

# Deep Submergence Science Committee

A summary of  
Activities, Plans, Issues  
since 09/03

Patricia Fryer, Chair

# NDSF Chief Scientist Replacement

A decision was made to search  
outside WHOI for a  
replacement for Dan Fornari  
and an ad will be forthcoming

# RIDGE 2K Needs

Integrated Studies Sites will all require HOV and ROV/AUV:

1. Endeavor Segment, Juan de Fuca Ridge: chosen to advance understanding of linkages between physical, chemical, and biological processes at an intermediate spreading mid-ocean ridge.
2. 8 - 11° N, East Pacific Rise: chosen because it is a dynamic portion of the ridge and presents excellent opportunities to observe and measure mid-ocean ridge processes on a decadal time-scale, hydrothermal activity is prolific, and may dominate global mid-ocean ridge hydrothermal fluxes.
3. Lau Basin Spreading Center: chosen because it offers the opportunity to implement a truly integrated plan at a geologically new site (a backarc basin), applying the lessons and data amassed from previous decades of mid-ocean ridge research.

# MARGINS Needs

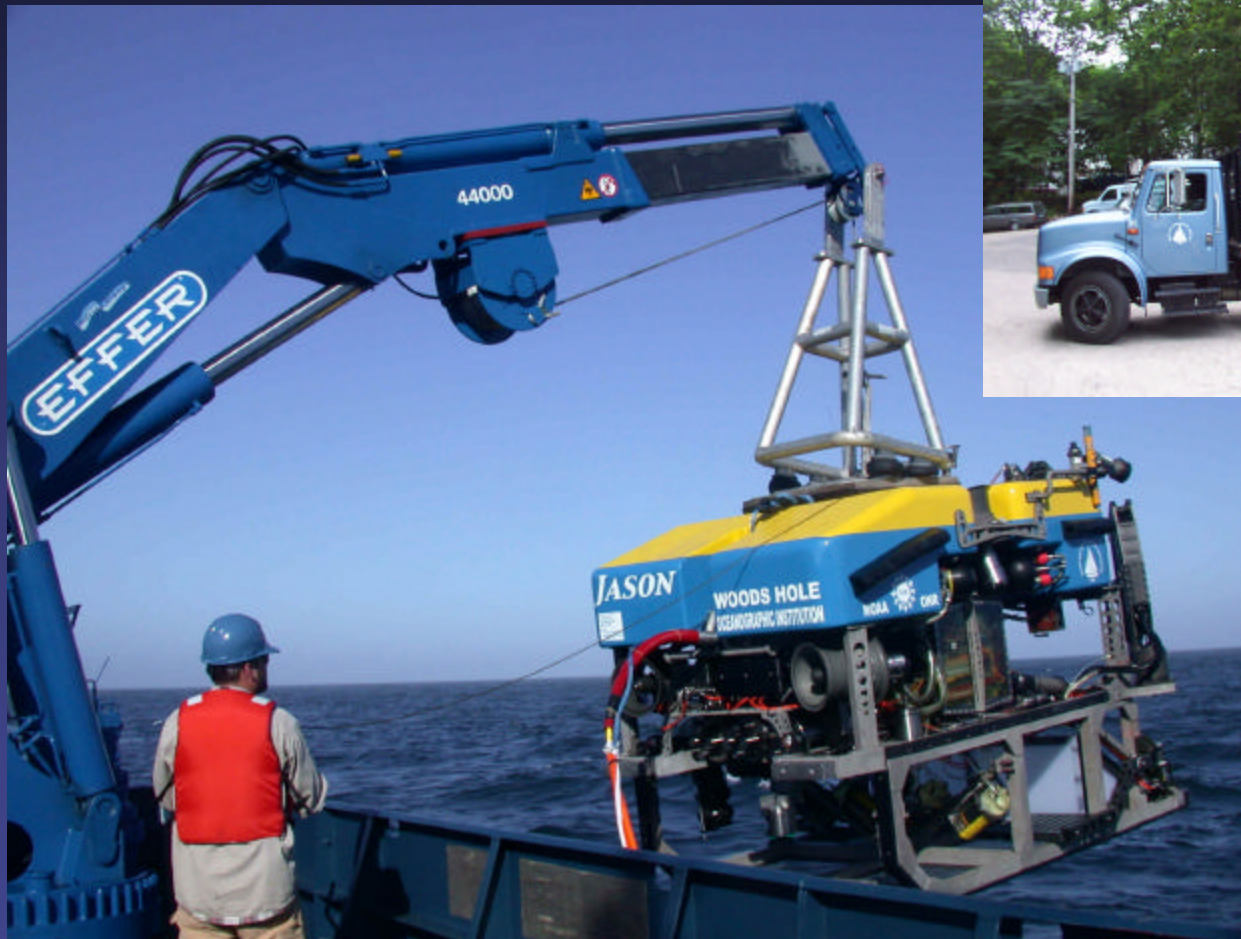
Margins Science Plans that will all require HOV and ROV/AUV :

