

UNOLS
DEep Submergence Science Committee
Planning Meeting

SUMMARY REPORT

December 4, 1994
Oregon/Nevada Room
Holiday Inn Golden Gateway
San Francisco, CA



DEEP SUBMERGENCE SCIENCE COMMITTEE
Planning Meeting Minutes
Sunday, December 4, 1994
Holiday Inn Golden Gateway
Oregon/Nevada Room
San Francisco, CA

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INTRODUCTION - The meeting was called to order on December 4, 1994 at 9:00AM by Jeff Fox, DEEP Submergence Science Committee (DESSC) Chair. He welcomed all the attendees and discussed the agenda which is included as **Appendix I**. Jeff explained that the DESSC was seeking greater participation by both NOAA/NURP and the Navy in order to enhance the focus on the total national deep submergence facilities. In this regard, DESSC was going to propose to the UNOLS Council that representation from the Navy's Sub. Dev. Group 1 and relevant NOAA/NURP labs would be invited to participate in DESSC meetings as ex-officio members. The agenda was followed except as indicated in these minutes. A list of the participants is included as **Appendix II**.

THE NATIONAL FACILITY (ALVIN and MEDEA /JASON)

The Year in Review - ALVIN and ROV Operations - Barrie Walden started with a series of viewgraphs, **Appendix III**, of the Deep Submergence Operations Group Milestones - 1994. ALVIN will complete 181 dives in 1994 which involves 265 days at sea and 282 operating days for ATLANTIS II. An impressive 99% dive completion

record was accomplished. Barrie presented a pie chart reflecting the costs of the year's operation which reflected 71.5% of the money going to salaries/benefits/overhead. Only 6.7% was spent on dive expendables. Barrie pointed out that since personnel is the primary cost of operating ALVIN the more days used for science dives the more cost effective the submersible becomes.

Barrie presented a series of viewgraphs depicting the accuracy of transponder positioning for a long baseline transponder survey. Accuracies of 4 meters are routine with P-code GPS positioning,. Transponder arrays now can be positioned in significantly less time as a result of the use of P-Code and improved software used for analyzing transponder survey data and arriving at on-bottom location fixes and depths for deployed transponders.

Dudley Foster followed with a presentation on the improvements in progress for ALVIN. Viewgraphs of his presentation are included as **Appendix IV**. Dudley explained the status of the "Imaging Proposal". It includes the purchase of new computer equipment and printers dedicated to science use on ATLANTIS II. Under Instrument Deployment, Tracking & Retrieval, Dudley explained that Jim Bellingham's subcommittee has been working on navigation upgrade approaches, both hardware and software - the results of their deliberations were presented later by Jim Bellingham. Ken Smith (SIO) successfully used the EXACT navigation system, normally used for centimeter-scale accuracy with the JASON ROV, for his two science diving programs off California. The modification of the EXACT system and the software integration for use with ALVIN was funded under the NSF/NOAA Imaging Proposal. Dudley reviewed the progress in the area of imaging. This includes the acquisition of cameras, lighting, video recorder and pan and tilt mounting. The full list of equipment and status is included in **Appendix IV**. Dudley then followed with a list of problem areas the ALVIN operation has experienced over the past year. This list was part of his viewgraph presentation and is included in the appendix.

Andy Bowen provided viewgraphs of the ROV and unmanned vehicle operations in the Deep Submergence Operations Group (DSOG), specifically the extremely successful ARGO-II and 120 kHz sonar field work at the TAG hydrothermal site on the Mid-Atlantic Ridge in support of ODP drilling. These are included as **Appendix V**. Andy reported that a proposal has been written and funded by ONR, to provide funding to test the manipulator arm of JASON and demonstrate a wide range of sampling capabilities for the ROV. ALVIN will be used to demonstrate the arms manipulative capabilities during a dive program in Nov. 1995 on East Pacific Rise vents at 9° 50'N.

The 1995 schedule - Rick Chandler provided the 1995 ALVIN schedule. It includes 165 science dives and 5 certification/engineering dives for a total of 170. The ATLANTIS II/ALVIN operations start in the Atlantic in late January 1995 with a series of dives on the Mid- Atlantic Ridge. After a transit of the Panama Canal ALVIN will work on the northern EPR then move to the San Diego area. After a short stand-down

period imposed by a shortfall in facilities funding, ATLANTIS II will transit to the Juan de Fuca area where it will operate from late May until late September taking advantage of the weather window. The ship and sub will then return to the San Diego area for more work and finally finishing the operational year working on the northern EPR. Year's end will find the ship and sub in Panama. A copy of ALVIN's schedule is included as **Appendix VI**.

AGOR 25/KNORR/ATLANTIS II Status - The report from WHOI on the status of AGOR 25/KNORR/ATLANTIS II was presented by Dick Pittenger. A copy of his presentation is included as **Appendix VII**. Dick first informed the gathering that the planning for conversion of KNORR to a submersible handling ship was well underway. ATLANTIS II is scheduled for retirement in early 1996 with KNORR conversion taking place at that time. ONR has funded the conversion design study. SEABEAM 2100 has been installed in KNORR, funded by both ONR and WHOI. A FIC/DESSC advisory panel provided input from the community for the conversion. The precise timing for the conversion will depend on the KNORR schedule as it completes 1995 in the Indian Ocean and works its way to WHOI via the Atlantic Ocean. Specifics of the conversion are included in the appendix. Funding for the work is still under discussion. WHOI has committed \$900K toward the conversion with additional funds from both federal and private sources being investigated. It seems clear, however, that the cost to convert the KNORR as presently defined will be significantly more than 1 million dollars.

ATLANTIS II is available for sale with no takers as of yet. The new ship, AGOR 25 is scheduled for delivery in early 1997 and will be named ATLANTIS. Work on this new ship is well in progress.

NOAA SUPPORTED OPERATIONS - Gene Smith provided a brief overview of the NOAA/UNRIP supported deep submergence operations. Gene reported that David Dune is scheduled to retire in February 1995, he then introduced CDR. John Green.

The Navy Deep Submergence Program - CDR. Green gave the deep submergence community an overview of the Navy's deep submergence programs. John started with the MORAY deployment in the fall of 1994. This included the use of both submersibles, TURTLE and SEACLIFF, as well as their Advanced Tethered Vehicle (ATV), for science operations in the Juan de Fuca area which was a program coordinated through NOAA. John also discussed the Navy's agreement with NSF/USGS/ONR/NOAA concerning the nuclear submarine cruises to the Arctic. The 1995 program, SCIEX 95 is scheduled for early spring. The Navy has also been working with Japan and France with their deep submergence programs. John reported the successful use of NR-1 for science operations off the east coast in the late summer/fall of 1994. Mary Scranton was the first woman to operationally use NR-1. Summaries of the dive records of TURTLE/SEACLIFF/ATV are included in John's viewgraphs which are presented as **Appendix VIII**.

Jeff Wheat announced that the West Coast UNRIP Center was accepting proposals for subsurface programs in the Northeast Pacific. UNRIP will pay for some of this science. Jeff also informed the community that a UNRIP Regional Coordination Office is being considered for Moss Landing and should open in August 1995.

Gene Smith promoted the Navy's ATV and encouraged more people to look at its capabilities. He invited Bob Embly to share some of his experiences using the ATV while aboard LANEY CHOUEST this fall. Bob showed slides of the vehicle and discussed its usefulness. It operates with a fiber optic Kevlar cable and has a 5 kilometer depth range. He was able to take rock samples and touted its excellent sampling capabilities. Bob did indicate that the vehicle did have navigational problems but that the Navy was working on these.

Alex Malahoff provided the community an update on the HURL program in Hawaii. PISCES-V is a 2000 meter submarine that is presently launched from a platform that sinks below the surface. This method is cumbersome and is being replaced by a ship launching system from the vessel KA'IMIKAI-O-KANOLOA or K-O-K. The K-O-K is a quiet operating ship with four diesel electric propulsion engines. In addition HURL operates a 2000 meter ROV system tethered by a fiber-optic cable. The vehicle will be rebuilt and will have two manipulators. Their program also supports an ocean floor observatory located on the volcanically active Loihi Seamount that is supported by an underwater cable. A SEABEAM system has been purchased for K-O-K. The entire system of the submersible, ROV and K-O-K expect to be fully integrated in the fall of 1995 and commence shakedown operations in the spring of 1996. At that time they expect to complete their currently funded dives. After establishing operating reliability the system is planning a Western Pacific expedition. This should come in 1997 and 1998.

FUNDING AGENCIES

NATIONAL SCIENCE FOUNDATION (NSF). Dave Epp started the NSF presentation with viewgraphs that reflected the usage of ALVIN by the NSF MG&G community. A copy of these viewgraphs are included as **Appendix IX**. The bar graphs reflect the dip and then increase in the proposals received by NSF for MG&G ALVIN programs. A second graph depicts the success rate of ALVIN programs compared to all programs which all fall in the 35% range. Dave said that ALVIN should be used like a dart to increase the efficiency of this expensive research tool.

Don Heinrichs followed with a report on the NSF budget. The NSF Ocean Sciences Division programs requested \$207.9 M in their 1995 budget. They will be receiving \$193.4 M which represents an increase of 2.4%. Major research initiatives received the largest increase of \$4.5M or 6.7%. These increases were related to strategic areas. Ship operations will receive \$35.2 M, ALVIN \$2.4 M and Marine Techs \$4.2 M. Don indicated the ship operations support in 1995 will be stressed with three major ships

deployed to the Indian Ocean. The financial implications may spill over into 1996. Viewgraphs from Don's presentation are included as **Appendix X**.

Don informed the community that the current three agency MOA for ALVIN will end in 1995. A preliminary meeting of the agencies is expected in December and a new MOA will be worked out during 1995. There is a need to deal with ROVs in the new MOA and a major revision is anticipated.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION/ NATIONAL UNDERWATER RESEARCH PROGRAM (NOAA/UNRIP) - Gene Smith provided the report for the NOAA/UNRIP program. He expressed the program's commitment to deep submergence science and the National Facility. He also voiced their commitment to the UNRIP Centers. Gene said that the integrated system of manned submersible and ROVs get the most science for the money and that more of these type operations should be planned. The NOAA/UNRIP Organic Act will have to start over in the new Congress. Gene informed the community that the new committee arrangement in Congress will affect this process.

OFFICE OF NAVAL RESEARCH (ONR) - Jim Andrews gave the report for ONR. Jim explained that the Navy's mission is changing. ONR has undergone a few reorganizations in the past year. The Ocean, Atmosphere, and Space S&T Department now integrates research (6.1), exploratory development (6.2), and advanced development (6.3) into one department. ONR is experiencing a refocus from deep water to littoral research. What was once a 90/10 deep water emphasis is now 50/50 deep water/shallow water.

The Department of Defense proposed budget cut of \$900 M for academic research announced earlier this year has now been reduced to \$200 M of which approximately \$60 M will be the ONR share.

With the exception of one engineering dive, no ONR ALVIN work is planned for 1995. Jim said the program managers are open for proposals and remain interested in deep submergence science. ONR will be funding a manipulator project for JASON to improve and test sampling capabilities.

Lastly, Jim provided copies of the vacancy announcement for the position Keith Kaulum left and Annette DeSilva is presently filling on a temporary basis.

THE DEVELOPMENT OF AN ASSET UTILIZATION MODEL FOR THE NATIONAL FACILITY IN 1996 AND BEYOND - Jeff Fox provided viewgraphs with world maps depicting the concentration of ALVIN and ROV potential dives for 1996/97 based on letters of interest. These are included as **Appendix XI**. Jeff explained that KNORR will be the submersible handling ship with both ALVIN and the ROV aboard. He suggested that we can expect to see more proposals for the ROV and probably less for ALVIN.

Jeff said the 1996/97 schedule will be influenced by the sailing time from WHOI. If the ALVIN overhaul and KNORR conversion complete at the optimum time in the summer of 1996 then there will be an opportunity for work in the Atlantic. This is particularly important since the first operations should be reasonably close to home to respond technical contingencies resulting from the major ALVIN overhaul and the conversion of the support vessel. In addition, DESSC has been informed that investigators involved in the British-RIDGE (BRIDGE) program are very keen to investigate several new Atlantic hydrothermal sites recently discovered this past year. Hence external sources of facilities funding may be available if the conversion process is completed in time for an Atlantic field season in the late-Summer/early Fall of 1996. If the conversion is delayed the weather in the Atlantic will not permit operations in the northern latitudes. This will create a more difficult shake-down period and will impact the Pacific schedule.

The letters of interest suggest work in the Central Atlantic and then the Eastern Pacific. Significant proposal pressure and some already funded programs suggest both northern and southern EPR operations. The timing of this work will be dependent upon the arrival of KNORR into the Pacific since weather considerations must be addressed for the southern EPR. After the EPR work the ship could work north to the Juan de Fuca area in the summer of 1997 and then to the Western Pacific or it could proceed from the southern EPR in the late spring of 1997 directly to the Western Pacific. The second alternative will cause the well funded Juan de Fuca work to miss two seasons. The first of these options would push the Western Pacific work into late 1997 and 1998. After considerable discussion it was the consensus of the group to allow proposal pressure drive the schedule. Investigators for work in both the Western Pacific and Juan de Fuca were encouraged to generate proposals for their respective areas and let the review process determine the operating route.

