Fall 2003 Newsletter

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Project Overview

Join us on-line, in real-time at the bottom of the ocean around Victoria and Vancouver! The Victoria Experimental Network Under the Sea (VENUS) is an ambitious project to conduct coastal oceanography in an innovative and informative way. VENUS will be a network of instruments dedicated to observing oceanographic processes in our marine environment. Measurements, images, and sound will be delivered to scientists, managers, the public, and a data archive via fibre-optic cables laid from three landfall sites. These cables will deliver power for instruments, lights, and robots, receive commands for project scientists, and deliver information back on the health of our oceans. The VENUS project will install observatories in Saanich Inlet, across the southern Strait of Georgia, and across Juan de Fuca Strait (Figure 1). To date, funds are available to design and install the observatory infrastructure. Once installed, the observatory will support new oceanographic experiments for long-term studies of our coastal waters.

The VENUS observatory consists of numerous components. First and foremost are the oceanographic sensors and instruments to be deployed on the ocean bottom. These will include standard sensor suites, such as Temperature, Salinity and Pressure (CTD), and Acoustic Doppler Current Profilers (ADCP) for monitoring the seawater conditions and currents, and novel new technologies such as in situ dissolved gas sensors. Instrument suites will plug onto the network backbone at VENUS nodes.

These nodes will provide the power and communications necessary to control and receive data from the instruments, and send information back to the scientists and network operators. A fibre optic, high voltage cable will run from the bottom-mounted node to a shore station, where data will be buffered and transferred to the Data Management and Archive System (DMAS). The DMAS will provide both a user interface to the observatory array, and a permanent data archive.

Keeping Current

Saanich Inlet Array Request for Proposals

On 5 November, 2003 UVic released RFP 243 – VENUS Project Saanich Array Construction. This RFP marks the first major RFP of the VENUS Project. Interested companies have been asked to bid on the design, fabrication, installation and acceptance testing of the Saanich Inlet Array. At the successful completion of this contract, the VENUS Project will have a fully functioning 3km array and a Network Operations Centre. The Saanich Array is expected to become operational in the second quarter of 2004. Future RFPs will be issued for the Data Management and Archive System and the Strait of Georgia/Juan de Fuca Strait Arrays.
**We’re Moving**

VENUS, NEPTUNE Canada, and the Ocean Board will be moving into the newly constructed Technology Enterprise Facility at the beginning of January 2004. The TEF building is situated at 2300 McKenzie Ave., Victoria, B.C., on the UVic campus. We are all extremely excited about having a place to call our own. Please note that when we move some of us will have a new telephone number.

**Island Tech 2003 Showcase November 19th**

We’ll be there! Come check out our exhibit at the Victoria Conference Centre on November 19 from 10AM to 8PM. Adrian Round, Project Manager, will also be doing a presentation around noon; time TBA. Talk to the team and get the most current updates.

**Oceanography Magazine Article**

An article about the VENUS Project titled “Research Plans for a Mid-Depth Cabled Seafloor Observatory in Western Canada” will appear in the 16-4 issue of Oceanography magazine. This upcoming special edition of Oceanography magazine issued by The Oceanography Society will be on the topic of ocean observations. The article written by Verena Tunnicliffe, Richard Dewey and Deborah Smith will summarize the project, vision and science while detailing the unique oceanographic regions where the VENUS cable will be laid.

Abstract: As the first cabled seafloor observatory that involves a geographically distributed network structure, VENUS will oversee the deployment of 3 powered fibre-optic cable lines in British Columbia’s SW waters. The funded infrastructure will offer two-way high-speed communication access and interaction in 24 hour real time from the ocean floor and water column to a land based location. With an expected life of at least 20 years, each cable line will have a unique set of instrument suite combinations that will reflect the environmental processes being studied by participating scientists and researchers. Internet access to data will be available for all: collaborators, scientists, students and the public. This revolutionary new approach to sharing data will undoubtedly change the pace of understanding about the oceans for both the scientific community and the general public. Web page (http://www.tos.org)

**Ocean Board News**

Tim Walzak was appointed in September as the acting Executive Director of the University of Victoria’s newly formed Ocean Science and Technology Board. Tim has been the President and CEO of the UVic’s Innovation and Development Corporation.

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**Saanich Inlet Array**

**Permits and Surveys**

VENUS plans to have the first cable and observatory node installed in Saanich Inlet by the summer of 2004. Saanich Inlet permit applications for the proposed cable route (Figure 2) have been submitted and preliminary site surveys have been conducted. The Saanich Inlet section of VENUS will be located approximately 3 km west of the Institute of Ocean Sciences dock in Patricia Bay, near the 100 m isobath. The cable will make land-fall on the IOS dock, where a shore station will buffer and transfer data to the VENUS archive.

