UNIVERSITY - NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

UNOLS

DEEP SUBMERGENCE SCIENCE COMMITTEE MEETING

SUMMARY REPORT

December 7, 1997

Moscone Center, Room 238
San Francisco, CA

UNOLS DEep Submergence Science Committee
Planning Meeting
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Appendices

Sunday, December 7, 1997

Welcome and DESSC Chair Report:

Mike Perfit, DESSC Chair opened the meeting by welcoming the meeting participants. He reported that it has been an exciting year with facilities upgrades and ATLANTIS coming on-line in the spring as the new support platform for ALVIN and the ROVs. The scheduling process for the deep-submergence facilities has been hectic, but it appears that most of the short-term planning has been settled. ATLANTIS was able to accommodate many of the programs on Juan de Fuca in the fall that had originally been scheduled for THOMPSON, but which had to be rescheduled because of the Z-drive failure on THOMPSON.

Over the past year, DESSC was informed of the Navy's plans to decommission TURTLE, SEACLIFF and ATV. They requested DESSC input on the science community's interest in using SEACLIFF and ATV for research. A working group was established in the spring to address future science uses of SEACLIFF. Their findings and recommendations were complied into a report and distributed to the agency representatives in the spring. In summary, it was recommended that SEACLIFF should be made available to the community. It was also recommended that an engineering study be conducted by WHOI to determine the feasibility and cost implications of bringing SEACLIFF on-line as a science tool. For now everything is on hold with respect to availability and utilization of Navy deep submergence assets until the Navy makes some final decisions regarding the disposition of their assets and any funding that may be available for transitioning them for use by the US science community.

After the working group had looked at SEACLIFF, DESSC was then informed about the availability of ATV. SIO expressed an interest in operating the vehicle for the science community should it be made available. They hosted a meeting in September at NSF to discuss the potential uses of ATV and their plans for operation of the vehicle. WHOI, DESSC and agency representatives were invited to attend. WHOI also expressed an interest in serving as operator. It was decided that more detailed information regarding operations and costs to operate ATV would be required before any future planning could be done.

In the past few years, DESSC has been very active and busy with the planning activities associated with bringing a new support platform on line, and integrating ROV operations with the ALVIN operations. Now DESSC is ready to start looking ahead at long-term facility needs. DESSC, with input from the science community and federal agencies, will begin to examine the types of deep submergence research that will be conducted into the 21st century and the facilities required to meet these science objectives.

Mike concluded by noting that this meeting will address long term facilities needs and ways to accommodate both expeditionary and time series work will also be an important topic of discussion.

These minutes reflect the order in which the meeting agenda was addressed, see ***Appendix I***. A list of meeting participants is included in ***Appendix II***.

1997 Science Reports:

Brief reports from Science PIs were presented.

Patty Fryer began with a report on her cruise in the Marianas Forearc using Jason/Medea aboard THOMPSON. Weather, equipment and personnel problems were experienced on this cruise, limiting the success of the ROV program, however, there were some important discoveries made and samples recovered that have important implications for convergent margin research. Patty and co-PIs sampled blue, serpentine muds containing high-pressure minerals from the summits of forearc seamounts. They determined that the fluids in the muds are derived from the subducting slab and rise rapidly from great depth.

It is important to note that ROV Jason had previously been used in 1996 for geological and geophysical field experiments with excellent success (i.e. Fornari/Humphris work at Lucky Strike on the MAR, and Johnson work at CoAxial on JDF). However, as the first group of geologists to use Jason in 1997, Fryer et al. identified some science operational and logistical limitations in using that system as an "exploration" tool and not as one component of a nested survey strategy. An early equipment failure resulted in difficulties in coring with Jason. They found that coring from Jason was difficult, and inserting probes was also difficult and could only be accomplished by the most experienced pilots. Use of contract support crews did not work out well and it was obvious that better training is necessary. Only two successful lowerings of Jason were made during the cruise. Patty has been working with DESSC and the DSOG to address these problems

and she felt that most of the difficulties experienced in her cruise could be resolved for future cruises.

Dan Fornari reported on the first two dives following ALVIN's certification. These dives were conducted during the transit from Bermuda to the Azores and included filming by the British Broadcasting Corp. Everything went well and the group walked off the ship with all their data on CDs. The only problem experienced was with SeaBeam which was not functioning during the cruise because of a problem with its uninterrupted power supply and associated hardware/software issues. The system was subsequently fixed, but real-time hard copy plotting of the swath data was not able to be done which initially hampered the science program. Plans are in place to upgrade SeaBeam during the ship's PSA period in early 1998. The science laboratories layout is very flexible and a major improvement over what was available on ATLANTIS-II. The science information system is very capable and includes extensive wiring throughout the ship and a video monitoring system.

Paul Johnson presented a series of slides on his October cruise to the Juan de Fuca and Gorda Ridges. His cruise originally had been planned for THOMPSON, but was rescheduled to ATLANTIS using ALVIN. Magnetometers were picked up from Gorda Ridge which had been deployed in September 1996. The magnetometers are equipped with 3-axis fluxgate magnetometers, 2-axis tilt sensors and internal temperature thermistors. They record data at 2-hour intervals. Thermal blankets for measuring conductive heat flow on the sea floor were retrieved. A tripod for measuring sediment dynamics was also tested. Paul reported that they observed and sampled the new lava flows on both the Gorda and Juan de Fuca ridges. Paul also reported on Jim Cowen's work to look at the subsurface biosphere in the Cascadia Basin. ALVIN was successfully used to attach organic carbon filters at the drill site. Following this operation, ALVIN transited 8 km on the bottom to the Baby Bare hydrothermal site for various measurements. Paul provided a slide showing the fluid flow out of the borehole cork and an image of the collector. The collector will be picked up next year. A lot was accomplished in Paul and Jim's five dives. The only problem encountered was that the ALVIN magnetometer was not operational. It was sent back to WHOI for refurbishing and is now operational.

Keir Becker could not attend the meeting but provided a written report on his ALVIN dives on the Juan de Fuca Ridge. Mike Perfit read the report which is included in ***Appendix III***. Keir's cruise was successful although there was some disappointment in the CTFM Sonar performance. Dudley and crew found effective ways to achieve the planned goals using transponders, so there were no significant problems on the cruise. Keir indicated that for future dive programs to CORKs and other borehole experiments, having a good CTFM or other long-range sonar would be quite important. It was also noted that equipping the CORKS or reentry cones with transponders that could be used to locate the sites would also be a viable method for facilitating relocation.

Bill Chadwick reported on his ATLANTIS cruise with Jason in September to the Juan de Fuca Ridge. This was a test cruise to try to use Jason for deployment of an array of acoustic extensometer instruments. The array will be deployed in 1998 and used in a seafloor observatory experiment. Twelve instruments will be deployed across the bottom and include acoustic modems

that can relay data to the surface. He reported that his one Jason dive was very successful and useful in planning for the actual deployment in 1998. Bill noted that one area of confusion associated with the ROV operation during his cruise was that WHOI Marine Operations had miscalculated the transit and work time and had not allowed for a full 24 hours of on-station time with Jason. This appears to have resulted from some constraints regarding arrival schedules in Astoria. In any case, WHOI Marine Ops. should ensure in the future that they have properly calculated the cruise logistics for the station and transit times which the PIs have been funded for.

Dana Yoerger presented viewgraphs from three different Jason cruises he participated in over the year. These were Bob Ballard's archaeological survey in the Mediterranean, the survey of the DERBYSHIRE wreck in the Western Pacific, and John Delaney's cruise on the Juan de Fuca. Dana noted that the RDI Acoustic Doppler Navigation was a very important addition to the system. He also pointed out that Jason's imaging suite could be operated with Doppler, with the EXACT ultra-short baseline navigation system, with sonar, or with all three. Dana displayed a photo mosaic of artifacts on the seafloor as an example from Bob Ballard's cruise in the Mediterranean. He also discussed the mosaicing processes used to map the sulfide structures on the seafloor of the Juan de Fuca Ridge during John Delaney's cruise. Under closed loop control, Jason was slowly traversed down the structure while the scanning 675 kHz Imagenix sonar was used to map the fine-scale (~on a centimeter scale) relief of the sulfide structure. Dana showed a short video tape where Imagenix was used with close loop control. He pointed out that this type of survey could not have been done with ALVIN because of size and maneuverability constraints, and also that the technology they used was not available a year ago for this type of work. He hopes to see this type of technology made into a more routine capability in the future, and that it points to the synergy between WHOI research engineers and the Deep Submergence Operations Group.

John Delaney continued by reporting on both his and Chuck Fisher's cruise to the Endeavor segment of Juan de Fuca Ridge in September. Chuck has been collaborating with Kim Juniper in a continuation of biological time-series experiments at the Juan de Fuca Ridge Observatory site. They are focusing on the ecology of the tubeworm communities and tubeworm physiology. They will study the productivity of tubeworms and their role in the food web of the vent community. To do this, Chuck set up tube worm gardens for observation of three types of communities. They are marking the worms with dyes in order to monitor their growth. Chuck has ten dives planned for next year (1998) to continue observations and is willing to accommodate ancillary programs by other PIs during his 1999 cruise.

John Delaney began by thanking WHOI and NSF for coming to the rescue of the Juan de Fuca field season. He also noted the compromises made by many of the PIs working in the Juan de Fuca area in order to accommodate as many of the planned programs as possible. John then reported on his own dive series which represented the first integrated cruise using ALVIN and Jason. Support for this program included funding by the American Museum of Natural History. The ultimate goal of the program is to recover one or more large sulfide structures for the museum's "Hall of Planet Earth" exhibit to open in 1999. After recovery, the sulfide chimney will be divided and part of it will go to the museum the other part will be used for scientific studies to "micro" map the inhabitants of microbiological structures. The program consists of three cruises.

In John's first cruise, concentration was on the selection and characterization of candidate chimneys. In 1998, a second cruise is planned to test recovery techniques. Actually recovery is planned during the summer of 1998. John reported that although four of his 20 planned days were lost to weather, the cruise was very successful. He noted that it does really take 24 hours to swap out the Jason and ALVIN vehicles, but that the actual time may vary somewhat and the Expedition Leader should be the one to make these types of decisions at sea. PIs should consider this when planning their multi-vehicle deep submergence cruises.

Marv Lilley very briefly reported that he had an ALVIN dive at Middle Valley on the Juan de Fuca Ridge in mid October to study temporal variations in sedimented-ridge hydrothermal systems. He noted that this is a difficult area for sampling operations so late into the fall weather window.

Craig Smith provided a written report prior to the meeting. Mike Perfit read his report, see ***Appendix III.***

Richard Lutz reported on his two ALVIN cruises in 1997. The first cruise was on the Mid Atlantic Ridge and was with Bob Vrijenhoek (Rutgers U.) in cooperation with the U.K. BRIDGE scientists. This cruise also coincided with operations the French were conducting using NAUTILE. Since their scheduled operations coincided with those of ALVIN, a dive was coordinated for a photo shoot opportunity with both vehicles on the bottom.

ALVIN's cruise continued with visits to seven hydrothermal sites. The cruise was multi-disciplinary and consisted of 14 dives funded by NSF and four dives funded by BRIDGE. Rich presented a series of slides showing the geological and geophysical elements of the cruise. In the biological studies, organisms were sampled at each site including shrimp, mussels and clams. They had remarkable success in getting all sampling accomplished. A new, developmental digital beta video system developed by W. Lange at WHOI was used for imaging. Rich noted that the cruise represented a marvelous cooperative effort between diverse science personnel and the technical groups at WHOI.

Rich continued with a report on his second cruise of the year to 9 North on the East Pacific Rise. Eighteen dives were funded by NSF's Biology and MG&G Programs. Marv Lilley, Karen Von Damm and Dan Fornari participated in the cruise. Dan conducted a successful night program with a deep towed photosled. The digital still camera on the towsled worked very well. The water chemistry work also was successful with samples collected from all vents including new high temperature chimneys. The time lapse camera which has been on the bottom since 1995 worked well with two shots taken per day for approximately 600 days. Rich thanked Tim Shanks for his efforts in making the cruise a success. A WHOI initiative was able to install new prototype cameras aboard the vehicle in time for Rich's cruise. Rich noted that this was the first color high-definition system used in a deep sea application and worked very well. Representatives from the Discovery Channel and National Geographic were also aboard. All 18 dives were successful with all work goals exceeded. Rich praised Bill Lang and Barrie Walden for their help in providing a great collaborative effort. Rich concluded by showing video images taken during his cruise.

National Deep Submergence Facility Operator's Report:

Dick Pittenger reviewed the outline for the operator's report. A complete set of viewgraphs presented by WHOI are included as ***Appendix IV***. He then reviewed the AGOR-25/ATLANTIS II/ALVIN schedule in 1997. After an overhaul which began in the fall of 1996 and ended the early spring of 1997, ALVIN resumed science operations with its new support platform, ATLANTIS. These operations continued for the second half of the year. In early 1998, ATLANTIS will arrive in San Diego for its Post Shipyard Availability (PSA) period.

1997 ALVIN & ROV Operations

Rick Chandler reviewed the facilities operations for the past year. In June, operations began with work on the Mid Atlantic Ridge. Programs were conducted using ALVIN by Dan Fornari, BRIDGE, the BBC and Lutz/Vrijenhoek. From there, ATLANTIS transited through the Panama Canal for ALVIN work off of California with Craig Smith. A series of programs were then conducted on the Juan de Fuca Ridge for Bill Chadwick, John Delaney, Chuck Fisher, Keir Becker, Paul Johnson, Jim Cowen, and Marv Lilley. These dives lasted late into the fall weather window for this area and, as a result, a few days were lost to weather. John Delaney's cruise marked the first integrated facilities cruise in which both ALVIN and Jason were utilized. These programs had originally been planned for THOMPSON, but with the failure of THOMPSON's Z-drive system, they were rescheduled on ATLANTIS. Many compromises were made among the PIs including the shortening of many of their programs. Following the work on the Juan de Fuca Ridge, ATLANTIS went south to the Northern East Pacific Rise for a cruise with Rich Lutz. ATLANTIS' final cruise of the year is also on the Northern East Pacific Rise and will accommodate Jim Childress, Alan Chave & Cindy Van Dover, and Phil Taylor & Carl Wirsen's work. Rick displayed a map showing the 1997 work sites for ALVIN and the ROVs.

Rick continued by reviewing ALVIN's statistics. In 1997, ALVIN will complete 84 dives. ALVIN's new batteries have increased the vehicle's power and resulted in increased bottom time. In addition to bringing ATLANTIS on-line, the year was highlighted by other key events. ALVIN and NAUTILE conducted a joint dive on the Mid-Atlantic Ridge and met on the seafloor. ALVIN and the ROVs were integrated with joint operations from ATLANTIS. WHOI hired a new pilot for support of deep submergence operations.