Patty Fryer, who gave a brief summary of the interest in the far Pacific earlier in the day, informed the gathering that there were seventeen proposals from U.S. scientists for ALVIN work in the Western Pacific. These proposals constitute 257 dives. She said the areas being proposed were scientifically mature. In addition, another 94 dives are proposed by non-U.S. scientists for a grand total of 351. A copy of Patty's summary is included as **Appendix XII**.

TECHNOLOGY AND SCIENCE SENSORS IMPROVEMENTS FOR THE NATIONAL FACILITY - Dudley Foster provided viewgraphs of improvements being planned for ALVIN. These viewgraphs are included as **Appendix XIII**. The improvement planning was divided into near term (prior to end of next overhaul) and long term (> 3 years). Both near and long term improvements are planned for imaging, navigation, data logger, sensors & samplers, and submersible systems. Long term dive duration plans include battery replacement, possibly NiCd, and the redesign of the sphere interior.

Andy Bowen reported on the improvements planned for the ROV systems. His viewgraphs are included as **Appendix XIV**. Near-term improvements include: 1.) the refinement of JASON's manipulator, 2.) the re-configuration of the DSL 120, 3.) install and test improved vehicle attitude sensors, 4.) integrate real-time bathymetric processing for 120 kHz sonar system, 5.) improved elevator to aid sample recovery and, 6.) actively monitor planning and development for seabed observatories. Long term improvements are 1.) foster and promote continued coupling between fundamental engineering 2.) navigational capabilities 3.) streamline Data Processing, 4.) indoctrinate AUV technology, 5.) decrease at sea manpower and, 6.) imaging upgrade.

Jim Bellingham reported to the group on the plans for upgrading submersible navigation. His viewgraphs are included as **Appendix XV**. Jim explained that the upgraded navigation plans will ensure that the navigation system is common to both manned and unmanned submersibles. He had several concerns. These include the potential for large position jumps when switching transponders, introducing software that is difficult to use, having in-hull displays that are not as versatile as desired, array deployment responsibility not well defined and post processing requirements that are not well supported. Jim cited several constraints such as, upgrades should not disable present systems until the new system is fully functional and the upgrade should not increase the workload on the operator. Additional constraints are included in the viewgraphs.

Jim discussed long baseline (LBL) upgrades as well as transponderless navigation. Common hardware/software will be needed for all DSOG vehicles (sub., ROV, towed vehicles). There is a concern for appropriate support in post-processing and the merging of surface and in-hull data files. Significant work is yet to be done in the navigation area, however, a course is now set and plans need to be developed.

DEEP SUBMERGENCE ISSUES - Third Party Tools Debra Stakes brought the group up to date on the continued developmental progress made on the Stakes/Holloway rock drill. She has taken 30 cores using the MBARI ROV. This configuration provides horizontal cores only. The gatling gun arrangement permits four cores of one meter each. When used on ALVIN the drill is configured for vertical drilling. Debra reported that 300 rpms provide the best results.

Jeff followed by explaining that the committee was working on a third party tool policy. This was being encouraged by NSF. The rock drill provides an excellent example for the development of this policy. Jeff also briefly explained that the DESSC was working on better ways to more effectively plan for the future and developing a model for the 21st century that will provide a more dependable funding base for deep submergence science.

OTHER BUSINESS - John Delaney presented the group with an excellent video of imaging capabilities of the MEDEA/JASON ROV and 120 kHz side-looking sonar

system. His video flew us through the features of the Juan de Fuca area. The demonstration illustrated video visualization and suggests both a scientific and media value for this kind of presentation.

Rich Lutz presented a proposal for a potential IMAX production of deep sea hydrothermal vents. The effort supported by National Geographic would use the Russian MIRs to film vent areas throughout the world. He suggested that the timing could be right to coordinate one of the northern EPR sites with ALVIN and asked the gathering their views of this possible effort. Considerable discussion followed. It was concluded that a "wait and see" attitude be adopted. If private funding is made available, if the timing is right and it does not negatively impact ALVIN's science then it could be considered as an exciting opportunity. Several persons noted the important public relations value of this work, however, others cautioned that for it to be successful, it had to be carried out with sensitivity to U.S. deep submergence assets and future needs.

DESSC EXECUTIVE MEETING - Upon the conclusion of the regular meeting the DESSC Executive (Standing) Committee met. Present were: J. Fox, D. Fornari, D. Orange, H. Milburn, J. Bellingham, R. Collier, K. Von Damm, R. Pittenger and J. Bash. Dan Fornari discussed the third party tool policy development and distributed a letter to NSF co-signed by Jeff Fox and Barrie Walden. A copy of this letter is included as **Appendix XVI**. Jeff reported that he would communicate to the agencies the DESSC/user community perspective on issues relevant to the MOA. Jeff reported that Karen Von Damm would Chair the subcommittee overseeing the KNORR conversion to a submersible handling ship. He suggested that a meeting should probably be scheduled for early 1995. Jeff extended kudos to Jim Bellingham and his navigation subcommittee. As a final note Jeff said that the "fork" decision for the KNORR schedule in 1996/97 (ie whether the ship departs the EPR by going north to Juan de Fuca or the western Pacific) would be discussed and possibly determined at the June DESSC meeting. No date was set for this meeting. The Committee adjourned at 1730 hrs.

APPENDIX I

DEEP SUBMERGENCE SCIENCE COMMITTEE
Tentative Agenda
PLANNING MEETING
SUNDAY, DECEMBER 4, 1994, 9:00 a.m. - 5:00 p.m.
HOLIDAY INN GOLDEN GATEWAY - OREGON/NEVADA ROOM - SAN FRANCISCO, CA

- 0900** Meeting convenes, Welcome, Introductions and Meeting Goals (J. Fox, DESSC)
- 0915** The National Facility (ALVIN and MEDEA/JASON)
a. The year in review - ALVIN and ROV Operations (WHOI Team)
b. The 1995 schedule (R. Chandler)
c. AGOR 25/KNORR/ATLANTIS II Status (D. Pittenger)
- 1045** NOAA Supported Operations (G. Smith)
a. The Navy Deep Submergence Program (Cdr. J. Green)
b. The NR-1 Program (TBA)
c. The HURL Program (A. Malahoff)
- 1130** Agency and Program Management Report: Review of Issues Pertinent to Deep Submergence Science
a. NSF
b. ONR
c. NOAA
- 1200 - 1315** **Break for Lunch**
- 1315** The Development of Utilization Model for the National Facility in 1996 and Beyond (J. Fox)
a. A Review of Letters of Interest - Areas of research and timing; comments and discussion
b. Assessment of programs (scientific maturity, critical mass, timing, etc.)
c. The creation of outline of National Facility operations for 1996 and 1997
d. Utilization strategy for HURL and Navy assets.
- 1415** Technology and Science-Sensors Improvements for the National Facility
a. Thoughts on future upgrades for ALVIN and ROV (WHOI Team)
b. A model for upgrades in navigation (J. Bellingham)
c. Suggestions for improvements from the floor
d. Identification of improvements of critical importance: A short list
e. Strategy for acquisition.
- 1530** Deep Submergence Issues
a. A policy for 3rd party tool development:
o The rock drill
b. How do we plan more effectively for the future:
o Utilization of distributed assets
o Develop an asset model for the 21st century and address the question of the future of manned presence.
- 1630** Other Business Arising
a. Origins: A Potential IMAX Production (R. Lutz)
b. Imaging capabilities of MEDEA/JASON ROV (J. Delaney)
- 1700** DESSC Executive Meeting
a. Review results of meeting
b. Development of timetable and delegation of responsibilities
c. Schedule for upcoming meetings.

APPENDIX II

ATTENDEES

<u>NAME</u>	<u>AFFILIATION</u>	<u>INTERNET ADDRESS</u>
Jim Andrews	ONR	andrewj@onrhq.onr.navy.mil
Tim Askew	HBOI	
Jack Bash	UNOLS	unols@gsosun1.gso.uri.edu
Jim Bellingham	MIT/Sea Grant	belling@mituma.mit.edu
Andy Bowen	WHOI	abowen@whoi.edu
Dave Butterfield	U of WA/NOAA	butterfield@pmel.noaa.gov
Rick Chandler	WHOI	rchandler@whoi.edu
Bob Collier	COAS/OSU	collier@oce.orst.edu
Keith Crook	HURL	crook@iniki.soest.hawaii.edu
Mary D'Andrea	UNOLS	unols@gsosun1.gso.uri.edu
Paul Dauphin	NSF	jdauphin@nsf.gov
John Delaney	U of WA	jdelaney@u.washington.edu
Dave DeMaster	North Carolina State U	demaster@meavax.nrrc.ncsu.edu
Annette DeSilva	ONR	desilva@onrhq.onr.navy.mil
Henrietta Edmonds	MIT/WHOI	hedy@mit.edu
Robert Embley	NOAA	embley@new.pmel.noaa.gov
David Epp	NSF	depp@nsf.gov
Dudley Foster	WHOI	dfoster@whoi.edu
Jeff Fox	URI	jfox@gsosun1.gso.uri.edu
Chris German	IOS, UK	cge@uk.ac.nwo.ua
Joe Galewsky	UC Santa Cruz	joe@earthsci.ucsc.edu
Cdr. John Green	USN	jwgreen@technet1.jcte.jcs.mil
Rachel Haymon	UCSB	haymon@magic.geol.ucsb.edu
Don Heinrichs	NSF	dheinric@nsf.gov
Ken Johnson	MLML	johnson@mlml.calstate.edu
Paul Johnson	U of WA	johnson@ocean.washington.edu
David Kadko	U of Miami/RSMAS	dkadko@rsmas.miami.edu
Leslie Kahn	UC Santa Cruz	lkahn@earthsci.ucsc.edu
Marty Kleinrock	Vanderbilt	kleinrmc@ctrvax.vanderbilt.edu
Gary Klinkhammer	OSU	gklinkhammer@oce.orst.edu
Peter Linke	GEOMAR/Germany	punke@geomar.de
Richard Lutz	Rutgers	rlutz@ahab.rutgers.edu
Ken Macdonald	UCSB	macdonald@magic.geol.ucsb.edu
Alexander Malahoff	HURL	malahoff@iniki.soest.hawaii.edu
Bary Massoth	NOAA	massoth@pmel.noaa.gov
Brian McAdoo	UC Santa Cruz	bmcadoo@earthsci.ucsc.edu
Hugh Milburn	NOAA/PMEL	milburn@pmel.noaa.gov
David Naar	U of So Florida	naar@marine.usf.edu
Jim Newman	MBARI	neji@mbari.org
Dan Orange	MBARI	dano@mbari.org