1. **Source to Sink:** The objective is to discern the relationships among processes relevant to sediment production, transport, accumulation, and preservation on margins at multiple temporal and space scales, from turbulence to tectonics and from sedimentary fabric to sequence stratigraphy and basin analysis (continental slope and abyssal distribution).
2. **Subduction Factory:** The objective is to study all aspects of subduction, from deformation and dehydration of the slab to deformation and hydration/metamorphism of the overriding plate, magmagenesis, arc formation and backarc basin extension/magmatism, with the goal of understanding mass balance at convergent plate margins (trench and deep forearc/backarc).
3. **SEIZE:** The objective is to study the behavior of seismic activity along the subduction zone, mass flux, tsunamigenesis, and controls over the distribution of earthquakes in space and time (trench and deep forearc).

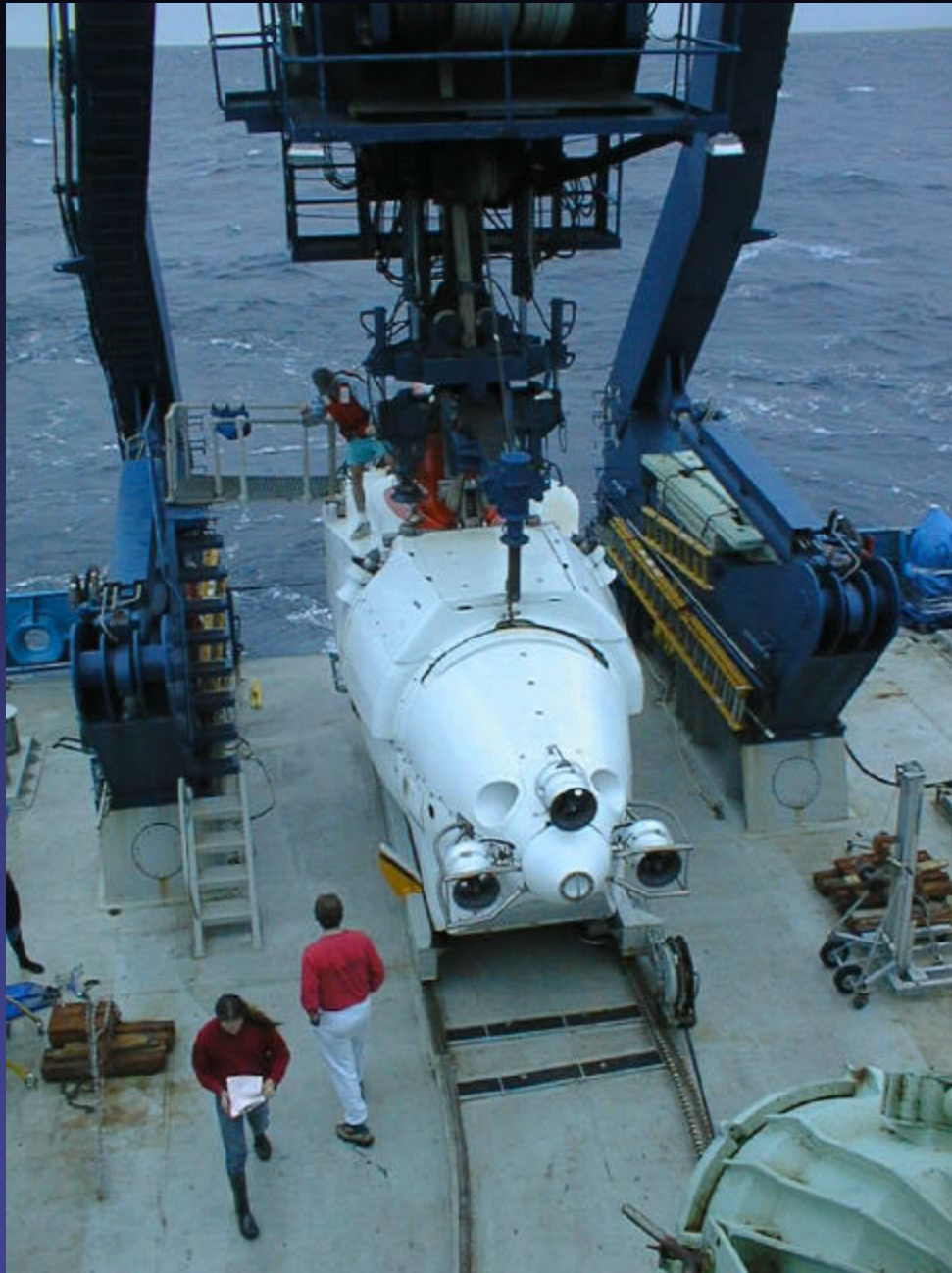
# Future Submergence Facility Needs Ocean Studies Board Reports

