

## Canarie IIP-03 "Undersea Window" Project Milestone 3 Report

### Appendix 2: Communications



#### **Window on another world**

April 6, 2006

#### **'Undersea Window' promises closest ever look at world under the water**

Call it underwater reality TV. McGill University researchers and their partners will place a camera on the ocean floor, 100 metres below sea level off the coast of Vancouver Island, to relay images in real time on the Internet to scientists.

The "Undersea Window" will offer a new and unique opportunity to witness a host of underwater phenomena such as plankton blooms, fish migrations and volcanic eruptions. Directing the camera installations by remote control, scientists will interact with the marine world in real time. Researchers will no longer have to collect data intermittently from stationary instruments.

McGill University is responsible for the underwater camera and for the software and Internet technology that will stream the images from the seabed to the scientists' computers. The school is partnering with the University of Victoria, which will be responsible for the deployment of the camera and for a remotely operated undersea vehicle that will be used for installation and maintenance.

Major financing is being provided by CANARIE, a non-profit corporation responsible for developing Canada's advanced Internet infrastructure supported by its members, project partners and the federal government. CANARIE, industrial partners and the University of Victoria are contributing a total of \$1.3 million to the project.

The first components of the undersea laboratory were constructed last month. John Roston and Jeremy Cooperstock of McGill are, respectively, the project director and head of software development. Colin Bradley of UVic is the head of engineering development.

To learn more about "Undersea Window" and related projects, please visit:

[Undersea Window Project](#)

[VENUS: Victoria Experimental Network Under the Sea](#)



**University  
of Victoria**

Media Release

Date: April 06, 2006

## **MORE THAN \$2 MILLION SUPPORTS TECHNOLOGY BEHIND UVIC OCEAN OBSERVATORY PROJECTS**

Two revolutionary, interactive seafloor observatories led by the University of Victoria will benefit from more than \$2 million in new funding from CANARIE 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 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 Benoît Pirene, 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, UVic and McGill, 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.

For more information on NEPTUNE Canada and VENUS visit [neptune.uvic.ca/](http://neptune.uvic.ca/) and [www.venus.uvic.ca](http://www.venus.uvic.ca)

For more information on the Undersea Window project, visit [www.canarie.mcgill.ca/project\\_ciip\\_index.html](http://www.canarie.mcgill.ca/project_ciip_index.html)