

Form 9-1366
(Nov. 1998)

U.S. Department of the Interior
U.S. Geological Survey
Joint Funding Agreement

Customer #:
Agreement #:
Project #:
TIN#:
Fixed Cost Agreement Yes

THIS AGREEMENT is entered into as of the 1st day of March, 2004 to the 12 of March, 2004 by the US GEOLOGICAL SURVEY, UNITED STATES DEPARTMENT OF THE INTERIOR, represented by Chief Scientist of the Central Region Geological Hazards Team, Jill McCarthy,

is here on denominated as party of the first part; and the Puerto Rico Seismic Network, University of Puerto Rico, represented by the Chancellor, Dr. Jorge I. Vélez Arocho,

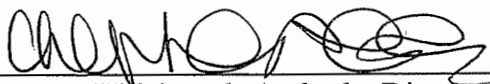
is here on denominated as party of the second part.

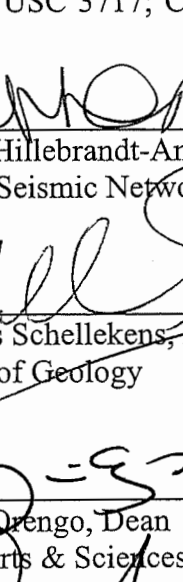
1. The parties hereto agree that subject to availability or appropriations and in accordance with their respective authorities there shall be maintained in cooperation Vs and Vp velocity site characterization research in Puerto Rico, herein called the program.
2. The following amount shall be contributed to cover all of the cost of the necessary field and analytical work directly related to this program.
 - (a) \$0.00 by the party of the first part during the period February 23, 2004 to September 30, 2005.
 - (b) \$10,000 by the party of the second part during the period. The Puerto Rico Seismic Network will pay this amount to the USGS when the field work is complete. Payments will be covered by the account number 6-26859.
 - (c) Additional or reduced amounts by each party during the above period or succeeding periods as may be determined by mutual agreement and set forth in an exchange of letters between the parties.
3. The costs of this program may be paid by either party in conformity with the laws and regulations respectively governing each party.
4. The field and analytical work pertaining to this program shall be under the direction of or subject to periodic review by Jill McCarthy, an authorized representative of the party of the first part.
5. The areas to be included in the program shall be determined by mutual agreement between the parties hereto or their authorized representatives. The methods employed in the field and office shall be those adopted by the first part to insure the required standards of accuracy subject to modification by mutual agreement.

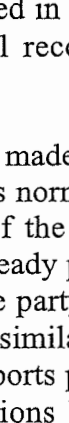
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6. During the course of this program, all field and analytical work of either party pertaining to this program shall be open to the inspection of the other party, and if the work is not being carried on in a mutually satisfactory manner, either party may terminate this agreement upon 60 days written notice to the other party. The authorized representative of the party of the second part shall be Mr. Dario Torres, Director, Finance Department of the University of Puerto Rico at Mayagüez.
7. The original records resulting from this program will be deposited in the office of origin of those records. Upon request, copies of the original records will be provided to the office of the other party.
8. The maps, records, or reports resulting from this program shall be made available to the public as promptly as possible. The maps, records, or reports normally will be published by the party of the first part. However, the party of the second part reserves the right to publish the results of this program and, if already published by the party of the first part shall, upon request, be furnished by the party of the first part, at costs, impressions suitable for purposes of reproduction similar to that for which the original copy was prepared. The maps, records, or reports published by either party shall contain a statement of the cooperative relations between the parties.
9. Billing for this agreement will be rendered upon completion. Payments of bills are due within 60 days after the billing date. If not paid by due date, interest will be charged at the current Treasury rate for each 30 day period, or portion thereof, that the payment is delayed beyond the due date. (31 USC 3717; Controller General File B-212222, August 23, 1983).

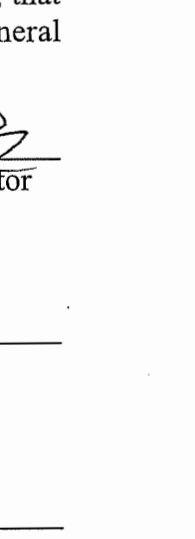
U.S GEOLOGICAL SURGVEY
 UNITED STATES
 DEPARTMENT OF THE INTERIOR

By: 
 Christa von Hillebrandt-Andrade, Director
 Puerto Rico Seismic Network

By: 
 Dr. Johannes Schellekens, Director
 Department of Geology

By: 
 Jill McCarthy, Chief Scientist
 Central Region Geological Hazards Team

By: 
 Dr. Moisés Orengo, Dean
 Faculty of Arts & Sciences


By: 
 Dr. Jorge L. Vélez Ayocho, Chancellor
 University of Puerto Rico at Mayagüez

Statement of Work


Introduction

Puerto Rico lies along a tectonically active plate boundary zone which makes its urban centers and infrastructures susceptible to the effects of earthquake induced ground shaking. Ground motion and site amplification effects are strongly influenced by the physical properties of the near-surface geologic units through which earthquake energy passes. Previous studies have consistently shown that decreasing mean shear-wave velocity in the near-surface geologic materials generally correlates with an increase in the average amplification of earthquake ground motion (Brocherdt and Gibbs, 1976; Hartzell et al., 1996; Williams et al., 2000). Efforts are underway to develop seismic hazard, shake map and ground motion models for Puerto Rico's urban areas. A critical element for understanding local and regional seismic hazard parameters is the acquisition and determination of Vs velocity structure data for the various rock and soil units. Little information currently exists about the velocity structure of bedrock and soil units in and around the urban centers and PRSN broadband seismic instrument stations located throughout Puerto Rico. This study will begin the process of acquiring this needed information in a systematic fashion.


Field Investigations



In 2004, personnel from the Puerto Rico Seismic Network (PRSN) and the USGS High-Resolution Imaging Group-Golden, CO (William Stephenson, Robert Williams and Jack Odum) are undertaking a cooperative research investigation that will acquire near-surface shear-wave (Vs) and compressional-wave (Vp) velocity information for Puerto Rico's bedrock and soil units. This USGS group will employ two non-invasive surface seismic (refraction/reflection, ReMi-refraction microtremor) methods that they have used successfully in similar seismic hazard mapping investigations within urban area across the continental USA.



A benefit to this collaborative investigation is that the USGS team will be available to demonstrate to students, faculty or interested parties the various aspect of the study and the uses of the acquired data. Additional there will be the opportunity to work jointly with, and provide complimentary information to, local researchers who are working on other seismic hazard investigations.



Administrative Information

USGS Information

Organization/Cost Center: GD/CRGHT

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Golden, CO, 80401

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Denver, CO 80225-0046

Principal Investigators

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