Next, Rick provided the 1997 Unmanned Vehicles Operations Summary. He provided a list by vehicle of the number of lowerings along with their respective bottom time. He also provided a listing of the type and quantity of images and data which were collected using the vehicles. Lastly, a brief listing of the ROV sampling operations conducted per cruise was provided.

ALVIN Overhaul, Upgrade and Recertification

Dudley Foster followed with an overview of ALVIN's overhaul, upgrades and recertification. After completion of ALVIN's overhaul, the vehicle was loaded onto the newly delivered ATLANTIS at Woods Hole. Following public relation/educational visits to New York City and Washington, DC, ATLANTIS and ALVIN conducted recertification dives off of Bermuda. The recertification dives to 4500 meters went well. WHOI thanked ONR and NSF for their help in working with NAVSEA to keep everything running on the tight schedule. Dudley reported that a few things still need attention; such as the pencil cameras, new HMI lights and the pan and tilt.

The pan and tilt has been less than successful. It is still under warranty and has been sent back to the factory. Battery power improvements have been made and are working well. Based on the available experience to date, it appears that there is approximately an 18% increase in power which results in an average of approximately 30 minutes of extra bottom time per dive.

With the successful completion of the NSF imaging proposal/grant, a new proposal has been funded [which WHOI is presently working on]. The full list of funded items is included in ***Appendix IV***. The list includes the purchase of additional syntactic foam which will be inserted into ALVIN's third battery compartment. Additional syntactic foam was also purchased for Jason to increase its payload. As part of the second facilities upgrade proposal, WHOI has provided funding for developing steerable elevators for use with ALVIN and ROV Jason. Inductive data and temperature links are under development and WHOI plans to have them operating on Jason for the Guaymas Basin work in Spring 1998 and on ALVIN prior to the southern EPR work. Development of a virtual ALVIN was also funded as part of the upgrade and will serve as a power training tool for pilots and scientists and can also be used for planning efficient power usage during operations.

ROV Upgrades

Andy Bowen reported on ROV upgrades by first reviewing the upgrades which will be applied system-wide to all the vehicles. These include the replacement of the data logger, control van, overhaul of the portable winch, personnel training, installation and testing of a new traction winch and replacing ATLANTIS' hydroboom. Next Andy reviewed the upgrades which are specific to the individual vehicles. The full list of upgrades is provided in ***Appendix IV***. Some of the Jason/Medea upgrades are a direct result of the technical difficulties experienced in the Marianna Cruise for Patty Fryer. This includes improvements to the hydraulic system. WHOI will also try to make the Jason manipulators more user friendly.

Post-Processing of DSL-120 Data

Dan Scheirer gave a progress report on the improvements to the post-processing routines that can be used to process DSL-120 sonar data. These efforts were funded by NSF as part of an upgrade to the DSL-120 data acquisition hardware and software which has been spearheaded by Fornari, Lerner, Bowen, Stewart and Walden at WHOI. Dan reviewed improvements to the acquisition hardware and software. He reviewed the DSL-120 data processing set-up which is a dual processing system (in case anything goes wrong with the real-time system). Dan provided an example of a DSL-120 dataset which represented one hour of side scan data with a 1 km wide swath. Within a few hours of collection, processed (i.e. speed and slant range corrected, and with smoothed navigation [depending on the type of operations being conducted]) sonar data is available on the ship for analysis by the science party. The "EndUser" software he has developed as part of the upgrade effort, in cooperation with WHOI, is documented and available to all interested scientists who plan to use the DSL-120.

Other Key Vehicle Issues

Barrie Walden reported on other key vehicle issues being addressed by WHOI. These include staffing plans for ROV flyaway operations. WHOI is trying to determine what future staffing

requirements are needed as more capabilities continue to be added to the vehicles. WHOI will be hiring two new people to the Deep Submergence Operations Group.

Barrie continued by reviewing the turnaround times required to swap vehicles during a cruise. To go from ALVIN operations to an ROV takes approximately 12 hours and to go from an ROV to ALVIN takes approximately 24 hours. These are based on sharing of deep submergence personnel on the cruise and issues related to differences in watches for ALVIN versus Jason operations. The DSOG will continue to monitor vehicle switchout times, but for the time being the above estimates should be used by PIs when preparing their cruise plans.

ATLANTIS Science Facilities and Upgrades Planned

Dick Pittenger continued by reviewing ATLANTIS upgrades and improvements planned (see ***Appendix IV*** for a full description). The Z-drive thruster problems that have been plaguing the AGORs are under study. Dick gave a brief history of the problems which have occurred on MELVILLE, KNORR and THOMPSON. It would appear that there have been several different causes for the various gear failures including defective manufacturing. Where no spares are available, as with the upper unit on THOMPSON, it takes 13 weeks for manufacture and delivery of replacement units. This presents an unacceptable situation. A variety of fixes have been recommended and carried out. For THOMPSON, REVELLE, ATLANTIS, and BROWN these fixes have included better gear specifications, factory testing, and purchasing spares. More frequent inspections of the thruster units are also planned.

A number of problems related to shipboard noise have been identified on ATLANTIS. Bow thruster noise has been identified as a problem. It appears that it is caused by impeller cavitation due to its design and installation. During the PSA, they plan to repair the problem by rearranging the flow of water to the impeller and installing sound dampening material in the affected berthing areas. Anchor banging on the hull has also created a noise problem on ATLANTIS. REVELLE experienced a similar problem and a fix was identified. The same fix is planned for ATLANTIS. A new HVAC (air conditioning) system is planned for the 01 level on ATLANTIS. This will lower demand on the entire air handling system.

The transducers associated with the Bathy 2000 system broke and may be the result of incorrect installation by the shipbuilder. Fortunately the system is still under warranty and repair of the broken transducers is planned during PSA. An upgrade of SeaBeam is also planned for the PSA period. The upgraded system will be identical to KNORR's system. The Zeta plotters will be replaced by HP plotters allowing for real time hard copies. WHOI plans to upgrade the ship's port hydroboom so that it can safely withstand the full breaking strength of the 0.680 fiber optic cable or 9/16 trawl cable; this is especially important for ROV/tethered vehicle use on ATLANTIS.

A number of ship configuration changes have been studied by WHOI. Doors to the forward science hold, analytical lab and main lab will be widened to facilitate access. WHOI has decided not to enlarge the ALVIN hanger at this time. WHOI also determined that it would be too expensive to add berthing to ATLANTIS at this time. It was determined that the addition of ten

bunks would cost approximately $500 K. The addition of extra berthing will be reviewed in the future.

The total work package planned during PSA is estimated to cost $2M.

Science Liaison and Operator/User Communication
Dick continued with an update on the WHOI marine operations group communication path. A WHOI Marine Ops web site is in place and provides access to on-line manuals, schedules, information, and vessel/vehicle specifications, <www.marine.whoi.edu>. WHOI hopes to provide a more proactive role in the planning process for the facilities. Scientists planning to use the deep submergence vehicles are encouraged to visit the web site. Dick reviewed the information flow within the WHOI marine operations group. Don Moller serves as the coordinator. The cruise preparation sequence for pre-proposal, pre-cruise and post-cruise planning were reviewed and is included in the WHOI viewgraphs (***Appendix IV***).

1998 Schedule
Rick Chandler concluded the WHOI Operator's report by reviewing the 1998 planned schedule for ATLANTIS, ALVIN and the ROVs. The year begins with ATLANTIS in San Diego for its PSA period. From there, ALVIN operations are planned for off San Diego. This will be followed by Jason operations off Guaymas. ALVIN operations are planned for the Northern EPR to be followed by ALVIN operations on the Juan de Fuca Ridge this summer. In August, ALVIN operations are planned again off San Diego. For the remainder of the year ATLANTIS and ALVIN will be at the Southern East Pacific Rise for a series of programs, one of which will also require DSL-120. "Fly-away" ROV operations include one program in March on the Southern EPR using DSL-120 from MELVILLE. Three programs are scheduled from THOMPSON in August through October using Jason, ARGO-II and DSL-120 at Juan de Fuca and then off of Hawaii. Rick provided a world map showing the planned 1998 work sites, see ***Appendix IV.***

Other Facility Operations:

Marine Physical Laboratory (MPL)
Fred Spiess provided an update on deep submergence facilities at MPL, see ***Appendix V***. He began with a description of the Wireline Reentry System. The control vehicle is a 500 kg package suspended from a 0.68" standard cable. Its maximum operating depth is 6,000 meters and has some propulsion capabilities for maneuvering. It is equipped with sonars, slow scan TV and lights, and long-baseline transponder navigation. Ship requirements for support of the vehicle include a winch, 0.68" electromechanical wire capable of work at 2300V. A frame, capstan and normal deck handling gear is also needed along with 10 KVA of 240/480 V, 60 Hz power. Dynamic positioning is necessary if the equipment is to be monitored more than an hour. Fred presented viewgraphs of sketches showing the control vehicle tethered from the ship as it is used for borehole assessment.

Fred also provided a viewgraph of the Deep Tow instrumentation system. The system includes various sonars, cameras, water samplers, biological sampling net, a temperature gauge, transducers, transponders, and a magnetometer cable.

ROPOS

Steve Scott began his report with a brief account of events since the loss of ROPOS from THOMPSON in 1996, (see ***Appendix VI***). He thanked the community for their letters of support to replace the lost ROPOS with a new vehicle. The Canadian Government applied the insurance funds for construction of a new ROPOS vehicle. The new vehicle was delivered in June 1997 by International Submarine Engineering in Vancouver. Its design is similar to the original ROPOS with a 5,000 meter capability and two arms. The new vehicle comes with separate vehicle and science telemetry systems and separate hydraulic functions for science. The system will be launched and recovered from the same cage with a 300m umbilical. Steve reported that during operations with the new vehicle this year, the Vector cable failed. A replacement cable will be acquired in 1998. There are also plans to obtain a new winch.

Steve gave a summary of dive operations in 1996 noting that the original ROPOS had been supported off a number of different platforms. Operations planned for 1997 have all been completed. There are still a few bugs to work out with the new system. Debra Stakes used the system in November for rock drill trials in the Saanich Inlet. John Delaney plans to use ROPOS in 1998 for a chimney recovery project on Juan de Fuca Ridge. There are also tentative plans for the Germans to use ROPOS from POLARSTERN for work under the polar ice. For more information on ROPOS, Steve encouraged everyone to visit the ROPOS Website at <www.ropos.com>.

Monterey Bay Aquarium Research Institute

Debra Stakes reviewed deep submergence research activities at MBARI, see ***Appendix VII***. She began by reviewing 1997 operations using the ROV VENTANA. A variety of programs were conducted within Monterey Bay area. These included midwater surveys, experiments in benthic ecology and geology of cold water seeps, a margin seismology experiment, and chemical instrumentation. Although 90% of VENTANA's work is done within the Bay, in 1997 MBARI conducted the first major ROV VENTANA work outside of the Monterey Bay area in the Eel River Basin. Dan Orange displayed a short video showing an ROV gas sampler in operation in the Eel River. Other work outside of the Monterey Bay area included chemical instrumentation. MBARI Osmosamplers were installed on BATS and HOTS moorings as well as hydrothermal vents on Loihi Seamount. Osmosamplers were installed in ODP boreholes on the Juan de Fuca Flank and Barbados. There was a collaborative effort with IOS which included five days of test dives with the MBARI drillsled mounted on ROPOS.

Debra reviewed MBARI work planned for 1998. This includes a seismology experiment, a ten day ROV program in the Santa Barbara Basin, and a mapping program for areas off Hawaii and off the U.S. west coast. Additionally, 17 days of ROPOS dives are scheduled for the SW Indian Ridge in March-April.

Debra concluded by providing the status of ROV TIBURON and WESTERN FLYER. TIBURON conducted a series of tests and training dives in Monterey and Carmel Canyons. The vehicle has successfully dove to 2,700 meters. Unfortunately, WESTERN FLYER operations

have not gone as smoothly. Structural problems were revealed and will require repair. The ship will lay-up for seven months beginning in March for repair work.

Hawaii Undersea Research Laboratory (HURL)
Keith Crook reviewed the HURL operations history for 1995 through 1998, see ***Appendix VIII***. In 1995, an award of $3.8 million was made to complete the conversion and begin operations of KA'IMIKAI-O-KANALOA (KOK). However, after the year was planned, $1.54M was lost by recession. In 1996, HURL was awarded $1.883M and 49 of 50 planned PISCES dives were completed. In 1997, HURL was awarded $2.14M and completed 22 of 27 planned dives. Most of the operations have been on Loihi. In 1998, a dry-docking of KOK is planned to maintain ABS classification. The cost of this work is estimated at $200K. Dives have been approved for the Southern Hawaiian Islands in 1998.

AGENCY REPORTS:

National Oceanic and Atmospheric Administration (NOAA)
No NURP representatives were able to attend the meeting. Gene Smith provided a written report which is included as ***Appendix IX***. Mike Perfit explained that NURP had received $13.5M for 1998 with core funding going to each of the centers. The centers can receive funds in addition to the core money through peer reviewed competitive proposals.

National Science Foundation (NSF)
Don Heinrichs presented a series of viewgraphs which are included as ***Appendix X***. Don began the NSF report by reviewing personnel changes. Lisa Rom has returned to NSF as Assistant Program Director for the Oceanographic Technology and Interdisciplinary Coordination (OTIC) program. Recruitment of a permanent Program Director for Instrumentation and Technical Services has been initiated. Sandy Shor will continue in this position for the remainder of 1997.

The 1998 NSF Ocean Science budget is $206.2M. This represents a 2.1% increase over 1997. The Facilities budget will remain the same as 1997 which was $52.3M. No major changes are expected in the number or mix of NSF sponsored sea going projects. More than one ship will be laid up in 1998 with continued lay-ups expected in the future. Don provided a list of programmatic priorities within Ocean Sciences.

The National Science Board (NSB) passed a resolution on "Competition, Recompetition, and Renewal of NSF Awards." They affirmed peer reviewed competition and recompetition as the process most likely to assure the best use of NSF funds for supporting research and education. The NSB has stated that NSF needs to look at whether the benefits of competition outweigh the difficulties of moving a facility. NSF must periodically determine whether there is a better approach to managing the facility. The academic research fleet and submersibles are considered a single "distributed" facility for competition/recompetition review. NSF will sponsor an external review of the academic research fleet in 1998. A plan on how to conduct the required fleet review is to be presented to the NSB in February for their approval.