1. Exploration of the Seas <http://www.nap.edu/catalog/10844.html> Recognizes the need for establishing seafloor observatories
2. Seafloor Observatory Network <http://www.nap.edu/books/0309089905/html/> NSF will establish the OOI to facilitate creation of global ocean observing system
3. Future Needs in Deep Submergence Science: <http://books.nap.edu/books/0309091144/html/53.html#pagetop> The need exists for greater access both to assets and for geographic diversity. Recommends a new deep-water ROV and an improved HOV.

The need for ROVs will continue to grow, more large ROVs like Jason 2 will be needed for extended geographic range (and for observatory work).







## An improved Alvin

would provide a significant upgrade in capability, including greater depth range. It would further scientific goals and permit use over a wider geographic range (HOVs cannot work even for mid-water studies in depths greater than their maximum depth capability).

DESSC is currently working to review and provide comment on a proposal by WHOI for a new Alvin.

# Partial Inventory of HOVs

HOV	Facility/Operator (country)	Depth Capability (m)
Shinkai 6500	Japan Marine Science and Technology Center (JAMSTEC) (JP)	6500
Mir I & II	P.P. Shirshov Institute of Oceanology, Russian Academy of Sciences (Rus)	6000
Nautile	French Research Institute for Exploration Of the Sea (IFREMER) (FR)	6000
Alvin	National Deep Submergence Facility (NDSF) Woods Hole Oceanographic Institution (WHOI) (USA)	4500
Cyana*	IFREMER (FR)	3000
Shinkai 2000*	JAMSTEC (JP)	2000
Pisces IV & V	Hawaii Undersea Research Laboratory (HURL) The two can be used simultaneously (USA)	2000
Johnson Sea-Link I & II (USA)	Harbor Branch Oceanographic Institution (HBOI)	1000
Deep Rover	Nuytco Research Ltd. (CAN)	900
DeepWorker 2k	Nuytco Research Ltd. (CAN)	900
NR1	US Navy (General Dynamics)	724
Remora 2000*	Comex, (FR)	610
JAGO	Max Plank Institute, (D)	400
Delta	Delta Oceanographics (USA)	370
Clelia	HBOI (USA)	300
Various	Commercial salvage companies (& tourist subs)	<300

(\* Still exist, but are not currently in service.)