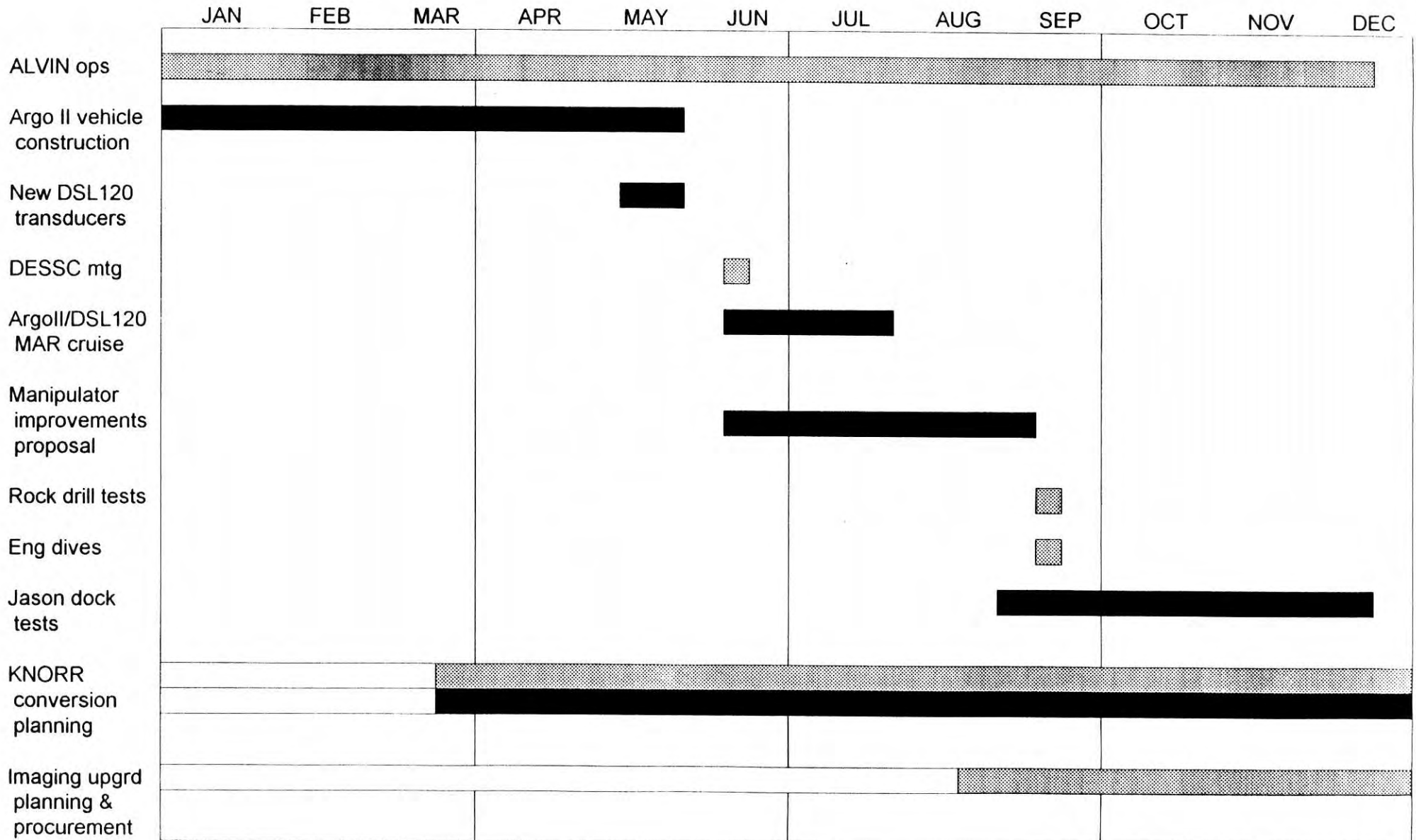
Mike Perfit	U of Florida	per@nervm.nerdc.ufl.edu
Dick Pittenger	WHOI	rpittenger@cliff.who.edu
Don Reed	San Jose State	dreed@geosun1.sjsu.edu
Veronique Robigou	U of WA	vero@ocean.washington.edu
Tim Shank	Rutgers	shank@zodiac.rutgers.edu
Andy Shepard	NURC/UNCW	sheparda@nurc.cmsr.uncwl.edu
Alexander Shor	NSF/ODP	ashor@nsf.gov
Eli Silver	UC Santa Cruz	silver@earthsci.ucsc.edu
John Sinton	U of Hawaii	sinton@soest.hawaii.edu
Craig Smith	U of Hawaii	csmith@soest.hawaii.edu
Eugene Smith	NURP/NOAA	genesmith@rdc.noaa.gov
Debra Stakes	MBARI	debra@mbari.org
Cindy Van Dover	Duke	vandover@metolius.ml.duke.edu
Karen Von Damm	UNH	kvd@christa.unh.edu
Geoff Wheat	U of Hawaii	gwheat@soest.hawaii.edu
Robert Zierenberg	USGS	robert@mojave.wr.usgs.gov

APPENDIX III

Deep Submergence Operations Group

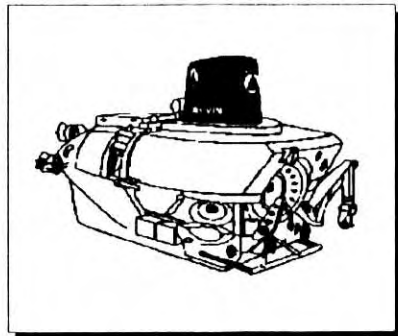
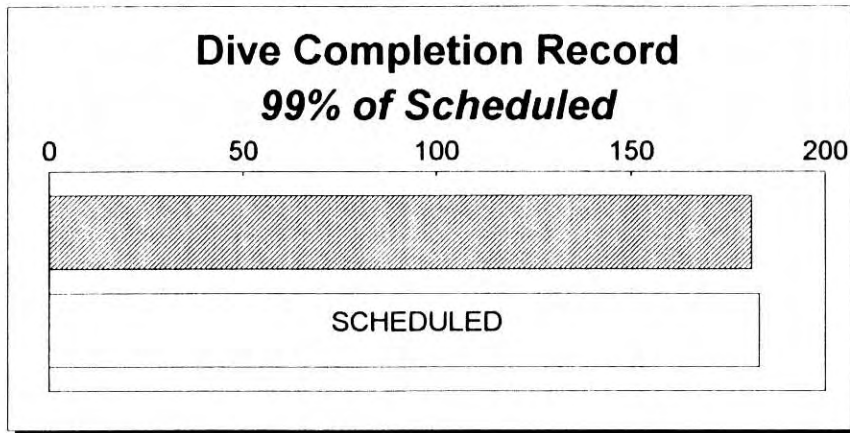
MILESTONES - 1994


 ALVIN
 ARGO/JASON



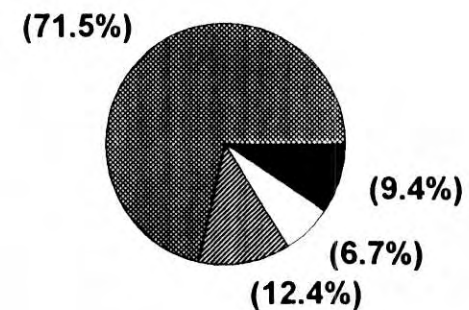
ALVIN - 1994

Assigned Operating Days	282	Hours Submerged	1,343
Days at Sea	265	Avg Dive Duration (hr)	7.42
Dives	181	Scientific Cruises	12

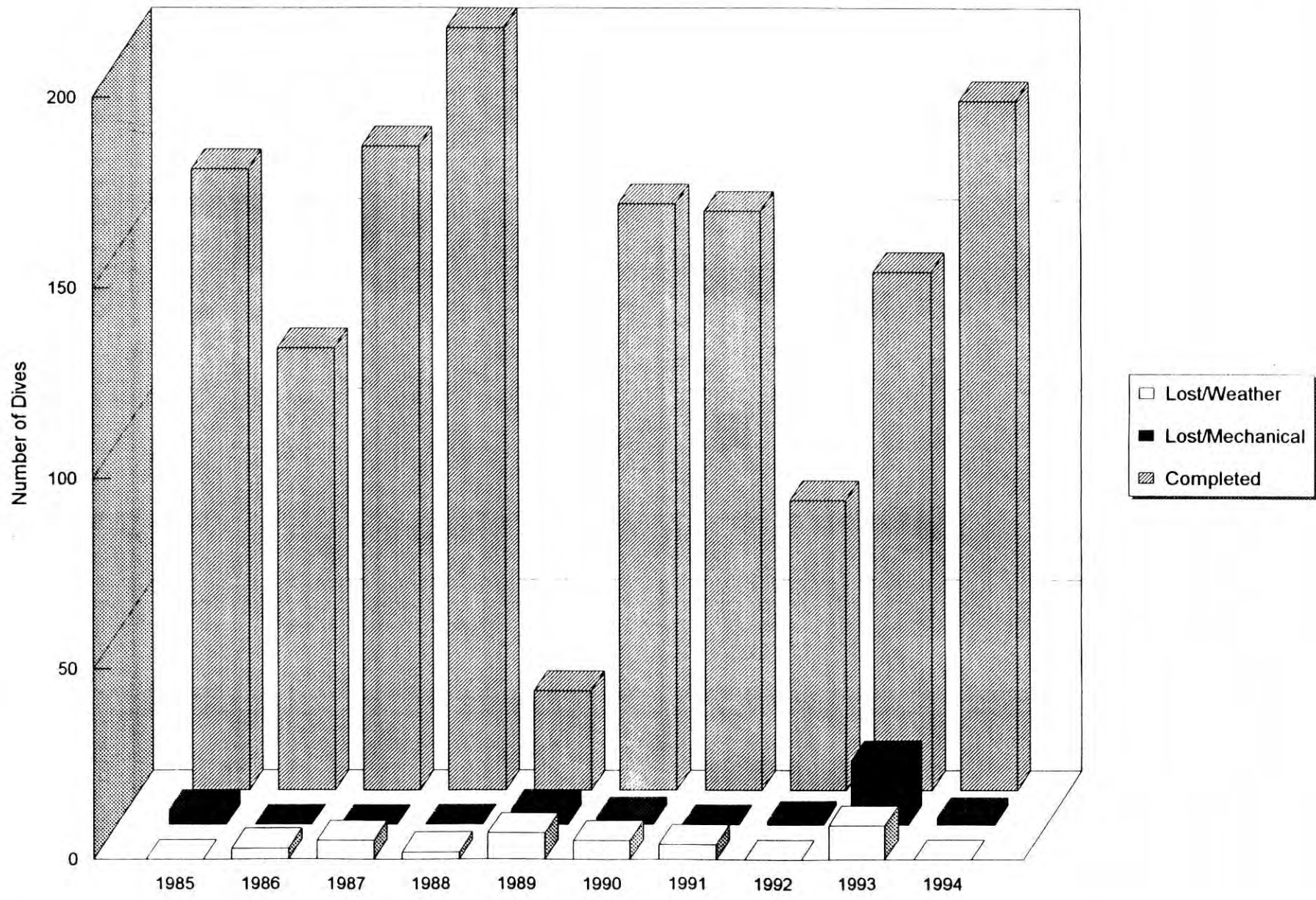


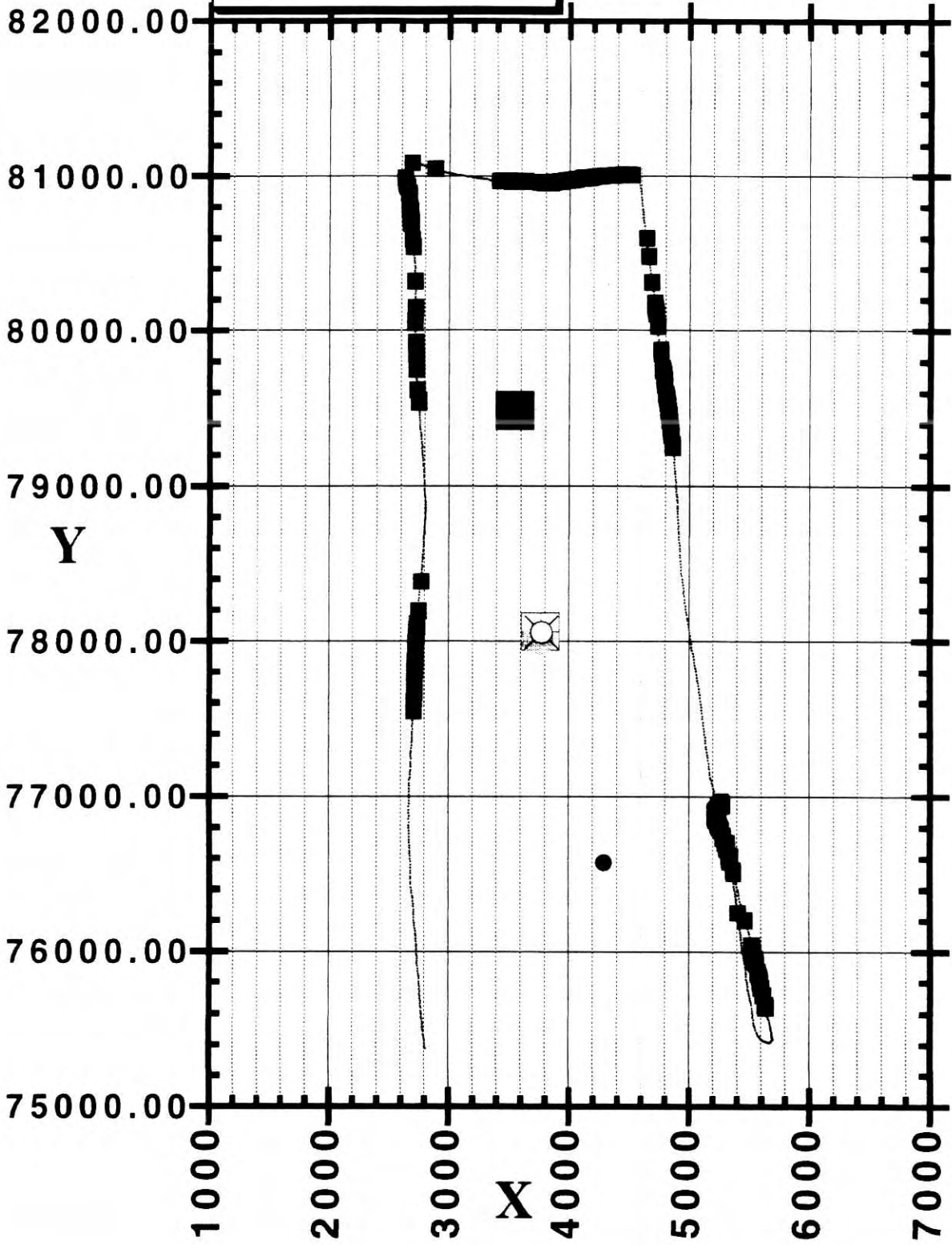
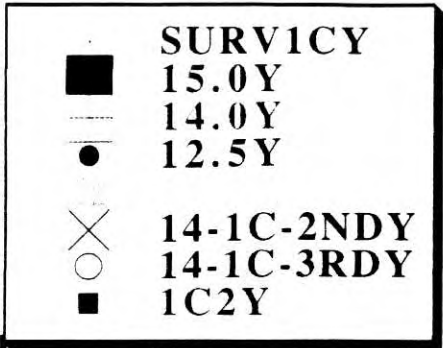
OPERATING COST BREAKDOWN

