

NOAA Ship *Okeanos Explorer*



NOAA ship *Okeanos Explorer* will be America's first ship dedicated solely to ocean exploration and discovery. The ship carries cutting-edge technology that will enable explorers at sea and at Exploration Command Centers ashore to investigate the unknown and poorly understood ocean and its phenomena. Exciting new discoveries will be shared live through the Internet with everyone from top government policy-makers to students learning about the mysterious ocean.

The vessel, formerly the US Naval ship *Capable*, was transferred to NOAA in 2004 and converted to conduct deep-ocean exploration. Using advanced technologies, *Okeanos Explorer* will support national objectives to explore all the dimensions of the ocean for the purpose of discovery and the advancement of knowledge.



Using telepresence technology, live images and data will be transmitted from seafloor to scientists ashore at Exploration Command Centers.

Missions

Following commissioning and a series of field tests, the ship will begin its first full field season in 2009, and will operate for the first two years in the Pacific, generally between the tropics of Cancer and Capricorn. Missions of the ship include mapping, site characterization, reconnaissance, education and outreach. Reconnaissance is searching an unknown area for an interesting anomaly, using all ship systems to focus on a specific target with high discovery potential. In addition, the ship will conduct regular water column exploration to improve characterizations of water mass properties at sites both when searching for anomalies and when transiting through poorly known deep water areas.

3D Mapping System

The vessel has a hull-mounted, first-of-its kind multibeam mapping system, which will produce high resolution maps of the seafloor. The maps will be used to identify unique seafloor features for further exploration and will provide a road map for exploring a particular site with the remotely-operated vehicles (ROVs).

Remotely-operated Vehicle System and Dynamic Positioning

The ROV system on *Okeanos Explorer* is attached by a tether and capable of operating to depths of 6,000 meters. The camera sled is outfitted with a high-definition camera that will be positioned above the primary

vehicle to image it as it investigates interesting features and habitats. The primary ROV is equipped with similar high-definition cameras and lights, as well as special sensors and manipulators for collecting data and samples. Tucked into and operating from the primary ROV is a 60-pound xBot that will provide exploration access to confined areas where it could be difficult or unwise to send the larger and more expensive main ROV. To remain stationary when the ROVs are deployed, the ship will use its dynamic positioning (DP) system, a sort of automatic pilot that integrates satellite positioning data with the ship's engines and thrusters.

Telepresence and High Speed Communications

The most unique visible feature is the satellite dome atop the mast, containing a 3.7 meter diameter satellite dish capable of transmitting data through Internet2 connections to scientists ashore at Exploration Command Centers. The ship will send real-time high-definition video feeds from the ROVs, data collected by the hull-mounted multibeam mapping system, and data collected by sensors installed on the ship and ROV. Scientists ashore will communicate with the ship, assess information and conditions, and participate in missions no matter where in the world the ship is located. Exploration Command Centers are at the "Inner Space Center" at the University of Rhode Island, which will be the hub station; the Center for Coastal and Ocean Mapping and Joint Hydrography Center at the University of New Hampshire; Mystic Aquarium and the Institute for Exploration in Mystic, Connecticut; NOAA's Pacific Marine Environmental Lab in Seattle; and NOAA's Science Center in Silver Spring, Maryland.

Okeanos Explorer was named by a team of five students from Woodstock High School in Woodstock, Illinois. The team won NOAA's nationwide ship-naming contest with its name selection and supporting educational project. *Okeanos* is the ancient Greek term for ocean.

Ship Specifications

Length (LOA): 224 ft
Breadth: 43 ft
Draft: 17 ft
Full Load Displacement: 2312 lt
Lightship Displacement: 1616 lt
Speed: 10 knots
Range: 9600 nm
Endurance: 40 days
Hull Number: R337
Call Letters: WTDH
Commissioned Officers: 6
Licensed Engineers: 3
Crew: 18
Mission Personnel: 19
Launched: October 28, 1988
Transferred to NOAA:
September 10, 2004
Commissioned: August 13, 2008
Builder: VT Halter Marine, Inc.
Moss Point, Mississippi



The bell-shaped camera sled, the science-class ROV and the small xBot can operate as deep as 6000 meters. NOAA illustration with vehicle drawings by ROV builder Phoenix International.

A New Ship, A Strong Partnership

In addition to numerous partnerships with outside organizations, NOAA's Office of Ocean Exploration and Research (OER) and NOAA's Office of Marine and Aviation Operations (OMAO) enhanced their strong partnership as the ship was refitted for ocean exploration missions. Staff from OMAO and OER worked closely together and with others during the refitting of the ship to convert this former naval vessel to explore the ocean with new and exciting scientific and communications capabilities. There are other innovations sailing with *Okeanos Explorer*. OMAO and OER partnered to find innovative ways to staff and operate this ship, and potentially other ships in the NOAA fleet. Cross-training of staff from OMAO and OER will provide more depth and flexibility in operating the ship, its telepresence capability, and its exploration sensors and systems. With its assigned missions and with telepresence, the ship will explore the ocean and provide data ashore in new ways.

Office of Marine and Aviation Operations

Since NOAA's beginning, NOAA ships and aircraft have played a critical role in the collection of its oceanographic, atmospheric, hydrographic, fisheries and coastal data. This fleet of platforms is managed and operated by NOAA's Office of Marine and Aviation Operations, composed of civilians, wage mariners, and officers of the NOAA Commissioned Officer Corps, one of the Nation's seven uniformed services. NOAA's fleet of ships is the largest fleet of federal research and survey ships in the Nation. The fleet supports a wide range of marine activities, including fisheries research, nautical charting and mapping, and ocean and climate studies. Many of NOAA's vessels are unique in their ability to conduct scientific research and assessments. NOAA's fleet of aircraft provide a wide range of capabilities including hurricane prediction and atmospheric research, marine mammal surveys, snow surveys to support hydrological forecasting, and coastal mapping. NOAA aircraft are modified to carry scientists and specialized instrument packages to conduct research for NOAA's missions.

Office of Ocean Exploration and Research

NOAA's Office of Ocean Exploration and Research supports interdisciplinary expeditions to study, map and explore the unknown ocean. In addition to the missions undertaken by the *Okeanos Explorer*, the office sponsors projects chosen during an annual competitive peer-reviewed grant proposal process. Exploration missions are provided funding, ship time and support for new and advanced undersea tools and technologies, helping scientists make biological, chemical, physical and archaeological discoveries. Key missions are chronicled and shared with the public through the Office's award-winning Web site, which has more than six million visitors a year. A minimum of 10 percent of the Office's annual budget supports education and outreach, including lesson plans that meet national science education standards. Students of all ages are invited to learn about ocean exploration by visiting oceanexplorer.noaa.gov.

NOAA Commissioned Officer Corps

The NOAA Corps is one of the seven uniformed services of the United States. It is composed of commissioned officers who provide NOAA with an important blend of operational, management, and technical skills that support the agency's science and surveying programs at sea, in the air, and ashore. NOAA Corps officers, in addition to managing and operating ships and aircraft, are also scientists and engineers. Corps officers serve in NOAA's research laboratories and program offices throughout the Nation and in remote locations around the world. For example, an officer serves as station chief at the South Pole, Antarctica.

About NOAA

NOAA understands and predicts changes in the Earth's environment, from the depths of the ocean to the surface of the sun, and conserves and manages our coastal and marine resources. Visit <http://www.noaa.gov>.

Explore with us at oceanexplorer.noaa.gov
Visit the ship's Web site at www.moc.noaa.gov