# Partial Inventory of ROVs

ROV	Facility/Operator (country)	Depth Capability (m)
Kaiko*	Japan Marine Science and Technology Center (JAMSTEC) (JP)	11000
UROV 7K	Japan Marine Science and Technology Center (JAMSTEC) (JP)	7000
Jason2/Medea	National Deep Submergence Facility (NDSF) Woods Hole Oceanographic Institution (WHOI) (USA)	6500
Victor 6000	IFREMER (FR)	7000
ISIS	Southampton Oceanography Center (UK)	6000
ATV	Marine Physical Laboratory (Scripps Institution of Oceanography (USA) (USA)	6000
ROPOS	CSSF, Sidney, BC (CAN)	6000
Tiburon	Monterey Bay Research Aquarium Institute, (USA)	4000
Urashima	Japan Marine Science and Technology Center (JAMSTEC) (JP)	3500
Hyper Dolphin	(JAMSTEC) (JP)	3000
HYSUB 75-3000		
<a href="http://www.oilpubs.com/oso/rov/h_left.htm">http://www.oilpubs.com/oso/rov/h_left.htm</a> for oil industry vehicles, mostly 3000 m)		
Ventana	Monterey Bay Research Aquarium Institute, (USA)	1850

(\* Lost at sea, but plans exist to replace it.)

# Partial Inventory of AUVs

AUV	Facility/Operator (country)	Depth Capability (m)
ABE	Woods Hole Oceanographic Institution (WHOI) (USA)	5000
SeaBED	Woods Hole Oceanographic Institution (WHOI) (USA)	2000
<b>Odessey IIb (5)</b>	AUV Laboratory at MIT Sea Grant (MIT) (USA)	6000
<b>Sauvim</b>	<b>Autonomous System Laboratory, Univ Hawaii (USA)</b>	<b>6000</b>
<b>Caribou</b>	AUV Laboratory at MIT Sea Grant (MIT) (USA)	4500(max) 3000(op)
<b>CETUS™</b>	AUV Laboratory at MIT Sea Grant (MIT) (USA)	4000(Ti) 200(AI)
<b>Xanthos</b>	AUV Laboratory at MIT Sea Grant (MIT) (USA)	3000
PTEROA150	Underwater Technology Research Center, Institute of Industrial Science, U. Tokyo (JP)	2000
AutoSub	Southampton Oceanographic Centre (UK)	1600
Maridan AUV	Maridan ApS (DK)	1500
<b>Slocum Gliders</b>	<b>Webb Research Park, Falmouth, MA (USA)</b>	<b>1200</b>
Theseus	ISE Research Ltd. (CAN)	1000

Numerous others mainly commercial for shallower work...

# **Inventory of Tools and Sensors**

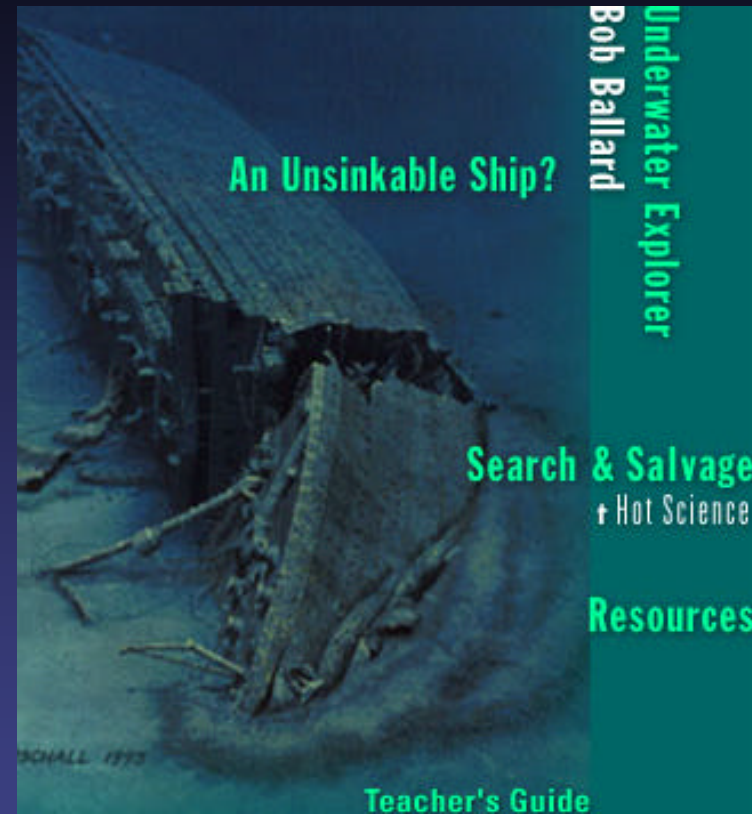
**THE NDSF provides a list of tools and sensors used on Alvin and Jason2/Medea**