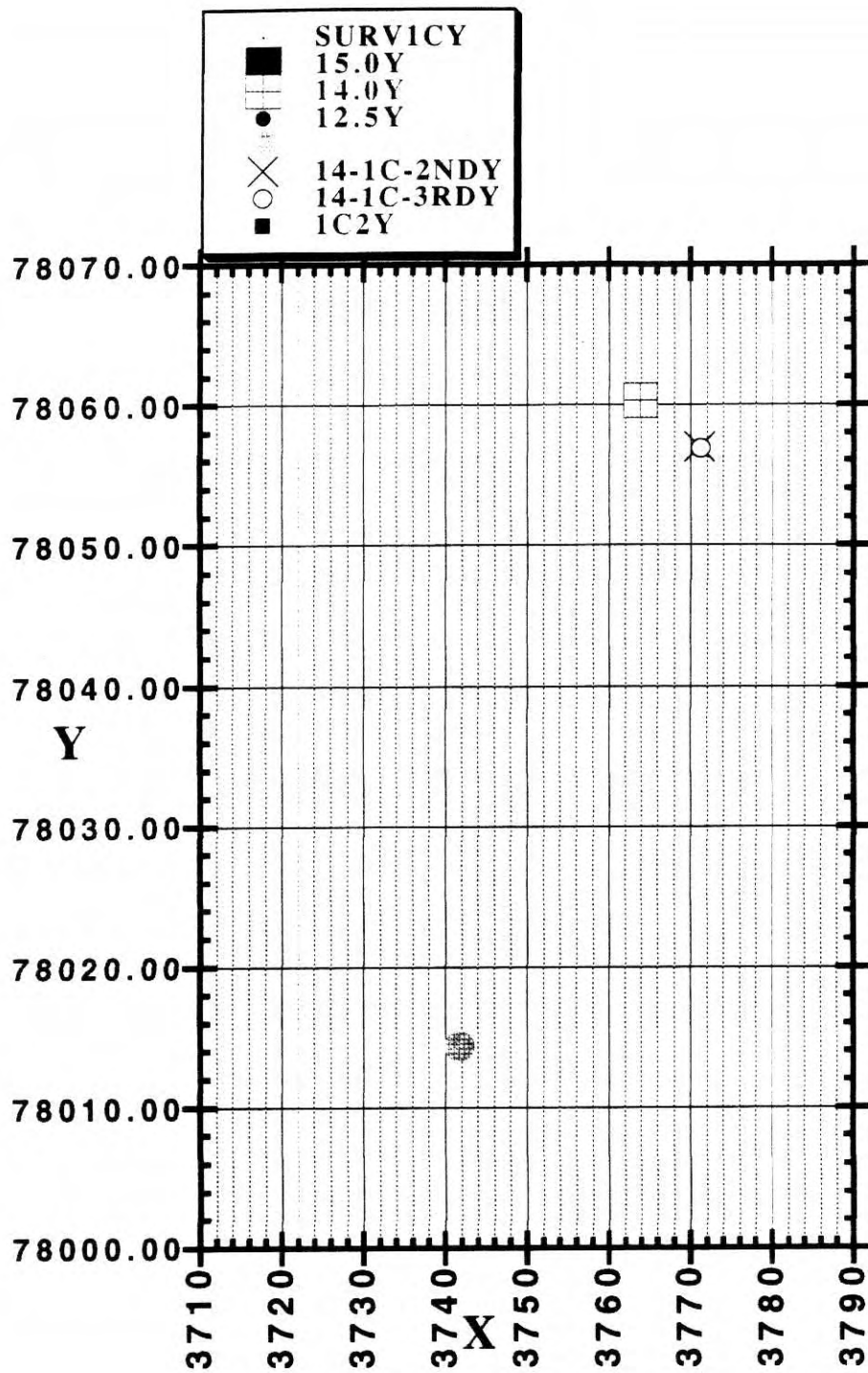
- Salaries/Benefits/Overhead
- ▨ Repairs & Maintenance
- Dive Expendables
- Other Expenses (Travel, Insur., etc.)



ALVIN Dives Lost vs. Completed







APPENDIX IV

ABC's of 1994 DSV ALVIN Improvements and Problems

A. From the "Imaging" proposal

***Computer Facilities**

PowerMac 7100/66, 17" monitor, Laserjet, Deskjet, and ethernet connection.

***Instrument Deployment, Tracking, Retrieval**

LBL navigation upgrade study, J. Bellingham

EXACT integration, used on two Ken Smith cruises

***Imaging**

Additional 1-chip color camera- TBD

Pan and Tilt- still investigating options

3-chip, "Broadcast" quality, camera-TBD

High quality color monitor-TBD, possibly 9" Sony PVM 1944

Video recorders-6 Hi8, one SVHS purchased

(6) HMI lights, 4 delivered, 2 on order

HMI light spares, on order

(2) SeaArc II lights, on order

(4) Lasers for manip camera, 3 delivered, 1 on order

(1) Spare relay chassis assembly- under construction

B. Other Improvements

- *Installed new Ti motor controller housings**
- *Increased certified operating depth to 4500 meters**
- *Installed and evaluated Datasonics PSA-900 altimeter**
- *New Sperry SR-50 gyro, modifications, testing, installation**
- *New EBA's, modifications, testing, installation**
- *Improved performance of ALVIN video distribution system**
- *Integrated DOS program capability into ALVIN computer**
- *Integrated attitude information into Datalogger**
- *Installed 3rd battery charger, improved battery maintenance**
- *Expanded LAN on ATLANTIS II**
- *P-code GPS installed**
- *Transponder survey program improved**

C. Problems

*Low battery capacity

- new chargers
- rotate batteries
- improved charge/discharge monitoring system
- training

*VB system: fitting corrosion, pump wear, hydraulic valve leakage

- change piping/fitting material
- investigate new pump source
- investigate new valves

*Straza Comm and Nav. Transducers: noisy, weak

- investigate possible wiring/electronic problems
- quantitative test of transducers

*Straza CTFM Sonar: poor sensitivity

- continue review of other systems
- justify rebuild of present electronics
- investigate acquisition of newer Straza unit

*ALVIN Shore power circuit failures

- move circuitry outside control center

*Explosive release devices not certified

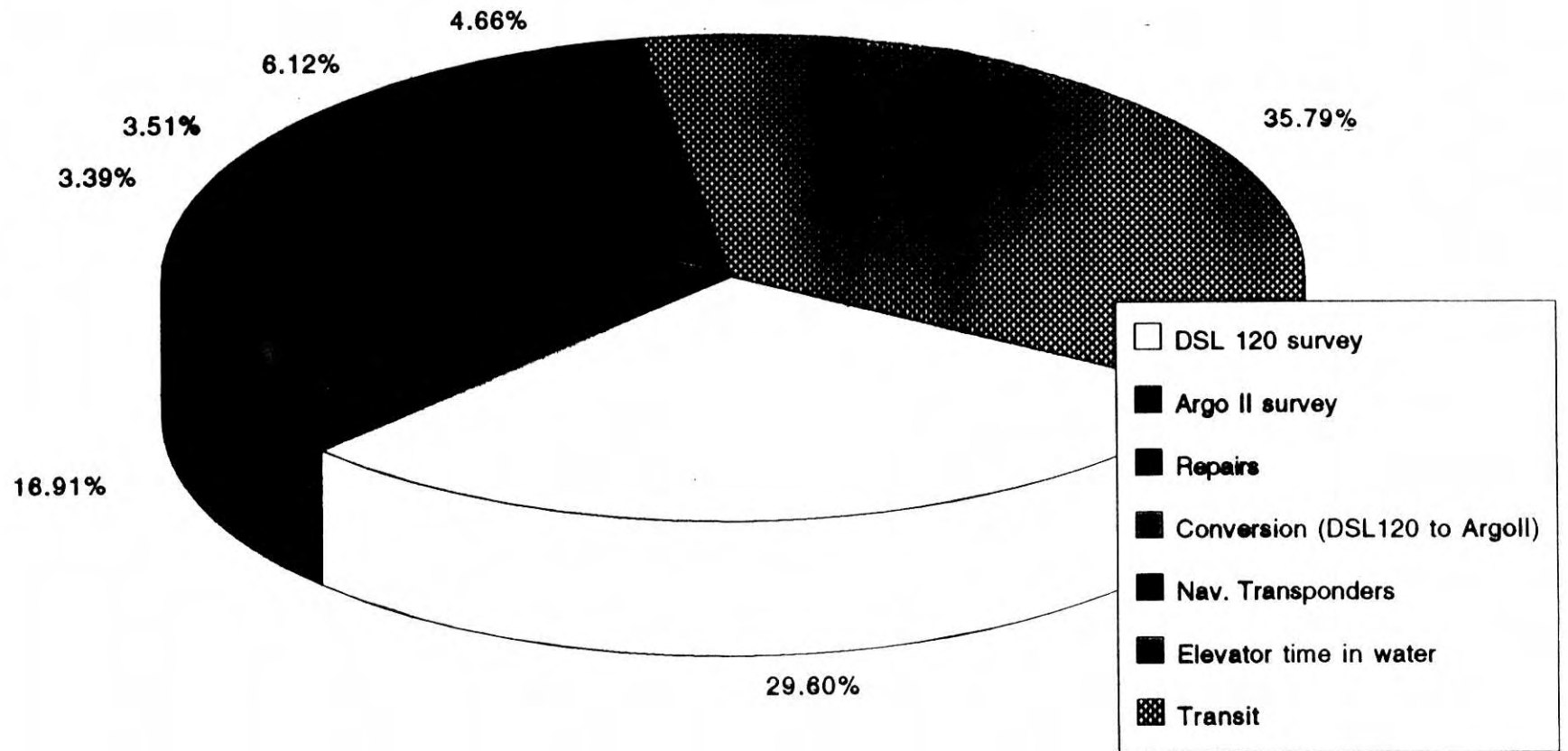
- waiting for NAVSEA approval of our purchase specification

*High pressure bulkhead electrical connector wear

- Evaluating alternative connectors

APPENDIX V

DSL120/ARGO II Survey of TAG



Jason ROV Manipulator Testing and Capabilities Demonstration

1. Operational Pressure Test at WHOI

Objectives:

- Verify the mechanical and electrical integrity of the manipulator in high pressure environment.
- Life test bearings and seals under simulated loads.

2. Dock Trials at WHOI

Objectives:

- Operate manipulator for extended period under working conditions
- Develop sample and tool storage methods
- Demonstrate operation of selected samplers:
 - Temperate probe
 - Sediment tube cores
 - Water samplers
 - Biological grabs
- Demonstrate vehicle's ability to make and break underwater electrical connectors
- Determine optimum configuration of vehicle work space video cameras
- Provide an opportunity to document and demonstrate capabilities

