

**National Oceanic and Atmospheric Administration  
National Weather Service  
National Data Buoy Center Ocean Observing System of Systems  
NOOSS O&M  
04-02-02-001  
Operational Analysis  
2007**

**Executive Summary**

National Data Buoy Center (NDBC) is comprised of a combination of National Oceanic and Atmospheric Administration (NOAA) civil service employees, U.S. Coast Guard (USCG) personnel, and a service contractor. NDBC executes, manages and serves as the program office for the NOAA/NWS/NDBC Ocean Observing System of Systems (NOOSS). The NOOSS is the nation's primary marine surface weather observing network. The NOOSS component systems are moored buoys, Coastal Marine Automated Network stations; and Voluntary Observing Ship (VOS) stations. In 2003, the Deep-ocean Assessment and Reporting of Tsunamis (DART) tsunami warning array stations were added. The Pacific Tropical Atmosphere, Ocean (TAO) array was added in 2005. The NOOSS provides accurate, quality controlled atmospheric/oceanographic data in real-time, 24x7x365, to the public, NOAA service and modeling communities, other government agencies, the private sector and universities.

NOOSS surface and oceanographic observations are a primary and critical information source of NOAA's Goal Teams and over 15 NOAA operational Programs, such as Local Forecast and Warning, Environmental Modeling, and Coasts Estuaries and Oceans. The Commerce and Transportation Mission Goal outcomes, to increase transportation safety and productivity, directly depend on NOOSS observations.

Program achievements within the most recent calendar year include:

- NWS Observations delivered (yearly) - 1,762,069 observations
- NOAA IOOS Observations delivered (yearly) - 7,401,515 observations
- DART buoys deployed - 10 stations operational

The NDBC IOOS Data Assembly Center (DAC) integrates regional observations into NOAA's operational data stream from more locations and stations that are being created by the emerging Regional Associations. Beginning in FY09, the NOOSS DAC will go operational with the addition of the O&M funding. NDBC has operated the NOOSS DAC as a Prototype IOOS DAC with primary data assembly and quality control (PDA&QC) responsibilities. The Operational DAC will capture and process all RA data. These data will be released into all standard NOOSS data distribution channels, including NOAAPORT and AWIPS.

This operational analysis (OA) is an annual, in-depth review of the program's performance based on the following:

- Customer Results
- Strategic and Business Results

- Financial Performance
- Innovation

## **1.0 Customer Results**

NOOSS serves as the nation's primary surface marine weather observing network providing critical information to a wide variety of customers. NOOSS provides the nation an improved ability to forecast and predict hazardous phenomena such as hurricanes, storm surge, floods, harmful algal blooms, tsunamis, etc. NOAA benefits by filling in-situ observation gaps: 1. Improve accuracy and timeliness of weather and water information will improve the ability to reduce coastal hazard impacts. 2. Increase lead time and accuracy for weather and water warnings and forecasts. 3. Increase development, application, and transition of advance science and technology to operations and services. 4. Develop data sets available for integration via IOOS DMAC standards. 5. Access and integrate non-NOAA observational data with operational NOAA data streams.

### **1.1 Customer Requirements and Costs**

NOOSS surface and oceanographic observations are a primary and critical information source of NOAA's Goal Teams and over 15 NOAA operational Programs, such as Local Forecast and Warning, Environmental Modeling, and Coasts Estuaries and Oceans. The Commerce and Transportation Mission Goal outcomes, to increase transportation safety and productivity, directly depend on NOOSS observations. The present NOOSS does not provide the temporal, spatial or diversity of measurements to adequately characterize the marine environment and it does not measure all the required parameters. In some coastal and ocean areas there is a total coverage gap, a data void. NOAA lacks the capacity to effectively operate and maintain the existing in-situ buoy infrastructure

NDBC works collaboratively to expand observations available to NOAA customers and partners:

- Other Federal Agencies requiring surface data for operational decisions including the FAA, DOD, EPA, USGS, Corps of Engineers, DHS
- State and local emergency managers and local officials charged with public preparedness and response decisions for extreme events, hazardous spills, homeland security issues, and wild fire
- Private sector environmental information providers
- Universities
- NOAA Regional Associations
- Weather sensitive businesses including transportation, energy, and agriculture
- National, state, and local media
- Citizens who act on the information or are directed to respond by governmental and other local decision makers

### **1.2 Performance Measures**

Performance of the NOOSS O&M investment for 2007 is summarized in the table below. The measures align with the Performance Reference Model developed by the Federal Enterprise Architecture Program Management Office (FEA-PMO). The performance goals are achieved, when funded, by a comprehensive effort that 1) provides for a robust preventive and corrective

maintenance program, 2) ensures an adequate and efficient level of spares are maintained at the depot, and 3) supports an aggressive, proactive program to identify and replace components that are vulnerable to technology obsolescence or that are demonstrating excessive failure rates.