**For others there are listings at various facilities.**

**These need to be compiled. We hope to create a site on the UNOLS DESSC web pages where users can go to find this compilation. For this effort**

**we'll be calling on you...**

# Marine Archeology Programs



<http://ina.tamu.edu/>

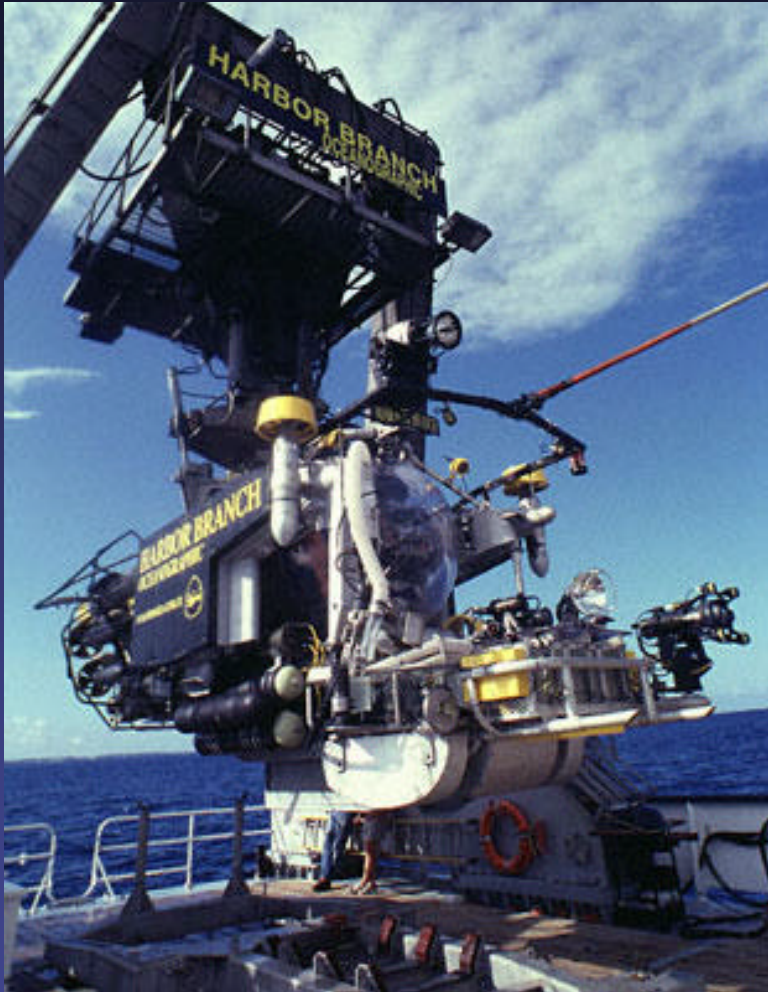
<http://www.serve.com/archaeology/>

[http://www.gso.uri.edu/index\\_net\\_big.html](http://www.gso.uri.edu/index_net_big.html)

# Education and Outreach Efforts

- Dive and Discover: <<http://science.who.edu/DiveDiscover/>>
- REVEL: <http://www.ocean.washington.edu/outreach/revel/>
- Mud Volcanoes from the Mantle:  
<<http://www.soest.hawaii.edu/expeditions/mariana>>
- Extreme <<http://www.extremescience.com/>>
- NOAA Explorations <<http://oceanexplorer.noaa.gov/>>
- IMAX movie on Alvin explorations of Ridges released 2003
- NeMO
- MATE: ROV competition –<<http://www.marinetech.org/>>
- RIDGE2000 Lecture Series