3. Operational Pressure Test of the Jason Vehicle System

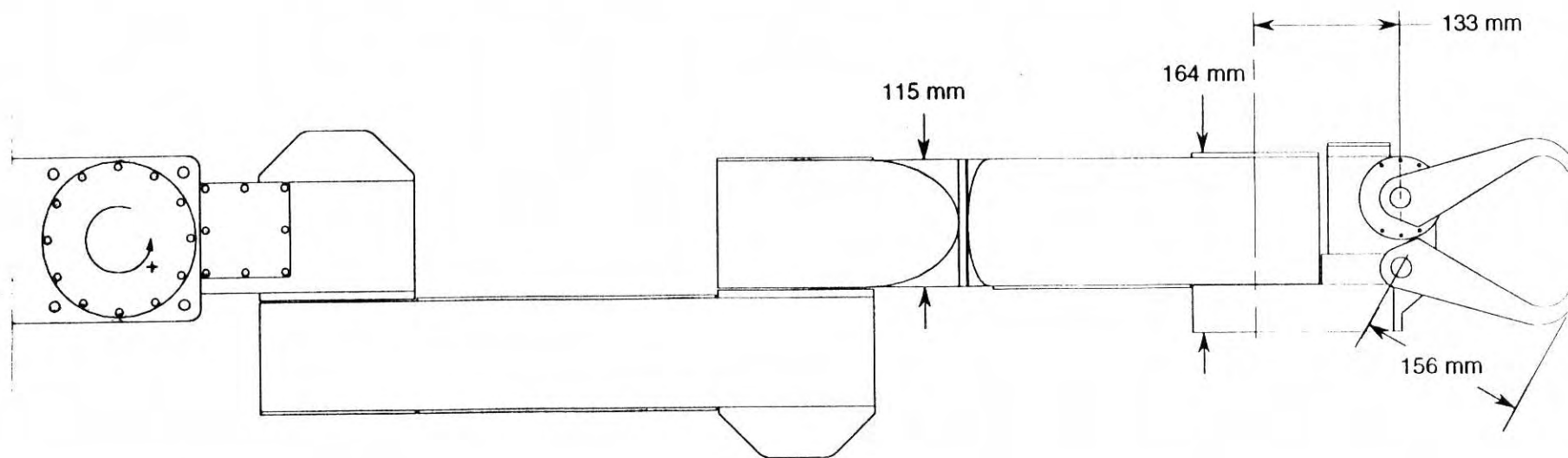
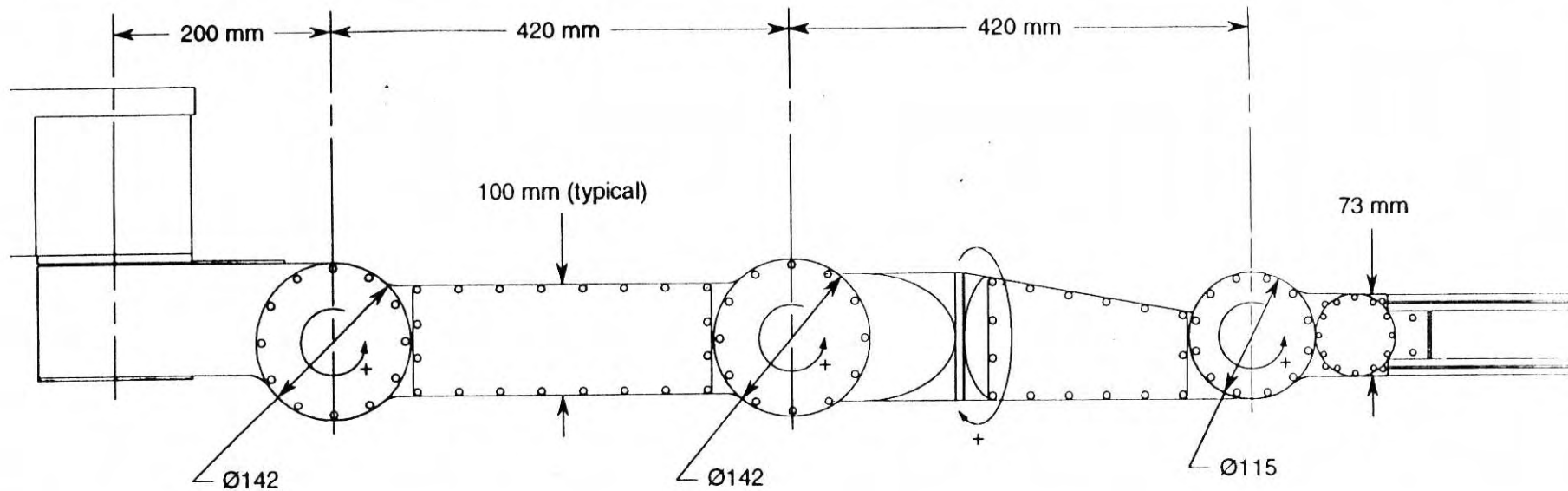
Objectives:

- Operate vehicle system at maximum design pressure for extended period
- Demonstrate vehicle's ability to work with various tools and samplers in a simulated deep ocean environment.

4. Alvin Engineering Dive

Objectives:

- Demonstrate use of various samplers by the Jason manipulator in a "real-world" environment
 - Document operation of the arm using both video and still photography
-



- 5 Degrees of freedom
- Brushless DC motors with resolvers
- Rated lift of 8 kg at 750cm from sholder
- Weight in water: 18 kg



Jason Manipulator Arm
N. Ulrich - 28 March 94

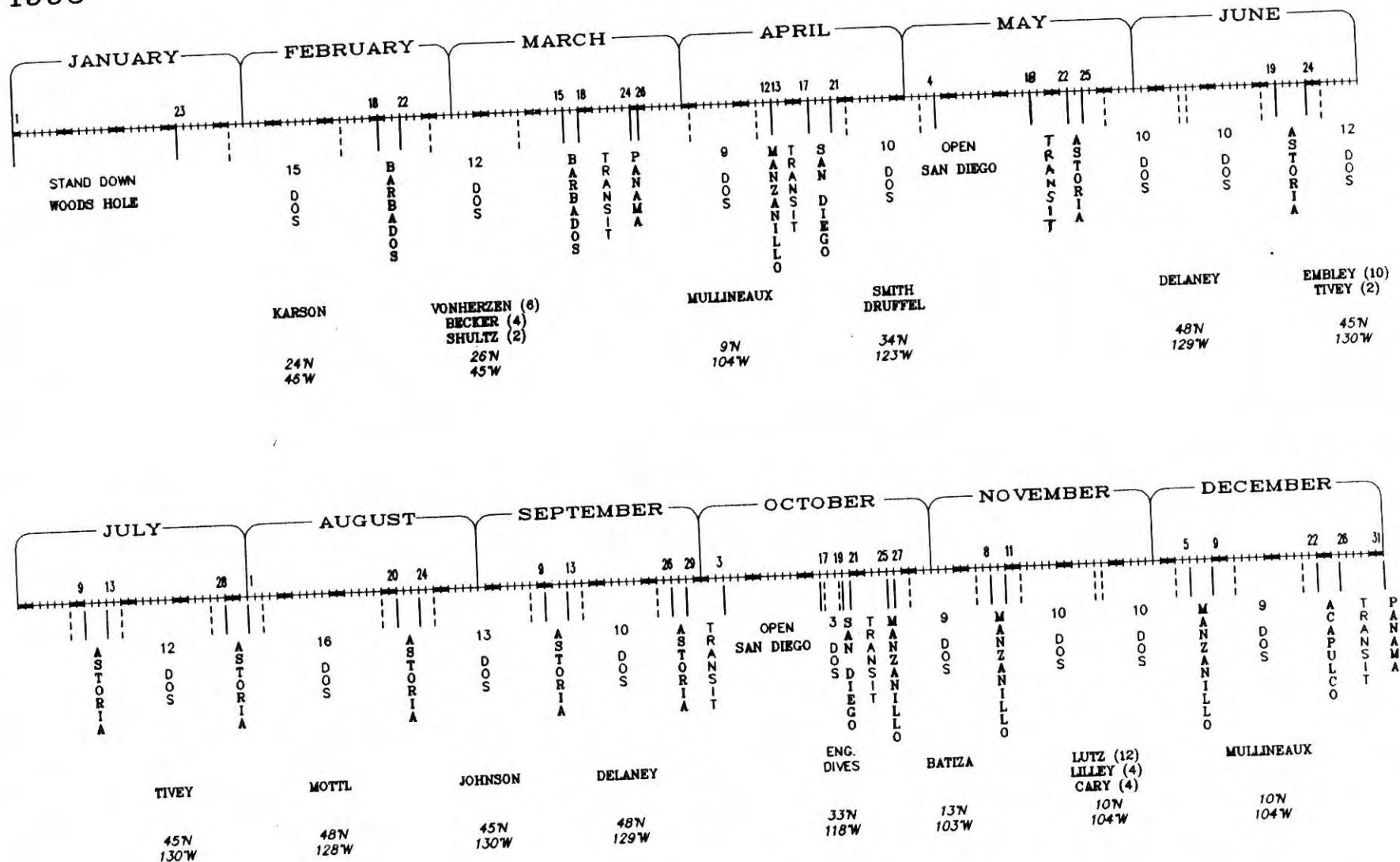
APPENDIX VI

TENTATIVE * R/V ATLANTIS II & ALVIN OPERATIONS

OPERATIONAL SCIENTIFIC SERVICES
WOODS HOLE OCEANOGRAPHIC INSTITUTION

1995

02 DEC 94
28 NOV 94
07 NOV 94
13 OCT 94



ALVIN Dives
Scale 1:50000

* Based upon requests for ALVIN time received by the UNOLS ALVIN Review Committee and therefore subject to revisions resulting from supporting agency funding decisions

APPENDIX VII

OWNER'S COPY

Deep Submergence Science Committee

San Francisco, California

4 December 1994

Woods Hole Oceanographic Institution



Richard F. Pittenger

KNORR Adaptation to Deep Submergence

WHEN will it be done?

- **Planning schedule**
 - **Community involvement**
- **Conversion schedule**

WHAT will be done?

