled. Units for strain, creep, or GPS position must be provided. Uncertainties must be included. For GPS networks, north, east, and vertical time series for each station must be presented, with uncertainties.

Operator website shall display coseismic signals or creep events within 30 days of an earthquake producing a detectable signal. Data to be included include: earthquake name (if any); date; time; magnitude; updated time series with label indicating earthquake; estimated coseismic change, with uncertainties, for each station (north, east, and vertical for GPS). Within 30 days of a creep or strain event, the operator website shall display: date; time; size; and sense of event, with uncertainty; updated time series with label indicating event.

For the operation of CGPS, the network operators shall maintain the instrumentation, telemetry, and provide the raw, 120-second or better data in RINEX format (or other format such as SOC or DBEN if a mutually agreed-to specification is accepted by USGS and partner data users and if the data format is fully and openly described.)

For the operation of strainmeter and creepmeter instruments, the network operator shall maintain the instrumentation at the site and provide computer files (plots alone are not acceptable) of clean, processed data in geophysically meaningful units over the Web with a nominal latency of not more than one month.

For the creepmeter and borehole strainmeter networks, the USGS will provide GOES telemetry systems.

For the long-base strainmeter, the network operator shall provide telemetry.

For both the borehole strainmeter and creepmeter instruments, raw data must be available in near real time for internal use by the USGS to assist with hazards assessments (these data are currently provided via the GOES telemetry.)

For creepmeters, borehole strainmeters, and long-base strainmeters, data must be archived with the Northern California Earthquake Data Center (NCEDC) in NCEDC standard format.

For alignment arrays the network operator shall measure existing sites in northern California at approximately one year intervals unless it is agreed, in consultation with USGS personnel, that measurements should be made more or less frequently.

Alignment array proposals may include the establishment of a limited number of new or replacement sites to monitor fault slip. These new or replacement sites would be of particular interest in defining the presence or absence of fault creep, or the distribution of creep rates, along major faults in the San Francisco Bay Area. If new arrays are installed, those sites shall be measured more frequently initially to expedite the estimate of the initial slip rate and to gauge the background “noise”.

Network operators may propose the upgrade of stations to real-time within PBO guidelines and/or to record high rate data (i.e., 1 Hz). Data must be available in RINEX as soon as practicable. Real-time and high rate data will be made open and freely available.

Partnerships Encouraged

The USGS seeks increased integration of the geodetic and seismological disciplines in its support of efforts to monitor earthquakes and earthquake processes. The USGS encourages proposals under this Announcement that include elements that lead to greater integration and coordination in the acquisition and interpretation of geodetic and seismic data.

Proposals are encouraged that document the use of partnerships, existing and proposed, to leverage EHP funds to extend the network and/or enhance its performance. Proposals that make use of the Major Research Equipment programs of the National Science Foundation, EarthScope, and the Network for Earthquake Engineering Simulation (NEES) are specifically encouraged. Also encouraged are Federal-State partnerships that extend what can be accomplished with EHP funds alone. If non-EHP funding contributes to geodetic network operations or to development proposals, a table should be included listing how resources will be divided between USGS, other Federal, State, and private funding sources, for each year of the agreement.

The USGS recognizes that potential conflicts may arise within the goals and objectives of various partners supporting network activities and operations. As a condition of accepting USGS funding, supported networks agree to consult with USGS management in the resolution of any such conflicts.

Network Objectives and Requirements: Seismic Networks

Background

For the past six years, efforts within the Advanced National Seismic System (ANSS) National Implementation Committee (NIC) and its working groups have been focused on system-building activities, such as the development of performance standards, instrumentation standards, data communication protocols (e.g., XML), and defining data archiving and communication needs. The USGS has supplemented these activities through development efforts for improved distribution of earthquake information (e.g., the Earthquake Notification Service, ENS, and Earthquake Information Distribution System, EIDS), the development of system tools, and the implementation of support contracts for seismic data processing software. These efforts are working toward building a nationally and regionally integrated system, in which all data collected are of high quality and are effectively and efficiently used and distributed, and from which products are generated that are reliable, timely, and useful. For more information on ANSS, see Circular 1188 and other documents at <http://earthquake.usgs.gov/research/monitoring/anss/documents.php>.

Now that a significant number of system development efforts are completed or nearly complete, USGS will begin routine monitoring of system performance in the upcoming five-year funding cycle, 2010-2014. This is consistent with guidance by the ANSS National Steering Committee, which endorsed in September 2005 the ANSS Coordinator's proposal to manage the ongoing development of ANSS for performance, rather than for specific station-installation targets. A set of comprehensive ANSS Performance Standards was adopted in 2006 and updated in 2008 and are available at the website noted above. These standards will allow USGS and individual network managers to identify the significant performance gaps and allocate resources for filling those gaps.

To ensure effective operation of a national system and the prompt exchange of earthquake information nationally and between regions and networks, USGS has established reporting requirements, detailed below and in Attachment D, for comprehensive metadata for all seismic stations operated with USGS funds. As in past seismic network cooperative agreements, USGS requires standard tools, formats, and practices. Supported networks may, in principle, use any software or hardware to meet ANSS performance standards, and innovation and cost efficiency are strongly encouraged. However, USGS may choose for cost-efficiency or other reasons to only support certain hardware and/or software. Such decisions will be made known broadly through ANSS committees and will be published on ANSS web pages. Networks choosing to use unsupported hardware or software should seek non-USGS funds for the purchase and maintenance of these assets.

At current funding levels, it will not be possible for all ANSS-supported networks to meet every minimum performance standard. USGS will work with each supported network to jointly decide where to focus resources to gain the greatest performance benefit. USGS will also provide and support tools and/or methods by which supported networks can measure current performance and compare it with the standards, and will work through the ANSS committee structure to help share solutions and expertise among network operators.

Continuous 24/7 operations at the National Earthquake Information Center (NEIC) will provide off-hours backup for all ANSS regional networks. While NEIC and cooperating regional networks will continue to operate using established business rules for publishing authoritative earthquake hypocenters and magnitudes, partner networks can also make bilateral agreements with NEIC to ensure cost-effective monitoring during non-workday hours and holidays. Also note that some key products, such as *moment tensors, finite fault models, broadband depths, and other modeled source*

parameters for large events, are not required of any regional network; they will be produced by NEIC as part of its normal operations.

USGS encourages the sharing of technical expertise and solutions among ANSS networks. Network managers are likewise encouraged by USGS to make use of the existing coordinating groups to find needed expertise and solutions and to maintain an active communication with the ANSS Coordinator and Technical Manager. Our shared goal is to maximize the performance of the system under the available resources and to provide useful and effective earthquake information and data to the many and diverse users of ANSS products.

USGS requests that proposers budget for the routine maintenance of the free-field and reference strong motion seismic stations in their region that are currently operated by USGS as part of the National Strong Motion Network (network code NP). These stations are listed in Attachment A-SN-2. USGS will provide cooperative support for these stations in the form of technical expertise, replacement supplies and equipment and, as needed, site visits.

Due to current and projected funding levels, USGS does not anticipate being able to support network expansion during fiscal years 2010-2014 (other than as noted above). Proposals to add new stations are discouraged unless they are matched by operational cost reductions or matching funds from a non-USGS source.

Supporting Information

Information on the Advanced National Seismic System can be found at <http://earthquake.usgs.gov/research/monitoring/anss>. Under Publications and Documents are the key documents supporting the implementation of ANSS, as well as a number of fact sheets providing information on ANSS products, accomplishments, and structure. In addition, the ANSS internal web site (at <http://earthquake.usgs.gov/research/monitoring/anss/internal>) contains ANSS performance, instrumentation and XML standards, and other documents and information specifically relevant to this request for proposals. Proposers are strongly encouraged to review carefully all documents specifically cited in this Attachment.

The primary Earthquake Hazards Program contact for seismic network operations for purposes of this announcement is Dr. Harley Benz (benz@usgs.gov).

Partnerships Encouraged

Proposals are encouraged that document the use of existing and proposed partnerships to leverage USGS/ANSS funds and/or to extend the monitoring network and/or enhance its performance. Proposals that make use of the Major Research Equipment programs of the National Science Foundation, EarthScope, and the Network for Earthquake Engineering Simulation (NEES) are specifically encouraged. Also encouraged are Federal-State partnerships that extend what can be accomplished with USGS funds alone. Proposals should include a table listing how resources are divided between USGS and other Federal, State and private funding sources, for the current year, and projected for the subsequent four years of the agreement.

The USGS seeks increased integration of the seismological and geodetic disciplines in its support of efforts to monitor earthquakes and earthquake processes. The USGS encourages proposals under this Announcement that include elements that lead to greater integration and coordination in the acquisition and interpretation of seismic and geodetic data.

Under sections 2 and 3 of Attachment D the various roles of EHP-ANSS staff are indicated. Proposers should familiarize themselves with these roles. Awardees will be expected to communicate with USGS staff on a regular basis, including consulting with USGS regarding any potential regional or national operational conflicts so that resolutions are reached quickly.

Network Operations Objectives and Requirements

The operation of ANSS regional seismic networks are divided here into five (5) broad objective areas:

- 1) Routine field and data center operations;
- 2) Exchange and integration, in real time, of data and information generated by networks;
- 3) Distribution and dissemination of earthquake notifications, data, and information via standard interfaces, protocols, and procedures;
- 4) Coordination of monitoring including rapid response activities to ensure seamless distribution of earthquake data products for public notification, awareness, and emergency response applications; and
- 5) Compilation and distribution of earthquake data and information products, including a national earthquake catalog and a seismic waveform data archive.

Following are details of these Objective areas that should be addressed in proposals.

Objective 1: Routine Field and Data Center Operations

Each organization to be funded will operate seismographic networks and data processing systems for rapid earthquake notification and reporting and the improved delineation and assessment of earthquake hazards, through efficient and effective processing and data distribution systems that provide robust and easy access to earthquake data and information products. Seismically and tectonically active regions in the United States will be monitored to provide a foundation for assessing earthquake hazards and earthquake potential.

USGS-supported regional networks must adhere to standard maintenance and operating procedures, as developed or adopted by the ANSS to ensure reliable collection and accurate and robust processing of data. Specific requirements are:

A. Free-field strong motion station installations shall follow the guidelines provided in “Guidelines for Installation of Advanced National Seismic System Strong-motion Reference Stations,” as published by the Consortium of Organizations for Strong Motion Observation Systems (COSMOS), 2001 (see <http://www.cosmos-eq.org> , under Publications and *Installation Guidelines*).

B. Broadband station installations shall follow, as a minimum, the guidelines provided in USGS Open File Report 02-0144, Methods of Installing United States National Seismographic Network (USNSN) Stations -- A Construction Manual (see <http://pubs.usgs.gov/of/2002/ofr-02-0144>).

C. Digital station Response Characteristics shall be fully described in *Dataless SEED* volumes, updated within 1 week of any changes to configuration that affect station response (see Special Terms and Conditions for more information). New and updated response shall be validated using the noise probability density methodology (e.g., the PQLX tool or equivalent). For more information on Dataless SEED, see: <http://www.iris.washington.edu/data/datalessDef.htm>. For more information on PQLX, see: <http://earthquake.usgs.gov/research/software/pqlx.php>.

D. Dataless SEED volumes shall be available online for easy access by the seismological community, for example through an approved ANSS data archive. USGS will provide and support the tool INV to assist networks in generating the required station metadata.

E. With USGS assistance, Vs30 profiles shall be developed by the end of each five-year cooperative agreement, for station sites representative of those expected to contribute to the calculation of a ShakeMap.

F. Funded seismic networks shall operate *SeisNetWatch* by the beginning of the cooperative agreement (February 1, 2010). *SeisNetWatch* will be configured such that a national-level *SeisNetWatch* server operated by the USGS can access state-of-health information for all ANSS-supported stations.

G. USGS-supported networks shall provide full metadata for all stations within 60 days of award (by March 31, 2010). See the metadata tables within the Progress Report template Attachment D-SN-1 following Attachment D for the required data. Thereafter, networks shall provide annual updates to full metadata as a component of each Annual Progress Report, due December 1 of each renewal year.

H. Regional networks shall adhere to computer network security standards outlined in the Internet Security Agreement previously signed by USGS-supported networks. A new Internet Security Agreement will be provided for signature in the first month of the cooperative agreement.

Objective 2: Real Time Integration of ANSS Regional and National Networks

USGS-supported regional and national networks need to exchange time-critical waveform and parametric data to affect comprehensive seismic monitoring across the nation and to ensure accurate determination and reporting of earthquake location, magnitude, and effects.