Don reviewed the various roles of the DESSC/Science community, the WHOI Operator and the agencies and questioned whether all elements are in balance to further the research requirements of the scientific community. NSF has initiated internal actions to review their role in the selection of scientific projects and scheduling priorities. They will also review the process and focus of multi-year planning and strategic thinking. A management team of Don Heinrichs, Dolly Dieter, Dave Epp, Phil Taylor, and Bruce Malfait has been established to address this issue.

Office of Navy Research (ONR)

Sujata Millick began her report by introducing Andy Silver who is working part time in the ONR Facilities program. She continued by reporting that the ONR budget for 1998 is $232M, of which $70-80M will go to Ocean Sciences.

Last year, $45M was appropriated to the Navy for construction of a new SWATH vessel. The design and construction of the ship will be performed under a new Navy acquisition process which will accelerate the construction through the early participation of industry. An RFP to select the operator of the SWATH has been initiated with the selection expected in January (note: the University of Hawaii has been selected as operator). NAVSEA has released a second RFP to select an industry team for the ship design and construction.

In other activities, the National Oceanographic Partnership Program (NOPP) has, among other projects, funded SeaNet which will work to bring the Internet to the ships at sea.

Over the past year, the Navy announced its plans to retire SEACLIFF, TURTLE, and ATV. Dr. Saalfeld received DESSC's report and recommendations regarding the community's interest in SEACLIFF. WHOI plans to submit a proposal to perform an engineering study to evaluate the feasibility of integrating SEACLIFF and/or its components into the National deep submergence facility. As of the DESSC meeting, the Navy had not finalized their disposition plans for SEACLIFF and ATV, nor had they replied to the Working Group's Report. ONR is sending a letter to the CNO in an effort to retain the ATV for science use. Both Scripps and WHOI have expressed an interest in operating the ATV if it becomes available. However, the Navy is now considering retaining ATV for their own use. The Navy's lease for their deep submergence support ship, LANEY CHOUEST, will end in the fall 1998.

UNOLS Report

Improvements in the UNOLS Scheduling Process - Jack Bash provided a summary of the Ship Scheduling Procedure Review Committee efforts. This subcommittee, chaired by Rich Jahnke, was charged to look at perceived weaknesses in the ship scheduling process.

One of the actions that is currently underway is a revised electronic ship time request process. The new electronic form will have two parts. The first part is a one page form that will provide the basic ship time request information. This form will be sent to UNOLS, the potential operator(s), the agencies and the PI. The PI can attach the electronic printout of the form to their science proposal for submission to the agencies. After funding, or at the request of the Program Manager, the PI should complete Part 2 of the ship time request form. This part will be used to

provide specific requirements for the cruise such as time constraints, equipment availability and operational conflicts.

All ship time requests will be automatically filed onto an electronic world chart located on the UNOLS web page. The chart can be used as a planning tool for PIs to determine where ocean research is going to be conducted and the parties involved. Neil Bouge from the University of Washington has been developing this web feature. A demonstration of the electronic world map feature can be accessed from the UNOLS web site at <http://maury.ocean.washington.edu/sst/ >. By clicking on a geographical area, the cruise requests for that location will be displayed. Out-year charts are also available. The displays are to allow the entire community an opportunity to track ship time requests and to encourage collaboration and consolidation of cruises. After receiving input from the community, corrections will be made and the new ship-time request web site will go on-line officially as a scheduling tool. The community is encouraged to access the demonstration web site. An on-line demo version of the revised scheduling procedures will be available at the UNOLS Booth. The aim of the revised electronic scheduling process is to increase communications between all parties involved in the cruise planning.

WHOI Archives:

Dick Pittenger provided the report on archiving activities at WHOI, see ***Appendix XI***. An Internal WHOI committee, Scientific Data Advisory Committee (SDAC), was set up in September to review all WHOI scientific data archiving policies and issues, including the National Deep Submergence Facility Archives. The committee along with the WHOI Marine Operations group recognized that the existing policy needs revision. There are four key issues in the WHOI formulation of a revised archiving policy. The policy must conform to academic standards for preserving scientific data acquired using public funds. The policy must be concise and provide clear interpretation. The policy needs to be fiscally responsible and operationally practical. Lastly, the archiving policy should provide for preservation of scientific rights of PIs consistent with funding agency guidelines.

A lengthy discussion followed and many questions arose. Who owns the data when there are multiple cameras in use which are funded by a mix of private and federally support? What type of data will be archived, processed or raw? It is generally understood that data should be made public after two years, but what defines the two-year period? Does the clock start when the grant terminates or from the time the data was collected? How would this apply to time series programs which span many years? How should commercial rights be handled?

It was recognized that archiving is a problem throughout the sciences. The community needs to know who holds the data and how to access it. WHOI needs direction from the agencies and community on whether the policy should provide general guidelines or whether it should be a specific policy. Dick reviewed the suggested timeline for producing a revised archiving policy. WHOI hopes to be able to complete the archiving policy revisions and submit to DESSC and federal agencies for final review and approval in March 1998.

Long Range Planning (Operations):

1999 and Beyond

Mike Perfit began this discussion with viewgraphs showing the geographic demand for deep submergence facilities and the areas which already have funded work for 1999 and beyond, see ***Appendix XII***. Areas of high interest continue to be in the traditional ALVIN areas, but there is also interest globally. There already are funded programs in 1999 and beyond in the Indian Ocean, Black Sea and off Hawaii. Mike showed a time line of funded programs and their respective weather windows. A complete listing of the funded programs, vehicle needs, and PIs was also provided.

It is clear that there will be a problem accommodating both time series work in addition to expeditionary type programs. PIs need to determine if their work can be carried out using ROVs instead of ALVIN. Steve Scott suggested that perhaps a long term arrangement could be worked out between ROPOS and the National Deep Submergence Facility group for use of ROPOS to accommodate work such as time series programs. It was questioned whether it is the feasible to make ROVs usable for all time series programs.

New Deep Submergence Vehicle Construction and Facilities Upgrades

Mike continued with a five to 20 year vision, see ***Appendix XIII***. The community needs to arrive at a consensus on what types of new vehicle(s) are needed to accomplish deep submergence science over the next 20 years. It appears that a suite of vehicles will be needed to accommodate future needs. There are a variety of issues which need to be addressed, such as, the operational limits and required support personnel. Substantial input and justification from the community is needed on whether or not a science dedicated ROV should be pursued. The community also needs to look at other types of vehicles such as AUVs as rapid response tools. Should these vehicles be included in the suite of science vehicles?

There was a discussion on how to approach long term needs and whether a workshop would be effective. It was suggested that perhaps a group of time series scientists could meet to discuss their facility needs. This group could produce a white paper with their recommendations. For the short term, an ROV needs to be found to meet time series needs. We need to look at what can be done to increase the capabilities of ROVs. Additionally, the community needs to be educated on how to effectively and efficiently utilize our deep submergence assets and needs to make decisions about upgrades to the existing facilities. It appears that construction of a science dedicated ROV could bridge the gap between short-term and long-term needs.

The community and WHOI operator need to explore funding strategies to implement required long-term new facility construction and short-term upgrade to existing vehicles. Agency, WHOI and private funding sources, or a combination, should be investigated. Mike concluded the meeting by noting that DESSC will continue to explore long-term facility needs and encouraged the community to provide their input.

The meeting was adjourned at 5:00 pm

APPENDIX I

Revised 12/2/97

UNOLS DEep Submergence Science Committee
Planning Meeting
Moscone Center, Room 238
San Francisco, CA

Sunday, December 7, 1997

8:30-9:00 **Welcome and DESSC Chair Report**
Key items that have concerned DESSC which impact the deep submergence community
- Short- and long-term scheduling process
- Navy vehicle decommissioning
- Deep submergence science in the 21st century and vehicle needs

9:00-10:15 **1997 Science Reports**
- Brief reports from Science PIs (5-10 minutes each)
- Post-processing of DSL-120 data - Dan Scheirer

10:15-10:30 **BREAK**

10:30-12:30 **National Deep Submergence Facility Operator's Report (R. Pittenger and WHOI Personnel)**
- 1997 ALVIN & ROV Operations (Chandler)
- 1996-97 ALVIN Overhaul, Upgrade and Recertification (Foster)
- ROV Upgrades (Bowen)
- Other Key Vehicle Issues (Walden)
- ATLANTIS Science Facilities and Upgrades Planned (Pittenger)
- Science Liaison and Operator/User Communication (Pittenger)
- 1998 Schedule (Chandler)

12:30-1:30 **LUNCH** (Lunches will be available at the meeting ($7.00)

1:30-2:00 **Other Facility Operations.**
- MPL
- MBARI
- ROPOS

2:00-2:45 **Agency and UNOLS Reports**
- NOAA/National Undersea Research Program
  - Hawaii Undersea Research Laboratory (HURL)
- National Science Foundation
- Office of Naval Research
- UNOLS Office - Report on the changes to the ship scheduling process.

2:45-3:00 **BREAK**

3:00-3:30 **WHOI Archives** - Mike Perfit will lead a discussion on Archive policies and guidelines.

3:30- 4:15 **Long Range Planning (Operations)**

- 1999 and beyond - summary of Website postings
- Global deep submergence science initiatives
- Scheduling - short and long term and facilitation of time-series experiments as well as global expeditionary science

4:15-5:00 **Future Deep Submergence Science Facility Needs**

- RIDGE Chair Presentation
- SEA CLIFF - Survey Results and Related Activities
- 5-10 year planning for new vehicle facilities
- DESSC Lectureships

APPENDIX II

DESSC - Dec. 7, 1997

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APPENDIX III

From kbecker@rsmas.miami.edu Mon Nov 17 09:39:19 1997
Date: Mon, 17 Nov 1997 10:28:00 -0500
From: Keir Becker <kbecker@rsmas.miami.edu>
To: UNOLS Office <unols@gsosun1.gso.uri.edu>, perfit@geology.ufl.edu
Subject: Re: December DESSC Meeting - Science Presentation

Dear Mike,

Thanks for your invitation to present results/comments based on my recent Atlantis/ALVIN cruise, which was quite successful despite being scheduled later than normal weather window. At this point, I am not planning on being at AGU for the Sunday DESSC. (I am going to a NAUTILE pre-cruise meeting the week before AGU and co-convening a workshop at Scripps the Monday/Tuesday after AGU, so I am minimizing my time at AGU to cover only the Wednesday/Thursday session I am co-convening.)

I can make a couple of pertinent comments based on my cruise experience:

(1) First, I'd like to emphasize that our dive program to our 6 instrumented boreholes was fully successful, despite the weather loss of 2 of our 6 dives. This was due largely to the fine performance by the ALVIN crew, and flexibility of ALVIN and Atlantis crews as well as science party. In past dive programs, I've usually sailed with 2 or possibly 3 experienced pilots, and it was a great plus to have 4 really good pilots aboard. Another key factor in overcoming the weather hits was the great state of the new batteries, which allowed us to visit pairs of our installations during single dives, when we had programmed individual dives for individual installations.

(2) There was one unexpected "surprise" which caused some consternation, although Dudley and crew found effective ways to work around it: That was the sad state of the CTFM sonar, which I had planned on using to locate our reentry cones. These cones are very bright sonar reflectors, and nearly all our past ALVIN dives have not required transponders because we can locate the cones so well with the CTFM, at ranges as great as 500m. Thus, I had based all my dive planning on using the CTFM and not requiring transponders at our 6 CORK sites. I was completely unaware there were any problems with the CTFM, so I didn't even think to contact DSOG about it ahead of the cruise. (Obviously, that's a lesson for me!) I'll restate that Dudley and crew found effective ways to achieve our goals using transponders, so there were no problems on our cruise. Nevertheless, for future dive programs to CORKs and other borehole experiments (like the Carson and Becker programs scheduled next June), having a good CTFM or other long-range sonar would be quite important. The available high-resolution sonars were absolutely no help -- although the CORKs show up at 300-500 m on the CTFM, they would appear on the high-resolution sonars only a few seconds before they became visible out the pilot's port hole. I understand that the CTFM is old and difficult and costly to maintain, but it seems to me having a good long-range sonar is generally important for future dive operations. If the DSOG plans on abandoning the CTFM for cost considerations, then perhaps they could compensate by adjusting the policies on "free" transponder deployments for multi-site cruises like mine.

Cheers, Keir

From csmith@soest.hawaii.edu Sun Nov 30 21:56:48 1997
Date: Fri, 28 Nov 1997 14:31:49 -1000 (HST)
From: Craig Smith <csmith@soest.hawaii.edu>
To: UNOLS Office <unols@gsosun1.gso.uri.edu>
Subject: Re: December DESSC Meeting - Science Presentations

Dear Mike,

I have been out of town and apologize for this late response. I will not be able to attend the DESSC meeting in San Francisco, so cannot make a short presentation. I could give you a short summary of the our work, if you wish (we are getting some very exciting results, we think). The ALVIN/Atlantis system worked well for this year, with one exception. The scanning sonar on ALVIN was not functional, so we were unable to locate experiments that we had dropped to the seafloor equipped with acoustic reflectors. Getting this piece of gear functional is very important; it is a basic system on the Navy's ATV, Scorpios, and Sea Cliff and is very useful when searching for targets in soft-sediment environments.

