RUTGERS
Coastal Ocean Observation Lab

NOS Integrated Ocean Observations Systems (IOOS)

Repair and Hardening of Mid-Atlantic Ocean Observing Assets After Hurricane Sandy

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Prepared by:

Rutgers University
Institute of Marine and Coastal Sciences
71 Dudley Road
New Brunswick, NJ 08901-8525

Michael Crowley
MARACOOS Director of Operations
848-932-3287
crowley@marine.rutgers.edu

INTRODUCTION

Seventeen High Frequency radars were damaged within the Mid Atlantic Regional Association Coastal Ocean Observing System when Hurricane Sandy passed through the region in October 2012. The objective of this work is to repair and harden these observing system assets as well as some computer and ADCP assets lost during Sandy. The benefits of this work will increase the coverage and data quality of the surface current measurements in the region. The US Coast Guard uses the surface currents operationally for search and rescue and NOAA Office of Response and Restoration for oil spill response. Other users of the data include New Jersey and Massachusetts Department of Environmental Protection offices, county health offices and Mid Atlantic Fishery Management Council. The technical networks that will be leveraged are the Mid-Atlantic Regional Association Coastal Ocean Observing System, NOAA National High Frequency Radar Network, DHS National Center for Secure and Resilient Maritime Commerce and the NJ Board of Public Utilities Radar Network.

1. PROGRAM INFORMATION AND HIGHLIGHTS

During December, the 1st month of the Sandy Supplemental project, the following technical progress was made:

- **Procurement**
    1. Initial discussions with CODAR began that will streamline the ordering process in January. As funding arrived during the 2nd half of December, and Rutgers closed for the end of year holiday, the beginning of the purchasing process for CODAR sites, the ADCP and computer systems will begin in January.

- **Site Installations**
    1. Site installations will begin in late February or early March.

- **Data Processing & QA/QC**
    1. Data processing and QA/QC checks will begin shortly after the first site is installed (April 2014).

2. ISSUES/RISKS & MITIGATION

Based on almost two decades of previous experience, high level potential risks to the success of this project include:

1. If the municipality, park or land owner of the potential installation site location refuses to allow installation of a site by the municipality, park or private residence, then there could be delays in site installation or it could force us to move the site location to a less than optimal location.
    a. Mitigation: As these are replacement sites with previous approvals, this risk should not come to fruition.
2. If CODAR delays the delivery of sites due to a backlog of orders or lack of personnel, site installations could be delayed.
    a. Mitigation: There are two mitigation strategies here: The first strategy was to discuss and plan the orders with CODAR in August to insert these into the CODAR construction process; The second strategy was to build an additional 1-2 weeks of slack in the schedule based on delivery dates estimated by CODAR in August, and then again in brief discussions in late December.
3. If CODAR delivers faulty equipment, then we would be forced to ship the equipment back to CODAR for repair, thereby delaying potential installations of the systems by several weeks.
    a. Mitigation: The CODAR equipment will be delivered in four batches of 3 to 6 sites at a time. If some of the equipment is faulty, it can be shipped back to CODAR to be fixed while technicians, test, install, calibrate and retest another system in the batch.
4. If there is severe weather such as winter snows, frozen ground, or a hurricane/nor'easter causing beach destruction, then installations could be delayed.
    a. Slack has been built into the schedule for these events which will occur over the 2 years of the project at one or more of the site locations.
5. If a technician departs Rutgers or UConn, then the team will lose technical proficiency and some of our capability to install the sites in a timely manner.
    a. There are now additional technicians at Rutgers not currently funded through this project that could replace funded team members should they depart for another job.

3. SCHEDULING

In late December the Sandy Supplemental Team had numerous discussions with CODAR to plan deliveries of systems to Rutgers and the University of Connecticut beginning in late February 2014. A current installation schedule based on these early discussions is shown in Figure 1. Note that this is not a final schedule and may be subject to adjustment based on availability of system types (Long Range (5 MHz) vs.

Mid Range (13 MHz) vs. Standard Range (25 MHz)). We expect to have a hardened and detailed schedule included as a supplement to the next monthly report as it will not fit within this document.