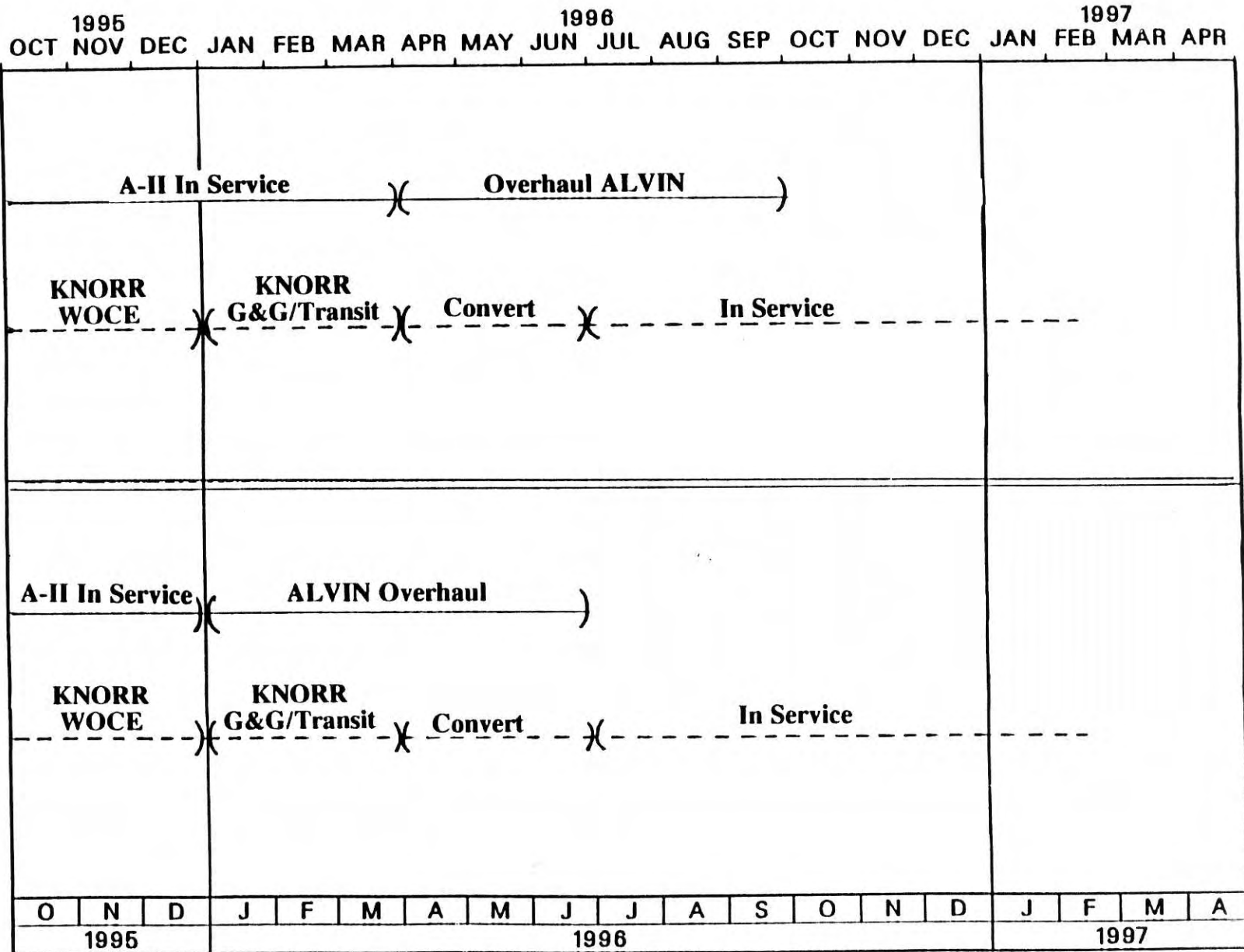
- **Scope of work**

Big Picture

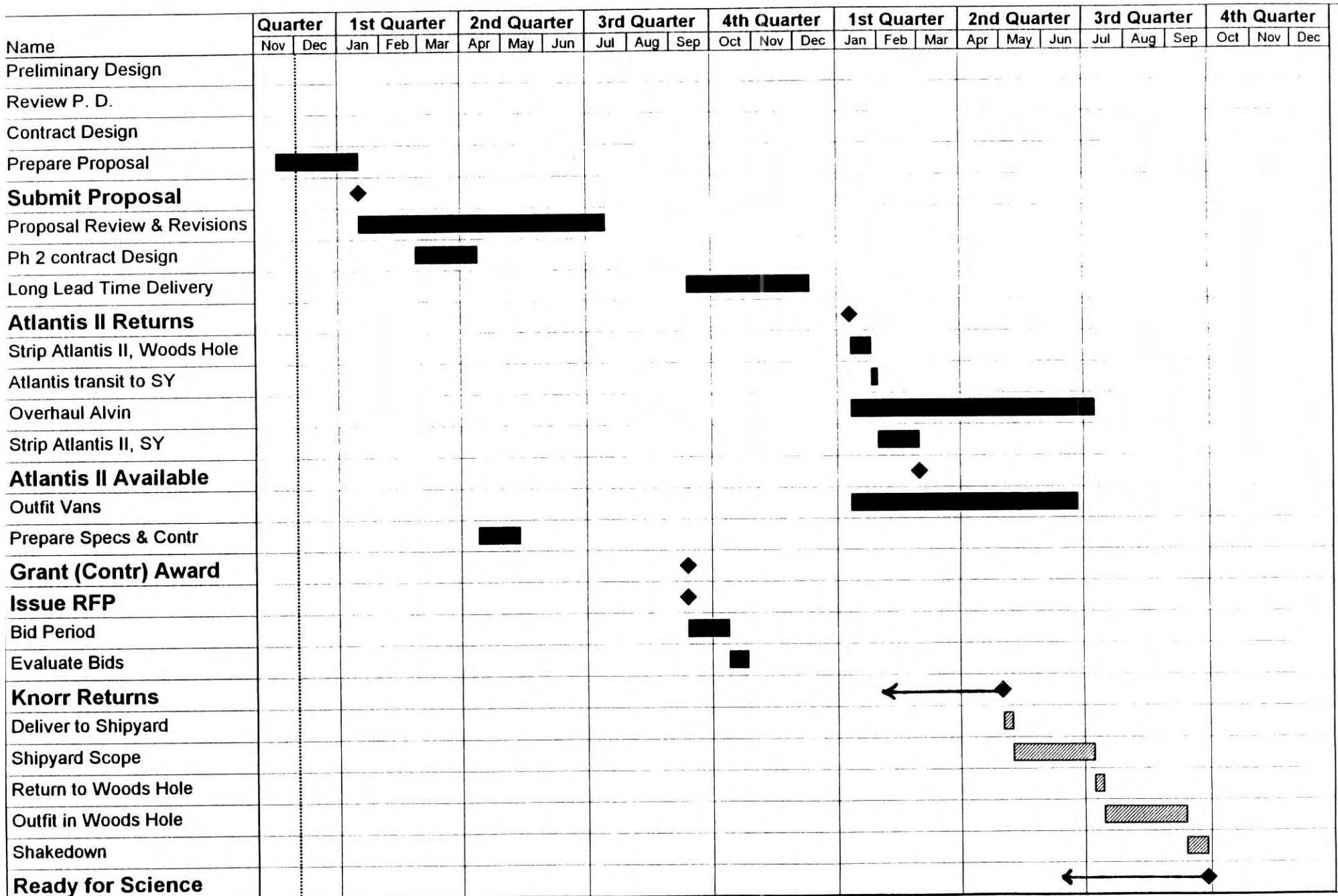
(Overview)

- ***Atlantis II* aging (replacement plans vague)**
- **WHOI proposed to replace *Atlantis II* with *Knorr* (AGOR-25/*Atlantis* to replace *Knorr*)**
- **Schedule for *Atlantis II* retirement, *Knorr* adaptation keyed to *Alvin* 3-year overhaul (planned for early 1996)**
- **Advanced design complete (ONR funded)**
- **SeaBeam installed (ONR, WHOI funded)**
- **FIC/DESSC advisory panel providing community inputs**
- **Community support**
 - ◇ ***Alvin* - high/growing - DESSC key**
 - ◇ **ROV's - soft/growing?**

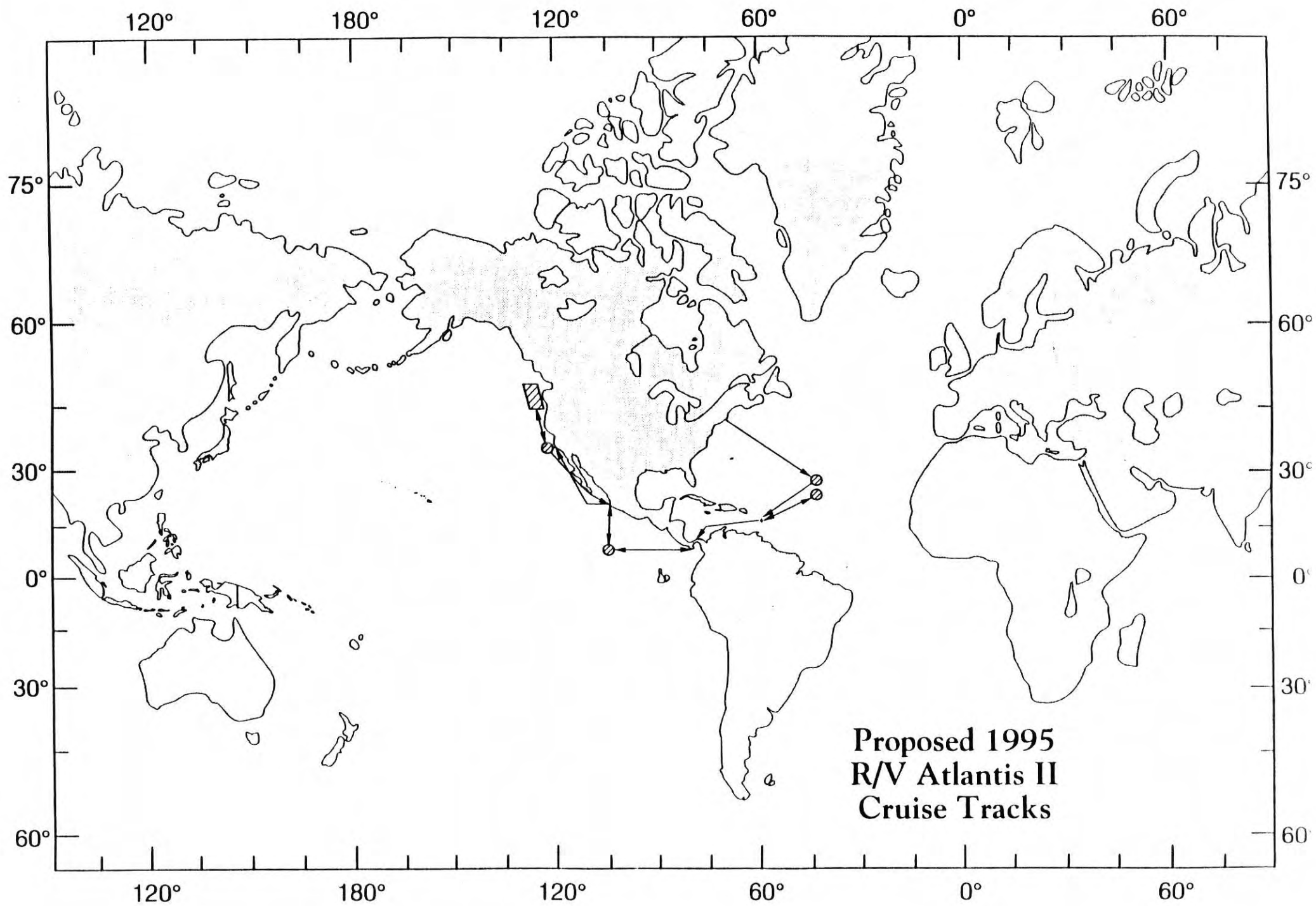
KNORR Conversion/ALVIN Overhaul Planning Schedules

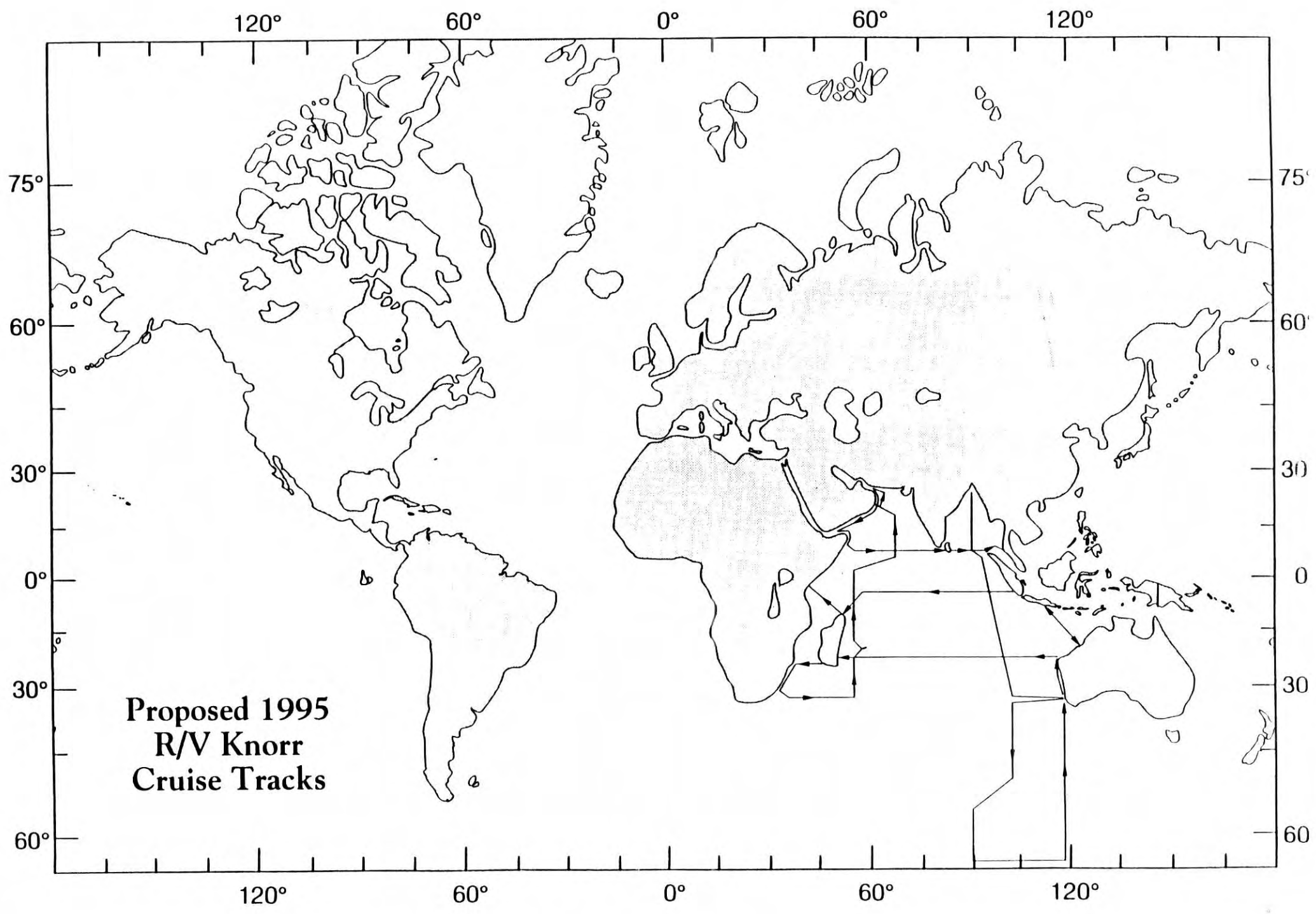


KNORR MODIFICATION PLAN



Revised: 12/1/94





**Proposed 1995
R/V Knorr
Cruise Tracks**

Community Guidance

(Letter of January 1994 - Ken Johnson *)

Overarching Goals:

To provide a submersible support ship with capabilities that exceed those of *Atlantis II*, while still maintaining as much of the general purpose oceanographic capabilities of *Knorr* as possible. It is very desirable to provide sufficient levels of support so that a hotel/laboratory ship would not be necessary.

- As much laboratory and open deck space should be maintained as possible.
- Additional berths should be provided for a total of 30 science personnel and 10 deep submergence support personnel.
- A multibeam mapping system must be provided for the *Knorr*.
- The problem of 'stern slamming' at low speeds should be rectified before *Knorr* is used for submersible operations.
- The ship should be fully capable of supporting 24 hour science operations during deep submergence expeditions. This might involve submersible dives during the day and dredging or hydrographic operations at night.
- Storage space on the *Knorr*, including dry storage for ship supplies, should be limited on extended cruises. Storage space should be maintained during the conversion process and improved if possible. Spaces currently used for the stern ramp and the moon pool can be sacrificed to maintain current storage space, including the lazarettes.

