Director’s Report by Chris Barnes

Much of our current focus is to complete the planning for an integrated marine program through the summer of 2009 that will see the final phases of the installation of the cabled observatory. At this point, we are anticipating the deployment of the five nodes by Alcatel-Lucent, using ROPOS ROV, in about May-early July with commissioning and hand-off to U Vic. Following that phase, NEPTUNE Canada will deploy, also using ROPOS, the extension cables, junction boxes and instruments (over 130, most clustered on frames at key locations close to each node site). The two operations need to be well coordinated, especially since ROPOS is needed for each phase. We are trying to secure the necessary ship time and avoid other west coast research cruises to the area of the observatory. Mairi Best and Brian Bornhold have devoted much time to these interactions and planning, with Peter Phibbs and the engineering team in close contact with Alcatel-Lucent. Peter and Mairi expand on some of the operational details in their articles.

As part of this planning, NEPTUNE Canada continues with the final purchases of whips, extension cables and connectors that will allow the further wet testing of many of the instruments. Other articles describe the successful deployment of the instrument pod in Saanich Inlet connected in real-time through the VENUS node. The instrument frame is a prototype from which others will be designed and manufactured in the first quarter of next year. All the instruments will be assembled on the frames and be ready for deployment by early May.

Colleagues at Ifremer participated in the pod installation, with the testing of their Tempo-mini package of instruments. It was timely that in November we had a visit of members from the French Embassy: Mr. François Delattre, Ambassador; Mr. Alexandre Garcia, Consul General; and Danielle Ziébelin, Scientific Attachée. With Alcatel-Lucent being the principal contractor and our cooperation and staff exchanges with Ifremer, there are opportunities and programs to further enhance this international collaboration. The month previous, we had a visit from members of the Irish Embassy, including Ambassador Declan Kelly.
This week we met with members of a trade commission from Korea. These are a few examples of our recent international interactions and the keen interest shown in the NEPTUNE Canada Project.

As countries expand their plans for cabled ocean observatories, there are plans to establish an International Association of Ocean Observatory Operators to help share experiences and develop formal collaborations and efficiencies. This was first proposed in 2006 and informal discussions have since occurred in Japan, Europe, and North America to advance this concept. A further informal meeting will occur at the American Geophysical Union meeting in San Francisco this month.

**Engineering**

by Peter Phibbs

One of the challenges of developing technology is the unpredictability. In the September newsletter, I mentioned an issue with a disconnect breaker in the medium voltage converter that “would be fixed in the delivered units”. It turned out that the issue also involved some circuitry in the MV converter. The fix looked simple, but when put in place caused the converter to fail tests that it had previously passed. So what appeared to be a low level issue in September has taken three months and a great deal of effort, and is still not fully resolved. Unpredictable. ASN has continued work on the other two major development tasks still ongoing: the low voltage power board and the medium voltage wet mate connector. The problem with the low voltage board has been resolved pending final testing. The medium voltage wet mate connector continues to present challenges during its qualification tests, and all parties are working diligently towards a solution.

A NEPTUNE Canada Junction Box, built by OceanWorks, was outfitted with a variety of instruments and deployed on VENUS Saanich in September. It is working well, and the internal temperature is lower than predicted, increasing our confidence that it will be suitable for long term deployment. The Saanich deployment is a good test run of our procedures for preparing equipment for deployment. It demonstrated the necessity for complete and thorough assembly and test procedures prior to deployment. Without that baseline, technicians trying to troubleshoot deployed equipment cannot be sure that they are not trying to solve a fundamental incompatibility. Thanks go to Kim Wallace, the Highland Technologies technician, and Paul Hansen, our QA Manager who were primarily responsible for the pre-deployment testing program with Science team oversight.

Alcatel-Lucent has begun scheduling vessels for the marine installation program in 2009. They hope to use C/S Lodbrog (image above), currently based in Taiwan, as the cable ship, supported by a second vessel with the ROPOS ROV aboard.

