

Summer 2007



University of Victoria

Saanich Inlet & Strait of Georgia

KEEPING CURRENT

Changes at UVic

VENUS and NEPTUNE Canada now have a new home at the University – not physically but “spiritually”. The Board of Governors has created its first not-for-profit registered society called Ocean Networks Canada Society. The purpose of the society is two-fold: i) to create a little distance from the University so that partnerships will be easier to develop; and ii) to create a body that has more flexibility in funding venues. The Board of Directors for ONCS, headed by Robert Giroux, held its inaugural meeting on Aug. 26 to approve the mandate and the executive for the Society. The President and CEO for ONCS is Martin Taylor who steps down after nine years as Vice President Research at the University. Martin knows VENUS well as we have reported to him over the last five years of planning and building. You can find him in the Technology Enterprise Facility and at onet@uvic.ca.



OCEAN NETWORKS CANADA

VENUS Personnel Changes

Within VENUS, we said goodbye to Deborah Smith who spent five years helping to build the Project. Fond memories include her great organizational talents, her ability to connect with funders and supporters, and some interesting times at sea. Deborah is growing her own business as a music industry manager. We now welcome Nikolai Korniyuk as our communications coordinator. Nikolai has experience in grants management, the shipping industry and - watch it - in herding scientists in a major research project. Nikolai is our media contact at (250) 472-5366.

Newsletter Contents

Keeping Current.....	1
Strait of Georgia & Saanich Inlet Updates.....	2
Seiches in Saanich Inlet	3
Conferences.....	4
Project Overview	4
Contact Information	4



The instrument platform being redeployed in Saanich Inlet. The real-time sediment trap is on the top, just behind the lifting line. For the full story on the Saanich Inlet Maintenance Cruise, please see Page 2.

Strait of Georgia Array - Update

Progress on the Strait of Georgia (SOG) array has continued at a steady pace. The Spring 2007 newsletter described in detail the installation of the main cable and node bases. In June, the Project Team returned to SOG to complete the task of landing the shallow water section of the main cable. The cable must cross the Sturgeon Bank, a 4.5 kilometre drying mud flat on the way to the Shore Station. A shallow water barge and three sets of progressively shallower draft tugs recovered the cable in the deeper waters of the Strait and redeployed it across the mud flats. The barge arrived at the Shore Station with 50 metres of cable on the reel, one foot of water under the keel and thirty minutes before the tide was due to start ebbing!

With the cable now landed, work is underway finalizing the construction of the Shore Station. A modified BRITCO Bulldog field office will serve as the SOG Shore Station. Contractors are currently installing the concrete pad and associated power and communication cables. We will have high-speed Internet lines from the Shore Station courtesy of TELUS and GVRD. With the Shore Station in place, the DMAS Team will install the necessary network equipment and servers to support the array control and data collection. OceanWorks will then install the array power system and the control computers.

OceanWorks has made steady progress on the subsea equipment. Schaefer Power has delivered the Medium Voltage Converters and the final integration of the Node Pods and SIIMS is well underway. All of the lessons learned from the development of the Saanich Inlet array and almost two years of operations have gone into the SOG design. The results are impressive!

Installation of the Node pods and the first set of instrument platforms is currently scheduled for 15-20 October 2007 but we are facing some difficult delivery schedules and engineering tests. Nonetheless, VENUS is growing!

Saanich Inlet Maintenance Cruise – September 10 to 17, 2007

The VENUS team was aboard CCGS Vector this past week servicing instruments in Saanich Inlet and preparing the Node bases in Strait of Georgia for a mid-October deployment of the Node pods.

Several instruments were swapped out for re-calibration, and a few were temporarily removed. The GTD (Gas Tension Device) will be returned to Pro-Oceanus for repair and the ALEC CTW was replaced with a newer unit and relocated to the camera frame. Particularly noteworthy was the inclusion of a new instrument to VENUS – the real-time sediment trap. The electronics board in an autonomous Technicap PPS 24 sediment trap was redesigned by *Round Innovations* (at home by our very own Project Manager) to provide real-time control of the trap motor. This allows a user the ability to capture samples based on events detected by other instruments.