A. Networks shall strive to meet ANSS performance standards for real-time data exchange and product generation. Where necessary, agreements among networks may be established to document details of the data exchange.

B. Regional networks shall adhere to common protocols and formats for routine exchange of waveform and parametric data to provide cost-effective coverage of seismically active areas.

C. Seismic networks shall provide all real-time waveform data required by neighboring regional networks and by the NEIC in support of their earthquake-reporting mission requirements. Currently, the following protocols and/or procedures are supported: a) between regional networks: EW import/export pairs and to the NEIC: CD1.1 (IMS protocol), SeedLink (Orfeus), Ring Replicator Protocol (NEIC), and ISI (GSN). Proposals should address waveform data exchange issues.

D. Seismic networks shall provide all real-time parameter data (e.g., picks, amplitudes, origins) required by neighboring regional networks and by the NEIC in support of their earthquake-reporting mission requirements. Currently, the following protocols and/or procedures are supported: a) between regional network: Earthworm import/export pairs and b) to the NEIC: Earthworm import/export pairs or Earthquake Information Distribution System (EIDS) using EqXML. Proposals should address parameter data exchange issues.

Objective 3: Earthquake Notifications, Data, and Information

USGS-supported networks shall adhere to standardized formats and procedures for distributing earthquake information and data via the Internet, delivering parametric data for use in a national catalog (see objective), delivering waveform data to permanent ANSS archival facilities (see objective 5), and adopting common web interfaces and distribution mechanisms.

A. Regional networks shall provide strong motion data of engineering interest to the National Strong-Motion Program for appropriate record processing and dissemination to the engineering community. Up-to-date station metadata for all ANSS strong motion stations must be available. (See Objective 1, Element A.)

B. Each ANSS “Tier I” network¹ shall maintain an earthquake information website. These websites must provide, at a minimum:

1. Computed hypocenters and magnitudes.
2. The network’s monitoring objectives in the context of the ANSS.
3. The scope of coordination with other monitoring networks.
4. Maps and lists of stations used in routine monitoring.
5. Links to earthquake products and network services.

The “home” web page must also acknowledge participation in the ANSS and financial support from USGS, and provide links to earthquake.usgs.gov and www.nehrp.gov (the NEHRP web site).

Objective 4: Coordination of Monitoring Activities and Reporting of Earthquakes and Network Information

Partners should work with the USGS and the ANSS NIC to develop and implement system-wide rules necessary to avoid problems and possible confusion resulting from posting and distributing multiple locations and magnitudes for the same earthquake. Supported networks shall coordinate earthquake response and reporting by adhering to system-wide rules for authoritative reporting of earthquake location and magnitude. Earthquake reporting must also include appropriate attribution and identification of earthquake data and information providers.

A. USGS-supported networks shall provide earthquake locations and magnitudes to the USGS Earthquake Hazards Program web site, earthquake.usgs.gov. Earthquake Information Distribution System (EIDS) will be used as a standard exchange utility. The USGS will support the regional networks in implementing the EIDS distribution system tools (i.e., in converting from QDDS) and in developing the software to generate native XML messages. Proposals should address parametric seismic data exchange issues.

B. For all significant earthquakes (either felt or larger than a regionally adopted threshold magnitude), supported networks must coordinate public response with other regional networks and the NEIC as quickly as possible.

C. ANSS Tier I networks shall establish plans and agreements to ensure the continuity of earthquake reporting in the event of a significant network disruption (fire, natural disaster, long-term power disruption, etc.). Electronic copies of plans and agreements shall be provided to the Cooperative Agreement Program Manager within 60 days of award (by March 31, 2010). Updates should be provided with each year’s Annual Progress Report.

¹ ANSS “Tier I” networks are defined by network codes: AK, CI, LD, HV, NC, NV, NM, UU, and UW.

Objective 5: Data and Information Products

Supported networks shall abide by ANSS Data Policy. USGS-supported networks must insure that both raw data and derived products are archived in accordance with ANSS performance standards and available in standard formats to support earthquake hazard reduction research and development.

A. An important goal of ANSS seismic monitoring is the compilation and maintenance of an authoritative and well-documented seismicity catalog. Regional catalogs (earthquake locations and magnitudes only) shall be uploaded to the ANSS composite catalog (<http://www.ncedc.org/anss/>). Catalog production procedures must be clearly documented. Please note that implementing the NEIC production of a curated national catalog in the first year of the agreement should make this requirement obsolete.

B. Regional catalogs (including earthquake locations, magnitudes, moment tensors, focal mechanisms, felt reports, ShakeMaps, picks, amplitudes, and durations) shall be submitted to the NEIC in standard formats within 30 days, to facilitate the creation of a definitive, curated, national catalog (see Special Terms and Conditions). Acceptable formats are EqXML (via EIDS), IMS1.0, and ShakeMap XML. Proposals should address seismic catalog data exchange issues.

C. Waveforms from ANSS stations shall be archived at an ANSS data center², according to the performance standards indicated in the self-rating questions in Table A-2. USGS-supported networks should plan and budget for the maintenance of a local 6-month-long archive of recently acquired data, to protect against possible short-term disruptions of the central archiving facility. The USGS will support this local short-term archive “buffer”. If the network chooses to maintain a longer local archive, it should do so with non-USGS funds.

Attachment A-SN-1

Seismic Network ANSS Performance Self Rating

Question	Explanation (if needed)
1. What is the minimum magnitude detection threshold for the best instrumented part of your network?	
2. What is the typical hypocentral location accuracy for earthquakes occurring within your network? Is it the same for automated vs. reviewed?	
3. Does your network report automated earthquake locations into EIDS? If yes, how long does it take?	
4. Does your network report analyst-reviewed earthquake locations for all quakes into EIDS (i.e., the little ones)?	If yes, what is the typical processing delay?
5. Does your network have 24/7 duty seismologists who review real-time earthquake locations above some magnitude?	If yes, what magnitude and how long does it take?
6. Describe the velocity model used to locate earthquakes in your network (1-D, multiple models, 3-D). Does it differ	

² The archive for networks outside of California is the IRIS Data Management Center (<http://www.iris.washington.edu/data/>); for California networks, the archive is Northern California Earthquake Data Center or the Southern California Earthquake Data Center.

Seismic Network ANSS Performance Self Rating

Question	Explanation (if needed)
for automated vs. reviewed?	
7. What software/program does your network use to locate earthquakes? Does it differ for automated vs. reviewed?	
8. What magnitudes does your network routinely report in real time (Md, ML, Me, Mw, Ms, etc.)? How long does it take to compute them?	
9. Does your network archive phase information at a datacenter?	If yes, how long is the delay to report? Where is the information archived?
10. What is the date of the most recent event you have contributed to the ANSS catalog?	If yes, how long is the delay to report? In what year does archiving begin?
11. Where is the permanent archive of seismic waveform data from your network?	If yes, describe what type of channels (e.g., EH, HH, HN) and how long is the delay to report? In what year does archiving begin?
14. Does your system compute focal mechanisms?	If yes, what type (first motion, moment tensor). In real-time? Do you archive them at a public datacenter?
15. Does your system automatically distribute email to the public in near real-time for significant events?	If yes, do you offer a website where they can sign up? What is the URL?
16. Does your system automatically distribute alphanumeric pages to the public in near real-time for significant events?	If yes, do you offer a website where they can sign up? What is the URL?
17. Does your system automatically compute ShakeMaps and make them publicly available? If so, how long does it take?	
18. Is your processing system hardened? (i.e., fault-tolerant, with redundant computers, UPS, back-up generator & fuel)?	
19. What is your network's total data volume (mbytes/day)?	Specify how the estimate was made (e.g., data rate or disk storage) and if the data is compressed or not.
20. What is your network's total data volume (mbytes/year to archive)?	If different from the daily volume times 365, explain the difference (e.g., reformatted, compressed, or edited).

Attachment A-SN-2

Free-field and reference strong motion stations currently operated as part of the

National Strong Motion Network (net code NP) currently operated as part of the National Strong Motion Network outside of California and Nevada (net code NP; more information is available at: http://nsmp.wr.usgs.gov/station_list/nsmn_stations_stano.html)

Site code	D[igital] or A[nalog]	Tele-metry?	Data logger	Tele-metry type	STATE	Station Name
2723	D	Y	K2	DU	AK	Valdez; Valdez Dock Co. Trims Camp; Highway Maintenance Station
2730	D		K2	NA	AK	
2738	D	Y	K2	DU	AK	Cantwell; ADOT Maintenance Station
2755	A		SMA-1	NA	AK	Cordova; Airport
2757	A		SMA-1	NA	AK	Mount Baldy
2758	A		SMA-1	NA	AK	Guyot Hills
2759	A		SMA-1	NA	AK	Sunshine Point
2768	A		SMA-1	NA	AK	Bancas Point
2769	A		SMA-1	NA	AK	Mt Hamilton
2770	A		SMA-1	NA	AK	Sherman Glacier
2772	A		SMA-1	NA	AK	Waxell Ridge
2782	A		SMA-1	NA	AK	Cordova; Earth Station
2786	A		SMA-1	NA	AK	Kayak Island
8007	D	Y	K2	DU	AK	Anchorage; International Airport Anchorage; Russian Jack Springs State Park
8011	D	Y	K2	DU	AK	
8014	A		SMA-1	NA	AK	Cape Yakataga; Airport
8019	D	Y	K2	DU	AK	Eagle River; Alaska Geologic Materials
8021	D	Y	K2	RT	AK	Anchorage; Klatt Elementary School
8023	D	Y	K2	DU	AK	Anchorage; Football Stadium
8024	D	Y	K2	DU	AK	Anchorage; Dowl Engineers Warehouse
8025	D	Y	K2	DU	AK	Anchorage; BS Lutheran Church
8026	D	Y	K2	DU	AK	Anchorage; Baptist Church of Christ
8027	D	Y	K2	DU	AK	Anchorage; State Fish & Game Anchorage; College Gate Elementary School
8028	D	Y	K2	RT	AK	
8029	D	Y	K2	RT	AK	Anchorage; Tudor Elementary School
8030	D	Y	K2	DU	AK	Anchorage; Police Headquarters
8031	D	Y	K2	DU	AK	Juneau; Downtown Fire Station
8032	D	Y	K2	DU	AK	Juneau; Airport Fire Station
8033	D	Y	K2	DU	AK	Juneau; Auke Bay Fire Station
8035	D	Y	K2	DU	AK	Kodiak Is; Chiniak; Chiniak School Anchorage; DOI Office of Aircraft Services
8036	D	Y	K2	DU	AK	
8037	D	Y	K2	DU	AK	Anchorage; NOAA Weather Facility
8038	D	Y	K2	DU	AK	Anchorage; Fire Station No. 01
8039	D	Y	K2	RT	AK	Anchorage; Fire Station No. 07 (new)
8041	D	Y	K2	RT	AK	Anchorage; Turnagain Elementary School
2449	D	Y	Etna	DU	AR	Blytheville; Fire Station No. 2
2458	D	Y	K2	DU	AR	Lepanto; City Hall (old FS)
2459	D	Y	Etna	DU	AR	Paragould; Post Office