The work will proceed as follows:

- The Trawl Resistant Frames (TRF) and nodes will be trucked from California to BC, and unloaded dockside.
- Each node will be assembled and tested to ensure they have not been damaged in transit
- The cable ship will come alongside and a TRF and node will be placed on the back deck under the A-Frame.
- The cable ship will transit to the first node site, and recover the end of the spur cable. The spur cable end was laid with a length of heavy rope attached, so either the cable ship will grapnel for the rope or the ROV will recover the rope end.
- Once the spur cable is on board the splicing crew will start preparing to make the splice between the spur cable and the Cable Termination Assembly on the node.
- Once the splice is complete and tested, the cable ship will lower the TRF to the seabed, keeping tension on the spur...
cable to stop the TRF from twisting. Meanwhile the ROV will be in the water, watching to ensure safe deployment.

- Once the node is in place, the ROV will plug a test device into each science port to ensure that they operate as expected, and it will complete a final inspection of the node. Meanwhile, the cable ship will return to port for the next assembly.

We are having detailed discussions with Alcatel-Lucent on the marine program. We have started ordering the extensions and whips required for the instrument installation. Cheryl Katnick continues to lead the task of ordering the cables and connectors, and will continue to touch base with science groups as we move forward.

We continue to work on the migration of the GIS data into DMAS. A knowledgeable consultant is being hired, who will help with the verification of the data and meta-data, with their registration in the database, and with the establishment of a web interface to the data. We hope to make all the georeferenced data available in the first half of 2009.

Science by Mairi Best

Instrument Platform in Saanich Inlet

NEPTUNE Canada’s deployment of the Instrument Platform in Saanich Inlet on September 28, 2008 went off well (image to right). In collaboration with VENUS, ROPOS, and IFREMER a newly configured platform with junction box and instruments was deployed to support integrated data testing and scientific collaboration. The instruments are running and the data is flowing.

The platform will remain connected to the VENUS Saanich Inlet node until February 2009 when it will be retrieved and prepared for the redeployment in July-August 2009 on the NEPTUNE Canada system at 2300 m where it will help scientists observe the amazing deep-sea ecosystems that flourish in the Endeavour Ridge’s main hydrothermal vent field.

Testing is useful both when it confirms that all is functioning well, but also when it identifies some improvements to be made. Both cases are present in this test deployment, and while some instruments are happily delivering scientifically relevant data, others are still having problems adapting to their new surroundings. Thanks to all who’ve been working to bring the latter into line. We’ve certainly been taking advantage of the remote instrument control to fine tune configurations!

Vertical Profiler System

As mentioned in our September publication the Vertical Profiler System (VPS) received its Factory Acceptance Testing this past summer in Japan. In November it travelled from Japan to arrive at the Marine Technology Centre in Sidney, BC.

The VPS instrument package remains under wraps at the Martine Technology Centre until January when the technician crew from Nichiyu Giken Kogyo (NGK), Japan will arrive to unpack, assemble, and prepare the VPS for deployment in August – September 2009.

Installation Preparations

A lot of effort has been going into pulling together all the pieces for next summer’s instrument installation. The stragglers are being rounded up, the extensions and whips are being hunted down, and plans are in place for assembling the pieces into integrated platforms over the next few months. With ship time firming up for late July – early September, the detailed shipboard schedule is being mapped out. Scientists and technicians leading the initiatives to install specific instruments are hard at work making sure that instruments reach us with time to test prior to deployment. They are also working with the data streaming from the test deployment on VENUS to fine tune configuration and calibration requirements on this system. Come February, these scientists will gather in Victoria for a Science and Data Workshop on both installation planning, but also planning for the data analysis and collaboration that will follow. In addition, our profile is being raised by scientists and staff through representation at meetings around the world.

Employment Opportunities

Visit our website at:

www.neptune.uvic.ca/about-neptune-canada/opportunities/
DMAS
by Benoît Pirenne

Oceans 2.0

As reported earlier, DMAS has embarked on the implementation of its “Oceans 2.0” project, supported by CANARIE’s Network-Enabled Platform funding program. Our project has three distinct components:

- the implementation of a generic, web-based interface for controlling underwater cameras and in particular its application to a HDTV camera (in collaboration with McGill University)
- the interoperability of the VENUS/NEPTUNE Canada data archive with that of other projects
- the implementation of a Web 2.0 environment to improve and facilitate the process of scientific discovery and knowledge generation in the face of continuous large data rates from many instruments

DMAS has now started this 2-year project on all three fronts. The HDTV camera hardware is being prepared for immersion in Saanich Inlet next spring and will be fitted with on-board low-latency H.264 compression, allowing for comfortable, delay-limited remote control over the CANARIE network.

