

AN AGREEMENT

between the

**U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE
CENTER FOR OPERATIONAL OCEANOGRAPHIC PRODUCTS
AND SERVICES**

and the

**UNIVERSITY OF PUERTO RICO AT MAYAGUEZ
PUERTO RICO SEISMIC NETWORK**

for the

**TECHNICAL ASSISTANCE FOR TIDE STATION OPERATION AND
QUALITY CONTROL AND DISSEMINATION OF DATA FOR THE
PUERTO RICO SEISMIC NETWORK (PRSN)**

NOS Agreement Code: MOA-2014-006/8835

I. PARTIES AND PURPOSE

- A. This Agreement is between the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), through the Center for Operational Oceanographic Products and Services (CO-OPS), and the University of Puerto Rico at Mayagüez (UPRM).
- B. The purpose of this Agreement is to define roles and responsibilities of both Parties as delineated in Section V. Both Parties have a common interest in the collection and dissemination of sea level data in Puerto Rico. This Agreement between the UPRM and CO-OPS will result in the quality control and dissemination of oceanographic and meteorological data through NOS web products. UPRM agrees to maintain Puerto Rico Seismic Network (PRSN) sensors and provide the sensor data to NOAA in accordance with NOS standards delineated in Appendix A.

II. AUTHORITIES

- A. The legal authority for NOS and UPRM to enter into this Agreement is the Coast and Geodetic Survey Act (CGSA), 33 U.S.C. § 883e, which authorizes the Secretary of Commerce to enter into cooperative agreements, or any other agreement, with, and to receive and expend funds made available by any state, or subdivision thereof, any federal agency, or any public or private organization, or individual for surveys and investigations authorized under §§ 883a et seq., or for performing related surveying and mapping activities, including special purpose maps and for the preparation and publication of the results thereof.
- B. The programmatic authority for NOS to enter into this Agreement is the CGSA, 33 U.S.C. §§ 883a et seq., which authorizes the Secretary of Commerce to conduct hydrographic and topographic surveys and tide and current observations, and analysis and prediction of tide and current data.

III. BACKGROUND

CO-OPS has operated and maintained two long-term sea level stations on Puerto Rico for several decades, and has recently added four additional stations to support multi-hazard warning in the region. The PRSN and the UPRM, as scientific and technical leaders in the region, play a critical role in tsunami warning and are key components of a developing Caribbean Sea Level Network. Since 2006, UPRM, through the PRSN, has installed six sea level observing systems (tide gauge stations) in support of multi-hazard warning in Puerto Rico and the U.S. Virgin Islands. These stations meet NOS standards for operation and are fully compliant with NOAA's tsunami-capable sea level stations. These six stations, located at Peñuelas, Fajardo, Mayagüez, Vieques, Yabucoa, and Arecibo, augment the existing NOAA/NOS National Water Level Observation Network (NWLON) in the U.S. Caribbean territories. CO-OPS and PRSN worked closely on the

installation and configuration of these stations, but the need exists to develop formal procedures to ensure that the data will be freely exchanged and be readily accessible for joint product development and use by several stakeholders, including primarily the tsunami community.

IV. THE PUERTO RICO SEISMIC NETWORK (PRSN)

The PRSN consists of the following major components:

- A. UPRM installed water level measurement stations at six locations: 1) Peñuelas, 2) Fajardo, 3) Mayagüez, 4) Vieques, 5) Yabucoa, and 6) Arecibo. These stations include an acoustic water level sensor with protective well, anemometer, air temperature, water temperature, barometric pressure, Data Collection Platforms (DCPs) with Geostationary Operational Environmental Satellite (GOES) transmitter, radio transceiver, rechargeable battery, solar panel, and antennas.
- B. Data dissemination through the standard CO-OPS web pages. The data quality of all data collected is maintained by CO-OPS through the Continuous Operational Real-time Monitoring System (CORMS). CORMS is a 24-hour, 7-day watch to monitor all PRSN data as well as data from NWLON stations. The automated system flags questionable data; personnel then intervene and stop transmission of questionable data until the issue is resolved.
- C. Spare equipment and measurement system components.
- D. Additional data collection sites or sensors may be added to the PRSN in the future and identified by amendments to this Agreement.

V. RESPONSIBILITIES OF THE PARTIES

- A. NOS agrees to provide at no cost to UPRM:
 - 1. Real-time quality control of all PRSN data in the form of 24 hours per day/7 days per week Continuous Operational Real-Time Monitoring System (CORMS) operation. This activity will be staffed by personnel contracted by CO-OPS to ensure that the data disseminated meets NOAA's standards.
 - 2. Communications services associated with CORMS.
 - 3. Calibration of Aquatrak sensors for each of the six Puerto Rico sites once per year.
 - 4. Any relevant software, leveling programs, trainings, and station documentation as updates are made, to ensure accuracy and efficiency of PRSN data.
 - 5. All applicable data products (including tidal datums, predictions, harmonic analysis and bench mark sheets) within a reasonable period of time.