Arriving at the Shore Station with less than 100m left on the big reel.

SIIM #3 was replaced with an upgraded version of its predecessor (SIIM #2), once again enabling access to the VENUS camera on the tripod and instrumentation on the camera frame. The camera frame Seabird CTD was removed for eventual deployment in SOG, and the new ALEC CTW was mounted in its place. The ‘noise’ problem with the ISUS-X Nitrate sensor was resolved by removing the copper bio-fouling guard, which appears to have ‘self-fouled’. The ISUS-X was redeployed with a simple guard only. A power supply was integrated into the Nortek Aquadopp, allowing the unit to run on VENUS power versus a battery.

Lastly, the hydrophone array was recovered due to a detected ground fault. The root of this problem has yet to be identified, hence the array will remain on shore with a redeployment planned for October.

Seiches in Saanich Inlet

Jim Gower, Oliver Campbell and Richard Dewey

The first suite of VENUS instruments were deployed in Saanich Inlet in February 2006. Among these instruments were a number of CTD devices that record Temperature, Conductivity, (from which we can calculate Salinity), and Pressure (Depth). Specifically, VENUS has maintained a near continuous record from a SeaBird 16+ Seacat CTD and a Falmouth Scientific NXIC CTD, interrupted by a few short power failures, recovery and re-deployment during scheduled maintenance cruises, and a one month gap in late September 2006 associated with the failure of an observatory Science Instrument Interface Module (SIIM). The 16+ Seacat instrument takes a record every minute, while the NXIC returns a sample every second.

These data have allowed us to track variations over periods ranging from a few minutes to over a year (at the time of this article 09/07). A detailed analysis of the water pressure records from the VENUS Instrument Platform (VIP) in Saanich Inlet at a depth of 96m reveals a host of signals, including contributions from tides, atmospheric forcing, and possibly earth quakes. One of the more intriguing signals is the frequent occurrence of short period (tens of minutes) waves.

If one looks at the pressure records on the VENUS web site (i.e. Data Plots), the dominant signal is the ~3m tidal variations, which modulate over a fortnightly period between nearly diurnal to mixed semi-diurnal. However, if one filters out the tides, either by high-pass filtering or through harmonic analysis, one is left with a much noisier signal, with variations from a few mm to tens of cm. Shown in Figure 1 is a two day record for June 13, 2007 of the raw (92-97 m) and the high-pass filtered (-0.05 – 0.05m) pressure record from the Seacat.

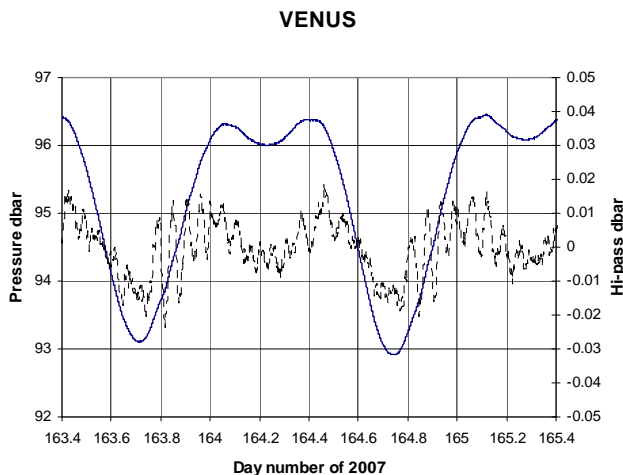


Figure 1. Raw and high-passed pressure records from VENUS sensors in Saanich Inlet for June 12-13, 2007.

A small amount of the tide remains in the high passed data, but a 3 cm wave with a period of ~1.4 hours is clearly evident, particularly during the dominant flood (rising) tide. An internal seiche generated by the tide at the mouth of the Inlet is the likely cause. A surface seiche would have a much shorter (~20 minute) period. A profiling CTD may be required to confirm the existence of internal seiches. At other times, isolated ~cm scale waves occur, and these often correlate well with regional seismic activity. Longer period fluctuations correlate well with large scale atmospheric pressure systems, which can slightly drain or fill Saanich Inlet as they pass.