The Web 2.0 environment is currently being designed. We expect to gradually unveil functionality as we move forward through the project. A first glimpse of the new functionality will -we hope- be demonstrated at the Science and Data Workshop taking place at the University of Victoria in February 2009.

Interoperability

On the Interoperability front, a small workshop was organized early September at our headquarters in which a number of people representing many data centres and marine data centres participated. Workshop participants are listed below.

Front row: from left: Andree Behnken, MARUM, University of Bremen; Lorraine Brasseur, Ocean Observatory Initiative, Consortium for Ocean Leadership; Mairi Best, NEPTUNE Canada; Jason Marling, Integrated Science Data Management, Dept. of Fisheries and Oceans; Paul Gaughan, SmartBay Galway, Irish Marine Institute

Back row: from left: Eric Guillemot, NEPTUNE Canada; Bob Branton, Ocean Tracking Network, Dalhousie University; Markus Dolensky, Scientific Data Interoperability Consultant; Benoît Pirenne, NEPTUNE Canada; John Graybeal, Marine Metadata Interoperability, Monterey Bay Aquarium; Brian Schlining, Monterey Bay Aquarium; Robert Arko, Lamont Doherty Earth Observatory, Columbia University

Missing: Richard Dewey and Jaklyn Vervynck, VENUS, UVic
Interoperability Workshop

The workshop allowed us to address all issues related to data interoperability in Ocean Science. To help us put things in perspective, Markus Dolensky, formerly with the European Southern Observatory in Munich, Germany was invited. Markus has spent the last decade developing solutions to interoperability problems in astronomy. He delivered a number of presentations explaining some of the basic issues and solutions already in place in this field. Other participants described relevant work at their own institute. On day two, John Graybeal spoke about ontologies and vocabularies. Jason Marling explained standards in use in the relevant Canadian government agency. The rest of the day was devoted to discussions on issues such as registries and data services. The workshop was concluded with a first list of sites that would be part of a small consortium of data repositories with interest in exchanging data “variables” of relevance to the North-East Pacific. In the next few months the Interoperability project will move forward with the selection of data exchange standards, the use of registries etc.

Some of the key findings of the workshop are summarized here:

- The power of Ocean Observatories such as NEPTUNE Canada and VENUS does not only lie in its continuous data streams, but in the fact that all streams and their sensors are all registered on the same spatiotemporal frame. This feature will open a great potential for analysis across different data sources. Should multiple data sources be also registered to the same frame, the potential would be even greater.

- “Variables” to be considered for interoperability include the traditional Temperature, Salinity, Pressure (TSP) and their derived values. The ability to exchange multi-media data is very attractive as well. The whole point of interoperability is not to grab data, but to show what is available and make it accessible.

- The experience of astronomy shows that heavily processed, multi-instrument focused surveys produce 20 times more publications than simple raw data. Facilities to help assemble such large datasets should be given priority. A suitable use case should be identified by the community.

- Interoperability should allow us to extend one or more dimensions (e.g., time) for a set of variables. This would provide the community at once with a more intensely observed area. The selection of variables such as TSP will illustrate the power of synergistic, highly observed areas. This can be achieved by providing data from global resources.

In summary, the workshop attendees agreed on the value of pursuing interoperability between us in the next 18 months or so and to start with the exchange of standard variables (such as TSP) residing at the different data centres. Table below shows the current sites and data types that we have agree to share at present. This list is expected to evolve as more players are indicating interest in exchanging data with us or as more data sources come on-line.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Variables: TSP and others</th>
<th>Other data: Biology</th>
<th>Other data: Imaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTN/Dalhousie (OBIS)</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>MBARI</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Bremen U: MARUM</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISDM/DFO</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHONe</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>LDEO</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The next steps include:

- Drafting agreements with the Institutes mentioned above

- Identification of a suitable host for the registry of data and services (hopefully an existing one)

- Agreement on technologies (protocols, formats) for data exchange

- Move to an implementation phase.