Aloha, Craig

Craig R. Smith
Professor
Department of Oceanography
University of Hawaii
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USA

APPENDIX IV

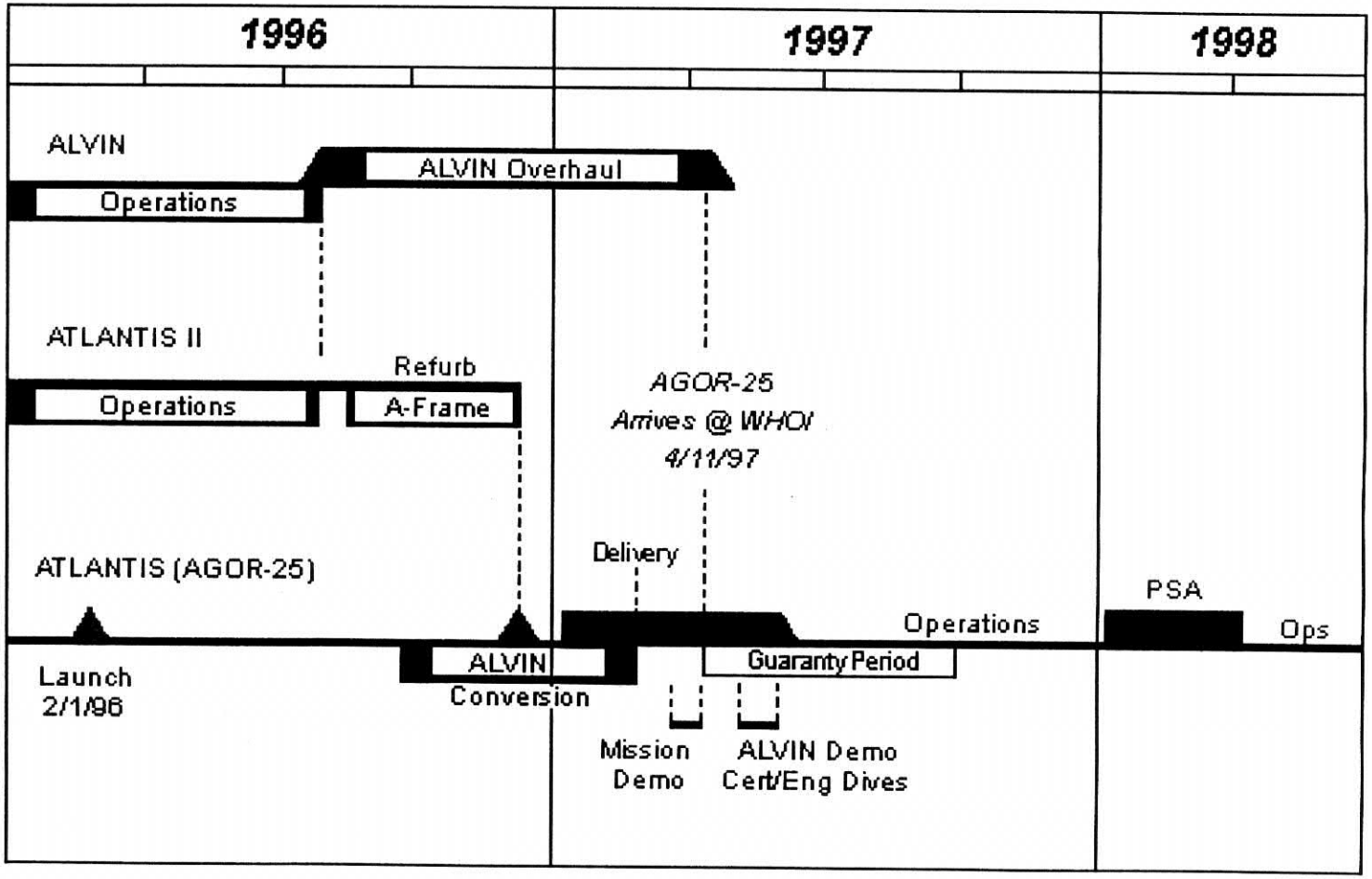
DESSC '97

WHOI Marine Department

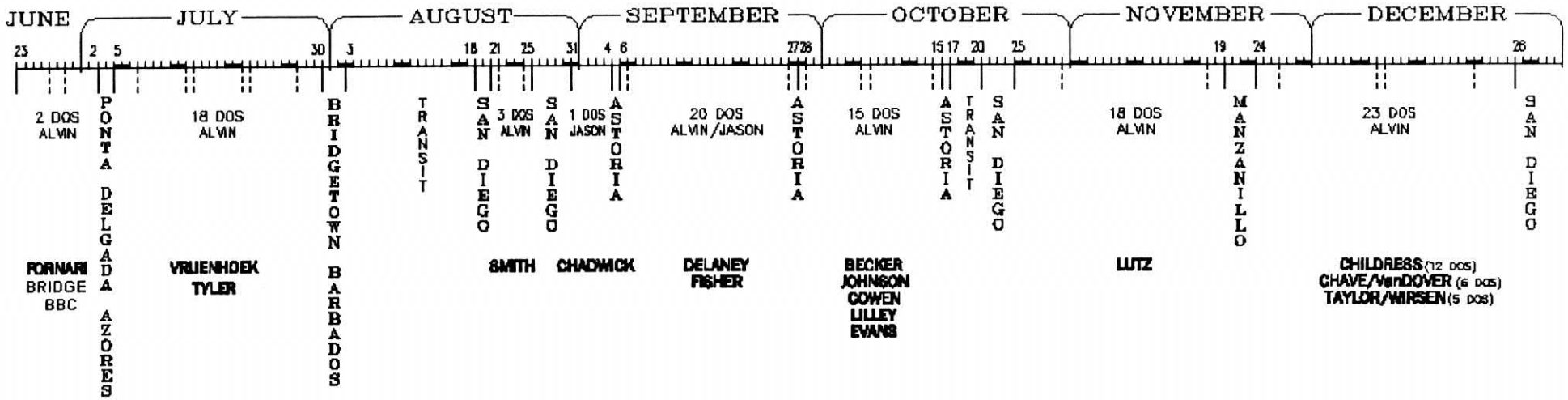
Outline

- Introduction/Timelines (Pittenger)
- 1997 *ALVIN* & ROV Operations (Chandler)
- *ALVIN* Overhaul, Upgrade and Recertification (Foster)
- ROV Upgrades (Bowen)
- Other Key Vehicle Issues (Walden)
- *ATLANTIS* Science Facilities and Upgrades Planned (Pittenger)
- Science Liaison and Operator/User Communication (Pittenger)
- 1998 Schedule (Chandler)

AGOR-25/ATLANTIS II/ALVIN Schedule



1997 *ALVIN* Operations Schedule

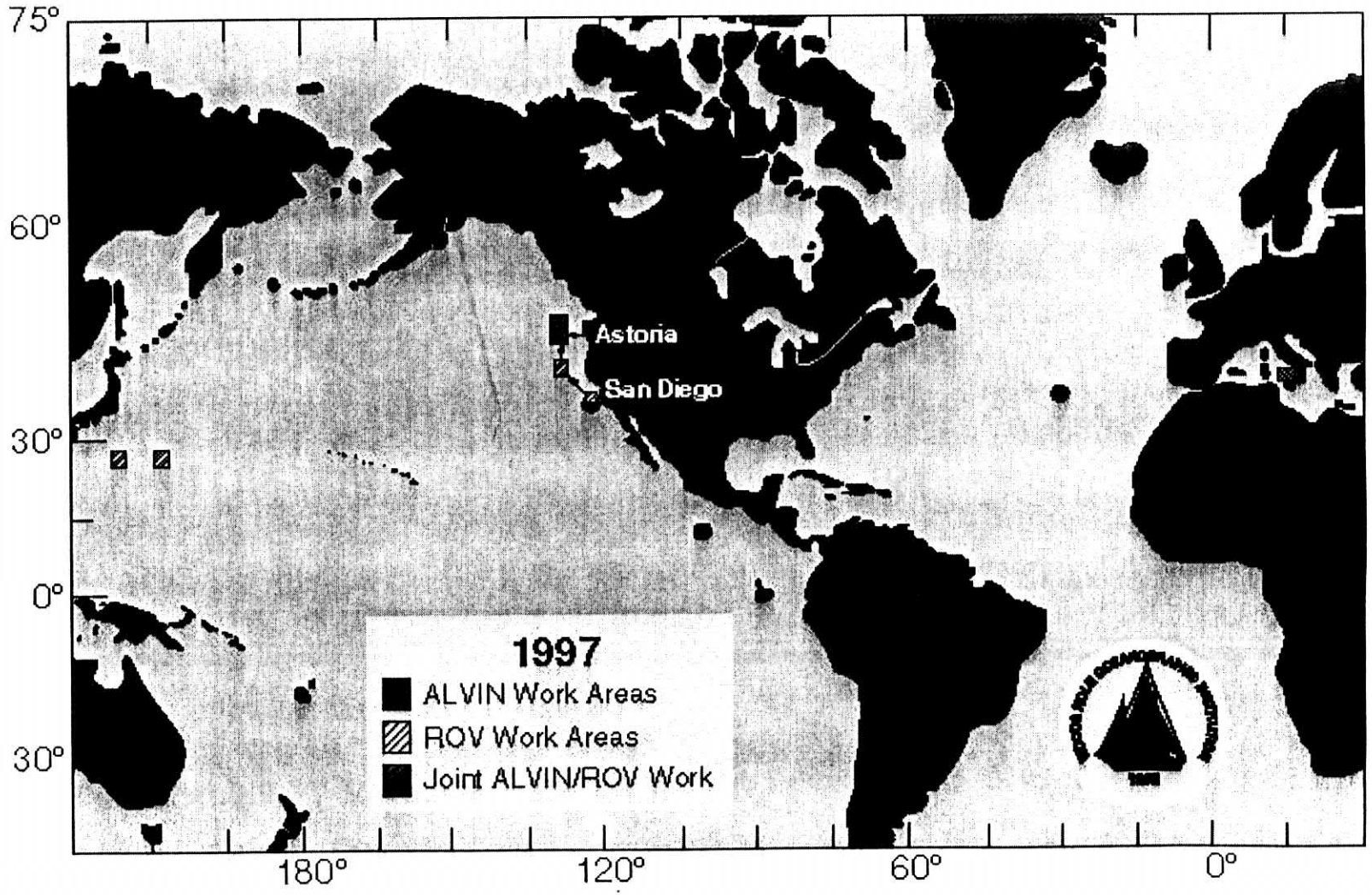


- ***84 dives so far***
- ***4 lost to weather (Becker/Johnson, JdF)***

1997 *ALVIN* Statistics

- Days at Sea: 176
- Assigned Operational Days: 164
- Number of Science Voyages: 8
- Dives Completed (as of 11/19): 74
- Average Dive Duration: 7.6 hrs.
- Average Bottom Time: 4.6 hrs.
- Highlights:
  - Joint *ALVIN*/ROV ops on *ATLANTIS*
  - Joint *ALVIN* - *Nautile* dives on MAR
  - New pilot: Steve Faluotico

1997 *ALVIN* and ROV Work Sites



1997 Unmanned Vehicles Operations Summary

- **By Vehicle:**
  - MEDEA: 2 Lowerings, 9.5 hrs bottom time (w/out JASON)
  - JASON: 34 Lowerings, 496.5 hrs bottom time
  - ARGOII: 7 Lowerings, 518.0 hrs bottom time
  - DSL120: 4 Lowerings, 80.0 hrs bottom time
- **Summaries for year:**
  - 1,024 hrs. bottom video collected (42.7 days!!) - actual hours spent on the bottom collecting video, *NOT* a compilation of lowering hours
  - 80 hours DSL-120 side scan collected
  - 160,000 ESC images collected (Derby: 130,000 Med: 5,000 Delaney: 25,000)
  - 39 ALBL transponders deployed/surveyed
  - 2 EXACT systems (multiple nets each) deployed/surveyed (Med, Delaney)
  - 21 elevators deployed/recovered (Med: 15!!)

ROV Sampling/Ops Highlights

- **Fryer**
  - Sediment/bottom sampling
- **Derbyshire**
  - HDTV close-up video
  - On-board mosaicing
  - Real-time continuous data interpretation/review
  - Extensive use of VISUAL/4D Geobrowser for data analysis/review
- **Med**
  - Over 100 archeological artifacts recovered
  - Downlooking ESC/Imagenix mapping
  - Joint operations with NR-1

ROV Sampling/Ops Highlights *(cont.)*

- **Chadwick**
  - Benchmark tests
  - First joint DSOG/DSL Jason lowering (JASON #227)
- **Delaney**
  - First joint ALVIN/JASON ops
  - Bio Sampling
  - Fwd and downlooking ESC/Imagenix mapping
  - Real time 3D video (UW)

ALVIN Overhaul, Upgrade & Recertification

- Highlights of overhaul
- Recertification
- Imaging upgrades since December 1996
  - *Pencil cameras*
  - *New HMI lights*
  - *Pan & tilt*
- Battery/power improvements
- WinFrog navigation
- Nautronics
- Other issues
  - *Motor controllers*

New Upgrades Funded

- Datalogger
- Syntactic foam
- Virtual *ALVIN*
- Scanning sonar
- Ring laser gyro
- In-hull digital cameras
- Steerable elevators
- Inductive links
- Temperature probes
- Major water samplers
- Pelagic pumps

ROV Upgrades

- **System-Wide**
  - Data logger replacement
  - Control van replacement
  - Portable winch overhaul
  - Personnel training/dock trials
  - Install/test new traction winch
  - Replace *ATLANTIS* hydroboom
- **rgo-II**
  - Overhaul all housings/connectors
  - Repair corrosion damage
  - Test Benthos DSC interface
  - Study addition of larger thrusters
- **Jason/Medea**
  - Thruster/manip controller heat sinks
  - Medea payload release
  - Replace thruster motor housings/update
  - Replace all thruster electrical connectors
  - Replace electrical harness components
  - Install and test ring laser gyro
  - Propose upgrade to manip master contr.
  - Install auxiliary flotation
  - Study upgrade of aux. hydraulic system
- **DSL-120**
  - Complete surface processing sys upgrade
  - Replace corrosion-damaged end caps

Other Key Vehicle Issues

- Staffing
  - ROV flyaway operations

- Vehicle turnaround time experience
  - *ALVIN* to ROV: 12 hours
  - ROV to *ALVIN*: 24 hours

  (subject to on-site operational considerations)

ATLANTIS Science Facilities & Upgrades Planned

- Z-Drive Problems
- Bow thruster noise
- Bathy2000
- SeaBeam
- Hydrobooms
- Ship Configuration

Z-Drive Failures

	Failures	Causes
KNORR/MELVILLE	1 lower unit gear (each)	Insufficient gear hardening and tooth contact
[illegible]SON (AGOR-23)	2 lower unit gears 1 upper unit gear	Trauma (grounding*)

*Before delivery

Z-Drive Fixes

- ***KNORR/MELVILLE***
  - New manufacturing specs
  - More frequent inspections
  - Spare gears (?)
- **AGOR-23** *(THOMPSON, REVELLE, ATLANTIS, BROWN)*
  - Better specs (done)
  - Factory tests (done)
  - Spare lower units (done)
  - More frequent inspections

Noise

- **Bow Thruster**
  - **Cause:** impeller cavitation
    - Design
    - Installation
  - **Fixes:**
    - Mechanical rearrangement of flow water to impeller
    - Prairie/masker air
    - Sound dampening material near berthing area
    - To be accomplished in PSA Jan/Feb 1998
- **Anchor**
- **HVAC**

Bathy2000

- ***Issues***
  - Broken transducers
    - Warranty item (possible cause: incorrect installation by the shipbuilder)
    - Transducers will be changed out during PSA dry dock
    - Present inability to replace hydrophones in the field will be fixed in the shipyard
  - PDR hard copy installed

SeaBeam

- *ATLANTIS* system will undergo upgrade identical to *KNORR*
- Features include:
  - Better survey management software
    - *SeaLogger*
    - *SeaSurvey*
    - *SeaSwath*
  - Control computers will be SGIs vs. PCs; second SGI can be placed in another lab
  - HP plotters will replace Zetas
    - *Real time hard copy*

SeaBeam Survey Mapping Software

- ***SeaLogger***

  Allows logging of multibeam data in a format that can be read by SeaSwath, SeaSurvey and a variety of other SeaBeam post-processing products.