6. Recommendations for hardware and equipment upgrades.
7. Proposals for and final approval of all changes, additions, modifications to the PRSN stations.
8. Notification to UPRM, through PRSN, of all upcoming field visits to coordinate opportunities for additional training and technical transfer as appropriate, provided no additional expense shall be incurred by NOAA.
9. Transmission and receipt confirmation of PRSN data by the NOAA Tsunami Warning Centers.
10. GOES assignments on a CO-OPS-hosted channel until alternate means can be achieved, as long as the timing of those stations is properly maintained, so as not to cause interference of data on adjacent slots.
11. Designation of a local site representative. CO-OPS' site representative is the contact listed in Section VII. CO-OPS shall notify UPRM if a new site representative is designated.
12. Technical consultation to UPRM regarding tide station operation, provided no cost will be incurred by CO-OPS.

B. The UPRM agrees, at no cost to CO-OPS, to:

1. Operate and maintain the PRSN sensors and provide the sensor data to NOAA in accordance with NOS standards delineated in Appendix A, as resources permit. The water level data will be transmitted to NOS via approved communication modes i.e. GOES, for quality control and dissemination.
2. Collect a minimum of 1-minute average water level data, and disseminate data every 6-minutes over GOES.
3. Perform, at a minimum, annual maintenance visits to every site to ensure all equipment is properly functioned and maintained.
4. Provide emergency maintenance to repair sensors that are not disseminating within a reasonable period of time. Additional site visits may be required in the event of extreme weather or questionable data, and are the responsibility of PRSN. Updates regarding emergency maintenance scheduling will be provided to CO-OPS.
5. Conduct first or second order differential levels between the primary water level sensor and a minimum of five tidal bench marks at least once per year, within 2 weeks of performed station maintenance.

6. Provide annual level and abstract files to CO-OPS within one month of performing differential levels. If the datum offset change is greater than 0.006m, a leveling abstract must be received within 1 day.
7. PRSN will notify CO-OPS of all plans to perform maintenance, and will provide full documentation, in accordance with CO-OPS standards, within one month. Provide CO-OPS a preliminary site report within one day.
8. Notify CO-OPS of any scheduled or unscheduled maintenance to the six sites that will cause disruption of data dissemination or altering of data reference heights (such as station datum).
9. Provide a field schedule to CO-OPS at least once per year including maintenance schedules and sensor calibration requirements for the next twelve months.
10. Ensure that the stations are properly maintained, including no drift in timing or sensor offsets, or obstructions to the acoustic sensor well.
11. Replace equipment that is no longer functioning properly, and upgrade technology as needed in the future.
12. Designate a local site representative. UPRM site representative is the contact listed in Section VII. UPRM shall notify NOS if a new site representative is designated.

VI. FUNDING, PAYMENT, AND REIMBURSEMENT ARRANGEMENTS

- A. There is no transfer of funds between the Parties under this Agreement.
- B. NOS will monitor data quality and terminate dissemination of information when, in its sole discretion, the information quality approaches unacceptable limits.
- C. NOAA/NOS/CO-OPS will not achieve full cost recovery for the services it is providing. NOAA's contribution to this partnership includes maintaining its Continuous Operational Real-time Monitoring System (CORMS) for data quality control and related data dissemination infrastructure. The collection of water level information that supports Tsunami modeling, forecasts and warnings as well as storm surge forecasts is in keeping with NOAA's mission to protect life and property.
- D. There will be no required amendments to this agreement unless there is a change in service, costs or products.

VII. CONTACTS

- A. Any written notices regarding this project shall be addressed to the following Points of Contact (POC) for each of the Parties to this Agreement:

1. Name of NOS POC: Allison Allen
Position: COASTAL Program Manager
Address: NOAA/NOS/CO-OPS
1305 East West Highway
Silver Spring, Maryland 20910
Telephone Number: (301) 713-2981 x 161
Fax: (301) 713-4392
E-mail: Allison.Allen@noaa.gov

2. Name of UPRM POC: Dr. Víctor A. Huérfano
Position: Puerto Rico Seismic Network
Address: University of Puerto Rico
PO Box 9000
Mayagüez, PR 00681-9000
Telephone Number: (787) 833-8433
E-mail: victor@prsn.uprm.edu

- B. The Parties agree that if there is a change regarding the information in this section, the Party making the change will notify the other Party in writing of such change. This change does not require a formal amendment.

VIII. DURATION OF AGREEMENT, AMENDMENTS, OR TERMINATION

- A. This Agreement will become effective upon the signature of both of the approving officials of the respective organizations entering into this Agreement and expire December 1, 2018. The Agreement will be reviewed annually.
- B. This Agreement may be amended or modified at any time by the mutual written consent of the Parties before its expiration. This Agreement may be canceled or terminated by either Party upon 120 days written notice to the other Party.