We are hoping to reach the implementation phase by May 2009 with a first prototype demonstration shortly thereafter.

In conclusion, the workshop was very valuable in that it allowed a number of organizations with similar interests to evaluate possible initiatives that will benefit our respective user communities. A pragmatic approach to data interoperability was proposed whereby some of us agree to explore the exchange of a well defined set of ocean data “variables”. Examples of how astronomy is facing the challenges of making data from various origins interoperable were presented and encouraging in the way they can empower scientists. Finally, a roadmap is being prepared to achieve practical results in the near future.
Website Redesign
launched October 20, 2008

The process of redesigning the website began 18 months ago and has involved many phases and players including:

- Visioning, competitive analysis, and user insight done in consultation with TELUS
- Development of a detailed Information Architecture framework for the site by Faye Hoffman, UVic
- Hiring of an in-house Web Developer, Tim Boesenkool and Web Content Manager, Dwight Owens
- Implementation of Visual Design aspects by the Rocketday Arts team
- Our scientific community who provided valuable feedback during the process, and critical content

NEPTUNE Canada’s vision for the website is to create a portal into the ocean environment/network and a hub for live and previously captured data (via DMAS). With the NEPTUNE integrated dataset as a catalyst, it will be a world-leading resource for information on Earth and ocean science research; a dynamic interactive space where researchers (both new and experienced from a variety of disciplines) can learn from others and collaborate together on research projects. The Web site will provide researchers with a comprehensive suite of tools and resources to explore and analyze data and develop and manage experiments.

Some of the new website features include:

- A research project database
- Location maps
- Detailed instrument listings
- Searchable live data from the seafloor (register for a free account to access the live data)
- Lesson plans database for K-12 educators
- access to our full news archives
- streaming video presentations, and a multimedia gallery

These features, however, are just a start. In the coming months, we plan to add much more, as we gradually transform the site into a virtual commons for ocean science research and collaboration. This upgrade is only our first step toward the Oceans 2.0 environment we envision for the future.

When fully implemented, our website will allow you to:

- search, discover, analyze, and integrate diverse data
- collaborate online with distant colleagues
- monitor all sorts of live data streams coming from instruments throughout our network
- subscribe to web services that notify you when natural events of interest are detected by observatory sensors and instruments
- set up your own personalized or shared virtual "lab", where you can run experiments, collect data and even control underwater instruments
OOI completes successful Final Design Review

In mid-November, the OOI project team completed a two-part Final Design Review, held by the National Science Foundation, with two external review panels. A Cost and Schedule Review on Nov. 6-7 was followed with a Programmatic and Technical Review on Nov. 12-14.

In its final report, the review panel noted that “the OOI continues to demonstrate the potential for significant broader impacts and the intellectual merits are outstanding,” and “the OOI project team is to be congratulated on the excellent progress made since the Preliminary Design Review (PDR) and the overall state of readiness of the project planning documentation.”

The objective of the review was to gain confidence in a risk-adjusted cost that defines the budgetary resources and schedule needed to accomplish the requested scope. While the technical baseline has not changed fundamentally since PDR in December 2007, the design now has more clarity in specific subsystems and firmer cost estimates from concentrating engineering efforts in high-risk areas. The project also has more confidence in operating within NSF’s guidance for the Operations and Maintenance budget after infrastructure completion. The OOI will now be considered by several review bodies internal to NSF before it is forwarded to the Office of Management and Budget for inclusion in the FY2010 budget request to Congress.

A public package of FDR documents, including the panel report, is being prepared and will be posted on the Ocean Leadership web site.

Cowles Named OOI Program Director

Tim Cowles, Professor of Biological Oceanography at Oregon State University, has been appointed the Program Director for OOI and will be the Director of Ocean Observing Programs at Ocean Leadership. Tim is a biological oceanographer who has had administrative experience, including interim Dean at OSU, has been UNOLS Chair, and has led and participated in many interdisciplinary programs. Cowles will join the Ocean Leadership staff in Washington, DC in early January.