- ***SeaSwath***

  Displays bathymetry, amplitude and side-scan data in real time. View waterfall swath displays, make adjustments and either print continuously or on-demand to a DeskJet printer.

- ***SeaSurvey***

  Displays geo-referenced multibeam sonar data as it is being gathered. Can show color-filled bathymetry, side-scan or amplitude overlaid with bathymetry contours and ship's track. Support for data type changes, zoom and pan functions, different color scales and on-screen quality control of data. Print to either DeskJet 750 or 1600 printer.

Hydrobooms

- The port hydroboom (a.k.a. "Frankenboom") will be upgraded so that it can safely withstand the full breaking strength of the .680 fiber optic cable or 9/16 trawl cable, without all the braces. NAVSEA has directed the shipbuilder to make this upgrade. We have contingency plans in case that gets tied up in dispute.

The fairlead to the starboard hydroboom has been significantly improved and no problems are foreseen. We are studying alternatives for further improvement.

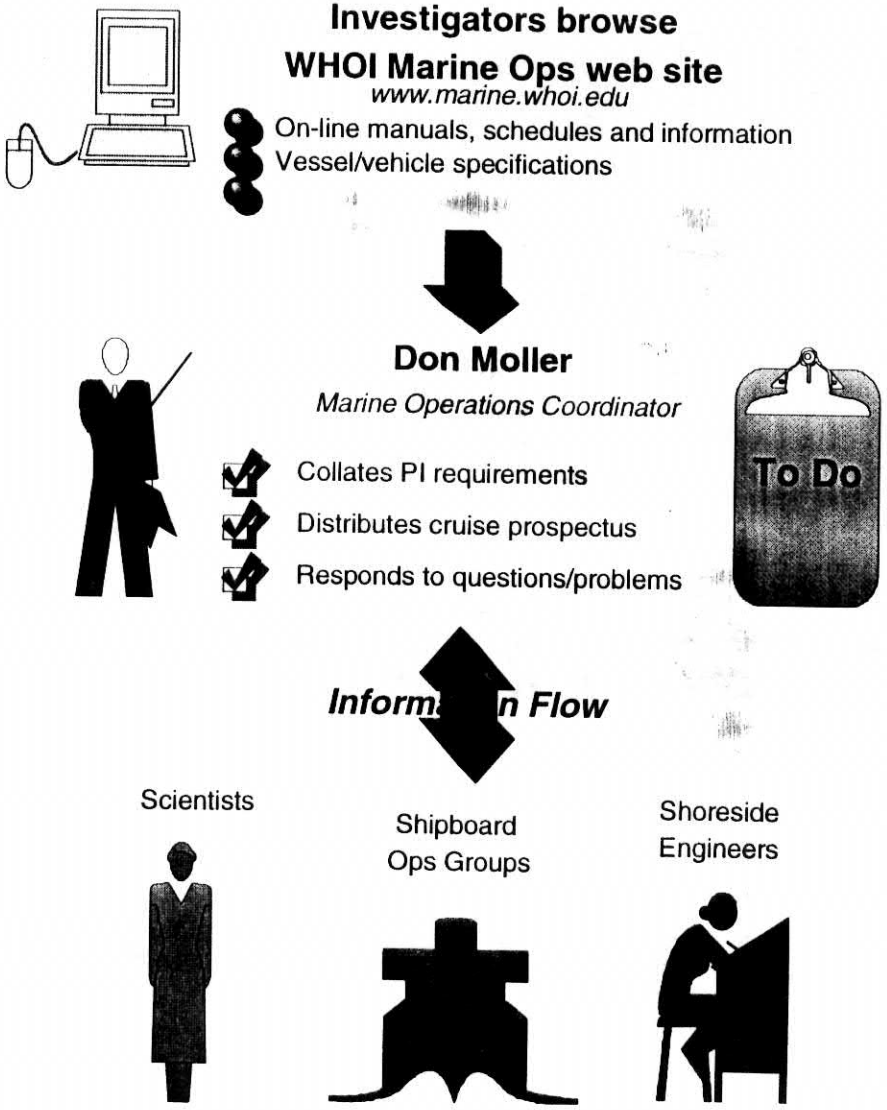
Ship Configuration

- The forward end of the Main Deck passageway, the doors to the forward science hold, Analytical Lab and forward door to the Main Lab are all being widened or "opened up" to facilitate access.

- At present there is no design or plan to enlarge the *ALVIN* hanger, but we are investigating an awning over aft door.

- $2M work package includes:
  - Aft capstan, lab vans, fume hood modification, waste heat water maker, crane upgrades, 01 Level HVAC, anchor handling mods, etc.

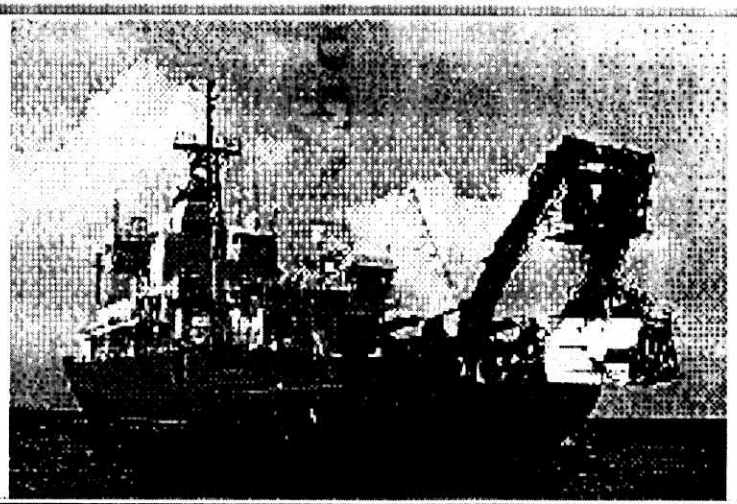
WHOI Marine Ops Communication Path



Marine Operations Web Pages

Marine Operations

Ships & Vehicles
Scheduling & Administration
Support Services

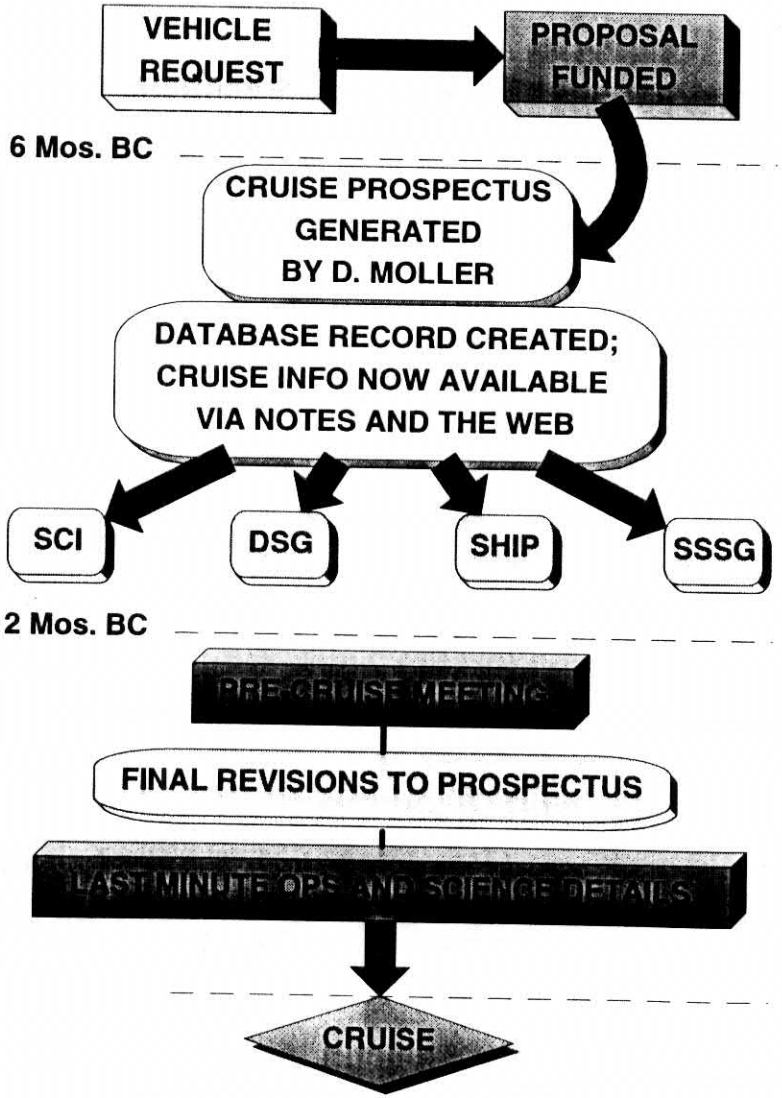


Comments: *rchandler@whoi.edu*

You are visitor **28764**

Go to Woods Hole Oceanographic Institution's Home Page

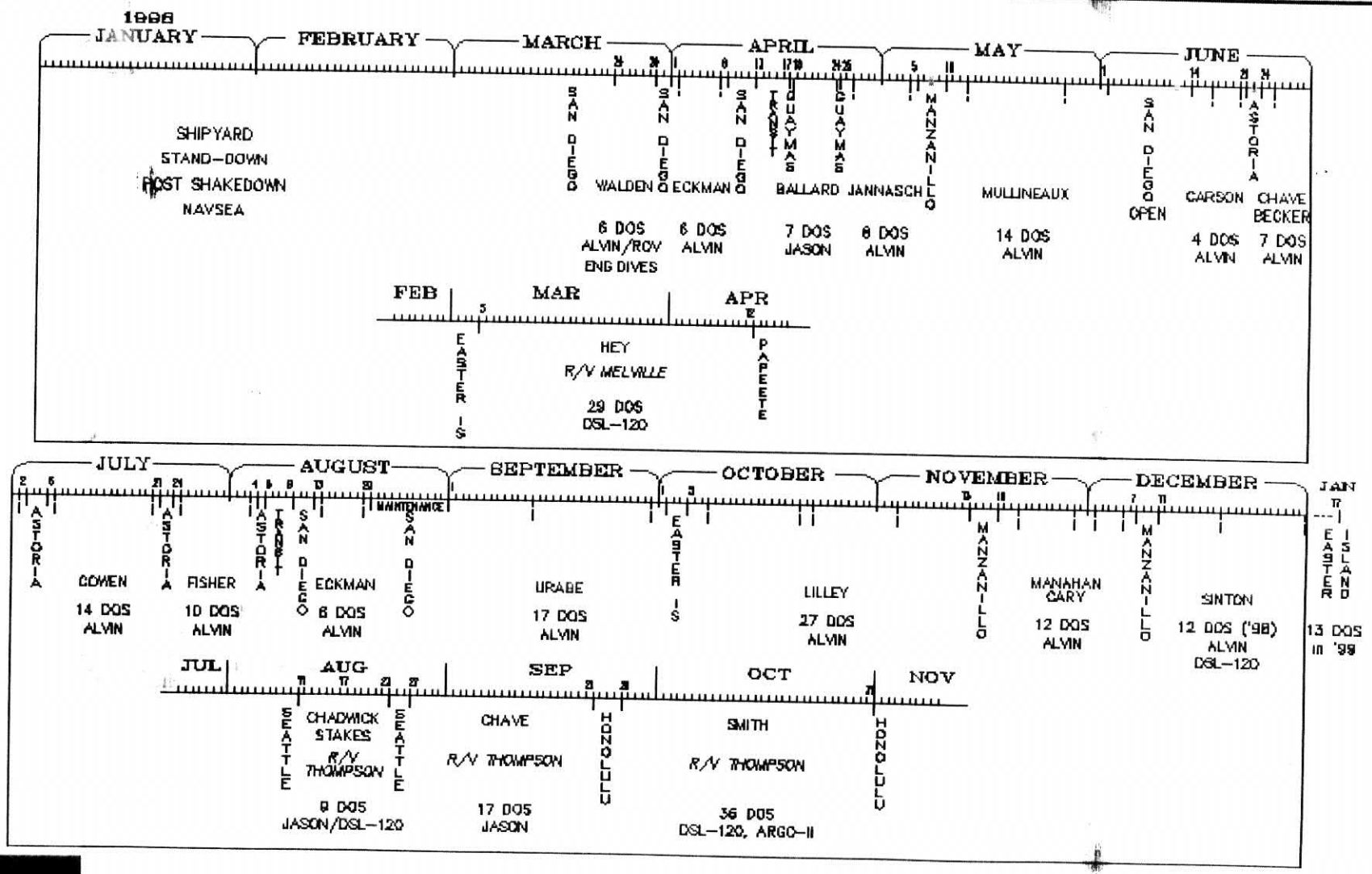
Cruise Prep Sequence



Guidelines for Information Exchange: WHOI-DSG and Science Users

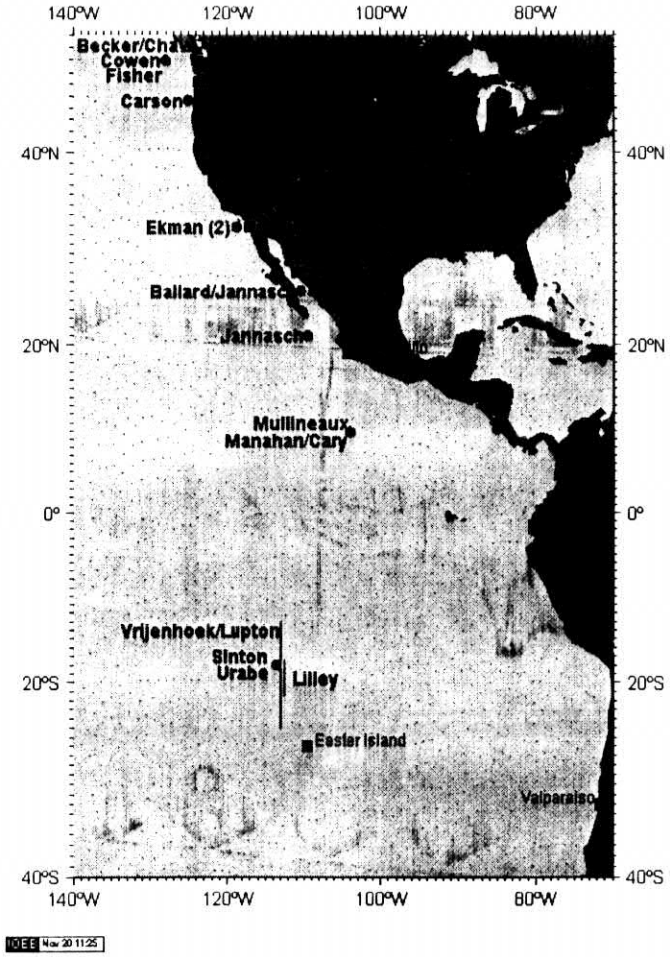
- ***Pre-Proposal***
  - PIs access WHOI-DSG web site, contact DSG with specific program questions
  - DSG sends email notices of changes in reference info on the web
  - PIs fill out web-based Cruise Prospectus Form
- ***Pre-Cruise***
  - PI sends DSG a copy of the funded proposal for reference/review
  - DSG sends email reminder about web resources available
  - PI provides proposal status info as it is updated
  - 3 months prior to cruise PIs provide specific dive/lowering plans and technical info
  - WHOI sends PI shipboard personnel and archive forms
  - PI sets up purchase order with WHOI for cruise related charges
  - DSG compiles information and relays to shipboard DSOG
- ***Post-Cruise***
  - PI receives duplicate video tapes and CD-ROM of cruise data
  - PI sends cruise report to WHOI archives and responds to questionnaires
  - PI sends Final Cruise Report to State Dept. (if required)
  - WHOI sends 35mm film duplicates to PI
  - After 2 years, cruise data available for general use

1998 Schedule



'98 Work Sites on the Web

- *http://www.marine.whoi.edu/schedules/at98trac.htm*



APPENDIX V

WIRELINE REENTRY SYSTEM
CONTROL VEHICLE, LOGGING TOOL, SHIP REQUIREMENTS

CONTROL VEHICLE

500 kg (in water) package suspended from 0.68" electromechanical cable.
Two thrusters to control lateral position, vertical controlled by wire out.
max. operating depth 6,000 m.
sonars (sector search, narrow beam up, narrow beam down)
Slow scan TV and lights.
Long baseline transponder navigation.