Site code	D[igital] or A[nalog]	Tele-metry?	Data logger	Tele-metry type	STATE	Station Name
2492	D	Y	K2	DU	AR	Forrest City; Fire Dept.
2493	D		K2	NA	AR	Newport; Fire Sta. No. 2 (former Fire/Police Sta)
2499	D		Etna	NA	AR	Corning; New Post Office
2451	D		Etna	NA	IL	Cairo; Fire Station
2497	D		SMA-1	NA	KS	Overland Park; Bays Residence
2420	D	Y	K2	DU	MO	New Madrid; Noranda Plant
2448	D		K2	NA	MO	Hayti; County Medical Center
2452	D		K2	NA	MO	Portageville; Post Office
2453	D		Etna	NA	MO	Sikeston; Fire Station NE
2454	D	Y	Etna	DU	MO	Campbell; Fire Station
2456	D	Y	K2	DU	MO	Gideon; City Hall
2457	D	Y	Etna	DU	MO	Dexter; Fire Station No. 2
2491	D		Etna	NA	MO	St. Louis; Visitors Center
2495	D	Y	Etna	DU	MO	Poplar Bluff; Fire Station
2404	D		K2	NA	TN	Tiptonville; Reelfoot Lake State Park
2450	D	Y	Etna	DU	TN	Union City; Fire Station
2460	D		K2	NA	TN	Obion; Police Dept
2461	D	Y	K2	DU	TN	Dyersburg; Fire Station No. 2
2494	D	Y	Etna	DU	TN	Paris; Fire Station
7214	D	Y	K2	DU	ID	Boise; Discovery Center of Idaho
7218	D	Y	K2	DU	ID	Idaho Falls; BLM District Office
7221	D	Y	K2	DU	ID	Pocatello; BLM Field Office
2202	D		K2	NA	MT	Helena; Carroll College
2205	D	Y	K2	DU	MT	Bozeman; Montana State University
2255	D	Y	K2	RT	MT	Butte; Montana Tech
7209	D	Y	K2	DU	MT	Kalispell; County Justice Center
7210	D	Y	K2	DU	MT	Missoula; Fire Station No. 1
7216	D	Y	K2	DU	MT	Dillon; University of Montana, Western
7220	D	Y	K2	DU	MT	West Yellowstone; Hebgen Lake Ranger Sta.
2267	D	Y	Etna	DU	UT	Cedar City; So. Utah University
2272	D	Y	Etna	RT	UT	Salt Lake City; Eastwood School
2282	D	Y	Etna	DU	UT	Salt Lake City; Salt Lake Junction AT&T
2285	D		K2	NA	UT	Salt Lake City; Liberty Park
2286	D	Y	K2	RT	UT	Salt Lake City; Roosevelt Elementary School
2287	D	Y	Etna	DU	UT	Salt Lake City; Int Airport, NOAA Weather Svc
2291	D	Y	Etna	DU	UT	Logan; Utah State University
2299	A		SMA-1	NA	UT	Magna; City Water Well Field
7202	D		K2	NA	UT	Murray; Meadowbrook Golf Course
7203	D		K2	NA	UT	Salt Lake City; Bonneville Golf Course
7207	D	Y	Etna	DU	UT	Brigham City; Post Office
7211	D	Y	K2	DU	UT	Nephi; Post Office
7212	D	Y	K2	RT	UT	Ogden; Weber State University
7213	D	Y	Etna	DU	UT	Provo; Utah State Hospital

Site code	D[igital] or A[nalog]	Tele-metry?	Data logger	Tele-metry type	STATE	Station Name
7223	D	Y	Etna	RT	UT	St. George; Dixie College, Softball Field
7224	D	Y	Etna	RT	UT	Cedar City; So. Utah University
7225	D	Y	Etna	RT	UT	Beaver; City Maintenance Yard
7226	D	Y	Etna	RT	UT	Richfield; UDOT IT Radio Shop
7227	D	Y	Etna	RT	UT	Gunnison; City Maintenance Yard
7228	D	Y	Etna	RT	UT	Nephi; Juab School District
7229	D	Y	Etna	RT	UT	Santaquin; City Maintenance Shop
7231	D	Y	K2	DU	UT	Kearns; SLC Sheriff's Dept
7232	D	Y	Etna	RT	UT	Tremonton; City Parks & Rec Office
7233	D	Y	Etna	DU	UT	Salt Lake City; Episcopal Church Headquarters
2172	D	Y	K2	DU	OR	Portland; Portland State University
2193	D	Y	K2	DU	WA	Gig Harbor; Fire Station
2194	D	Y	Etna	DU	WA	Shelton; Fire Station
7026	D	Y	Etna	DU	WA	Stanwood; Camano Island Fire Station No. 1
7028	D	Y	Etna	DU	WA	Forks; La Push Coast Guard Station
7029	D	Y	Etna	DU	WA	Port Townsend; Fort Worden State Park
7030	D	Y	Etna	DU	WA	Seattle; SeaTac Airport Fire Station
7031	D	Y	Etna	DU	WA	Everett; Fire Station No. 2
7032	D	Y	Etna	DU	WA	West Seattle; Fire Station No. 29
7033	D	Y	Etna	DU	WA	Anacortes; Fire Station
7035	D	Y	Etna	DU	WA	Aberdeen; Fire Station
7038	D	Y	K2	DU	WA	Tumwater; Fire Station Hdqtrs
7039	D	Y	Etna	DU	WA	Quinalt Lake; Ranger Station
7040	D	Y	Etna	DU	WA	Port Gamble; Museum
7041	D	Y	Etna	DU	WA	Port Angeles; Fire Station
7042	D	Y	K2	DU	WA	Vancouver; USGS, Cascades Volcano Obs.
7043	D	Y	K2	DU	WA	Bellingham; Fire Station No. 2
7044	D	Y	K2	DU	WA	McChord AFB; Fire Station
7045	D	Y	K2	DU	WA	Raymond; Fire Station
7046	D	Y	K2	DU	WA	Camp Murray
7051	D	Y	Etna	DU	WA	Bremerton; New Fire Station No. 1
7054	D	Y	Etna	DU	WA	Olympia, Centennial Park

Proposal Information Summary

You must submit this summary with your proposal. Use the format below to provide the information in the order requested.

1. Panel Destination: (Use 2-letter code, GN or SN)

2. Project Title:

3. Principal Investigator(s): (Institute/Organization Name)
 (Street Address/P.O. Box)
 (City, State, Zip Code)
 (Telephone Number)
 (FAX Number)
 (E-mail Address)

4. Authorized Institutional Representative: (Name)(Institution)
(Organizational Unit)
 (Street Address/P.O. Box)
 (City, State, Zip Code)
 (Telephone Number)
 (FAX Number)
 (E-mail Address)

5. Amount Requested: (List amounts requested for
FY 2010, 2011, 2012, 2013, 2014, and total 5-year
support)

6. Proposed Duration: 5 years (60 months)

7. Active Earthquake-related Research awards) (List project title & funding source for all active
and Development Proposals

8. Has this proposal been submitted to any other agency for funding, if so, which? (List name of agency, and program or division to
which this proposal was submitted)

See 3-page budget summary form at the end of this document

Special Terms and Conditions

1. Method of Payment

A. Until APRIL 1, 2010 (or until notified by the Contracting Officer), the U. S. Geological Survey (USGS) will use the Department of Health and Human Services (HHS) Payment Management System (PMS) to provide electronic invoicing and payment for assistance award recipients.

(1) The Recipient agrees that it has established or will establish an account with PMS. With the award of each grant/cooperative agreement, a sub-account will be set up from which the Recipient can draw down funds.

(2) Instructions for obtaining payments will be provided to the recipients by HHS. Inquiries regarding payment should be directed to:

Division of Payment Management
 Department of Health and Human Services
 P. O. Box 6021
 Rockville, MD 20852
www.dpm.psc.gov
 Raynette Robinson (301) 443-9180

B. On and after APRIL 1, 2010 (or as notified by the Contracting Officer), the USGS will be using the Department of the Treasury Automated Standard Application for Payments (ASAP) to provide electronic invoicing and payment for assistance award recipients.

(1) The Recipient agrees that it has established or will establish an account with ASAP. With the award of each grant/cooperative agreement, a sub-account will be set up from which the Recipient can draw down funds.

(2) Instructions for obtaining payments will be provided to the recipients by ASAP. Inquiries regarding payment should be directed to:

www.asap.gov

Regional Financial Center	Time Zone	Phone Number	Business Hours	Mailing Address
Philadelphia	Eastern	(215) 516-8021	7:30 a.m - 4:00 p.m.	P.O. Box 51317 Philadelphia, PA 19115-6317
Kansas City	Central	(816) 414-2100	7:30 a.m - 4:00 p.m.	P.O. Box 12599-0599 Kansas City, MO 64116-0599
San Francisco	Mountain or Pacific	(510) 594-7182	7:30 a.m - 4:00 p.m.	P.O. Box 24700 Oakland, CA 94623-1700

Payments may be drawn in advance only to meet immediate cash disbursement needs.

2. Definitions

A. Grant Agreement

A grant agreement is the legal instrument reflecting a relationship between the Federal Government and a State or local government or other recipient whenever:

- (1) the principal purpose of the relationship is the transfer of money, property, services, or anything of value to the State or local government or other recipient in order to accomplish a public purpose of support or stimulation authorized by Federal statute, rather than acquisition, by purchase, lease, or barter, of property or services for the direct benefit or use of the Federal Government; and
- (2) no substantial involvement is anticipated between the executive agency, acting for the Federal Government, and the State or local government or other recipient during performance of the contemplated activity.

B. Cooperative Agreement

A cooperative agreement is the legal instrument reflecting a relationship between the Federal Government and a State or local government or other recipient whenever:

- (1) the principal purpose of the relationship is the transfer of money, property, services, or anything of value to the State or local government or other recipient to accomplish a public purpose of support, or stimulation authorized by Federal statute, rather than acquisition, by purchase, lease, or barter, of property or services for the direct benefit or use of the Federal Government; and
- (2) substantial involvement is anticipated between the executive agency, acting for the Federal Government, and State or local government or other recipient during performance of the activity.

C. Grantee / Cooperator

Grantee or cooperator means the nonprofit corporation or other legal entity to which a grant or cooperative agreement is awarded and which is accountable to the Federal Government for the use of the funds provided. The grantee or cooperator is the entire legal entity even if only a particular component of the entity is designated in the award document. For example, a grant or cooperative agreement award document may name as the grantee one school or campus of a university. In this case, the granting agency usually intends, or actually requires, that the named component assume primary or sole responsibility for administering the grant-assisted project or program. Nevertheless, the naming of a component of a legal entity as the grantee or cooperator in a grant or cooperative agreement award document shall not be construed as relieving the whole legal entity from accountability to the Federal Government for the use of the funds provided.

The term “grantee” or “cooperator” does not include secondary recipients such as sub grantees, contractors, etc., who may receive funds from a grantee pursuant to a grant.

D. Recipient

Recipient means grantee or cooperator.

E. Principal Investigator

The Principal Investigator is the individual designated by the Recipient (and approved by the USGS)

who is responsible for the technical direction of the research project. The Principal Investigator cannot be changed or become substantially less involved than was indicated in the Recipient's proposal, without the prior written approval of the Contracting Officer.

F. Cooperative Agreement Program Manager

(1) The Cooperative Agreement Program Manager will work closely with the USGS staff noted as providing substantial involvement under section 3, below, and the Principal Investigator to ensure that all technical requirements are being met. The Program Manager's responsibilities include, but are not limited to, providing technical advice on the accomplishment of the proposal's objectives; reviewing the technical content of reports and the other information delivered to the USGS; and determining the adequacy of technical reports in coordination with the Network Coordinator.

(2) The Cooperative Agreement Program Manager is Elizabeth Lemersal, External Research Support Manager, U.S. Geological Survey, 905 National Center, 12201 Sunrise Valley Drive, Reston, VA 20192. The Program Manager does not have the authority to issue any technical direction which constitutes an assignment of additional work outside the scope of the award; in any manner causes a change in the total cost or the time required for performance of the award; or change any of the terms, conditions, or general provisions of the award.

G. Network Coordinator

(1) Network Coordinators are in charge of conducting the peer review panels to evaluate both internal USGS and external research proposals for either seismic networks or for geodesy. Each Network Coordinator will work closely with the Cooperative Agreement Program Manager and the Principal Investigator to ensure coordination with other appropriate Principal Investigators and appropriate USGS project scientists working in the same ANSS region for overall conformance with USGS and ANSS goals and standards within that region. The Network Coordinator's responsibilities include, but are not limited to, providing technical advice on the accomplishment of the proposal's objectives; reviewing the technical content of reports and other information delivered to the USGS; determining the adequacy of the technical reports; and resolving and conducting site visits, in coordination with the Grants Program Manager and contract personnel, as frequently as practicable.

(2) The Network Coordinator for seismic networks is Dr. Harley Benz and for geodesy is Dr. Nancy King. The Network Coordinators do not have the authority to issue any technical direction which constitutes an assignment of additional work outside the scope of the award; in any manner causes a change in the total cost or the time required for performance of the award; or changes any of the terms, conditions, or general provisions of the award.

H. Contracting Officer (CO)

Contracting officers are individuals who have been delegated in writing by the USGS Office of Acquisition and Grants as the sole authority designated to obligate Federal funds and create terms and conditions of awards. They are the only individuals who have authority to negotiate, enter into, and administer awards resulting for this program. Contracting officers have responsibility to ensure the effective use of Federal funds.

Functions of the contracting officer include but are not limited to:

(1) Issuing the grant program announcement in coordination with the grants program manager.