# Other Facility Reports: Harbor Branch Oceanographic Institution



Summary of 2003 operations

08/18-31 Biomed research (Clelia)

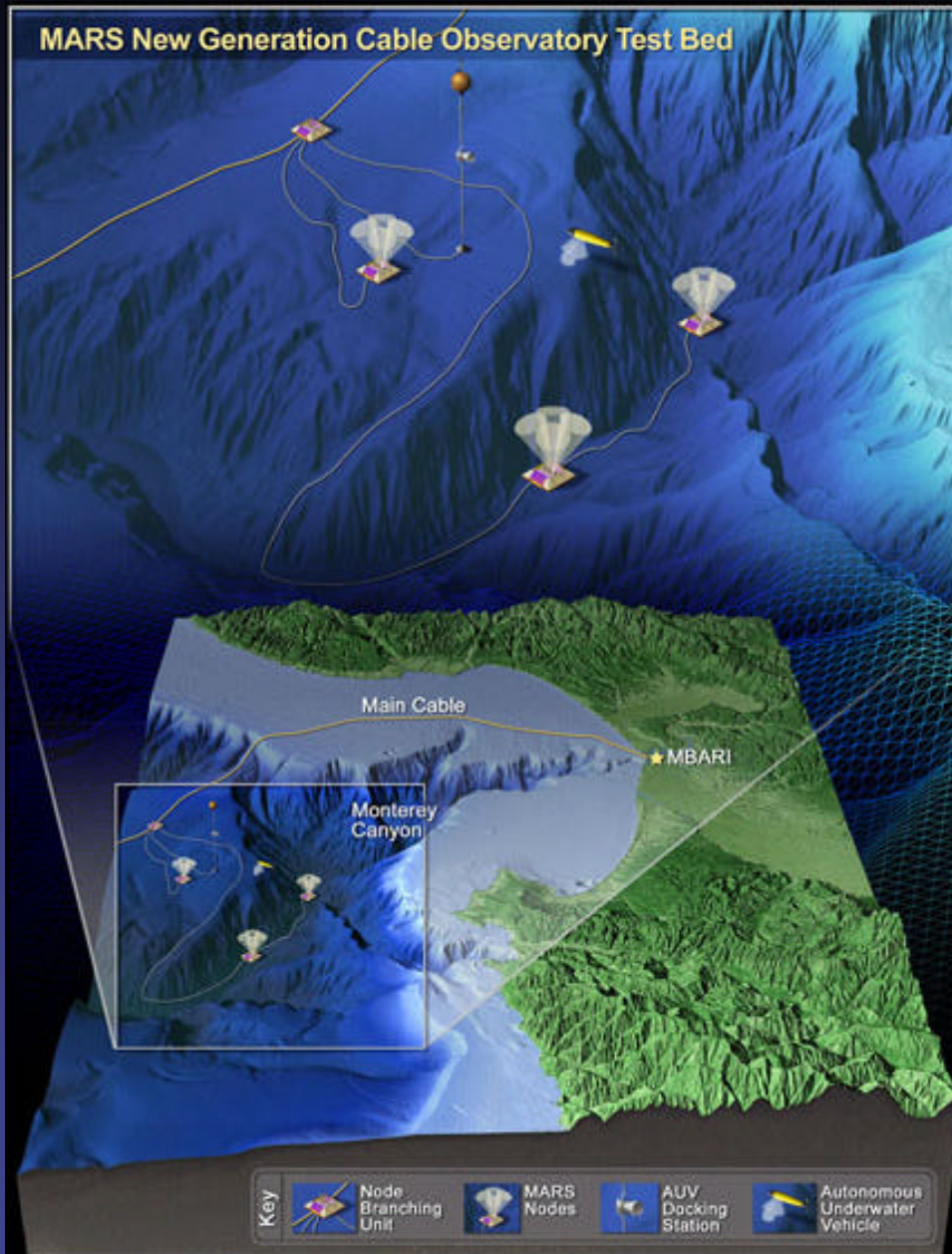
09/09-27 Georges Bank, Gulf of Maine zooplankton  
research (JSL)

10/9-27 - Bahamas biomedical research (JSL)

<http://www.hboi.edu/>



# Monterey Bay Research Aquarium Institute



The Monterey Accelerated Research System (MARS), a cabled observatory system, with benthic instrument nodes, AUVs, and various benthic and moored instrumentation. MARS will enable the community to test arrays of sensors and data handling for future observatory needs. MBARI operated several scientific research expeditions outside of Monterey Bay in 2003.