Some of the larger (~20 cm), high-frequency (~10 minute period) waves observed in the VENUS pressure and Canadian Hydrographic Service (CHS) tide gauge records in Saanich Inlet may be due to pressure waves traveling overhead in the atmosphere. Shown in Figure 2 are the high-passed pressure records from VENUS and CHS near mid day on July 13, 2007. Attempts to match up the occurrence of these waves with either seismic or wind events is unsatisfying, with either timing or magnitude issues. Similar sub-surface pressure waves have been reported following large atmospheric disturbances including anthropogenic events such as (in the 1960s) the atmospheric testing of atomic bombs. Research and analysis into the seiche modes of Saanich Inlet and other pressure fluctuation events is on-going.

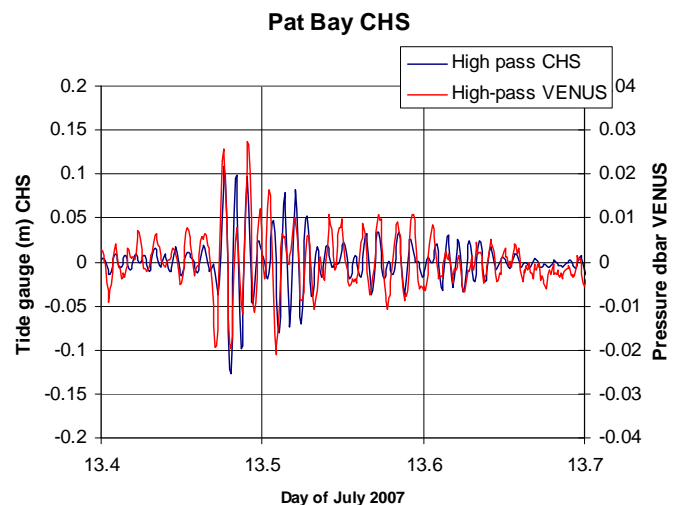


Figure 2. High-passed pressure records from VENUS (red) and CHS (blue) for July 13, 2007.

COME SEE VENUS AT OCEANS '07 & PICES XVI

OCEANS 2007 MTS/IEEE "On the Edge of Tomorrow"



September 29 – October 4, 2007
Vancouver Convention &
Exhibition Centre
Booth 314D

VENUS is a
Highlighted Exhibitor
featuring a live seafloor camera feed

<http://www.oceans07mtsieevancouver.org>

Exhibit Partner Global Marine Systems Ltd



North Pacific Marine Science Organization

PICES 16th Annual Meeting

The Changing North Pacific: Previous Patterns,
Future Projections, and Ecosystem Impacts

October 26 – November 5, 2007
Victoria Trade & Convention Centre

**Exhibit Partner
Canadian Scientific Submersible Facility**

Project Overview

VENUS is a research facility that is supporting coastal oceanography and providing data for processes studies, seasonal cycles, and long term climate studies in British Columbia waters. The VENUS network of instruments is dedicated to real-time observations of oceanographic processes in our marine environment. The VENUS Data Archive supports data mining and communication among users. Measurements, images, and sound are delivered to scientists, managers, the public, and a data archive via seafloor fibre-optic cables laid from two separate landfall sites. These cables are delivering power for instruments, lights, and robots, transmitting commands from project scientists, as well as serving information back on the state of our oceans.

The VENUS Project includes two interactive laboratories, one currently installed and operational in Saanich Inlet and a second in the Strait of Georgia to be fully installed by the fall of 2007.



The VENUS Team

Verena Tunnicliffe, Project Director	(250) 472-5365
Adrian Round, Project Manager	(250) 472-5364
Richard Dewey, Associate Director, Research.....	(250) 721-4009
Nikolai Korniyuk, Manager, Communications & Outreach	(250) 472-5366
Paul Macoun, Project Engineer.....	250) 472-5369
Jaklyn Vervynck, Data Manager	(250) 472-5367
Faith Bateman, Project Administrator	(250) 472-5368

www.venus.uvic.ca
venus@uvic.ca