- (2) Receiving grant proposals and related documents in response to a grant program announcement. The contracting officer as receiving official shall mark all proposals with a control number and the date officially received. He shall notify each applicant of the receipt of its proposal.
- (3) Approving the grant program manager's Technical Evaluation Plan, which describes in detail the evaluation process for a competitive grant/cooperative agreement program. The contracting officer shall ensure the openness and fairness of the evaluation and selection process.
- (4) Serving in an advisory capacity at peer review panel meetings. He shall interpret grant management policies to panel members.
- (5) Notifying grant program applicants whether or not they were selected for funding or of any other disposition of their application.
- (6) Negotiating, as necessary, the final grant/cooperative agreement budget.
- (7) Issuing grant/cooperative agreement awards and revisions to awards.
- (8) Approving invoice payments.
- (9) Receiving all requests for changes to an award. The contracting officer shall serve as the mandatory control point for all official communications with the grantee which may result in changing the amount of the grant/cooperative agreement, the grant/cooperative agreement budget, or any other terms and conditions of the grant.
- (10) Receiving financial reports required by the terms and conditions of the award.
- (11) Closing out grant/cooperative agreement awards when all applicable award requirements have been complied with.

3. Reporting Requirements, Operational Requirements, and Data Availability

Data generated as a part of work funded under this program must be made readily available; there is no provision for PIs to have exclusive access to data for a proprietary period of time. The USGS may publish, reproduce, and use all technical data developed as a result of this award in any manner and for any purpose, without limitation, and may authorize others to do the same. Any project funded under the Earthquake Hazards Program Seismic and Geodetic Network Operations External Research Support shall fall under this clause. Should any questions arise, both the USGS Contracting Officer and the Recipient will determine which data fall in this category.

Regular reporting is critical for network operations; required reporting and related time frames are described below. USGS will evaluate suitability for renewal funding near the end of each funded year during the term of each cooperative agreement based both on network performance and on reporting. The ANSS Performance Standards for seismic networks are therefore incorporated into these terms and conditions and can be found at

<http://earthquake.usgs.gov/research/monitoring/anss/documents.php>.

Geodetic Network Operations

For cooperative agreements to support of geodetic network monitoring, U.S. Geological Survey (USGS) will be substantially involved with the Principal Investigators (PIs) and other institution staff during the term of each cooperative agreement.

Dr. Nancy King, Dr. Ken Hudnut, and staff at the USGS Pasadena Field Office, and Dr. Jessica Murray-Moraleda at USGS Menlo Park, will provide technical assistance with GPS monumentation, equipment, telemetry, and analysis. Dr. Evelyn Roeloffs (Cascades Volcano Observatory) and Dr. John Langbein (USGS Menlo Park) will provide technical advice regarding creepmeters, strainmeters, and telemetry.

Operational requirements for Geodetic Networks are attached as Attachment D-GN-1.

Seismic Network Operations

For cooperative agreements to support of seismic network monitoring, U.S. Geological Survey (USGS) will be substantially involved with the Principal Investigators (PIs) and other institution staff during the term of each cooperative agreement. Specifically, project chiefs and staff within the USGS Earthquake Hazards Program seismic monitoring projects and, more broadly, the ANSS Integrated Products Team, will provide awardees with administrative and technical assistance regarding appropriate seismic systems that meet ANSS goals and standards. Awardees are expected to participate in the regular Network-ANSS coordinating calls generally held on the first Friday of each month.

USGS personnel will also coordinate with funded institutions on all USGS Government Furnished Equipment (GFE).

Dr. Lind Gee and staff at the Albuquerque Seismological Laboratory (ASL) will provide the technical specifications and other details on data acquisition and seismic sensor systems. In addition, ASL can provide recommendations on procedures for installation, configuration, and maintenance of seismograph stations.

Dr. Harley Benz and staff at the National Earthquake Information Center (NEIC) in Golden, Colorado will provide assistance regarding the setup of real-time data and catalog exchange between NEIC and the regional networks, which includes the exchange of regional network data and data from the Advanced National Seismic System (ANSS) backbone network.

Operational requirements for Seismic Networks, tied to network objectives, are attached as Attachment D-SN-1.

A. **Required reports/documents.** The Principal Investigator or Director, Sponsored Research Office is required to submit the following reports or documents. Further description of requirements follows the table below.

Report/ Document	GN +/or SN	Method of Delivery	Submit To	When Due
(1) Full Metadata for all USGS-supported stations	GN +	Send file as an email attachment using metadata tables in Attachment D-GN-2 or D-SN-2	Cooperative Agreement Program Manager	60 days after award
(2) Continuity of earthquake reporting plans and agreements	Tier I SN	Send files as email attachments	Cooperative Agreement Program Manager	60 days after award
(3) Progress Report	GN +	Send PDF file as an email attachment using format in Attachment D-GN-2 or D-SN-2	Cooperative Agreement Program Manager	At least 60 calendar days prior to the end of budget period for FY10, 11, 12, & 13 See details of formatting in section B(3) below
(4) Publication*	GN +	Send PDF file as an email attachment (or 1 reprint if PDF not possible)	Cooperative Agreement Program Manager	Immediately following publication
(5) Final Technical Report	GN +	Send PDF file as an email attachment; Maximum size: 10 MB	Cooperative Agreement Program Manager	Within 90 calendar days after the end of the award See details of formatting in section B(5) below
(6) SF 272 Federal Cash Transactions Report (or its successor SF 425, Federal Financial Report)	GN +	Electronic submission	USGS via PMS Electronic 272 System [see Section 3.B(6)]	See Section 3.B(6)
(7) SF 425 Federal Financial Report	GN +	See Section 3.B(7)	See Section 3.B(7)	See Section 3.B(7)
(8) Final SF 425 Federal Financial Report	GN +	See Section 3.B(8)	See Section 3.B(8)	See Section 3.B(8)

* Publication means any book, report, photograph, map, chart, or recording published or disseminated

to the scientific community. Preprints of articles submitted for publications will be accepted as final reports.

B. **Report preparation instructions.** The Recipient shall prepare the reports/documents in accordance with the following instructions:

(1) Full Metadata for all USGS-supported stations. All geodetic and seismic network operators shall use the metadata format in Attachment D-GN-2 or D-SN-2 to describe all USGS-supported station metadata. Tables with required metadata should be submitted as email attachment(s) to the Cooperative Agreement Program Manager. These metadata are due within 60 days of award. Submit metadata tables as attachment(s) to emails to both the Cooperative Agreement Program Manager and the Network Coordinator.

(2) Continuity of earthquake reporting plans and agreements. All Tier I seismic networks shall establish plans and agreements to ensure the continuity of earthquake reporting in the event of a significant network disruption (fire, natural disaster, long-term power disruption, etc.). Electronic copies of plans and agreements shall be provided as email attachments to the Cooperative Agreement Program Manager within 60 days of award (by March 31, 2010).

(3) Progress Report. Recipients of multi-year awards shall submit a report that summarizes the progress of the project during the current funding period. Work that was proposed for each year should have been completed in that year. **Please note** that Progress Report will not be published on the USGS website, so all research data described in Progress Reports must be repeated or restated in the Final Technical Report. Submit a PDF file (maximum size: 10 MB) with embedded graphics as an E-mail attachment to: **gd-erp-coordinator@usgs.gov**.

The subject of your email should be **“Progress Report - insert your grant / project number here”**.

Format the Progress Report as follows:

- Single spaced and formatted for 8 ½ x 11” paper
- Number all pages
- Embed figures in the PDF file
- Figure captions directly under figures

ANSS Tier I networks shall establish plans and agreements to ensure the continuity of earthquake reporting in the event of a significant network disruption (fire, natural disaster, long-term power disruption, etc.). Electronic copies of plans and agreements shall be provided to the ANSS Technical Manager within 60 days of award (by March 31, 2010). Updates should be provided with each year’s Annual Progress Report.

(4) Publications. All publications that contain work performed during the project period shall include the following statement:

“Work supported by the U.S. Geological Survey (USGS), Department of the Interior, under USGS award number (*Recipient, insert award number*). The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.”

Submit an Adobe Acrobat PDF file of publications to: gd-erp-coordinator@usgs.gov

If PDF is not possible, send one (1) reprint to:

External Research Support

U.S. Geological Survey
905 National Center
12201 Sunrise Valley Drive
Reston, VA 20192

(5) Final Technical Report. Final Technical Reports shall describe in detail the work performed and results obtained during the award period. Final Technical Reports are due 90 days after the conclusion of the project period. Any information contained in a previously submitted progress report shall be repeated or restated in the Final Technical Report. Please note that one Final Technical Report is to be submitted for each set of collaborative research grants.

(a) Submit the Final Technical Report as an Adobe Acrobat PDF file with all figures, photo-graphs, maps, and illustrations embedded, and all pages numbered. Submit the report as an e-mail attachment in PDF format to: gd-erp-coordinator@usgs.gov (maximum size = 10 MB).

(b) Final Technical reports shall consist of the following sections:

(1) **Cover page** with the following information:

Award Number

Title.

Author(s) and Affiliation(s) with Address and zip code

Author's Telephone numbers, fax numbers and E-mail address

Term covered by the award and the report (start and end dates)

(2) **Abstract**

(3) **Main body of the report.** The main body of the report and all illustrations and figures shall be single-spaced on 8 ½" x 11" paper.

(4) **Bibliography** of all publications resulting from the work performed under the award. One copy of each publication is required if the Recipient has not previously submitted them to the Cooperative Agreement Program Manager.

(6) Standard Form 272, Federal Cash Transaction Report (or its successor SF 425, Federal Financial Report) is required quarterly for each PMS/ASAP subaccount. Quarterly reports are due 45 days after the end of each fiscal quarter until the final Federal Financial Report is submitted. Instructions for submitting SF 272/SF 425 can be found at the PMS website:

http://www.dpm.psc.gov/grant_recipient/psc_272_reports/psc_272_reports.aspx?explorer.event=true

On and after APRIL 1, 2010 (or as notified by the Contracting Officer), the SF 425 Federal Financial Report must be submitted by mail to Maggie Eastman, Contracting Officer at the address in block 5 of page 1 of this award.

If after 45 days, recipient has not submitted a report, the account will be placed in a manual review status. Funds may be withheld for accounts with delinquent reports.

(7) SF 425, Federal Financial Report (original) is required annually and is due 90 calendar days after the end of the annual budget period. Reports will be submitted to the Contracting Officer at the address shown in Block 5 of the award form.

(8) Final Federal Financial Report

A. The recipient will liquidate all obligations incurred under the award and submit a final STANDARD FORM 425, FEDERAL FINANCIAL REPORT (which replaces the current SF 269,

Financial Status Report) no later than 90 calendar days after the grant/cooperative agreement completion date. Recipient will promptly return any unexpended federal cash advances or will complete a final draw from PMS/ASAP to obtain any remaining amounts due. Once 120 days has passed since the grant/agreement completion date, the PMS/ASAP subaccount for this award may be closed by USGS at any time.

B. Subsequent revision to the final SF 425 will be considered only as follows -

(1) When the revision results in a balance due to the Government, the recipient must submit a revised final Federal Financial Report (SF 425) and refund the excess payment whenever the overcharge is discovered, no matter how long the lapse of time since the original due date of the report.

(2) When the revision represents additional reimbursable costs claimed by the recipient, a revised final SF 425 may be submitted to the Contracting Officer with an explanation. If approved, the USGS will either request and pay a final invoice or reestablish the PMS/ASAP subaccount to permit the recipient to make a revised final draw. Any revised final report representing additional reimbursable amounts must be submitted no later than 1 year from the due date of the original report, i.e., 15 months following the agreement completion date. USGS will not accept any revised SF 425 covering additional expenditures after that date and will return any late request for additional payment to the recipient.

C. **Adherence to reporting requirements.** A Recipient's failure to submit the required Final Technical Report and final financial report, generally within 6 months of the end date of the award, will likely result in delay or non-issuance of new awards. Failure to submit a satisfactory Progress Report or to adhere to award operational requirements may result in non-renewal of award. Delay in submitting Progress Reports will likely result in delayed renewal of funds.

4. **Adherence to Original Research Objective and Budget Estimate**

A. Any commitments or expenditures incurred by the Recipient in excess of the funds provided by this award shall be the responsibility of the Recipient. Expenditures incurred prior to the effective date of this award cannot be charged against award funds.