IX. RESOLUTION OF DISAGREEMENTS

Should disagreement arise as to the interpretation of the provisions of this Agreement, or amendments and/or revisions thereto that cannot be resolved at the operating level, the area(s) of disagreement will be stated in writing by each Party and presented to the other Party for consideration. If agreement on interpretation is not reached within 30 days, the parties shall forward the written presentation of the disagreement to respective higher officials for appropriate resolution.

X. OTHER TERMS AND CONDITIONS

- A. This Agreement in no way limits other government agencies (federal, state, and local), port authorities, companies involved in maritime commerce, commercial fishermen, recreational boaters and fishermen, researchers, and the general public from having access to PRSN data through the Internet.
- B. This Agreement shall be governed, interpreted, and enforced in accordance with the Federal laws of the United States of America.

XI. APPROVALS

ACCEPTED AND APPROVED FOR THE
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

ACCEPTED AND APPROVED FOR THE
PUERTO RICO SEISMIC NETWORK

BY: _____
Richard F. Edwing
Director
Center for Operational Oceanographic
Products and Services

BY: Lucas N. Avilés Rodríguez
Dr. Lucas N. Avilés Rodríguez
Chancellor *JK*
University of Puerto Rico
Mayagüez Campus

DATE: _____

DATE: May 15, 2014

BY: Marisol Vera
Dr. Marisol Vera Colón
Director, R&D Center *JK*
University of Puerto Rico
Mayagüez Campus

DATE: 05-13-2014

APPENDIX A.

**MANAGEMENT, OPERATION, MAINTENANCE, AND REPAIR STANDARDS
FOR THE PUERTO RICO SEISMIC NETWORK (PRSN)**

INTRODUCTION

The PRSN is a continuously operating coastal observation network, similar to the National Water Level Observation Network (NWLON), and is therefore subject to the same operation and maintenance standards as the NWLON. The standards, documented in the following reference documents, are updated as required and posted on the CO-OPS web site. All field personnel using these standards are notified of any updates at the beginning of each calendar year when the updates are announced.

The following references document NOS operational standards. Documentation for the measurement and data transmission components are available at <http://tidesandcurrents.noaa.gov/pub.html>) and include:

1. Draft NOAA Administrative Order (NAO) Ship Charter Policy
2. Next Generation Water Level Measurement System (NGWLMS) Site Design, Preparation, and Installation Manual, NOAA/NOS, January 1991
3. Standing Project Instructions for Coastal and Great Lakes Water Level Stations (latest update available online)
4. Annual Project Instructions: Installation, Operation, and Maintenance of Coastal and Great Lakes Water Level Stations (latest update available online)
5. USER'S GUIDE FOR INSTALLATION OF BENCH MARKS AND LEVELING REQUIREMENTS FOR WATER LEVEL STATIONS, NOAA/NOS, OCTOBER 1987
6. CO-OPS WATER LEVEL AND METEOROLOGICAL SITE RECONNAISSANCE PROCEDURES, UPDATED MAY 2009
7. GUIDELINES FOR METEOROLOGICAL STATION RECONNAISSANCE AND METEOROLOGICAL SENSOR HEIGHT MEASUREMENTS, UPDATED MAY 2009
8. Water Level Station XPERT Site Report
9. User's Guide for GPS Observations at Tide and Water Level Bench Marks (latest update available online)
10. Specifications and Deliverables for Installation, Operation, and Removal of Water Level Stations, November 2008
11. NOS HYDROGRAPHIC SURVEYS SPECIFICATIONS AND DELIVERABLES (latest available online)
12. WATER LEVEL STATION SPECIFICATIONS AND DELIVERABLES FOR SHORELINE MAPPING PROJECTS, UPDATED MAY 2009
13. Xpert DCP User's Manual, October 2006
14. User's Guide for Writing Bench Mark Descriptions, Updated February, 2011
15. Standards and Specifications for Geodetic Control Networks", Federal Geodetic Control Committee, September 1984
16. Revised NGS 3 – Dimensional (3 – D) Rod Mark, National Geodetic Survey, July 1996.

17. Spatial Data Modifications and Enhancements, FY 05 Functional Requirements Document, August 2005
18. SOP-06-001 for Upgrading or Installing a New Water Level Station, Updated May 2011
19. NGWLMS GOES MESSAGE FORMATTING, Phil Libraro 1/2003
20. NWLON/DMS Quality Control Software (QC) Functional Requirements Document, Revised November 2004
21. User's Guide for Electronic Levels with Translev and Windesc, Updated September 2010
22. System Development Plan, CORMS

This documentation may also be obtained from the NOS POC (See Section VII).