

**CANADIAN SCIENTIFIC
SUBMERSIBLE FACILITY
ETABLISSEMENT CANADIEN DES
SUBMERSIBLES SCIENTIFIQUES**

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*Promoting undersea research
with Canadian technology*

Report to the Deep Submergence Science Committee

Summary of Activities April 1999- May 2000

1. Operations:

In 1999 CSSF supported joint US/Canadian cruises to Axial Seamount and the Endeavour Vent field, conducted a gas pipeline inspection and recovered an experimental mooring for the Canadian Coast Guard:

The objectives of the June 21 to July 14, 1999 NOAA-led NeMO'99 cruise included geological mapping of a recent volcanic eruption on Axial volcano on the Juan de Fuca ridge, sampling of hydrothermal fluids and particles from sea-floor vents and sampling of animal communities around the sea-floor vents. Operating from the UNOLS Thomas.G.Thompson, ROPOS spent 274 hours diving (more than 12 hours for each day on site). Scientific equipment carried included, hot fluid sampler, stereo camera, strobe, Imagenex scanning sonar, 2 gas tight water samplers, still camera, and suction sampler with thermocouple.

This was followed by the July 15-21 Revel '99/Deep Endeavour cruise to the Endeavour Segment vent sites. Sponsored by the University of Washington, the Canadian Department of Fisheries and Oceans and the Canadian Natural Sciences and Engineering Research Council the objectives of this cruise were to revisit earlier experimental sites, recover equipment, and obtain samples and imagery from a proposed Marine Protected Area. ROPOS was in the water for 99 of the 168 hours of the cruise. Equipment carried included fluid sampler, stereo camera, strobe, Imagenex sonar, 2 gas tights, still camera, temperature probe.

From September 1-8, CSSF carried out a visual and cathodic protection system inspection of the Vancouver Island Pipeline System Marine Crossings. ROPOS operated in 'live-boat' mode in depths of up to 425m from the MV Kigoria. ROPOS was in the water for 87 of the 133 hours of the cruise, carrying a Cathodic Protection Probe, and line cutter.

At the end of September CSSF conducted two brief cruises in BC waters, operating ROPOS in live boating mode from two different support vessels within a week.. The first, conducted from the CCGS Laurier, recovered an experimental navigation buoy mooring to allow engineering studies of wear on various components. ROPOS carried a special hydraulic tool to cut the shackles connecting the mooring line to the anchor. The second trip, on CCGS Vector, collected a visual record of the bottom topography and condition of the Point Grey and Five Finger Island Ocean Disposal sites, for the Canadian Department of Environment. Total time away from the dock on these two cruises was 54 hours: ROPOS was in the water for 36 hours.

2. Data management system:

A new data management system was tested during 1999 operations, in which dive and data logs are compiled in HTML format, in real time while ROPOS operations are in progress. It quickly demonstrated its worth:

- It requires less effort during operations than earlier methods.
- The results can be used without any post-dive processing, although post-dive processing is possible if needed.
- ROV video frame-grab images are captured and included under control of the scientific team, providing a visual record of dive events and the conditions under which samples are collected. Each frame is listed and accessed from the HTML log.

- Sample lists can be printed out before the ROV is on the surface. This gives easy locating and tracking of the samples as they are recovered from the vehicle.
- No special training is required: information entry and retrieval is practically intuitive to anyone experienced in using the World Wide Web.
- The up-to-date data log is available in real-time to anyone connected to the shipboard computer network, greatly reducing the number of errors in other types of records, such as sample labels.

Every scientist can leave the expedition with a CD-ROM containing all dive logs, related navigational data, and other essential supporting data and images in a format easily read and manipulated on a variety of computer platforms. This new system was developed by the Canadian Scientific Submersible Facility (CSSF) in partnership with the Canada Foundation for Innovation and four Canadian universities (New Brunswick, Québec à Montréal, Toronto, Victoria).

3. 5000m capability restored:

CSSF has taken delivery of a new Lantech winch, which, with the new 5500m Vector Cable umbilical, will allow ROPOS to once again work at depths comparable to the 4972m achieved in 1996. The 'footprint' of the new winch is smaller than a standard container, making it easier to ship than the previous winch.

4. Major Facilities Access Funding from the Canadian Natural Sciences and Engineering Research Council.

Canadian scientists and their collaborators can now use ROPOS at lower direct costs, thanks to a Major Facilities Access grant awarded to a consortium of ROPOS users. The grant covers part of the overhead costs of the ROPOS operation, so only the direct costs of field operations must be paid from research funding. The MFA grant also provides funding for one Pacific Coast ROPOS mobilization in each of its three years as well as one Atlantic Coast mobilization in the three year period. An Atlantic Coast operation is being planned for June 2001. The result has been to significantly increase the number of ROPOS days available to Canadian scientists and their collaborators.

5. Plans for 2000 and 2001

Operations confirmed for 2000 include sea-trials of the new winch (completed), a NOAA fisheries ... cruise to the Oregon Margin, a NOAA/Canadian cruise to Axial Seamount, a German/Canadian cruise to the Oregon Margin , and a Canadian cruise to the Endeavour Ridge and the Vancouver Island Continental Margin.

Planning for 2001 includes a Canadian cruise to the Labrador Sea, Scotian Shelf and Gulf of St. Lawrence, followed by joint US/Canadian work in the North East Pacific.