B. The following requests for change **require advance written approval by the Contracting Officer shown on your award. Your request must be submitted to the Contracting Officer at least 45 calendar days prior to the requested effective date of the change:**

- (1) Changes in the scope, objective, or key personnel referenced in the Recipient's proposal.
- (2) Request for supplemental funds.
- (3) Transfer of funds between direct cost categories when the cumulative amount of transfers during the project period exceeds 10 percent of the total award.
- (4) Foreign travel not approved at time of award.
- (5) Acquisition of nonexpendable personal property (equipment) not approved at time of award.
- (6) Creation of any direct cost line item not approved at time of award.
- (7) Any other significant change to the award.
- (8) **No-cost Extensions to the Project Period.** **No cost extensions are discouraged.** The Earthquake Hazards Program (EHP) awards grants and cooperative agreements for research that extends or supplements ongoing research within the USGS. The timely conduct of funded projects is of great importance to the achievement of EHP goals. Applicants should consider their time commitments at the time of application for a grant. Requests for no cost extensions will be considered on a case-by-

case basis. The USGS reserves the right to limit the length of time and number of no-cost extensions. Please note that no-cost extensions are not intended to be used merely for the purpose of expending unobligated balances. Applicants must supply documentation supporting their request for an extension.

The Recipient **shall include** in the request:

- the cause of the needed extension,
- a description of the remaining work to be completed,
- the proposed new end date, and
- the amount of funds remaining.

A request for an extension that is received by the Contracting Officer after the expiration date shall **not** be honored. Requests for no-cost extensions shall be submitted to the Contracting Officer **at least 45 days** before the grant end date.

C. The Contracting Officer will notify the Recipient in writing within 30 calendar days after receipt of the request for revision or adjustment whether the request has been approved.

5. Nonexpendable Personal Property

The recipient shall comply with 2 CFR Part 215, Section 215.34. Title to nonexpendable personal property acquired wholly or in part with Federal funds shall be vested in the Recipient unless otherwise specified in the award document. The Recipient shall retain control and maintain a property inventory of such property as long as there is a need for such property to accomplish the purpose of the project, whether or not the project continues to be supported by Federal funds. When there is no longer a need for such property to accomplish the purpose of the project, the Recipient shall use the property in connection with other Federal awards the Recipient has received. Under no circumstances shall title to such property be vested in a sub-tier recipient. Disposal of nonexpendable personal property shall be in accordance with the applicable OMB circular.

The following equipment shall be vested: To be completed at time of award.

6. Government-furnished equipment

Title to Government-furnished equipment (GFE) remains vested in the Federal Government. Recipients shall submit annually an inventory listing of federally owned property in their custody to the Federal awarding agency. Upon completion of the award or when the property is no longer needed, the recipient shall report the property to the Federal awarding agency for further Federal agency utilization. The following GFE will be provided to the applicant:

To be listed at time of award

Upon completion of the award or when the property is no longer needed, all GFE provided under this agreement shall be shipped to the ANSS Regional Depot at the Albuquerque Seismological Laboratory at the following address:

ANSS Regional Depot

USGS Albuquerque Seismological Laboratory
10002 Isleta Rd SE
Kirtland AFB, NM 87117 USA

7. Record Retention Period

Unless a longer period is requested by the award, a Recipient shall retain all records for 3 years after the end of the project period for which it uses USGS award funds.

8. Pre-agreement Costs

Pre-agreement costs are not authorized under this program. Costs must be obligated during the project period.

9. Site Visits

Site visits may be made by USGS representatives to review program accomplishments and management control systems and to provide technical assistance, as required.

10. Metric Conversion (43CFR Sec 12.915)

All progress and final reports, other reports, or publications produced under this award shall employ the metric system of measurements to the maximum extent practicable. Both metric and inch-pound unit (dual units) may be used if necessary during any transition period(s). However, the recipient may use non-metric measurements to the extent the recipient has supporting documentation that the use of metric measurements is impracticable or is likely to cause significant inefficiencies or loss of markets to the recipient, such as when foreign competitors are producing competing products in non-metric units.

11. Violation of Award Terms

If a Recipient materially fails to comply with the terms of the award, the Contracting Officer may suspend, terminate, or take such other remedies as may be legally available and appropriate in the circumstances.

12. Award Closeout

Awards will be closed out once all requirements have been met. Technical and financial reports must be submitted on time as specified in section 3, above. Failure to adhere to the reporting requirements may result in no future awards.

13. Partnership with Grantees/Cooperators

The USGS, through its federal grant/cooperative agreement awards, will collaborate with universities, federal state, local and tribal governments, and private organizations and businesses to provide relevant, timely, objective knowledge and information on natural resources, hazards, and the environment.

14. Buy American Act Notice (43 CFR Sec. 12.710(c))

Pursuant to Section 307(b) of the Department of the Interior (DOI) and Related Agencies Appropriations Act, FY 2000, Public Law 106-113, please be advised on the following:

In the case of any equipment or product that may be authorized to be purchased with financial assistance provided using funds made available in this Act, it is the sense of the Congress that entities receiving the assistance should, in expending the assistance, purchase only American-made equipment and products.

15. Anti-Lobbying (43 CFR Part 18)

The Recipient shall not use any part of the appropriated funds from the Department of the Interior for any activity or the publication or distribution of literature that in any way tends to promote public support or opposition to any legislative proposal on which Congressional action is not complete.

16. Seat Belt Provision (43 CFR Sec. 12.2(e))

Recipients of grants/cooperative agreements and/or sub-awards are encouraged to adopt and enforce on-the-job seat belt use policies and programs for their employees when operating company-owned, rented, or personally owned vehicles. These measures include, but are not limited to, conducting education, awareness, and other appropriated programs for their employees about the importance of wearing seat belts and the consequences of not wearing them.

17. No Endorsement Provision (43 CFR 12.2(d))

[Paragraph (B) applies to all awards. The remainder of this provision applies only when:

(1) the principal purpose of the agreement is a partnership where the recipient/partner contributes resources to promote agency programs or publicize agency activities, assists in fundraising, or provides assistance to the agency; and

(2) the agreement authorizes joint dissemination of information and promotion of activities being supported; and

(3) the recipient is not a State government, a local government, or a Federally-recognized Indian tribal government.]

(A) Recipient shall not publicize or otherwise circulate, promotional material (such as advertisements, sales brochures, press releases, speeches, still and motion pictures, articles, manuscripts or other publications) which states or implies governmental, Departmental, bureau, or government employee endorsement of a product, service, or position which the recipient represents. No release of information relating to this award may state or imply that the Government approves of the recipient's work products, or considers the recipient's work product to be superior to other products or services.

(B) All information submitted for publication or other public releases of information regarding this project shall carry the following disclaimer:

The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the opinions or policies of the U.S. Government. Mention of trade names or commercial products does not constitute their endorsement by the U.S. Government.

(C) Recipient must obtain prior Government approval for any public information releases concerning this award which refer to the Department of the Interior or any bureau or employee (by name or title). The specific text, layout photographs, etc. of the proposed release must be submitted with the request

for approval.

(D) A recipient further agrees to include this provision in a subaward to any subrecipient, except for a subaward to a State government, a local government, or to a Federally-recognized Indian tribal government.

18. Use of U.S. Flag Air Carriers

Any air transportation to, from, between or within a country other than the U.S. of persons or property, the expense of which will be paid in whole or in part by U.S Government funding, must be performed by, or under a code-sharing arrangement with, a U.S. flag air carrier if service provided by such a carrier is "available" (49 U.S.C. 40118, commonly referred to as the Fly America Act). Tickets (or documentation for electronic tickets) must identify the U.S. flag air carrier's designator code and flight number. See the Federal Travel Regulation §301-10.131 - §301-10.143 for definitions, exceptions, and documentation requirements. (See also Comp. Gen. Decision B-240956, dated September 25, 1991.)

19. Activities on Private and Other Non-Federal Lands

[Paragraph B applies to all awards. The remainder of this provision applies only when the award involves funds appropriated to the biological research activity of the USGS.]

A. Funds provided for the biological research activity in USGS annual appropriations may not be used to conduct surveys on private property, unless specifically authorized in writing by the property owner.

(i) Accordingly, the recipient shall not enter non-Federal real property for the purpose of collecting information regarding the property, unless the owner of the property has –

- consented in writing to the entry;
- been provided notice of that entry; and
- been notified that any raw data collected from the property must be made available at no costs, if requested by the land owner.

(ii) In this provision, the term “recipient” includes any person that is an officer, employee, or agent of the recipient, including a person acting pursuant to a contract or sub-agreement.

B. The recipient shall comply with applicable State, local, and Tribal government laws, including laws relating to private property rights.

The Recipient shall comply with applicable State, local, and Tribal government laws, including laws relating to private property rights.

20. Access to Research Data

A. By regulation (43 CFR 12.936), recipients that are institutions of higher education, hospitals, or non-profit organizations are required to release research data first produced in a project supported with Federal funds that are cited publicly and officially by a Federal agency in support of an action that has the force and effect of law (e.g., regulations and administrative orders). “Research data” is defined as the recorded factual material commonly accepted in the scientific community as necessary to validate research findings. It does not include preliminary analyses; drafts of scientific papers; plans for future research; peer reviews; communications with colleagues; physical objects (e.g., laboratory samples, audio or video tapes); trade secrets; commercial information; materials necessary to be held confidential by a researcher until publication in a peer-reviewed journal; information that is protected under the law (e.g., intellectual property); personnel and medical files and similar files, the disclosure of which would constitute an unwarranted invasion of personal privacy; or information that could be

used to identify a particular person in a research study.

B. These requirements do not apply to commercial organizations or to research data produced by State or local governments. However, if a State or local governmental grantee contracts with an educational institution, hospital, or non-profit organization, and the contract results in covered research data, those data are subject to these disclosure requirements.

C. Requests for the release of research data subject to this policy are required to be made to USGS, which will handle them as FOIA requests under 43 CFR 2.25. If the data are publicly available, the requestor will be directed to the public source. Otherwise, the USGS Contracting Officer/Grants Officer, in consultation with the affected recipient and the PI, will handle the request. This policy also provides for assessment of a reasonable fee to cover recipient costs as well as (separately) the USGS costs of responding.

21. Trafficking in Persons (22 U.S.C. § 7104(g))

A. Provisions applicable to a recipient that is a private entity.

(i) You as the recipient, your employees, subrecipients under this award, and subrecipients' employees may not--

(a) Engage in severe forms of trafficking in persons during the period of time that the award is in effect;

(b) Procure a commercial sex act during the period of time that the award is in effect; or

(c) Use forced labor in the performance of the award or subawards under the award.

(ii) We as the Federal awarding agency may unilaterally terminate this award, without penalty, if you or a subrecipient that is a private entity --

(a) Is determined to have violated a prohibition in paragraph a.1 of this award term; or

(b) Has an employee who is determined by the agency official authorized to terminate the award to have violated a prohibition in paragraph a.1 of this award term through conduct that is either—

1. Associated with performance under this award; or

2. Imputed to you or the subrecipient using the standards and due process for imputing the conduct of an individual to an organization that are provided in 2 CFR part 180, "OMB Guidelines to Agencies on Governmentwide Debarment and Suspension (Nonprocurement)," as implemented by our agency at 43 CFR Part 42.

B. Provisions applicable to a recipient other than a private entity. We as the Federal awarding agency may unilaterally terminate this award, without penalty, if a subrecipient that is a private entity --

(i) Is determined to have violated a prohibition in paragraph a.1 of this award term; or

(ii) Has an employee who is determined by the agency official authorized to terminate the award to have violated a prohibition in paragraph a.1 of this award term through conduct that is either—

(a) Associated with performance under this award; or

(b) Imputed to you or the subrecipient using the standards and due process for imputing the conduct of an individual to an organization that are provided in 2 CFR part 180, "OMB Guidelines to Agencies on Governmentwide Debarment and

Suspension (Nonprocurement),” as implemented by our agency at 43 CFR Part 42.

C. Provisions applicable to any recipient.

(i) You must inform us immediately of any information you receive from any source alleging a violation of a prohibition in paragraph a.1 of this award term.

(ii) Our right to terminate unilaterally that is described in paragraph a.2 or b of this section:

(a) Implements section 106(g) of the Trafficking Victims Protection Act of 2000 (TVPA), as amended (22 U.S.C. 7104(g)), and

(b) Is in addition to all other remedies for noncompliance that are available to us under this award.

(iii) You must include the requirements of paragraph a.1 of this award term in any subaward you make to a private entity.

D. Definitions. For purposes of this award term:

(i) “Employee” means either:

(a) An individual employed by you or a subrecipient who is engaged in the performance of the project or program under this award; or

(b) Another person engaged in the performance of the project or program under this award and not compensated by you including, but not limited to, a volunteer or individual whose services are contributed by a third party as an in-kind contribution toward cost sharing or matching requirements.

