‘Bringing the Ocean to the World,’ in High-Tech

University of Washington/W.M. Keck Foundation/N.S.F.

The new network will study phenomena like the teeming life around thermal vents.

By WILLIAM YARDLEY
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SEATTLE — Thousands of miles of fiber-optic cables are strung across the world’s oceans, connecting continents like so many tin cans in this age of critical global communication. So the fact that about 800 more miles of fiber-optic cable will soon thread the sea floor off the coast of the Pacific Northwest might not seem particularly revolutionary. Until you meet John R. Delaney, part oceanographer, part oracle.

Harley Soltes for The New York Times

John Delaney is a leader in the effort to plant a network of sensors and cables in the oceans.

“This is a mission to Planet Ocean,” said Mr. Delaney, a professor at the University of Washington. “This is a NASA-scale mission to basically enter the Inner Space, and to be there perpetually. What we’re doing is bringing the ocean to the world.”

Under a $331 million program long dreamed of by oceanographers and being financed by the National Science Foundation, Professor Delaney and a team of scientists from several other institutions are leading the new Ocean Observatories Initiative, a multifaceted effort to study the ocean — in the ocean — through a combination of Internet-linked cables, buoys atop submerged data collection devices, robots and high-definition cameras. The first equipment is expected to be in place by 2009.

A central goal, say those involved, is to better understand how oceans affect life on land, including their role in storing carbon and in climate change; the causes of tsunamis; the future of fish populations; and the effect of ocean temperature on growing seasons. Oceanographers also hope to engage other scientists and the public more deeply with ocean issues by making them more immediate. Instead of spending weeks or months on a boat gathering data, then returning to labs

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to make sense of it, oceanographers say they expect to be able to order up specific requests from their desktops and download the results.

Researchers will be able, for example, to assemble a year's worth of daily data on deep ocean temperatures in the Atlantic or track changes in currents as a hurricane nears the Gulf of Mexico. And schoolchildren accustomed to dated graphics and grainy shark videos will only have to boot up to dive deep in high definition. "It'll all go on the Internet and in as real time as possible," said Alexandra Isern, the program director for ocean technology at the National Science Foundation. "This is really going to transform not only the way scientists do science but also the way the public can be involved."

The program has three main parts, two of which involve placing a range of sensors in the oceans and one that connects through the Internet all the information gathered, so that the public and scientists can have access to it.

A "coastal/global" program will include stand-alone deep-water data-gathering stations far offshore, mostly in the higher latitudes of the Atlantic and Pacific, where cold, rough conditions have made ship-based oceanography difficult.

In American waters, observation systems are planned on both coasts. In the Pacific, off the Oregon coast, the system will study the upwelling of cold water that has led to repeated "dead zones" of marine life in recent summers. In the East, off Martha's Vineyard, a coastal observation system is planned along the continental shelf, gathering information at the surface, subsurface and on the sea floor, where warm Gulf Stream currents confront colder water from off the coast of Canada.

"That mixing affects surface productivity, weather, carbon cycling," said Robert S. Detrick, a senior scientist at Woods Hole Oceanographic Institution.

In August, the Joint Oceanographic Institutions, which is administering the Ocean Observatories Initiative for the National Science Foundation, chose Woods Hole to lead the offshore buoy and coastal program. Woods Hole, which will receive about $98 million of the total cost, will partner with the Scripps Institution of Oceanography at the University of California, San Diego, and Oregon State University's College of Oceanic and Atmospheric Sciences.

In the Northwest, about $130 million of the initiative's cost is being dedicated to build a regional observatory, a series of underwater cables that will crisscross the tectonic plate named for the explorer Juan de Fuca. Rather than provide an information superhighway that bypasses the ocean, this new network is being put in place to take its pulse. Professor Delaney, whose specialty is underwater volcanoes that form at the seams between tectonic plates and the surprising life those seams support, is among those who have been pursuing the cable network for more than a decade, overcoming hurdles of money, technology and skepticism.

Some scientists have suggested that the Juan de Fuca is an imperfect laboratory, that it is small and lacks some features, like the most intense El Niño fluctuations, that might reveal more about how that phenomenon affects conditions at sea and on land. But Professor Delaney says the Juan de Fuca plate is well-suited for the program precisely because it is self-contained, just offshore and rich with seafloor activity, complicated current patterns and abundant fish and marine mammals. The new network shares many similarities with a plan called Neptune that Professor Delaney and others began pushing for in the 1990s. As part of an earlier effort related to that project, Canada is moving forward with its own cabled network off the coast of British Columbia.

"For the first three or four years, people just laughed when I said we're going to turn Juan de Fuca Plate into a national laboratory," Professor Delaney said. "Now they're not laughing."

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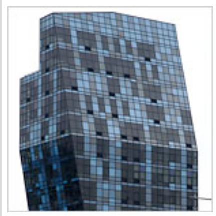

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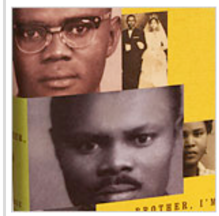

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