

## **\$2 Million Supports Ocean Observatories** <sup>[1]</sup>

Submitted by Rory Lattimer Thu, 2006-04-06 00:00

Two revolutionary, interactive seafloor observatories led by the University of Victoria will benefit from more than \$2 million in new funding from CANARIE <sup>[2]</sup> Inc., a national organization that promotes advanced networks and applications.

The NEPTUNE Canada (North-East Pacific Time-series Undersea Network Experiments) observatory, will lay 800 km of fibre optic cable and instruments off the outer coast of B.C., starting in 2007.

A sister observatory, VENUS (Victoria Experimental Network Under the Sea), will lay 43 km of cable and instruments in two locations off the south coast of B.C. The first 3-km leg of VENUS was installed in Saanich Inlet near Victoria in February.

Both observatories will use the Internet to continuously feed data, sounds and images from the ocean depths to laboratories, classrooms, science centres and homes around the world. Scientists will gather continuous information on ocean change, seismic activity, fish and marine mammal movements, and seafloor ecology.

The CANARIE funding, divided between two projects, will allow NEPTUNE and VENUS scientists to use leading-edge web services technology to communicate with their seafloor instruments and manage the large volume of data they collect. Web services are software systems designed to support machine-to-machine interaction over a network.

"CANARIE is very pleased to support the NEPTUNE and VENUS projects through our Intelligent Infrastructure Program," says Andrew Bjerring, president and CEO of CANARIE. "Projects such as these are leveraging the advanced capabilities of CANet 4, Canada's national research and education broadband network, to provide new knowledge and break new ground in scientific endeavour."

"We are delighted that our major observatory projects have attracted this level of support from CANARIE," says Dr. Martin Taylor, UVic's vice-president research. "Computer control of the subsea sensors and autonomous and tethered vehicles from many laboratories on land represents a huge computational and communications challenge."

In the first project, funded by \$1.1 million from CANARIE, the NEPTUNE team is partnering with IBM Canada <sup>[3]</sup> Ltd. to develop new technologies in software design and architecture.

These technologies will ensure that NEPTUNE and VENUS instrument systems are as flexible as possible, and that data can be quickly processed and shared across platforms.

"With so many types of instruments connected to the observatories we need a system that will quickly respond on its own to configuration changes," says Benot Pirenne, NEPTUNE Canada's assistant director for information technology. "We also need powerful, efficient and intelligent data processing to turn large volumes of raw data into information."

It's estimated that the NEPTUNE and VENUS archives will have accumulated several petabytes of data after only a few years of operation. One petabyte is equal to one quadrillion bytes, or roughly the equivalent of 20 million four-drawer filing cabinets full of text.

The second project, funded by more than \$939,000 from CANARIE, will develop web services technology to operate the controls of underwater high-definition TV cameras hooked up to VENUS and NEPTUNE. The cameras will relay high-quality imagery from the ocean floor to the world via the Internet.

Dubbed "Undersea Window," the project is led by McGill University researcher John Roston, a specialist in interactive multimedia. His partners are the NEPTUNE and VENUS teams, and Colin Bradley, director of UVic's laboratory for automation, communication and information systems research.

"This project will develop ways to interactively control camera and video transmissions from locations across the continent," says Bradley, who is responsible for the underwater engineering aspects of the project. "Ultimately, we'd like to move a camera around on an underwater vehicle, but for now we're working on the interfaces for a stationary system where the camera can pan, tilt and zoom on command."

The CANARIE contribution is being augmented with funding from industrial partners, the University of Victoria and McGill University, bringing the funding commitment for the two projects to \$1.5 million and \$1.3 million respectively. CANARIE is a not-for-profit corporation funded by Industry Canada to promote the development and use of next-generation research networks such as CANet 4 and the applications and services that run on them.

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