(ii) “Forced labor” means labor obtained by any of the following methods: the recruitment, harboring, transportation, provision, or obtaining of a person for labor or services, through the use of force, fraud, or coercion for the purpose of subjection to involuntary servitude, peonage, debt bondage, or slavery.

(iii) “Private entity”:

(a) Means any entity other than a State, local government, Indian tribe, or foreign public entity, as those terms are defined in 2 CFR 175.25.

(b) Includes:

1. A nonprofit organization, including any nonprofit institution of higher education, hospital, or tribal organization other than one included in the definition of Indian tribe at 2 CFR 175.25(b).

2. A for-profit organization.

(iv) Severe forms of trafficking in persons,” “commercial sex act,” and “coercion” have the meanings given at section 103 of the TVPA, as amended (22 U.S.C. 7102).

22. Research Integrity

A. USGS requires that all grant or cooperative agreement recipient organizations adhere to the Federal Policy on Research Misconduct, Office of Science and Technology Policy, December 6, 2001, 65 Federal Register (FR) 76260, http://www.ostp.gov/cs/federal_policy_on_research_misconduct. The Federal Policy on Research Misconduct outlines requirements for addressing allegations of research misconduct, including the investigation, adjudication, and appeal of allegations of research misconduct and the implementation of appropriate administrative actions.

B. The recipient must promptly notify the USGS Project Office when research misconduct that warrants an investigation pursuant to the Federal Policy on Research Misconduct is alleged.

23. Fiscal Integrity

The recipient will notify the USGS Contracting Officer/Grants officer of any significant problems relating to the administrative or financial aspects of the award, such as misappropriation of Federal funds.

24. Program Income

A. The recipient will have no obligation to the Federal Government for program income earned from license fees and royalties for copyrighted material, in accordance with 43 CFR 12.924(h) (for A-110 recipients) or 43 CFR 12.65(e) (for A-102 recipients).

B. If a purpose of this award is to support a conference, symposium, or similar event, income related to that event will be deducted from total allowable costs to determine the net allowable costs before calculating the Government's share of reimbursable costs, as provided in 3 CFR 12.65(g)(1) (for A-102 recipients) or 43 CFR 12.924(b)(3) (for A-110 recipients).

C. If the recipient is an educational institution or nonprofit research organization, any other program income will be added to funds committed to the project by the Federal awarding agency and recipient and be used to further eligible project or program objectives, as described in 43 CFR 12.924(b)(1).

D. For all other types of recipients, any other program income will be deducted from total allowable costs to determine the net allowable costs before calculating the Government's share of reimbursable costs, as provided in 3 CFR 12.65(g)(1) (for A-102 recipients) or 43 CFR 12.924(b)(3) (for A-110 recipients).

Requirements for Geodetic Network Operations

USGS-supported networks shall provide full metadata for all stations within 60 days of award (by April 30, 2010). See the metadata tables within the Progress Report template Attachment D-GN-2 following Attachment D for the required data.

Operators shall maintain a website and include the link in the proposal. The website will contain Station Information with data as in the table above and a link to time series of processed results in graphical and numerical form (requirements for network cooperative agreements are described in section 3 of Attachment D).

Operator website shall have links to time series for each station. Time series shall be available in graphical form, with a link to download results in numerical form. Contact information must be provided for users having difficulty downloading the time series. Time tags will be provided in both date/time (UTC) and decimal year; dates may be calendar date, year and Julian day, modified Julian day, or other common format. Date/time formats must be clearly labeled. Units for strain, creep, or GPS position must be provided. Uncertainties must be included. For GPS networks, north, east, and vertical time series for each station must be presented, with uncertainties.

Operator website shall display coseismic signals or creep events within 30 days of an earthquake producing a detectable signal. Data to be included include: earthquake name (if any); date; time; magnitude; updated time series with label indicating earthquake; estimated coseismic change, with uncertainties, for each station (north, east, and vertical for GPS). Within 30 days of a creep or strain event, the operator website shall display: date; time; size; and sense of event, with uncertainty; updated time series with label indicating event.

For the operation of CGPS, the network operators shall maintain the instrumentation, telemetry, and provide the raw, 120-second or better data in RINEX format (or other format such as SOC or DBEN if a mutually agreed-to specification is accepted by USGS and partner data users and if the data format is fully and openly described.) Data shall be available for download by anyone through the UNAVCO GPS Seamless Archive. The network operator shall process the data such that solutions are readily incorporated into PBO daily data products.

For the operation of strainmeter and creepmeter instruments, the network operator shall maintain the instrumentation at the site and provide computer files (plots alone are not acceptable) of clean, processed data in geophysically meaningful units over the Web with a nominal latency of not more than one month.

For the creepmeter and borehole strainmeter networks, the USGS will provide GOES telemetry systems.

For the long-base strainmeter, the network operator shall provide telemetry.

For both the borehole strainmeter and creepmeter instruments, raw data must be available in near real time for internal use by the USGS to assist with hazards assessments (these data are currently provided via the GOES telemetry.)

For creepmeters, borehole strainmeters, and long-base strainmeters, data must be archived with the Northern California Earthquake Data Center (NCEDC) in NCEDC standard format.

For alignment arrays the network operator shall measure existing sites in northern California at approximately one year intervals unless it is agreed, in consultation with USGS personnel, that measurements should be made more or less frequently.

Requirements for Seismic Network Operations

Following are requirements for seismic network operations described in terms of network operation objectives. The operation of ANSS regional seismic networks are divided here into five (5) broad objective areas:

- 1) Routine field and data center operations;
- 2) Exchange and integration, in real time, of data and information generated by networks;
- 3) Distribution and dissemination of earthquake notifications, data, and information via standard interfaces, protocols, and procedures;
- 4) Coordination of monitoring including rapid response activities to ensure seamless distribution of earthquake data products for public notification, awareness, and emergency response applications; and
- 5) Compilation and distribution of earthquake data and information products, including a national earthquake catalog and a seismic waveform data archive.

Following are details of these objective areas and related operational requirements.

Objective 1: Routine Field and Data Center Operations

Each organization will operate seismographic networks and data processing systems for rapid earthquake notification and reporting and the improved delineation and assessment of earthquake hazards, through efficient and effective processing and data distribution systems that provide robust and easy access to earthquake data and information products. Seismically and tectonically active regions in the United States will be monitored to provide a foundation for assessing earthquake hazards and earthquake potential.

USGS-supported regional networks must adhere to standard maintenance and operating procedures, as developed or adopted by the ANSS to ensure reliable collection and accurate and robust processing of data. Specific requirements are:

A. Free-field strong motion station installations shall follow the guidelines provided in “Guidelines for Installation of Advanced National Seismic System Strong-motion Reference Stations,” as published by the Consortium of Organizations for Strong Motion Observation Systems (COSMOS), 2001 (see <http://www.cosmos-eq.org>, under Publications menu, *Installation Guidelines* pulldown).

B. Broadband station installations shall follow, as a minimum, the guidelines provided in USGS Open File Report 02-0144, *Methods of Installing United States National Seismographic Network (USNSN) Stations -- A Construction Manual* (see <http://pubs.usgs.gov/of/2002/ofr-02-0144>).

B. Digital station Response Characteristics shall be fully described in *Dataless SEED* volumes, updated within 1 week of any changes to configuration that affect station response (see [Special Terms and Conditions](#) for more information). New and updated response shall be validated using the noise probability density methodology (e.g., the PQLX tool or equivalent). For more information on Dataless SEED, see: <http://www.iris.washington.edu/data/datalessDef.htm>. For more information on PQLX, see: <http://earthquake.usgs.gov/research/software/pqlx.php>.

D. Dataless SEED volumes shall be available online for easy access by the seismological community, for example through an approved ANSS data archive. USGS will provide and support the tool INV to assist networks in generating the required station metadata.

E. With USGS assistance, Vs30 profiles shall be developed by the end of each five-year cooperative agreement, for station sites representative of those expected to contribute to the calculation of a ShakeMap.

F. Funded seismic networks shall operate *SeisNetWatch* by the beginning of the cooperative agreement (February 1, 2010). *SeisNetWatch* will be configured such that a national-level *SeisNetWatch* server operated by the USGS can access state-of-health information for all ANSS-supported stations.

G. USGS-supported networks shall provide full metadata for all stations within 60 days of award (by March 31, 2010). See the metadata tables within the Progress Report template Attachment D-SN-2 of Attachment D for the required data. Thereafter, networks shall provide annual updates to full metadata as a component of each Annual Progress Report, due December 1 of each renewal year.

H. Regional networks shall adhere to computer network security standards outlined in the Internet Security Agreement previously signed by USGS-supported networks. A new Internet Security Agreement will be provided for signature in the first month of the cooperative agreement.

Objective 2: Real Time Integration of ANSS Regional and National Networks

USGS-supported regional and national networks will exchange time-critical waveform and parametric data to affect comprehensive seismic monitoring across the nation and to ensure accurate determination and reporting of earthquake location, magnitude, and effects.

A. Networks shall strive to meet ANSS performance standards for real-time data exchange and product generation. Where necessary, agreements among networks may be established to document details of the data exchange.

B. Regional networks shall adhere to common protocols and formats for routine exchange of waveform and parametric data to provide cost-effective coverage of seismically active areas.

C. Seismic networks shall provide all real-time waveform data required by neighboring regional networks and by the NEIC in support of their earthquake-reporting mission requirements. The following protocols and/or procedures are supported: a) between regional networks: EW import/export pairs and to the NEIC: CD1.1 (IMS protocol), SeedLink (Orfeus), Ring Replicator Protocol (NEIC), and ISI (GSN).

D. Seismic networks shall provide all real-time parameter data (e.g., picks, amplitudes, origins) required by neighboring regional networks and by the NEIC in support of their earthquake-reporting mission requirements. Currently, the following protocols and/or procedures are supported: a) between regional network: Earthworm import/export pairs and b) to the NEIC: Earthworm import/export pairs or Earthquake Information Distribution System (EIDS) using EqXML.

Objective 3: Earthquake Notifications, Data, and Information

USGS-supported networks shall adhere to standardized formats and procedures for distributing earthquake information and data via the Internet, delivering parametric data for use in a national catalog (see objective 5), delivering waveform data to permanent ANSS archival facilities (see objective 5), and adopting common web interfaces and distribution mechanisms.

A. Regional networks shall provide strong motion data of engineering interest to the National Strong-Motion Program for appropriate record processing and dissemination to the engineering community. Up-to-date station metadata for all ANSS strong motion stations must be available. (See Objective 1, Element A.)

B. Each ANSS “Tier I” network³ shall maintain an earthquake information website. These websites must provide, at a minimum:

1. computed hypocenters and magnitudes.
2. the network’s monitoring objectives in the context of the ANSS.
3. the scope of coordination with other monitoring networks.
4. maps and lists of stations used in routine monitoring.
5. links to earthquake products and network services.

The “home” web page must also acknowledge participation in the ANSS and financial support from USGS, and provide links to *earthquake.usgs.gov* and *www.nehrp.gov* (the NEHRP web site).

Objective 4: Coordination of Monitoring Activities and Reporting of Earthquakes and Network Information

Partners should work with the USGS and the ANSS NIC to develop and implement system-wide rules necessary to avoid problems and possible confusion resulting from posting and distributing multiple locations and magnitudes for the same earthquake. Supported networks shall coordinate earthquake response and reporting by adhering to system-wide rules for authoritative reporting of earthquake location and magnitude. Earthquake reporting must also include appropriate attribution and identification of earthquake data and information providers.

A. USGS-supported networks shall provide earthquake locations and magnitudes to the USGS Earthquake Hazards Program web site, *earthquake.usgs.gov*. Earthquake Information Distribution System (EIDS) will be used as a standard exchange utility. The USGS will support the regional networks in implementing the EIDS distribution system tools (i.e., in converting from QDDS) and in developing the software to generate native XML messages.

B. For all significant earthquakes (either felt or larger than a regionally adopted threshold magnitude), supported networks must coordinate public response with other regional networks and the NEIC as quickly as possible.

C. ANSS Tier I networks shall establish plans and agreements to ensure the continuity of earthquake reporting in the event of a significant network disruption (fire, natural disaster, long-term power disruption, etc.). Electronic copies of plans and agreements shall be provided to the Cooperative Agreement Program Manager within 60 days of award (by March 31, 2010). Updates should be provided with each year’s Annual Progress Report.

Objective 5: Data and Information Products

³ ANSS “Tier I” networks are defined by network codes: AK, CI, LD, HV, NC, NV, NM, UU, and UW.

Supported networks shall abide by ANSS Data Policy. USGS-supported networks must insure that both raw data and derived products are archived in accordance with ANSS performance standards and available in standard formats to support earthquake hazard reduction research and development.