* FIC/DESSC *Knorr* Conversion Subcommittee

Work Tasks

- **Relocate *Alvin***
 - **Move A-Frame**
 - . **Renovate, (Upgrade?)**
 - **Handling System**
 - **Hangar**
 - **Topside Control/Navigation**
 - **Battery Service**
 - **Weights**
 - **Shops, Stores**

- **Accommodate ROVs**
 - **Handling/Tending Systems**
 - **Topside Control/Navigation**
 - **Service/Storage**
 - **Shops/Stores**

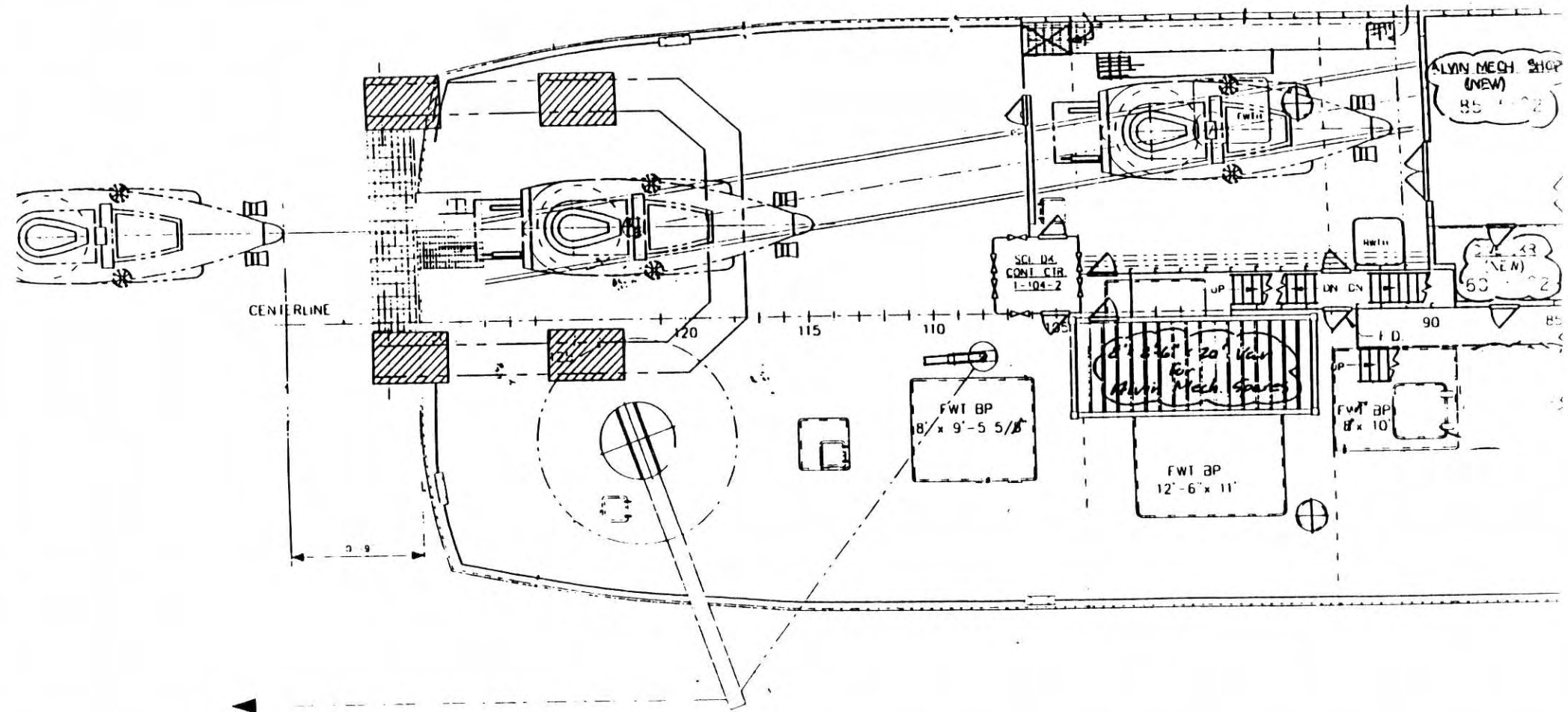
- **Retain *Knorr* General Purpose Capabilities**

- **Related Science Issues**
 - **P-Code GPS**
 - **SeaBeam**
 - **Dynamic Positioning**

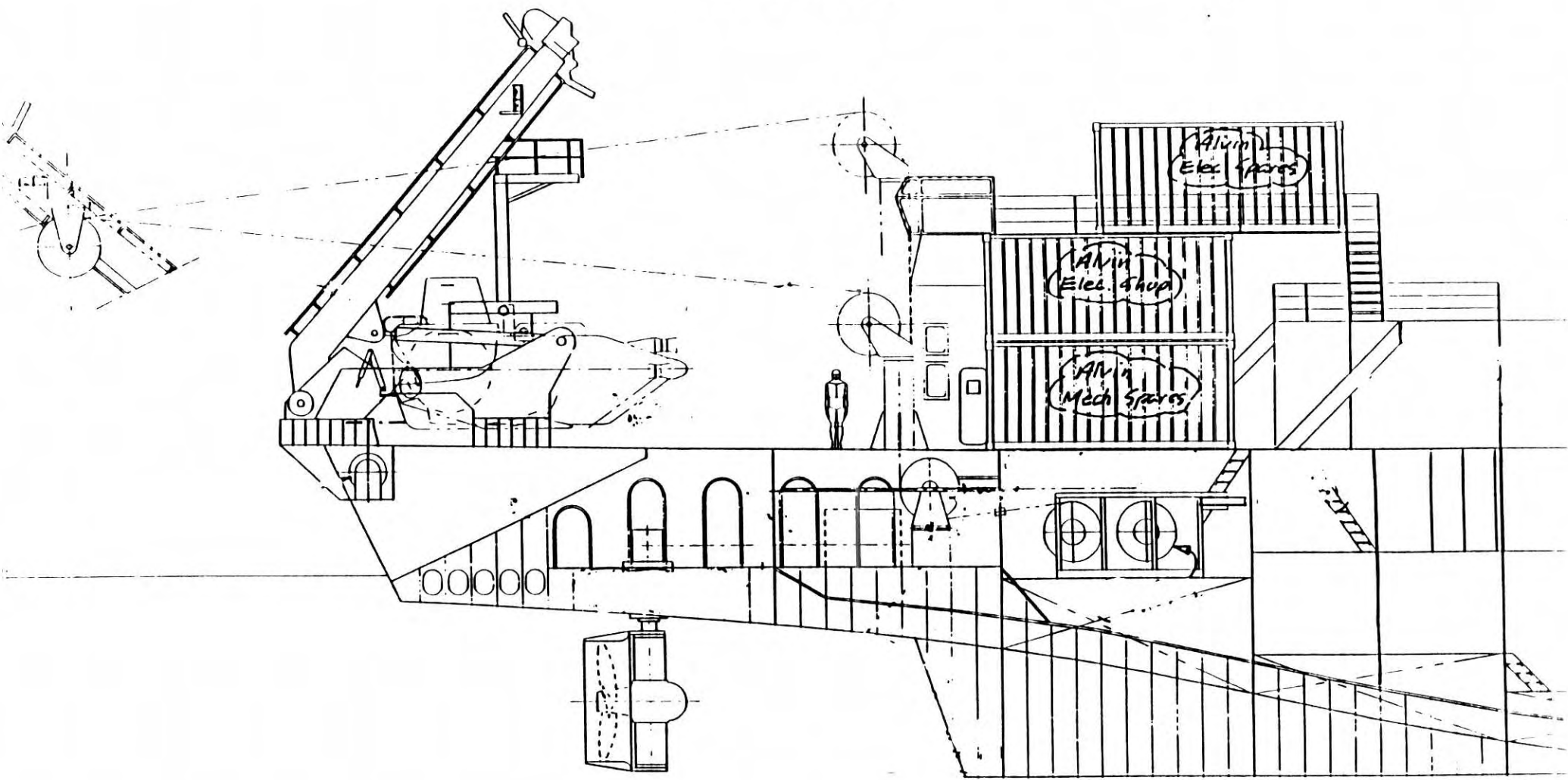
- **Related Ship Impact Issues**
 - **Berthing**
 - **Stores**

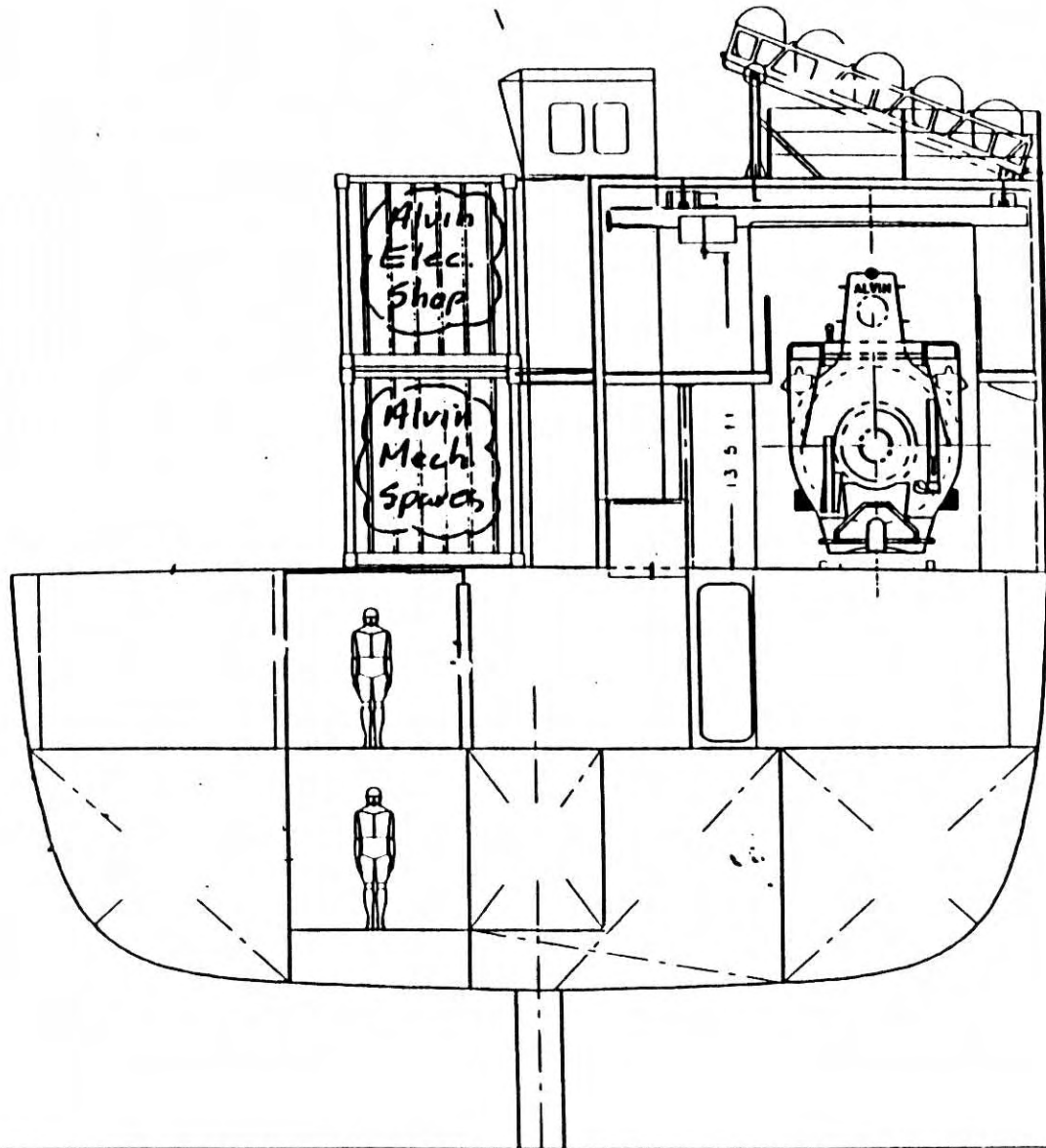
- **General Issues**
 - **Slamming/Rapid Ballast**