Measurement Area	Measurement Indicator	2006 Baseline	Through September 30, 2007
Mission and Business Results	System Availability Quality Controlled Observations from NOOSS Primary Data Assembly and Quality Control of NOOSS and Regional Data PDA&QC	1,700,000 quality controlled marine observations NOAA 3,500,000 total observations Federal Backbone and Regional Partners, NOAA and NON-NOAA	1,762,069 quality controlled marine observations NOAA 7,405,515 total observations Federal Backbone and Regional Partners, NOAA and NON-NOAA
Customer Results	System Availability Quality Controlled Observations from NOOSS	1,700,000 quality controlled marine observations	1,762,069 quality controlled marine observations
Process and Activities	System Operational Efficiency, System Availability	NWS NOOSS: 85% TAO: 80% DART: 80%	NWS NOOSS: 83.7% TAO: 80% DART: 80%
Technology	Tropical Atmosphere Ocean Equatorial Moored Buoy, TAO Refresh	TAO Technology Refreshment Acquisition development and execution. System Refresh 0 of 55 Stations	Acquisition Planning 0 of 55 Stations Refreshed

## 2.0 Strategic and Business Results

This investment continues to meet established cost, schedule and performance goals and must continue in order for NOAA to meet its Strategic Goals of Serving Society's Needs for Weather and Water; and Supporting the Nation's Commerce with Information for Safe, Efficient, and Environmentally Sound Transportation. The program also continues to meet the goals of our partners. Program management and controls are in place to ensure the program continues to meet its goals and objectives and monitor how well the program performs.

### 2.1 Program Management and Controls

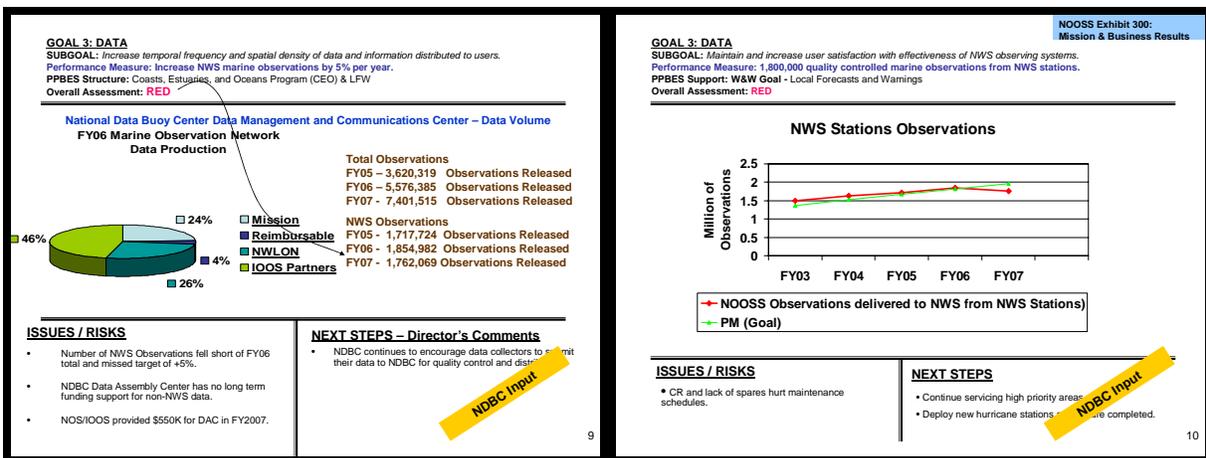
The day-to-day program and financial management of the NOOSS O&M program is provided by program managers and analysts within OOS. OOS provides centralized program planning and oversight. Critical functional tasks for operations, engineering, configuration management, logistics management, maintenance, telecommunications, and training are centrally planned by executed by NDBC.