A. An important goal of ANSS seismic monitoring is the compilation and maintenance of an authoritative and well-documented seismicity catalog. Regional catalogs (earthquake locations and magnitudes only) shall be uploaded to the ANSS composite catalog (<http://www.ncedc.org/anss/>). Catalog production procedures must be clearly documented. Please note that implementing the NEIC production of a curated national catalog in the first year of the agreement should make this requirement obsolete.

B. Regional catalogs (including earthquake locations, magnitudes, moment tensors, focal mechanisms, felt reports, ShakeMaps, picks, amplitudes, and durations) shall be submitted to the NEIC in standard formats within 30 days, to facilitate the creation of a definitive, curated, national catalog (see Special Terms and Conditions). Acceptable formats are EqXML (via EIDS), IMS1.0, and ShakeMap XML.

C. Waveforms from ANSS stations shall be archived at an ANSS data center⁴, according to the performance standards indicated in the self-rating questions in Table A-2. USGS-supported networks should plan and budget for the maintenance of a local 6-month-long archive of recently acquired data, to protect against possible short-term disruptions of the central archiving facility. The USGS will support this local short-term archive “buffer”. If the network chooses to maintain a longer local archive, it should do so with non-USGS funds.

⁴ The archive for networks outside of California is the IRIS Data Management Center (<http://www.iris.washington.edu/data/>); for California networks, the archive is Northern California Earthquake Data Center or the Southern California Earthquake Data Center.

Annual Progress Report USGS Cooperative Agreement for Geodetic Monitoring Operations

Reporting Period:
 Cooperative Agreement Number:
 C.A. Start Date & End Date:
 Geodetic Monitoring Project Name:
 Principal Investigator:
 Email Address:
 Co-Principal Investigator:
 Email Address:
 Institution and Address:
 Geodetic Project Web Site:

Major Goal(s) & Activities of the Geodetic Project:

[describe project goals and activities in general]

Accomplishments & Changes Implemented in this Reporting Period:

[describe what accomplishments and changes have taken place in your operations since the start date of the current cooperative agreement—include new stations, new procedures, new partnerships, major objectives accomplished, etc]

Map of Geodetic Stations:

[provide a page-width map of monitoring stations with site identifier and station location symbol—include a list of stations and the type of telemetry]

Metadata for GPS Stations

[provide updated information about each USGS-supported station, as illustrated by the example in the template]

Site/monument information for GPS stations:

Site name	Site code	Site Type	Monument description	Install date
CSU Northridge	CSN1	Continuously operating GPS	Wyatt driven-braced	4/27/1996

Site location information for GPS stations:

City	County	State	X coordinate, m	Y coordinate, m	Z coordinate, m	Latitude, deg N	Longitude, deg E	Elevation, m
Northridge	Los Angeles	CA	-2520226.1	-4637082.18	3569875.5	34.25355	-118.52381	261.4312

Instrument information for GPS stations, one line with date for each equipment change:

Date	Receiver type	Receiver S/N	Antenna type	Antenna S/N	Antenna
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					Height, m
4/27/1996	ROGUE SNR-8000	T-389	AOAD/M_T	276	0.0814
8/14/1998	ASHTech Z-XII3	LP03106	as above	as above	as above
5/13/1999	ASHTech Z-XII3	LP02792	as above	as above	as above
1/16/2009	TRIMBLE NETRS	4811147009	as above	as above	as above

Telemetry information

Telemetry	Sample interval, sec	Real time stream available?
Ethernet Freewave	30	no

Metadata for Strainmeter Stations

[provide updated information about each USGS-supported station, as illustrated by the example in the template]

Site/monument information for Strainmeter stations:

Site name	Site code	Site Type	Install date

Site location information for Strainmeter stations:

City	County	State	Latitude, deg N	Longitude, deg E	Elevation, m

Telemetry information

Telemetry	Sample interval, sec	Real time stream available?

Data Management Practices:

[describe project compliance with the USGS/EHP data management practices outlined in your 2010-14 Networks Cooperative Agreement—the practices are listed at the end of this document; provide IGS site log forms, in txt or pdf, for each monitoring station]

Time Series

[provide the specific link to time series on your network’s website]

Continuity of Operations and Response Planning:

[describe briefly plans to respond to major earthquakes, including cooperative arrangements with others and plans to cope with power and communication failures]

Problems or Concerns Encountered

[describe any problems or concerns related to the project and actions or plans to address them]

Other Information and Comments:

[provide additional information, comments, diagrams, photographs, etc that may be helpful to USGS in evaluating your progress during the reporting period for optional year funding]

USGS/EHP Data Management Practices for Geodetic Monitoring Operations:

- For the operation of CGPS, the network operators will maintain the instrumentation, telemetry, and provide the raw, 120-second or better data in RINEX format (or other format such as SOC or DBEN if a mutually agreed-to specification is accepted by USGS and partner data users and if the data format is fully and openly described.) Data shall be available for download by anyone through the UNAVCO GPS Seamless Archive. The network operator shall process the data such that solutions are readily incorporated into PBO daily data products. For the operation of strainmeter and creepmeter instruments, the USGS requires that the network operator maintain the instrumentation at the site, and provide computer files (plots alone are not acceptable) of clean, processed data in geophysically meaningful units over the Web with a nominal latency of not more than one month.
- For the creepmeter and borehole strainmeter networks, the USGS will provide GOES telemetry systems.
- For the long-base strainmeter, the network operator will provide telemetry.
- For both the borehole strainmeter and creepmeter instruments, raw data must be available in near real time for internal use by the USGS to assist with hazards assessments (these data are currently provided via the GOES telemetry.)
- For creepmeters, borehole strainmeters, and long-base strainmeters, data must be archived with the Northern California Earthquake Data Center (NCEDC) in NCEDC standard format.
- For alignment arrays the network operator will measure existing sites in northern California at approximately one year intervals unless it is agreed, in consultation with USGS personnel, that measurements should be made more or less frequently. Plots of time-series data shall be updated and made available to USGS annually, and tables or computer files of those time series shall be included in the Final Report and released in a publicly available form at the end of the final year of the agreement.

Annual Progress Report USGS Cooperative Agreement for Seismic Network Operations

Reporting Period:
 Cooperative Agreement Number:
 C.A. Start Date & End Date:
 Seismic Network Web Site:
 Network Code:
 Network Name:
 ANSS Region:
 Operator Address:
 Principal Investigator/Primary Contact:
 Email Address:
 Phone:
 Co-Principal Investigator/Alternate Contact:
 Email Address:
 Phone:

Changes Implemented in this Reporting Period

[describe what changes have taken place in your network's operations since the start date of the current cooperative agreement (new stations, new procedures, new partnerships, major objectives accomplished, etc.)]

Figure 1. Map of Seismic Stations:

[provide a page-width map of your network, distinguishing between ANSS backbone, broadband, short-period and strong motion stations.]

Summary Statistics for Regional/Urban Seismic Network

Total no. of stations operated and/or recorded	
Total no. of channels recorded	
No. of short-period (SP) stations	
No. of broadband (BB) stations	
No. of strong-motion (SM) stations	
No. of stations maintained & operated by network	
No. of stations maintained & operated as part of ANSS	
Total data volume archived (mbytes/day)	

Data Management Practices

[describe briefly your state of progress toward meeting ANSS data management performance standards (standards 4.1, 4.2, 4.3, 5.1 and 5.2) and the timeliness of import of your data into an ANSS archive.]

Continuity of Operations and Response Planning

[describe briefly any changes or updates to Tier I network plans and agreements; Tier II networks should describe progress that has been made toward developing plans to respond to major earthquakes, including cooperative arrangements with other networks and plans to cope with power and communication failures.]

Progress on Metadata Development

[describe briefly any issues you have related to meeting the ANSS metadata performance standard.]

Where on the web to you post the response information? (provide the exact link). Is the response information also available at an archive (NCDC, IRIS DMS, SCEC)?]

Metadata for each Regional Seismic Network Station

[provide updated information in the required fields; sample input provided]

Network Code	Station Code	Funding Code	Latitude	Longitude	Elevation
US	AAM	GS	42.3012	-83.6567	172
US	AHID	GS	42.7654	-111.1004	1960
US	GOGA	GS	33.4112	-83.4666	116
US	GOGA				
US	NCB	GS	43.9708	-74.2236	500

DAS Model	DAS Serial No.	Primary Sensor Model	Primary Sensor Serial No.	Secondary Sensor Model	Secondary Sensor Serial No.
Q330	1274	STS-2	90015	ES-T	200014
Q680	970301	CMG-3NSN (Discrete)	V3145,N3177,E3197	CMG-5T	T5020
Q330	0881	CMG-3TB	T3N98	ES-T	1618
Q330HR	1640	KS-54000	181		
Q730	980202	STS-2	99744		

Telemetry	Type Code	Site Ownership Code	Open (yyyymmdd)
CD	BB	P	19941008
CD	BB	ST	19971112
CD	BB	P	19930309
CD	BB	ST	19991020

Coding requirements:

- Include all stations operated.
- Funding codes:
 - o GS = USGS
 - o GS+ = USGS and other funding source
 - o N = non-USGS
- Latitude and longitude must be in signed, decimal degrees
- Latitude, longitude, and elevation must be relative to the WGS-84 datum
- DAS (Data Acquisition System) model should follow standard naming if possible and be as complete as necessary so that the vendor is unambiguous
 - o For example, acceptable models are: Q680, Q4120, Q730, Q330, 72-A, RT-130, Trident, Taurus, K2, Granite, Etna, Smart-24, Netquakes

- o Note that fine differentiations in model have been ignored (e.g., L-4C and L-4A)
- o Integrated accelerographs can be entered as both the DAS and Primary Sensor Models
- o Multiple DAS models should be entered on successive lines
- o Analog stations should leave the DAS Model field blank
- o Enter Serial Numbers for all digital stations
- Sensor model should follow standard naming if possible and be as complete as necessary so that the vendor is unambiguous
 - o Acceptable models are: CMG-3, CMG-3T, CMG-3TB, CMG-40T, STS-1, STS-2, KS-36000, KS-54000, KS-1, KS-2000, Trillium 120, Trillium 240, Trillium 40, Titan, S-13, GS-13, GS-21, GS-22, SS-1, L-4, HS-10, FBA-23, ES-T (Episensor), Etna, CMG-5, MEMS, PS-23, CD-24, Netquakes
 - o Note that fine differentiations in model have been ignored (e.g., 72A-07 and 72A-08)
 - o Integrated accelerographs can be entered as both the DAS and Primary Sensor Models
 - o Enter additional sensors on successive lines
 - o Enter Serial Numbers for all sensors
- Telemetry codes:
 - o CD = continuous digital
 - o CA = continuous analog
 - o T = triggered
 - o D = dialup
- Type codes (pick the code that best describes each station; use different codes with each line of equipment):
 - o BB = broadband
 - o SP = short period
 - o LP = long period
 - o FF = free field strong motion
 - o R = reference strong motion
 - o SM = structural strong motion
- Site ownership codes:
 - o FED = federal
 - o ST = state
 - o PR = private

Progress on ANSS Integration

[Describe briefly what progress you have made toward providing real-time waveform data, real-time picks, amplitudes/durations, and earthquake locations to other ANSS networks including the NEIC. Describe progress towards providing timely catalog data to the NEIC.]

Earthquake Data and Information Products

Network Products		
Does the network provide the following?	Yes/No	Comments/Explanation
Primary EQ Parameters		
Picks		
Hypocenters		
Magnitudes (& Amplitudes)		
Focal mechanisms		
Moment Tensor(s)		
Other EQ Parameters/Products		
ShakeMap		
Finite Fault		
Supplemental Information		
Felt Reports		
Event Summary		
Tectonic Summary		
Collated Maps		
Refined Hypocenters (e.g. double-difference)		
Web Content		
Recent EQ Maps		
Station Helicorder		
Station noise PDFs		
Station Performance Metrics		
Network Description		
Station List		
Station Metadata		
Email Notification Services		

Network Products		
Does the network provide the following?	Yes/No	Comments/Explanation
Contact Info		
Region-specific FAQs		
Region-specific EQ info		
Waveforms		
Triggered		
Continuous		
Processed		
Summary Products		
Catalogs		
Metadata		
Instrument Response		
Site Info (e.g. surface geology, Vs30)		
Descriptions:		
<i>Tectonic Summary:</i> Text and/or figures describing the tectonic setting of the event and related activity		
<i>Event Summary:</i> Text and/or figures (press releases, collated media/disaster agencies info) that describes the earthquake and its effects		
<i>Collated Maps:</i> Any map or set of maps that illustrates the event properties, tectonics, hazards, etc		
<i>Processed Waveforms:</i> Specialized processing that is required by some portion of the community, e.g. processed strong motion records for the engineering community		
<i>Catalogs:</i> Lists of parameters that describe an earthquake(s) or information used to describe an earthquake (e.q., picks, locations, amps,..)		
<i>Region-specific earthquake information:</i> Description (text and/or maps) of historical earthquakes, faults/geology, etc.		