Ocean Observing Instrumentation Workshop set for March 2009

The Ocean Observatories Initiative (OOI) Program Office will sponsor a workshop in March 2009 in Portland, OR focusing on instrumentation needs and readiness levels for ocean observing. The OOI, a research-focused observatory network funded by the National Science Foundation, will be an important collaborator with the Integrated Ocean Observing System (IOOS), the operationally-focused national system, and NSF-sponsored programs such as EarthScope and the Integrated Ocean Drilling Program.

The success of these efforts is based in large part on identifying effective and reliable in situ instrumentation as observing networks are being designed, deployed and expanded. Therefore, the goal of the workshop is to engage members of the technology development and manufacturing communities with scientific, engineering, and agency ocean observing communities in a discussion of OOI requirements and supplier capabilities.

The workshop will be open to all interested suppliers and manufacturers of the marine sensors and instrumentation identified as part of the OOI Final Network Design. Registration will be required. Questions can be directed to Mario Tamburri (tamburri@cbl.umces.edu) or Loraine Brasseur (lbrasseur@oceanleadership.org).

Project Funding Receiued

Ocean Leadership has received $7.86M of supplemental funding to the OOI cooperative agreement with the National Science Foundation to cover activities over the period of performance October 1, 2008–June 30, 2009. This will allow the integrated team at the Project Office and the Implementing Organizations to maintain readiness for the project’s construction start, now anticipated to be July 2010.
Ocean Networks Canada by Martin Taylor

This has been a busy fall for raising the ONC profile through presentations at international meetings. This began in Quebec City in September at the MTS/IEEE Oceans ’08 conference which also afforded good opportunity to interact with US colleagues from NOAA regarding mutual interests in promoting international data standards and interoperability for ocean observing systems. Next came the annual Science and Technology in Society meeting in Kyoto, Japan and a panel presentation on international collaboration in S&T with a particular focus on the challenges and opportunities associated with ‘big science’ platforms such as NEPTUNE Canada. Third, was the inaugural meeting of BioMarine, where the theme was the intersection of research and public policy in the oceans sector, with Martin Taylor moderating a panel on the future prospects for global fisheries by 2020, while Verena Tunnicliffe and Mairi Best presented papers on the VENUS and NEPTUNE Canada programs in the scientific sessions. BioMarine 2009 is scheduled to be held in Vancouver in October 2009 and should provide a timely opportunity to showcase the ONC programs.

Advancing-industry partnerships was the focus for the panel review of ONC’s CECR proposal in Ottawa on October 28th, with a funding decision expected before Christmas. A parallel application, with a similar decision date, to fund an ONC senior development officer, has been submitted to Western Economic Diversification.

Profile building is also the primary purpose of the just completed ONC video which has been released on the ONC website (www.oceannetworks.ca) and will be released shortly through the VENUS and NEPTUNE Canada web-sites as well as through other dissemination channels. The video was produced by Think Tank in Vancouver and appreciation goes to UVic Communications for its management of the project on behalf of ONC. The video was favourably received by audiences at two UVic alumni events in Ottawa and Toronto in late October where ONC was featured.

Arrangements are underway for the January 2009 Board meeting which will include ONC’s first one-day annual strategic planning retreat.

VENUS and NEPTUNE Canada, both led by the University of Victoria, and overseen by Ocean Networks Canada work side by side in the Technology Enterprise Facility on the University campus. The collaborative nature and physical closeness of these projects allows for many shared benefits and opportunities.

VENUS, or the Victoria Experimental Network Under the Sea, is a coastal, cabled seafloor observatory and the world’s first operational, real-time portal into the ocean. VENUS includes three interactive laboratories, one installed and operational in Saanich Inlet and two installed and operational in the Strait of Georgia as of September 2008.

For the latest news on VENUS visit their website at: www.venus.uvic.ca

NEPTUNE Canada
Transforming Ocean Science

University of Victoria
PO Box 1700 STN CSC
Victoria, BC V8W 2Y2
Phone: (250) 472-5400
Fax: (250) 472-5370
E-mail: neptune@uvic.ca
www.neptunecanada.ca