PAYLOAD

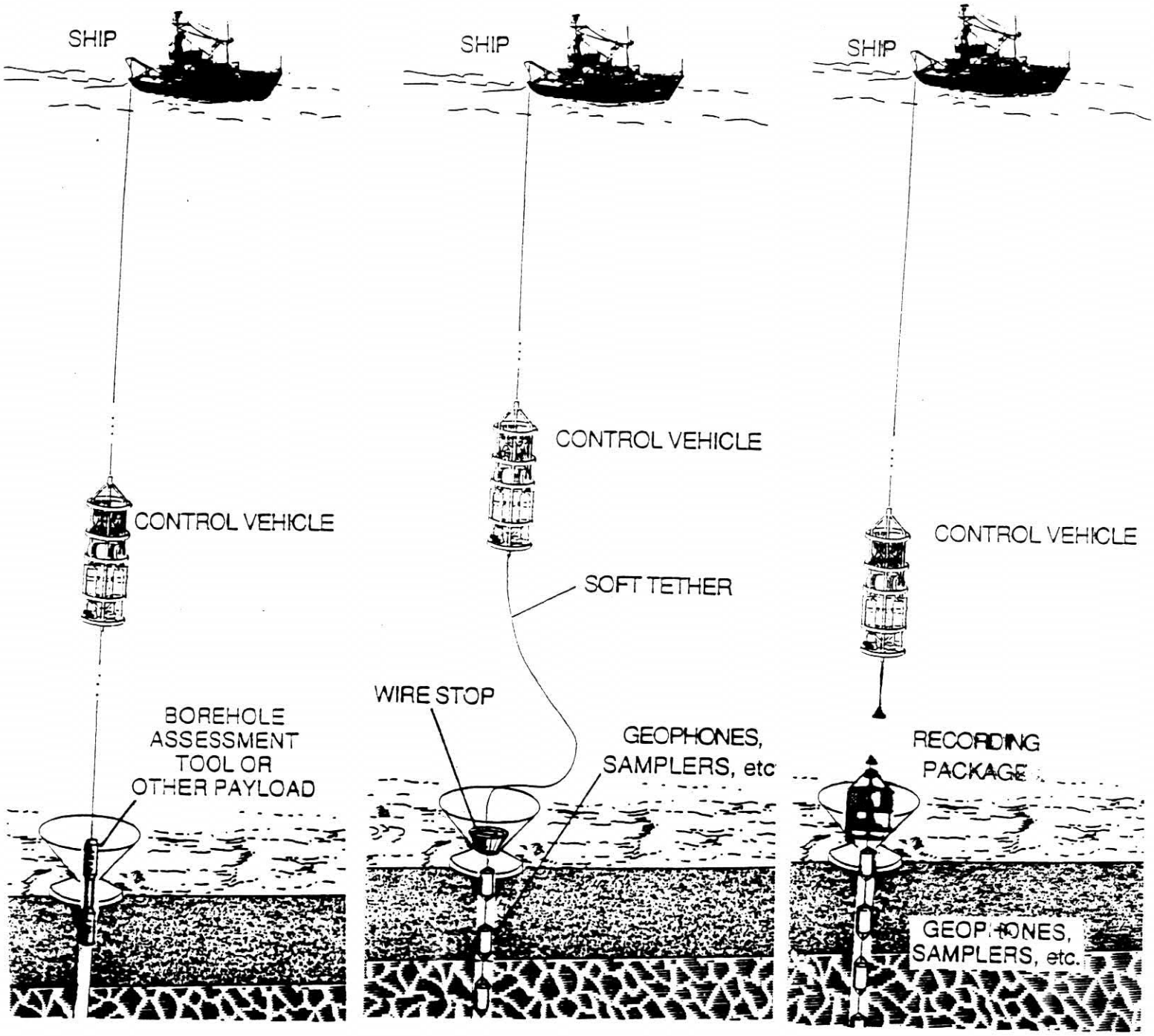
5,000 kg maximum wire tension minus wire weight of 0.8 kg/m
Telemetry:
down - RS232 9600 baud.
up - 2 channels - RS232 9600 baud and 2400 baud.
by special arrangement up to 300 KHz bandwidth.
Power - 110/220 V, 60 Hz, up to 9 KVA.
Other voltages available by special arrangement

LOGGING TOOL

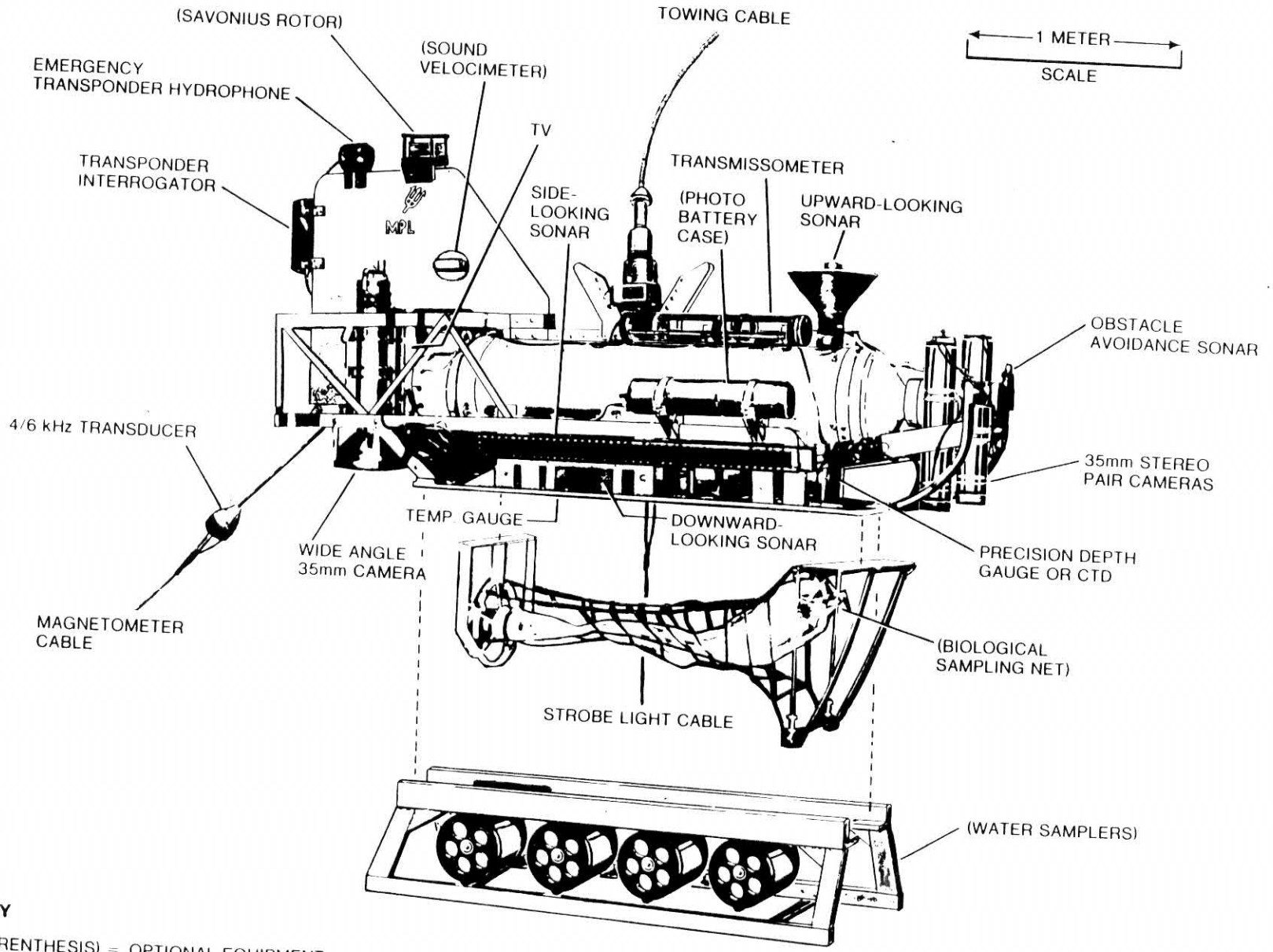
slow scan TV, lights, sonar and long baseline navigation for reentry guidance
pressure, temperature, tilt.
two three arm calipers.
modular - other elements (e. g. water sampler) can be added.

SHIP REQUIREMENTS

Winch
0.68" electromechanical wire capable of work at 2300V.
A frame, capstan and normal deck handling gear.
10 KVA of 240/480 V, 60 Hz power.
Dynamic positioning if equipment is to be monitored more than an hour or so.


SHIP
CONTROL VEHICLE
BOREHOLE
ASSESSMENT
TOOL OR
OTHER PAYLOAD
SHIP
CONTROL VEHICLE
SOFT TETHER
WIRE STOP
GEOPHONES,
SAMPLERS, etc
SHIP
CONTROL VEHICLE
RECORDING
PACKAGE
GEOPHONES,
SAMPLERS, etc.

DEEP TOW INSTRUMENTATION SYSTEM



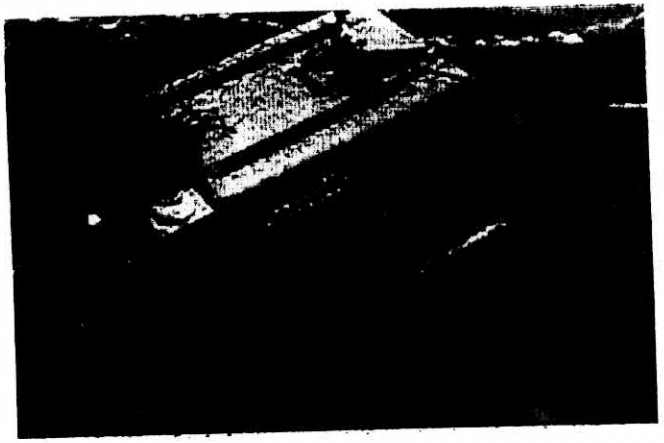
KEY

(PARENTHESIS) = OPTIONAL EQUIPMENT

M-4200

APPENDIX VI

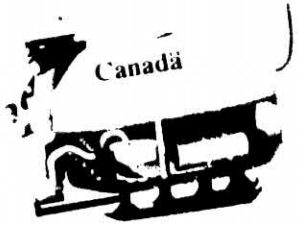
The New ROPOS



- Delivered June 1997
  - **construction 16 weeks at International Submarine Engineering (Vancouver)**
- Similar design to first ROPOS (5000m; 2 arms)
  - separate vehicle & science telemetry systems (NEW)
  - separate hydraulic functions for science (NEW)
  - launched/recovered in same cage (300m umbilical from cage)

CLIENTS SERVED AND SUMMARY OF DIVE OPERATIONS 1996

Type of client	Client name	Support vessel used
Research Agency / Institution	Natural Sciences and Engineering Research Council of Canada	R/V *Thomas G. Thompson* (University of Washington)
Research Agency / Institution	US West Coast & Polar Regions, National Undersea Research Center	R/V *Thomas G. Thompson* (University of Washington)
Research Agency / Institution	GEOMAR Institute, Germany	R/V *Sonne* (Germany)
Research Agency / Institution	Freiberg University, Germany	R/V *Sonne* (Germany)
Research Agency / Institution	University of Washington	R/V *Thomas G. Thompson* (University of Washington)
Government Agency, Canada	Environmental Protection Branch	*R.B.Young* (DFO, Canada)
Government Agency, Canada	Geological Survey of Canada	R/V *Sonne* (Germany)
Government Agency, Canada	Canadian Coast Guard	Shore based technical survey of Pisces IV submersible
Commercial	BC Hydro	*R.B.Young* (DFO, Canada)



Draft ROPOS schedule - 1997-1998

Chief Scientist/ Funding Agency	Support Vessel	Location	Date
Tunnicliffe (UVic) • NSERC • NURC (West Coast) • ISE	*John P. Tully*	Axial Seamount - new vehicle shakedown - vent sampling and survey - SUAVE scanner	June 30 - July 14, 1997
Stakes (MBARI) • MBARI	*Vector*	Saanich Inlet - rock drill trials	Nov. 17-21, 1997
Delaney (UW) • Natural History Museum (NY)	*Vector*	Saanich Inlet - hydraulic chain saw trials	Nov. 23-27, 1997
Robinson (Dalhousie) *Dick* (WHOI) • NSERC • NSF • MBARI	*James Clark Ross* (British Antarctic Survey)	SW Indian Ridge - rock coring and site survey of Atlantis plateau	March [redacted] 21 [redacted] – April 16, 1998 + mob/demob
Delaney (UW) • Natural History Museum (NY)	*Thomas G. Thompson*	Juan de Fuca Ridge - chimney recovery	June 1997
Tunnicliffe (UVic) *Embley* (NOAA) • NSERC • SeaGrant/NURC/NOAA	*Ron Brown* (NOAA)	Axial Seamount - vent sampling and survey - SUAVE scanner	[redacted] Aug - Sept. 1998
Thiel (Alfred Wegner Institute) • AWI	*Polarstern* (AWI)	Arctic Ocean - abyssal ecology - instrument deployments and sampling under sea ice	[redacted] 1999?