ANSS Cooperating Network Performance Self-Rating

Question	Answer	Explanation (if needed)
1. What is the minimum magnitude detection threshold for your network?		
2. What is the minimum magnitude detection threshold for the best instrumented part of your network?		
3. What is the typical hypocentral location accuracy for earthquakes occurring within your network? Is it the same for automated vs reviewed?		
4. Does your network report automated earthquake locations into QDDS? If yes, how long does it take?		
5. Does your network report analyst-reviewed earthquake locations for all quakes into QDDS (i.e., the little ones)?		If yes, what is the typical processing delay?
7. Describe the velocity model used to locate earthquakes in your network (1-D?, multiple models?, 3-D?). Does it differ for automated vs reviewed?		
8. What software/program does your network use to locate earthquakes? Does it differ for automated vs reviewed?		
9. What magnitudes does your network routinely report in real time (Md, ML, Me, Mw, Ms etc.)? How long does it take to compute them?		
10. Does your network archive phase information at a datacenter?		If yes, how long is the delay to report? In what year does archiving begin? Where is the information archived?
11. Does your network archive summary (i.e., earthquake catalog) information at a public datacenter?		If yes, how long is the delay to report? In what year does archiving begin?
12. Does your network archive event waveforms at a public datacenter?		If yes, describe what type of channels (e.g., EH, HH, HN) and how long is the delay to report? In what year does archiving begin?
13. Do you archive continuous waveforms at a public datacenter?		If yes, describe which channels and how long is the delay to report? In what year does archiving begin?
14. If your network archives waveforms, does it supply supporting instrument response metadata to support generation waveforms in SEED? For all waveforms?		

ANSS Cooperating Network Performance Self-Rating

Question	Answer	Explanation (if needed)
15. Does your network compute focal mechanisms?		If yes, what type (first motion, moment tensor). In real-time? Do you archive them at a public datacenter?
16. Does your network automatically distribute email to the public in near real-time for significant events?		If yes, Do you offer a website where they can sign up?
17. Does your network automatically distribute alphanumeric pages to the public in near real-time for significant events?		If yes, Do you offer a website where they can sign up?
18. Does your network automatically compute <i>ShakeMaps</i> and make them publicly available? If so, how long does it take?		
19. Does your network operate a fault-tolerant system (e.g., redundant computers, UPS, back-up generator with lots of fuel)?		
20. What does your network do with the data recorded on ANSS strong motion instruments? For example, do you make it available to the engineering community through a Data Center?		If so, which one?

Additional Information, Comments, and Suggestions

[please provide additional information, comments, diagrams, photographs or suggestions you think may be helpful to USGS in evaluating your proposal for renewal]

End of Special Terms and Conditions

Cost Principles, Audit, and Administrative Requirements

The Recipient shall be subject to the following OMB circulars and regulations, which are incorporated herein by reference. Copies of these Circulars can be obtained from the Internet at:

<http://www.whitehouse.gov/omb/circulars/index.html>.

I. OMB Circulars and Regulations

A. Educational Institutions

- 2 CFR 220, Cost Principles for Educational Institutions (OMB Circular No. A-21)
- OMB Circular No. A-110, Uniform Administrative Requirements for Grants and Other Agreements with Institutions of Higher Education, hospitals, and Other Non-profit Organizations, as implemented in 2 CFR 215 and 43 CFR Part 12, Subpart F.
- OMB Circular No. A-133, Audits of States, Local Governments and Non-Profit Organizations, as implemented in 43 CFR Part 12, Subpart A: Administrative and Audit Requirements and Cost Principles for Assistance Programs

B. State and Local Governments

- 2 CFR 225, Cost Principles for State, Local, and Indian Tribal Governments (OMB Circular A-87)
- OMB Circular A-102, Grants and Cooperative Agreements with State and Local Governments; as implemented in 43 CFR Part 12, Subpart C
- OMB Circular No. A-133, Audits of States, Local Governments and Non-Profit Organizations, as implemented in 43 CFR Part 12, Subpart A: Administrative and Audit Requirements and Cost Principles for Assistance Programs

C. Non-Profit Organizations

- 2 CFR Part 230, Cost Principles for Non-Profit Organizations (OMB Circular A-122), except recipients listed in Appendix C to Part 230 are subject to Federal Acquisition Regulation (FAR) Subpart 31.2, Contracts with Commercial Organizations (Contract Cost Principles and Procedures)
- OMB Circular No. A-110, Uniform Administrative Requirements for Grants and Other Agreements with Institutions of Higher Education, hospitals, and Other Non-profit Organizations, as implemented in 2 CFR 215 and 43 CFR Part 12, Subpart F.
- OMB Circular No. A-133, Audits of States, Local Governments and Non-Profit Organizations, as implemented in 43 CFR Part 12, Subpart A: Administrative and Audit Requirements and Cost Principles for Assistance Programs

D. Organizations for Profit, Individuals, and Others Not Covered Above

- Federal Acquisition Regulation (FAR) Subpart 31.2, Contracts with Commercial Organizations (Contract Cost Principles and Procedures)
- OMB Circular No. A-110, Uniform Administrative Requirements for Grants and Other Agreements with Institutions of Higher Education, hospitals, and Other Non-Profit Organizations, as implemented in 2 CFR 215 and 43 CFR Part 12, Subpart F,
- FAR Subpart 42.1, Contract Audit Services; FAR Subpart 42.7, Indirect Cost Rates; FAR Subpart 42.8, Disallowance of Costs

II. ADDITIONAL REGULATIONS

This award is subject to the following additional Government-wide regulations:

- (1) 2 CFR 180, Government Debarment and Suspension (Nonprocurement)
- (2) 2 CFR 1400, Department of the Interior Nonprocurement Debarment and Suspension

This award is subject to the following additional regulations of the U.S. Department of the Interior:

- (3) 43 CFR Part 12, Subpart E: Buy American Requirements for Assistance Programs
- (4) 43 CFR Part 17, Subpart A: Nondiscrimination on the Basis of Race, Color, or National Origin
- (5) 43 CFR Part 17, Subpart B: Nondiscrimination on the Basis of Handicap
- (6) 43 CFR Part 17, Subpart C: Nondiscrimination on the Basis of Age
- (7) 43 CFR Part 17, Subpart E: Enforcement of Nondiscrimination on the Basis of Handicap in Programs or Activities Conducted by the Department of the Interior
- (8) 43 CFR Part 18, New Restrictions on Lobbying
- (9) 43 CFR Part 41, Nondiscrimination on the basis of sex in education programs or activities receiving Federal financial assistance *[Applies only if this award provides assistance to an education program or student(s).]*
- (10) 43 CFR Part 43, Governmentwide Requirements for Drug Free Workplace

Section 1. Network Operation (station operations & maintenance, communications, and other items related to seismic data collection and archiving)

Cost Category	Federal Year One	Non-Federal Year One	TOTAL Year One	Federal Year Two	Non-Federal Year Two	TOTAL Year Two	Federal Year Three	Non-Federal Year Three	TOTAL Year Three
1. Salaries and Wages	\$	\$	\$	\$	\$	\$	\$	\$	\$
2. Fringe Benefits/ Labor	\$	\$	\$	\$	\$	\$	\$	\$	\$
3. Equipment	\$	\$	\$	\$	\$	\$	\$	\$	\$
4. Supplies	\$	\$	\$	\$	\$	\$	\$	\$	\$
5. Services or Consultants	\$	\$	\$	\$	\$	\$	\$	\$	\$
6. Travel	\$	\$	\$	\$	\$	\$	\$	\$	\$
7. Other Direct Costs	\$	\$	\$	\$	\$	\$	\$	\$	\$
8. Total Direct Costs (sum of	\$	\$	\$	\$	\$	\$	\$	\$	\$
9. Indirect cost/G&A	\$	\$	\$	\$	\$	\$	\$	\$	\$
10. Amount Proposed (8 + 9)	\$	\$	\$	\$	\$	\$	\$	\$	\$
11. Subtotal Network Operations (Federal + non-Federal amounts)			\$			\$			\$

Section 2. Data Processing and Product Generation (to include product distribution and public communication)

Cost Category	Federal Year One	Non-Federal Year One	TOTAL Year One	Federal Year Two	Non-Federal Year Two	TOTAL Year Two	Federal Year Three	Non-Federal Year Three	TOTAL Year Three
21. Salaries and Wages	\$	\$	\$	\$	\$	\$	\$	\$	\$
22. Fringe Benefits/ Labor	\$	\$	\$	\$	\$	\$	\$	\$	\$
23. Equipment	\$	\$	\$	\$	\$	\$	\$	\$	\$
24. Supplies	\$	\$	\$	\$	\$	\$	\$	\$	\$
25. Services or Consultants	\$	\$	\$	\$	\$	\$	\$	\$	\$
26. Travel	\$	\$	\$	\$	\$	\$	\$	\$	\$
27. Other Direct Costs	\$	\$	\$	\$	\$	\$	\$	\$	\$
28. Total Direct Costs (sum of	\$	\$	\$	\$	\$	\$	\$	\$	\$
29. Indirect cost/G&A	\$	\$	\$	\$	\$	\$	\$	\$	\$

30. Amount Proposed (8 + 9)	\$	\$	\$	\$	\$	\$	\$	\$	\$
31. Subtotal Data Processing & Related (Federal + non-Federal amounts)			\$			\$			\$

Tables continue on the next page for years 4 and 5.

Attachment C: Budget Summary (continued)

Section 1. Network Operation (station operations & maintenance, communications, and other items related to seismic data collection and archiving)

Cost Category	Federal Year Four	Non-Federal Year Four	TOTAL Year Four	Federal Year Five	Non-Federal Year Five	TOTAL Year Five
1. Salaries and Wages	\$	\$	\$	\$	\$	\$
2. Fringe Benefits/ Labor	\$	\$	\$	\$	\$	\$
3. Equipment	\$	\$	\$	\$	\$	\$
4. Supplies	\$	\$	\$	\$	\$	\$
5. Services or Consultants	\$	\$	\$	\$	\$	\$
6. Travel	\$	\$	\$	\$	\$	\$
7. Other Direct Costs	\$	\$	\$	\$	\$	\$
8. Total Direct Costs (sum of	\$	\$	\$	\$	\$	\$
9. Indirect cost/G&A	\$	\$	\$	\$	\$	\$
10. Amount Proposed (8 + 9)	\$	\$	\$	\$	\$	\$
11. Subtotal Network Operations (Federal + non-Federal amounts)			\$			\$

Section 2. Data Processing and Product Generation (to include product distribution and public communication)

Cost Category	Federal Year Four	Non-Federal Year Four	TOTAL Year Four	Federal Year Five	Non-Federal Year Five	TOTAL Year Five
21. Salaries and Wages	\$	\$	\$	\$	\$	\$
22. Fringe Benefits/ Labor	\$	\$	\$	\$	\$	\$
23. Equipment	\$	\$	\$	\$	\$	\$
24. Supplies	\$	\$	\$	\$	\$	\$

25. Services or Consultants	\$	\$	\$	\$	\$	\$
26. Travel	\$	\$	\$	\$	\$	\$
27. Other Direct Costs	\$	\$	\$	\$	\$	\$
28. Total Direct Costs (sum of	\$	\$	\$	\$	\$	\$
29. Indirect cost/G&A	\$	\$	\$	\$	\$	\$
30. Amount Proposed (8 + 9)	\$	\$	\$	\$	\$	\$
31. Subtotal Data Processing & Related (Federal + non-Federal amounts)			\$			\$

Attachment C: Budget Summary (continued)

Section 3 - total request for USGS funds

	Year 1	Year 2	Year 3	Year 4	Year 5	Total all Years
Subtotal Network Operations (from line 10)	\$	\$	\$	\$	\$	\$
Subtotal Data Processing and Related (from line 30)	\$	\$	\$	\$	\$	\$
Subtotal GFE (estimate)	\$	\$	\$	\$	\$	\$
Total request	\$	\$	\$	\$	\$	\$