In September, 2003 a preliminary bottom survey was conducted using side-scan sonar (Figure 3) and analog video using Coastal and Ocean Resources Inc. (www.coastalandoceans.com) ROV on the R/V John Strickland. Bottom sediment identification over a 400 m swath was mapped from the end of the IOS dock out to the 100 m isobath. Apart from a few hard targets near the south-east portion of the survey, no impediments were identified. Preliminary analysis suggested that the bottom type out near the potential node location was harder packed gravelly sand, which would provide an ideal landing environment for both the observatory node and the bottom mounted instrument suites. As a result of these surveys, a preliminary cable route was determined (Figure 2).
On October 20 and 21, 2003, the Canadian Coast Guard Ship (CCGS) VECTOR was outfitted with the Canadian Submersible Facilities remotely operated vehicle ROPOS (Figure 4). Detailed video and acoustic bottom surveys were repeated along the potential cable route. These surveys confirmed the earlier data, and indicate that there are no potential obstacles along the proposed route, and that the marine environment near the node location is ideal, both from a bottom substrate perspective, and from the abundance of marine life present in the area.

Juan de Fuca Strait Array

NSF Extension Proposal

The original proposal to CFI and BCKDF considered the termination of the VENUS network at the Canadian – US boarder mid-strait of Juan de Fuca Strait. However, it was always recognized that the scientific objectives associated with water and marine life exchange within Juan de Fuca Strait, Puget Sound, and the Strait of Georgia would be compromised without extending the observatory across the entire channel of Juan de Fuca. To this end, discussions with our US colleagues were initiated shortly after VENUS was funded. Numerous trips, meetings, and presentations were made to interested parties in Seattle and Olympia, with the goal of encouraging a US led effort to manage the costs and logistics associated with extending the VENUS observatory into US waters. This effort was rewarded in September 2003, when a group of committed scientists from various US institutions submitted a proposal to the National Science Foundation on behalf of the Applied Physics Laboratory in Seattle to extend the VENUS observatory across the entire width of Juan de Fuca Strait. We greatly appreciate the effort our colleagues south of the boarder put into this proposal, and we wait with great anticipation for its success.

Strait of Georgia Array

June Workshop: Mapping Science Locations

On June 17, 2003 a one-day Science Workshop was held at UVic to discuss the potential science that could be supported by a cabled observatory across the Strait of Georgia. This included re-visiting the originally proposed science objectives and instrument locations, as well as any new regions and science not included in the CFI proposal. Over 40 scientists attended the workshop from Victoria, Nanaimo, and Vancouver, covering a broad range of disciplines. In addition to the oceanographic studies planned for southern Strait of Georgia and the Fraser Delta regions, the sponge reefs and an active geo-seismic area were identified as possible sites for VENUS instruments. A product of this discussion was the generation of a chart showing some of the prime regions of scientific interest (Figure 5).

The possible cable route to service these sites might be slightly further north than the lines drawn in the original proposal, which assumed that the cable would land-fall at either the Tsawwassen ferry terminal, or the deep-sea coal port. Other land-fall possibilities include Sand Heads or Galiano Island, however, back-haul internet and power facilities at these sites may be more problematic. A detailed bottom analysis and regional survey will be undertaken to explore all possible cable routes.
Other Ocean Observatories

NEPTUNE

VENUS is closely affiliated with three other ocean observatories presently funded in both Canada and the US. Foremost is NEPTUNE, which is an international joint Canada-US project to build a regional scale ocean observatory into deep water off the west coast of North America. On October 17, 2003 a formal announcement was made that the Canadian portion of NEPTUNE had received full funding support ($62M) from both the CFI and the BCKDF. NEPTUNE Canada will also be managed from the University of Victoria, although it involves dozens of institutes and scientists from across Canada. The NEPTUNE Canada web site is www.neptunecanada.com, which includes links to its major US partners, the University of Washington, Woods Hole Oceanographic Institution, NASA’s Jet Propulsion Laboratory at the California Institute of Technology and the Monterey Bay Aquarium Research Institute. It is hoped that compatible technologies will be integrated into both NEPTUNE and VENUS so that observatory components will be transferable across networks with minimal re-configuration.

MARS

The Monterey Bay Aquarium Research Institute is also funded to build a NEPTUNE compatible ocean observatory, where their focus is for a developmental facility installed down into 1400 m depths (www.mbari.org/mars/). Identical fibre optic cable for both the VENUS and MARS observatories has already been purchased, and it is hoped that both the Strait of Georgia and Juan de Fuca sections of VENUS will be ready to be installed in coordination with the MARS array within the Monterey Canyon in late 2005.

Bonne Bay

The Bonne Bay Observatory (www.bonnebay.mun.ca) of Memorial University of Newfoundland was funded during the same CFI competition as VENUS. This more modest, single section, shallow water observatory is also scheduled to be deployed in spring 2004, and will operate from the Bonne Bay Marine Station. Although not formally a technology partner with VENUS, as are NEPTUNE and MARS, the Bonne Bay Observatory will share many similarities with the VENUS system.

ORION Workshop

This coming January (Jan. 4-8, 2004), there will be a joint US-Canada workshop in San Juan, Puerto Rico, to discuss the scientific opportunities that could be supported by cabled ocean observatories. This NSF-NSERC co-sponsored meeting on Ocean Research Interactive Observatory Networks (ORION) will formulate the science priorities and educational opportunities that can be addressed using ocean observatories. At present VENUS has several sister projects both in the U.S. (MARS and NEPTUNE), and Canada (NEPTUNE and Bonne Bay), sharing technologies and resources. Although the deadline for registration has passed, anyone interested in affecting the scientific policies of NSF and NSERC in their support of cabled observatories is encouraged to attend. Representatives from NEPTUNE Canada, Bonne Bay, and VENUS will be attending.

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