APPENDIX VII

1997 Results

ROV Ventana

Work within Monterey Bay area

- Ongoing work in midwater surveys (25 dives)

  Russ Hopcroft-- An optical plankton counter (OPC) is being deployed simultaneous with video transects from the ROV Ventana to access the abundance and size-spectra of particles (0.2-20 mm) in the upper 1000m of Monterey Bay. Quantitative data indicates that the absolute and relative of mesozooplankton decreases with depth, while absolute and relative abundance of marine snow increases with depth. The possibility of seasonality is being investigated.

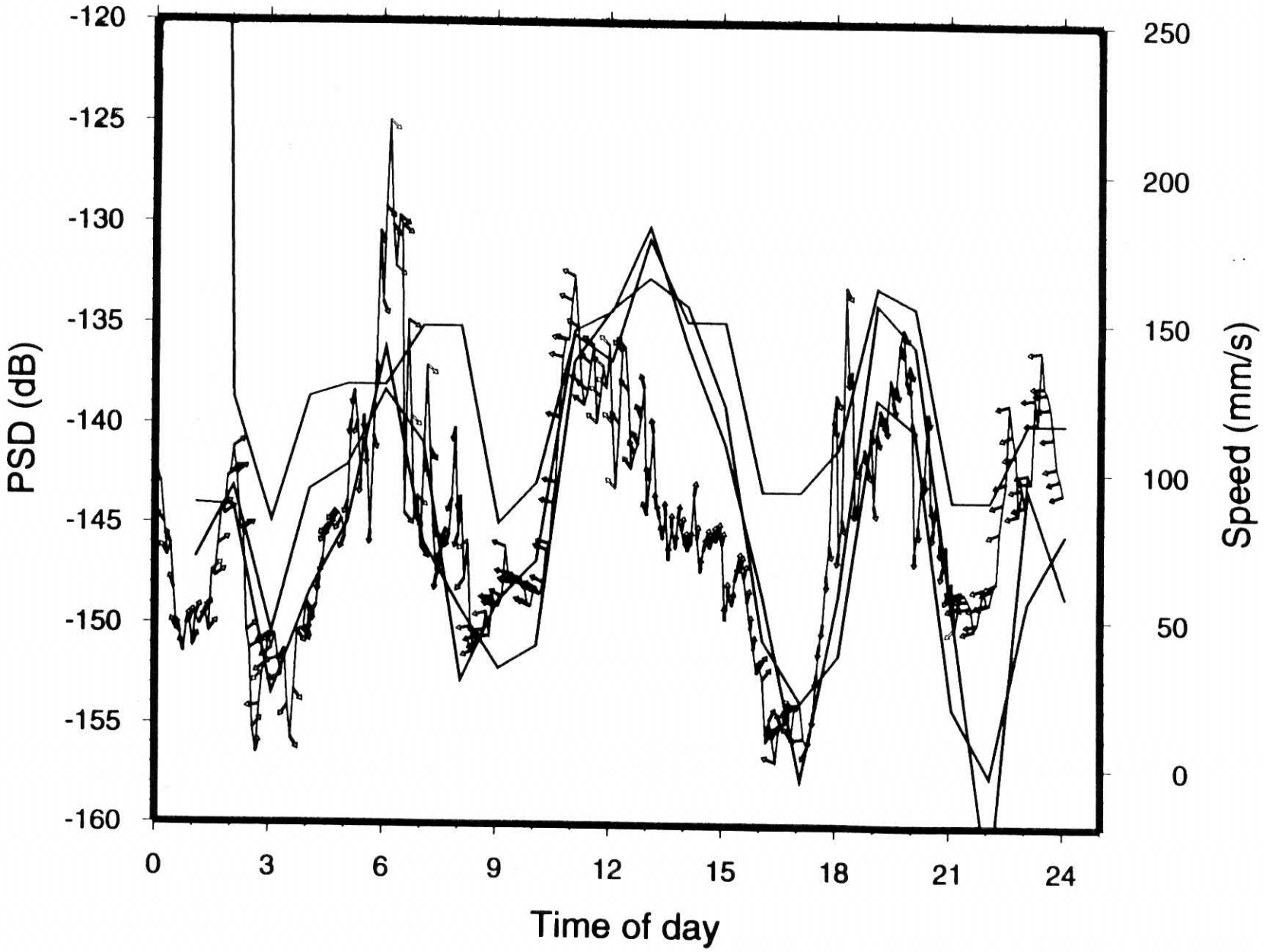
Work within Monterey Bay area

- Ongoing experiments in benthic ecology and geology of cold seeps (30 dives).
  - Deployment and recovery of clam corrals and larval recruitment studies in conjunction with analyses of pore fluids. Determined that the gross proportion of H2S is reflected in clam species distribution
  - New measurements on the affect of tides on fluid seepage using data from Benthic Barrel. Results are presented in talk T31E-11

Work within Monterey Bay area

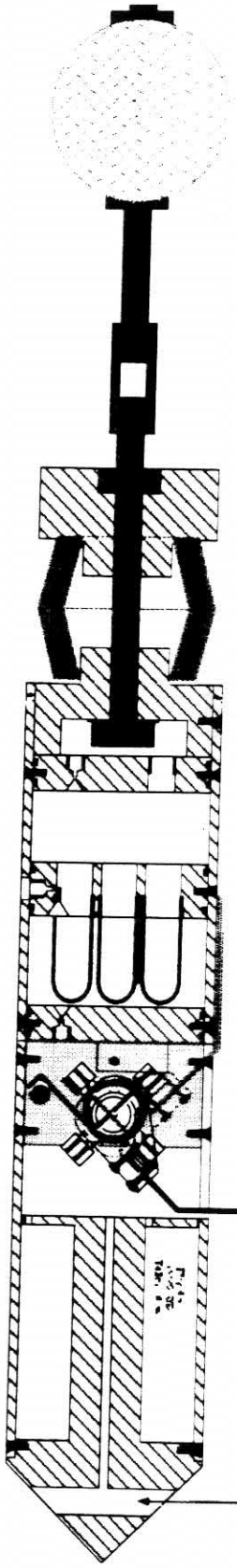
- Margin Seismology Experiment
  - MOISE Experiment (June - September) included broadband seismometer, suite of short period seismometers, current meter and pressure gauge. All instruments deployed and recovered using the ROV. Deployment included sinking a caisson for the broadband sensor package, and connecting the sensor package with the data logger and external battery pack in situ. Results in poster session Wed am.
  - MBARI Corehole seismometers deployed for several months and demonstrate high fidelity and quality comparable (or better than) traditional OBS'. Poster Thursday am.

MOIS BHZ and Current Data - Aug 18, 1997, 10-20, 20-30, 30-50 sec passbands



Work within Monterey Bay area

- Chemical Instrumentation
  - MBARI OsmoSamplers installed on M1 and in Elkhorn Slough. OsmoAnalyzers on M1 and M2.


ROV handle
(with flexible coupler
and softball grip)
Silicone Core seal
(activated by
rotating softball)
Osmotic pump
(20ul/hr=52ml/3mo.)
Isolation valve
(Seals sample
when sampler is
removed from
borehole)
Valve lever
Sample tubing
(75m of 0.8mm ID
teflon tubing
=52 ml)
Sample intake

Work outside of Monterey Bay Area

- Work in Eel River Basin—first major ROV Ventana work outside of Monterey Bay area.
- Eleven days of ROV operations in August 1997 examining fluid expulsion on a gas rich accretionary margin. Found seeps from 40m to 520m! Carbonate!!! Boodles of bubbling gas!!!

Interested? Two posters: T41A-07 (Orange et al.) and -08 (Yun et al.)

Work outside of Monterey Bay Area

- Chemical Instrumentation
  - MBARI OsmoSamplers installed on BATS and HOTS moorings as well as on hydrothermal vents on Loihi Seamount. Fluids from Loihi are now being analyzed.

  - Osmosamplers installed in ODP Boreholes on JDF Flank and Barbados

Collaborative work with IOS:

- Five days of test dives with MBARI drillsled mounted on ROPOS. Used existing drillsled to drill granite and new vertical drillsled to drill metasediments in Saanich Inlet. In preparation for ROPOS dive series in Indian Ocean

Work planned for 1998

- MBARI Seismology Experiment: 5-7 seismic stations operating continuously for a minimum of six months
- Santa Barbara Basin: 10 days of planned ROV dives examining fluid expulsion in a hydrocarbon rich environment planned for Oct 98
- Mapping Program: Although a vendor has not yet been selected, a budget has been approved to collect seafloor bathymetry and reflectivity data in a number of areas off Hawai'i and off the west coast of the continental US.
- Seventeen days of ROPOS dives scheduled for SW Indian Ridge in Mar-Apr '98.

ROV Tiburon and Western Flyer

- Tiburon conducted series of test and training dives in Monterey and Carmel Canyons.
- Science dives included instrument recovery and geological survey and sampling
- Has successfully dove to 2700 meters.
- Will be laid up for 7 months 1998 to repair structural problems with Western Flyer

APPENDIX VIII

HURL Operations History 1995-1997

1995: Awarded **$3.8 million** to complete conversion to operations from R/V Ka'imikai-o-Kanaloa.
Lost **$1.54 million** by rescission after year was planned.

1996: Awarded **$1.883 million;** shortened year to 9 months by shifting anniversary date. Completed 49/50 planned dives.

1997: Awarded **$2.14 million.** 12 month year. Completed 22/27 planned dives.

1998: Drydocking required to maintain ABS class: Cost: **$200,000.**

APPENDIX IX

E-mail to Mike Perfit from Gene Smith
NOAA/NURP statement to the DESSC Meeting
4 December 1997

Mike,

Please give my regrets to the attendees, as I would have preferred to attend the meeting. However, the late receipt of our appropriation, and its accompanying language,, has forced us to delay our competitive panel and this has made it impossible for anyone from NURP to attend.

Support of deep submergence science utilizing the National Deep Submergence Facility and other Navy deep submergence assets is a NURP priority. Proposals were solicited this year for ALVIN time in 1999, and while the selection process is not complete, enough quality science proposals have survived this year's competition to ensure that the $500,000 reserved by NURP for ALVIN support in 1999 will be well spent.

I would like to reiterate that all proposals for deep submergence science are solicited through the six NURP centers and that proposals to use ALVIN or Jason in 2000 must be submitted to the centers in 1998 in accordance with their respective announcements. The quality of the science proposed will be reviewed at the center science panels along with proposals to use other facilities in 1999 including the remaining US Navy deep submergence assets. NURP will continue to liaise with the Navy and other agencies to facilitate the use of Navy assets by civilian scientists.

I am happy to see that the Third Party Tools agreement is finally going public and would like to recognize the hard work that went into the drafting of that document.

The final point that I would like to make is that NURP now includes in its peer review process the mechanisms to continue to support the highest quality science, while ensuring that NOAA's research needs are factored into the selection of research projects. This integration of NURP's research priorities with NOAA's research and management needs also emphasizes interagency cooperation to achieve national benefit in overlapping areas of responsibility.

Best regards to all and Happy Holidays from NOAA.

APPENDIX X

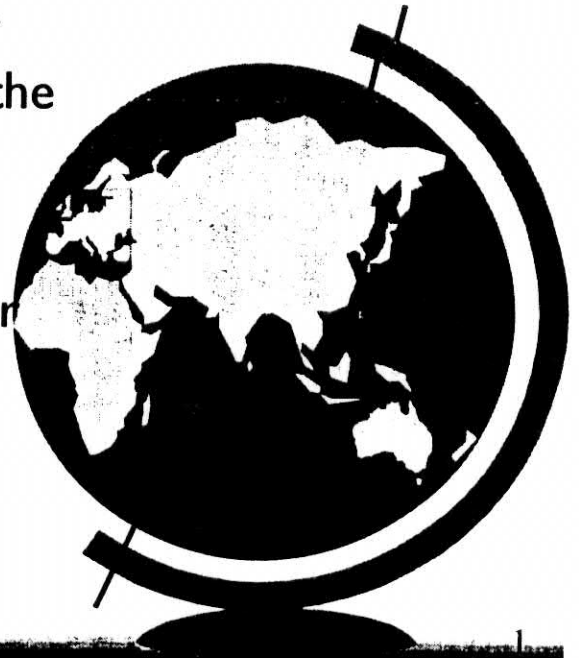
NSF Report
DESSC Planning Meeting
December 1997

Staff Changes

- Lisa Rom has returned to NSF as Assistant Program Director for the Ocean Technology and Interdisciplinary Coordination (OTIC) Program.

- Sandy Shor will continue as Program Director for Instrumentation and Technical Services (ITS) for the rest of the year.

- Recruitment of a permanent Program Director for the ITS position will be completed shortly.



NSF Report
DESSC Planning Meeting
December 1997

FY 1998 Budget

- FY 1998 budget for Ocean Sciences is $206.2 M, or a 2.1% increase over FY 1997.
- Research Section budget is $112.2M, or a 2.6% increase.
- Ocean Drilling Program budget is $41.7M, or a 3.7% increase.
- Centers and Facilities budget is $52.3M, the same as FY1997
- Programmatic priorities:
  - Disciplinary and Interdisciplinary studies
  - Life in Extreme Environments (LExEn)
  - GLOBEC and CoOP joint northeast Pacific studies
  - LTER program for two coastal sites
  - JOIDES Resolution drillship refit initiation

NSF Report
DESSC Planning Meeting
December 1997

Fleet Planning and Operation

- NSF does not anticipate major changes in number or mix of NSF-sponsored sea-going projects in the near future.
- More than one ship is expected to be out of service for all or most of CY 1998 operations.
- Additional or continuing lay-ups are anticipated for CY 1999 operations unless additional research projects requiring the use of UNOLS ships are sponsored by agencies other than NSF.