<http://www.mbari.org>

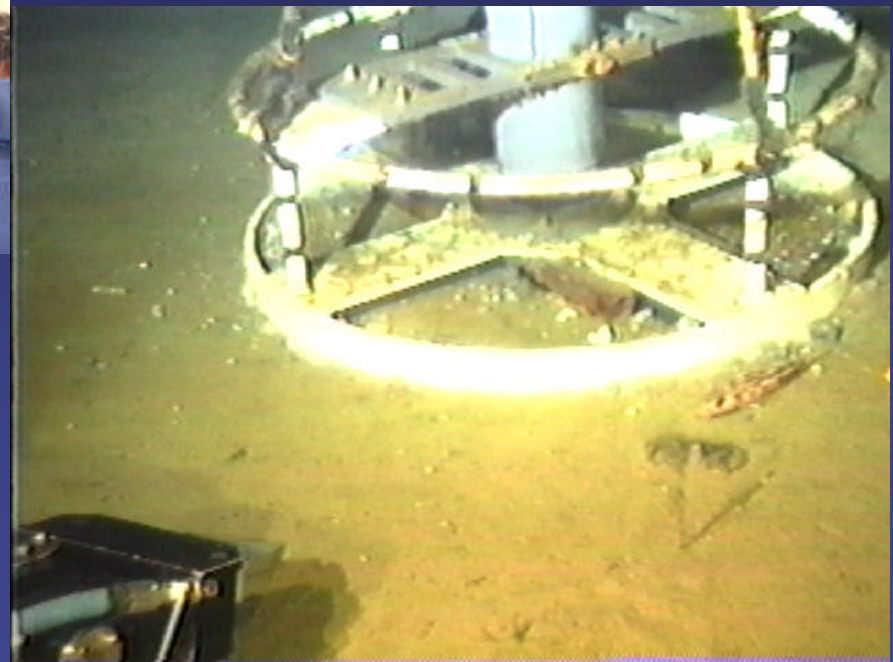
# Marine Physical Laboratory - ATV Sea Trials

May 2003

- Operations area west of San Diego
- 3 dives over two days
- Max depth 1100m



- Recorded dive video
- Collected 35 kg of rock samples
- Recovered lost acoustic transponder
- Streamed real-time video to the Internet, via RoadNet





# Hawaii Undersea Research Laboratory



## 2003 Operations

- 08 - test and certification dives for P-IV
- 09 - NW Hawaiian islands and banks P-IV, V and ROV dives on flanks of Nihoa is, Maro, Pearl and Hermes Reefs, Midway, Kure Atoll
- 10 - continue dives on NW Hawaiian islands and banks
- 11 - finish NW Hawaiian islands dives and commence NE Oahu work with P-V and ROV
- 12 - dives on LOIHI and W. coast of Big Island with P-V. Mid-month simultaneous two-sub dives (P-IV & -V) in marine sanctuaries sites

# ROPOS, The Canadian Scientific Submersible Facility



**2004  
Operations  
(next page)**

<http://www.ropos.com>

**There is currently funding allotted for deployment of cable for use in the Canadian collaboration in establishment of the seafloor monitoring effort associated with NEPTUNE. ROPOS will be involved with the effort.**