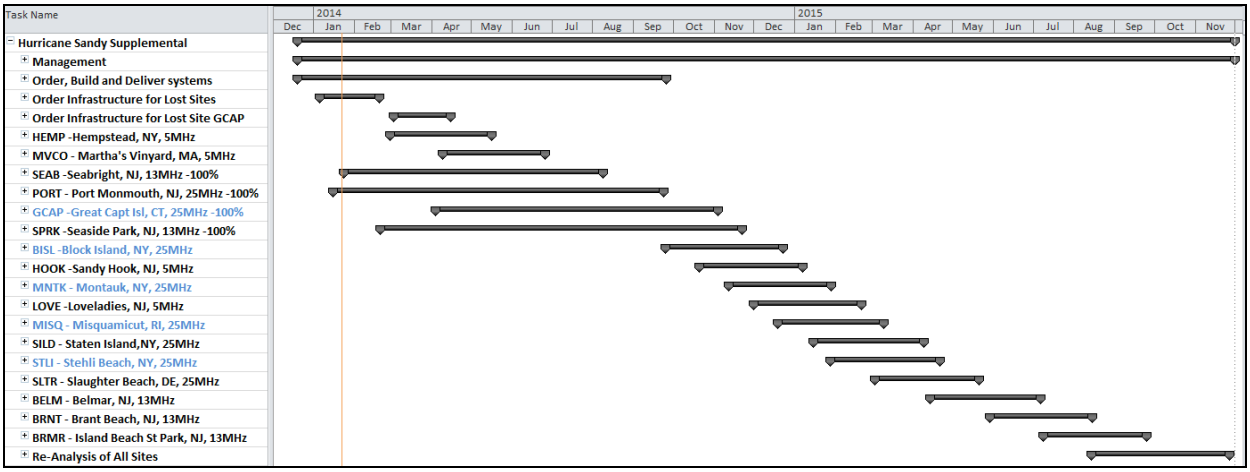

Figure 1. High level schedule for the CODAR installations.

There will be 21 major milestones over the course of this project which include delivery of the four batches of CODAR systems to Rutgers and the University of Connecticut, and primary installation completion of each of the 17 sites. Table 1 lists the scheduled dates of the installations. It should be noted that we expect to maintain site installations for each date in the Milestone Table, however, the exact site installation may vary based on availability/permission of local authorities, communication installations, power installations, etc.

	Milestone Name	Date
1	Deliver Batch 1: of SEAB, MVCO, HEMP	2/28/2014
2	Deliver Batch 2: SPRK, PORT, HOOK, LOVE	5/2/2014
3	Deliver Batch 3: of GCAP, BISL, SILD, MNTK, MISQ, SLTR, STLI	8/8/2014
4	Deliver Batch 4: of BELM, BRNT, BRMT	9/26/2014
5	Primary Installation Complete - HEMP	4/4/2014
6	Primary Installation Complete - MVCO	5/15/2014
7	Primary Installation Complete - SEAB	6/30/2014
8	Primary Installation Complete - PORT	8/13/2014
9	Primary Installation Complete - GCAP	9/23/2014
10	Primary Installation Complete - SPRK	10/13/2014
11	Primary Installation Complete - BISL	11/11/2014
12	Primary Installation Complete - HOOK	11/26/2014
13	Primary Installation Complete - MNTK	12/18/2014
14	Primary Installation Complete - LOVE	1/12/2015
15	Primary Installation Complete - MISQ	1/27/2015
16	Primary Installation Complete - SILD	2/26/2015
17	Primary Installation Complete - STLI	3/10/2015

18	Primary Installation Complete - SLTR	4/9/2015
19	Primary Installation Complete - BELM	5/26/2015
20	Primary Installation Complete - BRNT	7/6/2015
21	Primary Installation Complete - BRMR	8/14/2015

Table 1. The 21 Major project milestones include deliveries of the four batches of CODAR systems as well as primary installation of each of the 17 sites.

4. BUDGET AND EXPENDITURES

The contract arrived at Rutgers University on December 17, 2013. The internal financial set up of the grant within Rutgers was completed on December 23. Rutgers closed for the end of year holidays on December 24, therefore, there were no grant expenditures in December.

Expected January expenditures include:

- Charging salary at Rutgers for Hugh Roarty and Colin Evans.
- Submit order to CODAR for all 4 batches of systems.
- Ordering of the sheds and supporting infrastructure for sites that were completely lost during Sandy (likely February).
- Subcontractors (University of Connecticut) charging salary.

For reference, the budget for this project is shown in table 1. Future tables will include expenditures to date and remaining balances.

	Rutgers University		University of Connecticut		University of Rhode Island		University of Delaware		TOTALS
	FY 2014	FY 2015	FY 2014	FY 2015	FY 2014	FY 2015	FY 2014	FY 2015	
Personnel	$ 66,300	$ 66,300	$ 22,649	$24,031	$ 4,128	$4,252	$ -	$ -	
Fringe	$ 29,238	$ 29,238	$ 9,146	$ 9,700	$ 1,814	$1,962	$ -	$ -	
Travel	$ 10,000	$ 10,000	$ 2,000	$ 2,000	$ -	$ -	$ -	$ -	
Equipment	$1,145,095	$ -	$283,200	$ -	$172,206	$ -	$12,000	$ -	
Supplies	$ 23,989	$ 1,935	$ 23,436	$ 1,000	$ 13,647	$ -	$30,341	$ -	
Other	$ 195,602	$ -	$ 2,400	$ 2,400	$ -	$ -	$ -	$ -	
Indirect Charges	$ 78,025	$ 21,495	$ 11,936	$ 7,816	$ 3,918	$1,243	$ 6,068	$ -	
TOTALS	$1,548,249	$128,968	$354,767	$46,947	$195,713	$7,457	$48,409	$ -	$2,330,510

Table 1. Sandy Supplemental budget by item, group and fiscal year.