NSF Report
DESSC Planning Meeting
December 1997

- National Science Board (NSB) resolution on "Competition, Recompetition, and Renewal of NSF Awards" (Nov. 13, 1997)

  "Affirms its strong support for the principle that expiring awards are to be recompeted unless it is judged to be in the best interest of U.S. science and engineering not to do so. This position is based on the conviction that peer-reviewed competition and recompetition is the process most likely to assure the best use of NSF funds for supporting research and education."

NSF Report
DESSC Planning Meeting
December 1997

- NSB statement for Operations Awards (simplified)

  In a few cases, management of facilities operations is recompeted periodically. More generally, it is not. Facilities are often "immovable" -- or located at a unique site, dependent for successful operation on a dedicated staff, established or upgraded with substantial cost-sharing by a host institution.

  Even in cases where the management has been explicitly and rigorously reviewed and found to be effective, the benefits of competition may outweigh any short-term disadvantages of recompetition. NSF must determine periodically whether there is a better approach to managing the facility.

NSF Report
DESSC Planning Meeting
December 1997

- Academic research fleet and submersibles are considered a single "distributed" facility for competition/recompetition review.
- Ocean Sciences ongoing award authority extended through 1999.
- Ocean Sciences is to review the cost-effectiveness of the present and possible alternative methods of "managing" ship and submersible operations.
- NSF will sponsor an external review of the academic research fleet in 1998.
    - Action to be coordinated with other sponsor agencies.
    - Research requirements must determine operational capabilities.
- NSF management plan responding to external review report must be approved by NSB for 2000 and beyond operations.

stay tuned.

NSF Report
DESSC Planning Meeting
December 1997

- DESSC/Science community
  - "DESSC develops long-range scientific utilization plans to encourage highly qualified investigators and programs and to ensure the effective use of deep submergence assets throughout the U.S. community."
  - "In regard [to DSL at WHOI], DESSC provides recommendations to the supporting agencies via UNOLS and to the operating institution with respect to new techniques and instrumentation, operating policies, support, and use arrangements, and other matters relating to ALVIN and ROV's."
- Agencies/operator
  - "WHOI will operate ALVIN and designated ROV's..."
  - "Selection of scientific projects to use ALVIN and/or ROV's and the establishment of scheduling priorities will be at the discretion of the supporting agencies."

(NSF/ONR/NOAA MOA)

Query: Are all elements in balance to further research requirements of the scientific community?

NSF Report
DESSC Planning Meeting
December 1997

NSF internal action

- Review NSF practices re: coordination of "selection of scientific projects" and "scheduling priorities."
- Review process and focus of multi-year planning and strategic thinking both internal programmatic and external community issues.
- Serve as focal point for discussions with partner agencies and DESSC re: priorities, roles and responsibilities for research planning, operational issues, and project support.

Management Team

Don Heinrichs, SH/OCFS Chair
Dolly Dieter, PD/Ship Operations
David Epp, PD/Marine Geology and Geophysics
Phil Taylor, PD/Biological Oceanography
Bruce Malfait, PD/Ocean Drilling Program

Action: Modified, balanced system

APPENDIX XI

SUMMARY OF WHOI ARCHIVING DELIBERATIONS

- Internal WHOI committee (Scientific Data Advisory Committee-SDAC; Brian Tucholke of WHOI's G&G Dept. is the Chair) set up in September to review ALL WHOI scientific data archiving policies and issues, including the National Deep Submergence Facility Archives. SDAC has met five times over the past 3 months, and committee members have each met with their respective WHOI departments to discuss archiving issues.

- Extensive discussions have taken place among SDAC and all departments at WHOI, Marine Operations, WHOI Directorate, and with outside scientists.

- Recognition by SDAC and WHOI Marine Operations and Deep Submergence Facility that existing policy concerning deep submergence vehicles and data needs revision to conform with current composition of National Deep Submergence Facility vehicles and types of data collected for science.

- **Key Issues in WHOI Formulation of a Revised Archiving Policy**

1. Must conform to academic standards for preserving scientific data acquired using public funds.

2. Must be concise and provide for clear interpretation of data to be archived, as well as able to accommodate periodic revision as required

3. Needs to be fiscally responsible and operationally practical in terms of types and quantity of data collected and delivered to the scientists and archived.

4. Should provide for preservation of scientific rights of Principal Investigators consistent with funding agency guidelines; should provide for user-friendly access and utility for other scientists after the appropriate proprietary periods, and also facilitate both non-commercial and commercial use of data for science outreach and education. WHOI should act as custodian of deep submergence data and plow back any funds derived from commercial use to support/ enhance the archives and deep submergence vehicles.

- **Suggested Timeline for Producing a Revised Archiving Policy**

Dec. 7 '97- Fall DESSC meeting - receive community perspective on archiving and specific recommendations for changes to the present draft policy.

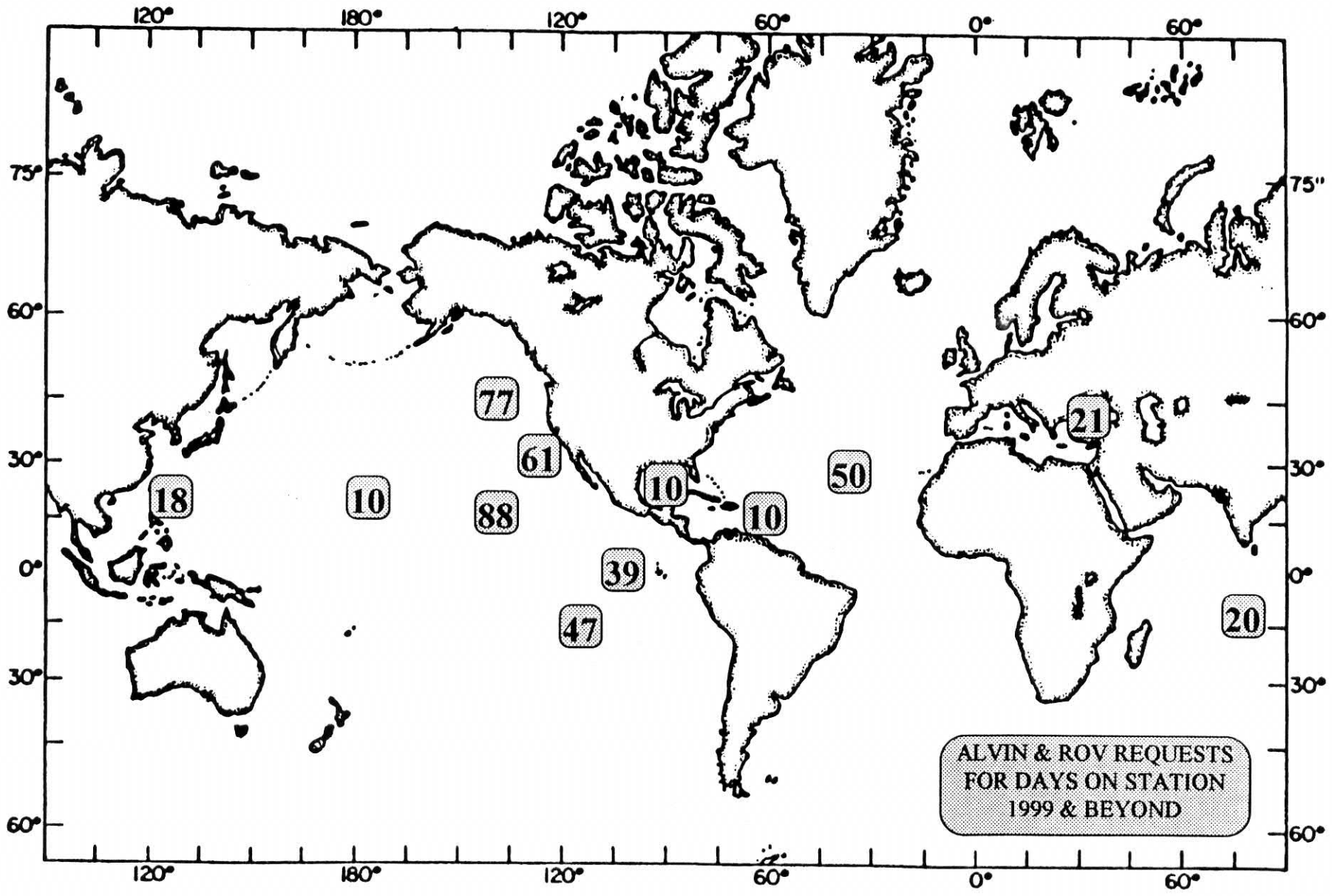
Jan. 1 1998 - Complete drafting of WHOI suggested revisions to deep submergence archiving policy and circulate to DESSC and federal funding agencies. Post on UNOLS/WHOI deep submergence WWW site and solicit community response.

Feb. 15 1998 - Compile DESSC, federal agency, and community-wide comments/revisions to draft policy.

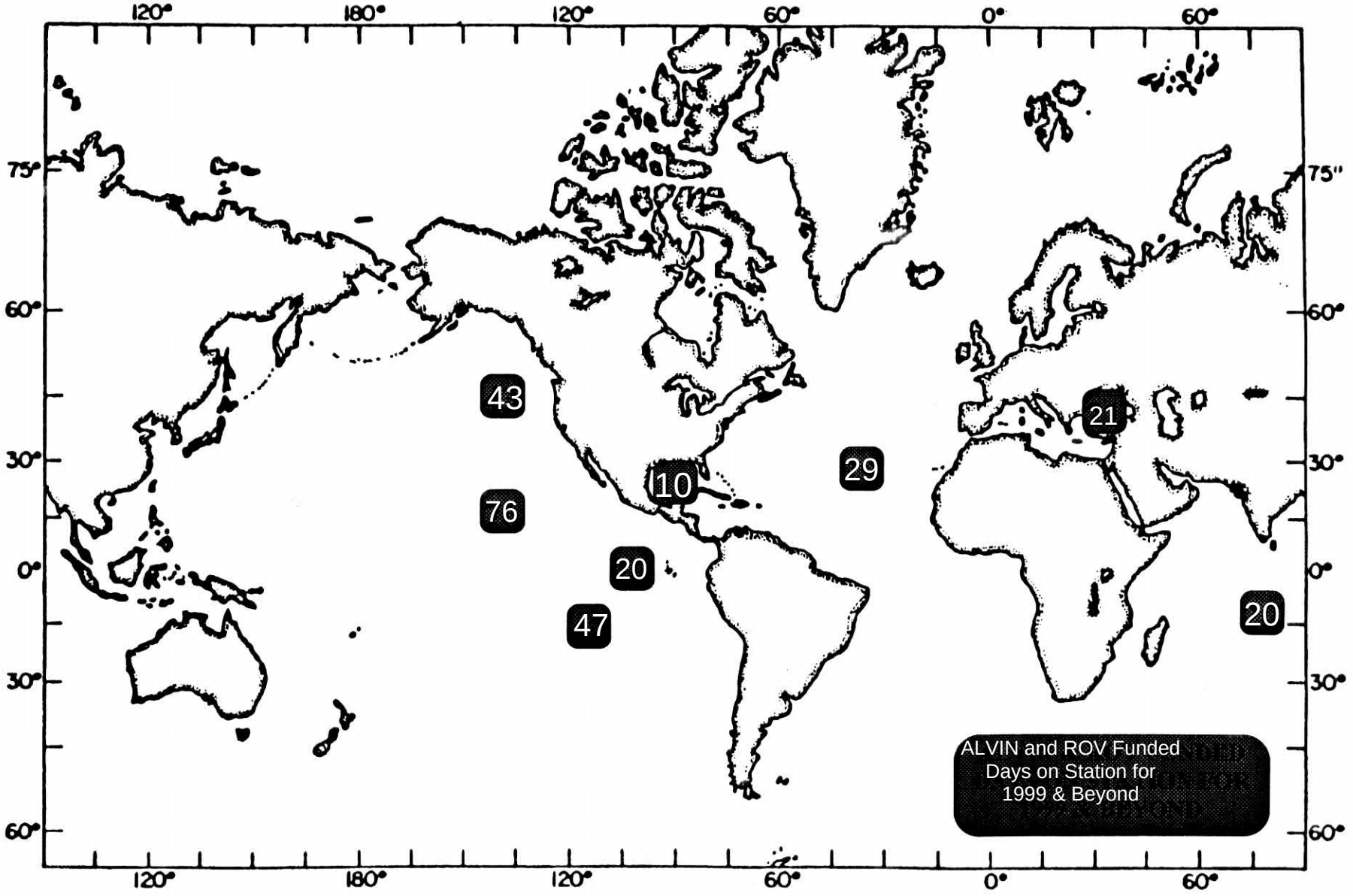
Mar. 1 1998 - Complete revisions and submit to DESSC and federal agencies for final review and approval.

APPENDIX XII

SUMMARY OF ALVIN & ROV REQUESTS: 1999 and Beyond



SUMMARY OF ALVIN & ROV FUNDED DAYS ON STATION: 1999 and Beyond



APPENDIX XIII

New Deep Submergence Vehicle Construction and Facilities Upgrades

The 5 to 20 Year Vision

- **Arrive at consensus on what type(s) of *new* vehicle(s) are needed to accomplish deep submergence science over the next 20 years**

Example:

- New construction should be 6000m science dedicated ROV versus 6000m submersible

Issues:

- Operational limits and required support personnel
- Vehicle tether management system and shipboard heave compensation
- Manipulation and Sampling
- Remote data communication
- Vehicle Systems Redundancy/Spares

- **Make decisions about upgrades to existing National Deep Submergence Facilities**

Examples:

- Use of Sea Cliff to enhance Alvin capabilities.
- Shared vehicle telemetry and science sensors between ROV Jason and Argo II.
- Surface control vans and electronics
- Existing manipulator on ROV Jason and basket space/configuration
- DSL-120 sonar array upgrades-altimeter, subbottom profiling, vehicle towbody, depressor and cable hydrodynamics

Issues:

- Identification of how to best utilize Sea Cliff to upgrade Alvin operational and science sensors, and the timetable over which this can be accomplished
- Expected useful service life of ROV Jason, Argo II and DSL-120 sonar
- Investment in upgrades to existing ROV & towed vehicle facilities to provide capabilities for next 5-7 years with ability to migrate investment to new ROV and towed vehicle facilities

- **Funding strategies to implement required long-term new facility construction and short-term upgrade to existing vehicles**

Examples:

- Tripartite federal funding plan for new vehicle construction and phased upgrade plan
- WHOI and private foundation funding
- Consortium of the above parties
- Other combinations

Issues:

- Writing the supporting document which makes the case for the need for new deep submergence vehicle construction and upgrades - long term and short term.
- Acquiring community, agency and "political" support for the projects.
- How quickly can the funding be secured
- When can the new and upgraded facilities be placed into service.
- Impact to ongoing and planned research objectives