## 2.2 Monitoring Cost, Schedule and Performance

OOS program analysts use several systems to measure and track cost, schedule, and performance metrics.

a. Cost: OOS has oversight responsibility for the entire NOOS O&M budget. Budget development and execution have been accomplished using PC-based spreadsheets (currently Microsoft Excel) linked to the NOAA financial management systems. These spreadsheets compare actual cost data with budget models and to make the required model adjustments for subsequent budget development cycles. Cost and financial data are monitored on a monthly basis to identify discrepancies with the approved financial plan and to develop corrective actions. These data are also used to support program/budget reviews, answer questions from higher headquarters, OMB, and Congress.

b. Schedule: Product improvements and sustaining engineering projects are funded within the NDBC Base budget for NWS Moored Buoy and C-MAN elements of the NOOSS. The DART element of the NOOSS, recently transitioned from Research to Operations, will complete Full Operating Capability in early FY08. No technology refreshment is anticipated to 5 years. The TAO portion of the NOOSS was budgeted for funding in FY08, however, Omnibus Legislation and NWS reprogramming have eliminated these funds. FY08 NOOSS Technology Performance measure targets will not be met as a result of these lost funds.



(excerpt for 2007 OPS Review NOOS O&M)

c. Performance: System performance is routinely and systematically monitored by the NOOSS Data Assembly Center. The NOOSS DAC is staffed 24/7 and supports all observing stations in the NOOSS. Analysis of the station outages and trouble tickets generated is used to improve maintenance and meteorological/oceanographic training, maintenance and operations manuals and documentation. NOOSS maintenance and failure information and statistics are tracked in the NDBC Engineering, Management and Information System (NEMIS) this information is used to calculate service availability, mean time between failures and mean time to repair. Monthly monitoring of these parameters provides an overall assessment of the health of the system two key measures are: 1) System Availability by component network and, 2) Number of stations refreshed. The quarterly OOS Operational Analyses show that except for NWS Moored Buoys and C-MAN stations, the system regularly meets or exceeds its performance goals. NWS Station Observations failed to meet performance expectations by 5%.

### 2.3 Security

The NOOSS O&M system is accredited under requirements spelled out in FIPA 200 / NIST 800-53 and all other applicable requirements and policies that are based on OMB and NIST guidance. Management, operational, and technical security controls are adequate to ensure the confidentiality, integrity and availability of information. Key security related dates included in table below. Management, operational, and technical security controls are adequate to ensure the confidentiality, integrity and availability of information.

Name of System	C&A Date	Date Security Control Testing Completed	Date Contingency Plan Tested
NOAA System - ID # NOAA8873	3/28/07	5/30/07	3/15//07

### 3.0 Financial Performance

NOOSS O&M funding pays for recurring costs for operations; system maintenance and repair; maintenance training for electronic technicians; preventive and depot level maintenance; logistics support; and sustaining engineering efforts with the goal of maintaining the minimum performance measures shown above. The established cost baseline for this performance is an annual, recurring funding level of \$23.24M. In FY07, the budget was reduced to \$18.27M during the appropriations process. Although the program successfully achieved most performance measures, sequential years of funding reductions is expected to have negative cumulative effect that will result in larger costs and higher risks to system performance in subsequent years. It is critical that FY08 funding continues at or above the FY07 level or the risk of network availability decreasing will increase significantly.

#### 3.1 Funding

FY2007 budget execution details are provided in the following table:

Budget Item	NWS FY06	NWS FY07 Requirement	NWS FY07 Actual
Operations and Maintenance	\$23.24M	\$23.24M	\$18.27M
<b>Total</b>	<b>\$23.24M</b>	<b>\$23.24M</b>	<b>\$18.27M</b>

#### 3.2 Financial Performance Review

Financial performance is monitored on a monthly basis by OOS program analysts and reviewed with the various NWS and NOAA organizations for reasonableness and cost efficiency. The NOOSS O&M budget is reviewed quarterly by the OOS Director in conjunction with the overall OOS budget. Where the government contracts for services, monthly reports from contractors are required to ensure the Government has the information it needs to evaluate cost performance. A detailed review of work and priorities is undertaken if cost is significantly above baselined values. Also, any necessary corrective actions are also identified and implemented.

#### **4.0 Innovation to Meet Future Customer Needs**

The mission of the OOS is to provide cost effective operations and maintenance support for NWS systems in support of our customers. OOS routinely explores alternative operations and maintenance concepts, best practices, contract strategies, technologies, etc to provide improved services at lower costs. A major joint effort with the National Ocean Service (NOS) is underway to deploy sensors on NWS meteorological buoys to measure key ocean parameters including temperature, salinity, ocean currents, and directional waves, as well as providing platforms from which endangered species can be monitored, and other chemical and biological parameters can be measured. This effort transforms the NWS' meteorological buoys into a multi-purpose platform reducing NOAA O&M costs.