# ROPOS, The Canadian Scientific Submersible Facility

## Current Draft Schedule for ROPOS (2004) :

Dates	Ship		
03/12 - 04/20;	Thompson;	Guam - Yokohama;	AIST, U of Tokyo, NOAA
06/14 - 06/28;	Tully;	West Coast Nor Am;	NSERC; Chapman, Leys
08/12 - 08/27; OCMS	Auriga;	Strait of Georgia;	Terrasen; Juan de Fuca NOAA
08/30 - 10/19;	Thompson;	West Coast Nor Am;	Delaney, Cork, Embley, Hufnagel
10/25 - 10/29;	Vector;	Strait of Georgia;	EPS; Sullivan
10/30 - 11/7;	Vector;	ROV left on board;	no operations
11/ 8 - 11/21;	TBD;	TBD;	VENUS; Hill, Tunncliffe

<http://www.ropos.com/calendar/itin.htm>



# Japan Marine Science and Technology Center (JAMSTEC)



Efforts are currently  
underway to replace the  
Kaiko, 11000 m ROV

(Lost at sea, May 2003)

For information contact:  
Kyijiko Mitsuzawa, email:  
main@jamstecseattle.org

<http://www.jamstec.go.jp/jamstec-e/index-e.html>



# Southampton Oceanographic Centre (SOC), Isis ROV



Lord Sainsbury launches  
ISIS, Nov. 11, 2003

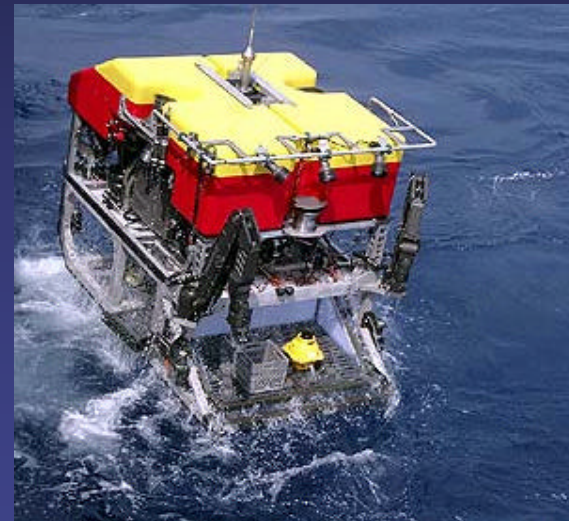
## Science Tools:

Coring system 10 -20 Samples 5cm diam. - 50cm  
Penetration  
Suction Sampler approx. 10 Samples, approx. 3.5 L  
Fluid/Gas Samplers - Gas Tight Syringes, approx. 10  
Sample, each. Approx. 1 L  
Water Sampler- Mini Rosette  
Butterfly Nets - 5 off samples  
Basket recovery for rock sample

## Operations

06 MAR Atlantis, German, C. SOC Jacksonville Florida, Isis trials

4 APR ROV Mooring Ops. Barbados (rescuing the VEX Moorings,  
Vema Fracture Zone MAR)



<http://www.soc.soton.ac.uk/>

# **Training Workshop at DESSC Annual Planning Meeting, Portland Or**

## **Afternoon: National Deep Submergence Facility Vehicles – Science and Operations Training Session**

This training session was the first of its kind and was offered to provide detailed information on both the capabilities of the National Deep Submergence Facility vehicles (primarily Alvin, Jason2 ROV, and the DSL-120A sidescan sonar) and sensor suites, and their at-sea operations procedures. The session also provided insightful information on the effective operating procedures for these systems. The material that was presented was designed to be informative to both new users of the facility vehicles, as well as those individuals who have had the opportunity to use the systems in recent years. The latest upgrades to the facilities were presented as well as planned improvements (e.g., the HROV). Handouts with key information, contacts and URL links were provided and will serve to allow the participants to easily look up key information that can help them structure proposals to use the vehicles, or upcoming field programs.

We hope to be able to offer additional training workshops at future DESSC meetings or other national science meeting venues. Feedback on the usefulness of the material presented, as well as suggestions for improving the session was solicited.



# Membership Openings on DESSC

The Chair of DESSC will be rotating off this summer and an ad for a replacement will be placed soon.

3 other members will rotate off and nominations for new committee members will be entertained at the summer DESSC meeting.

Interested individuals should contact Annette DeSilva at [office@unols.org](mailto:office@unols.org) with a one-page CV and one-page statement of purpose.