MAIN DECK

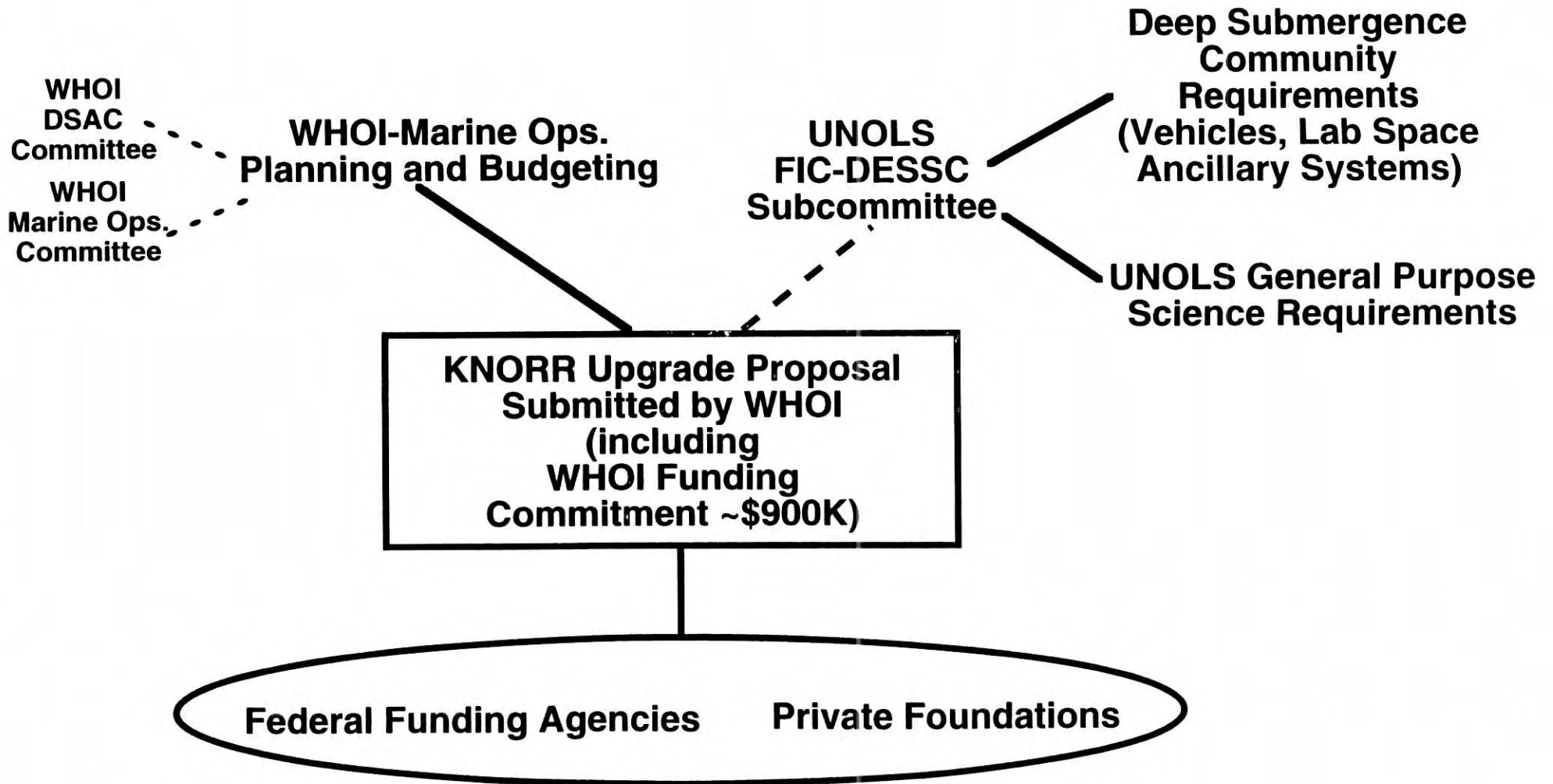


PROFILE

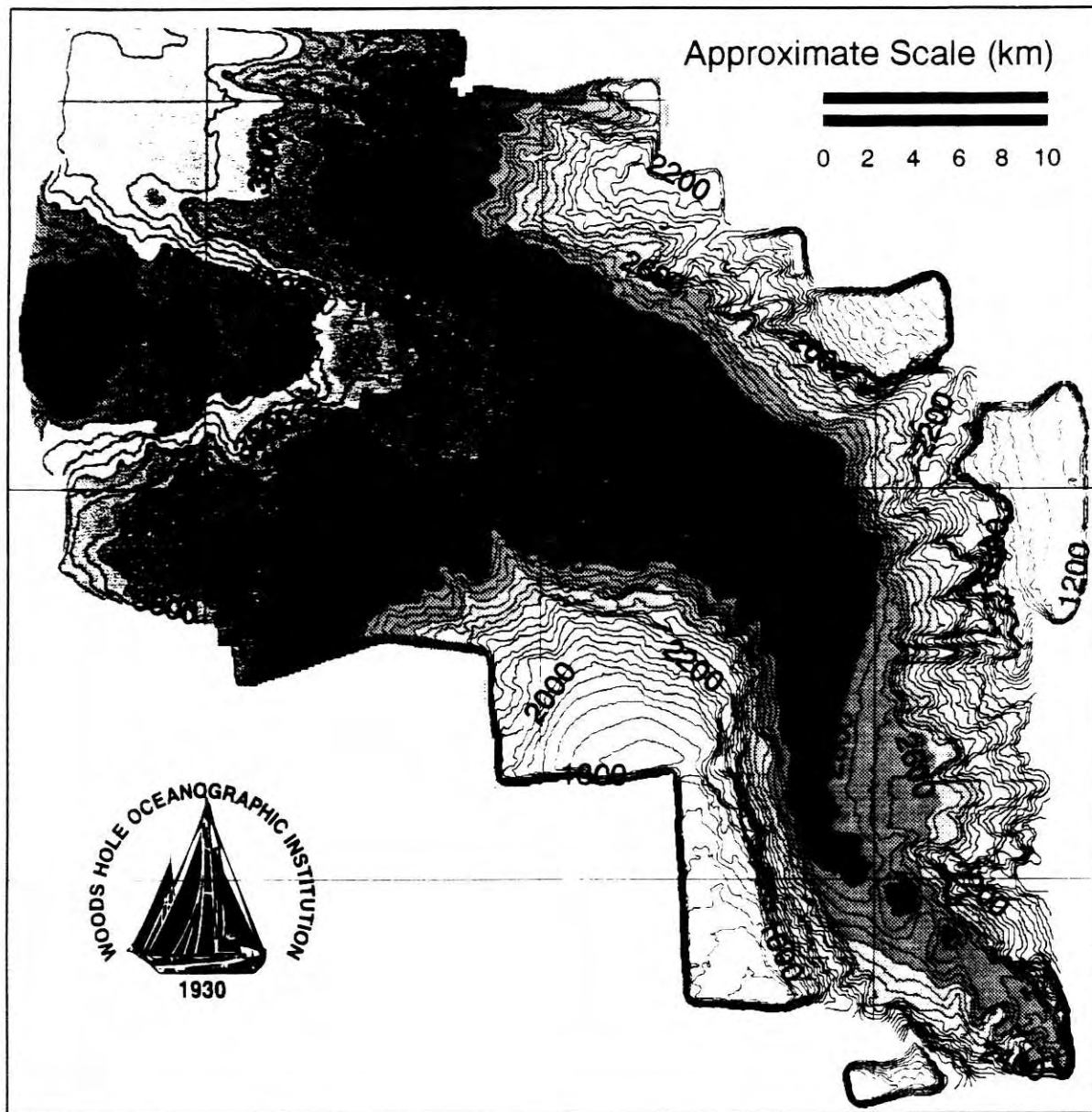




***R/V Knorr* Conversion Project Near-Term Action Process**



Seabeam 2100/12 Test from the R/V KNORR



Approximate Scale (km)

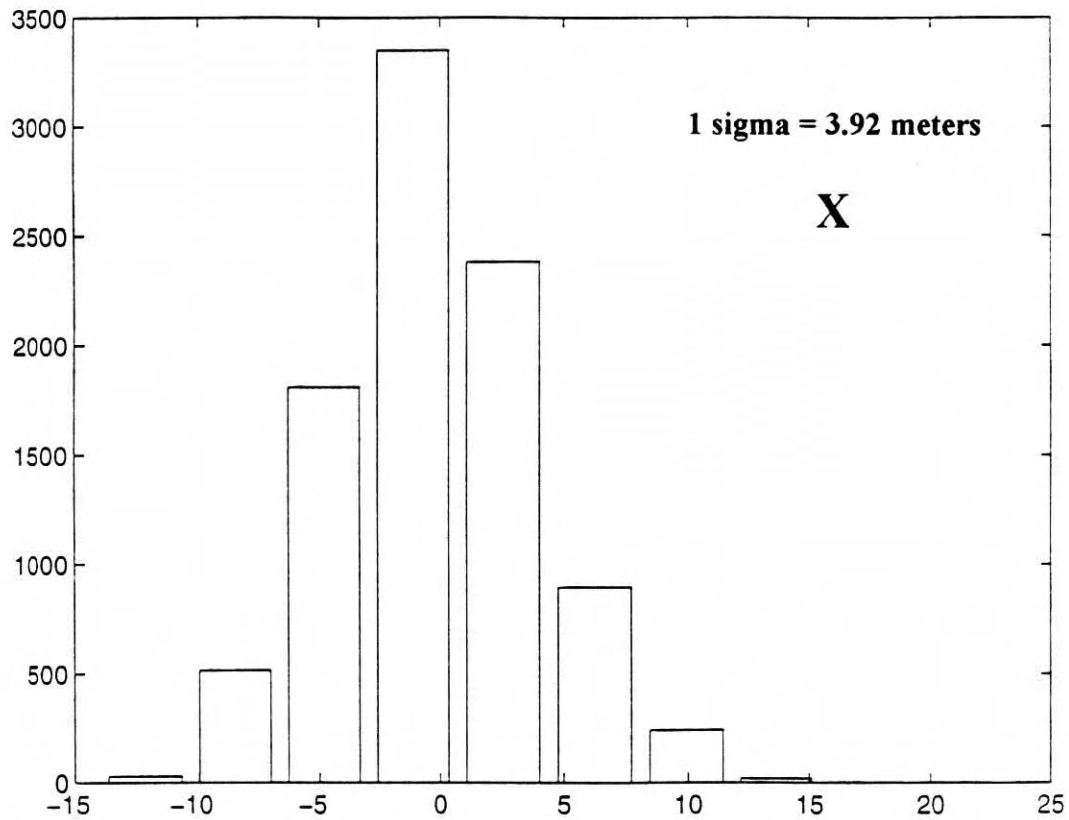
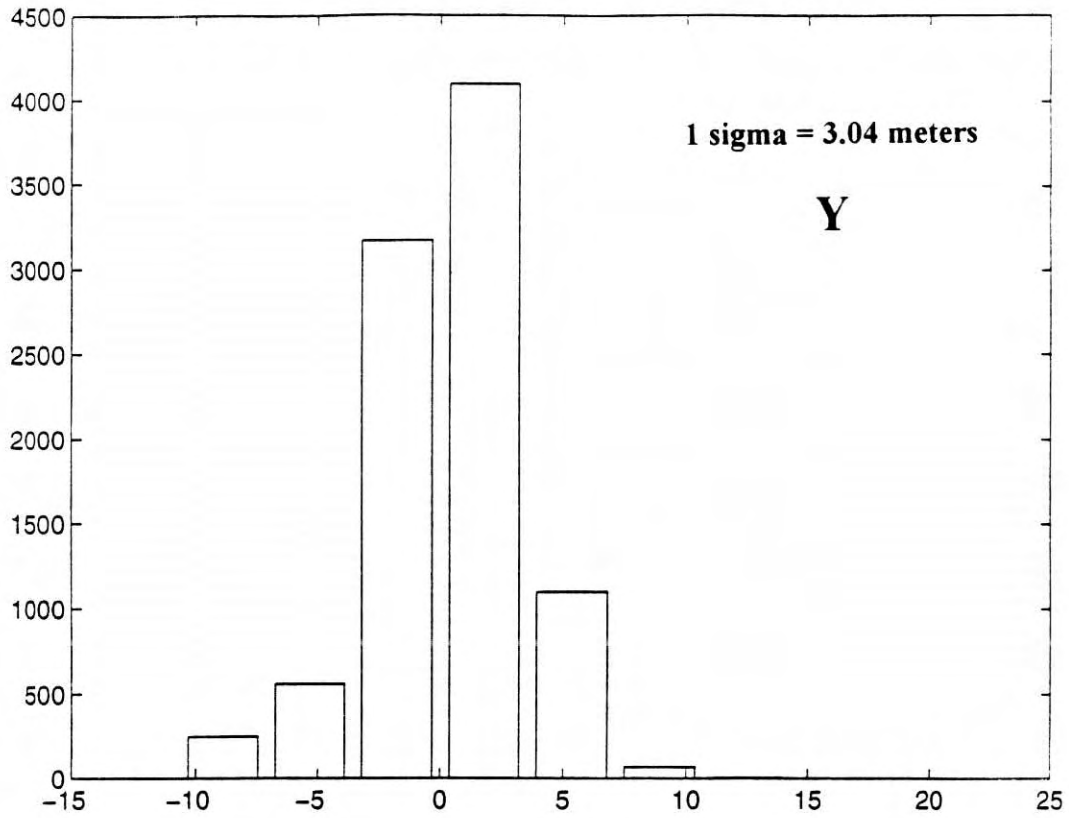


0 2 4 6 8 10

- Above 1000
- 1000 - 1200
- 1200 - 1400
- 1400 - 1600
- 1600 - 1800
- 1800 - 2000
- 2000 - 2200
- 2200 - 2400
- 2400 - 2600
- 2600 - 2800
- 2800 - 3000
- 3000 - 3200
- 3200 - 3400
- 3400 - 3600
- 3600 - 3800
- 3800 - 4000
- 4000 - 4200
- 4200 - 4400
- Below 4400

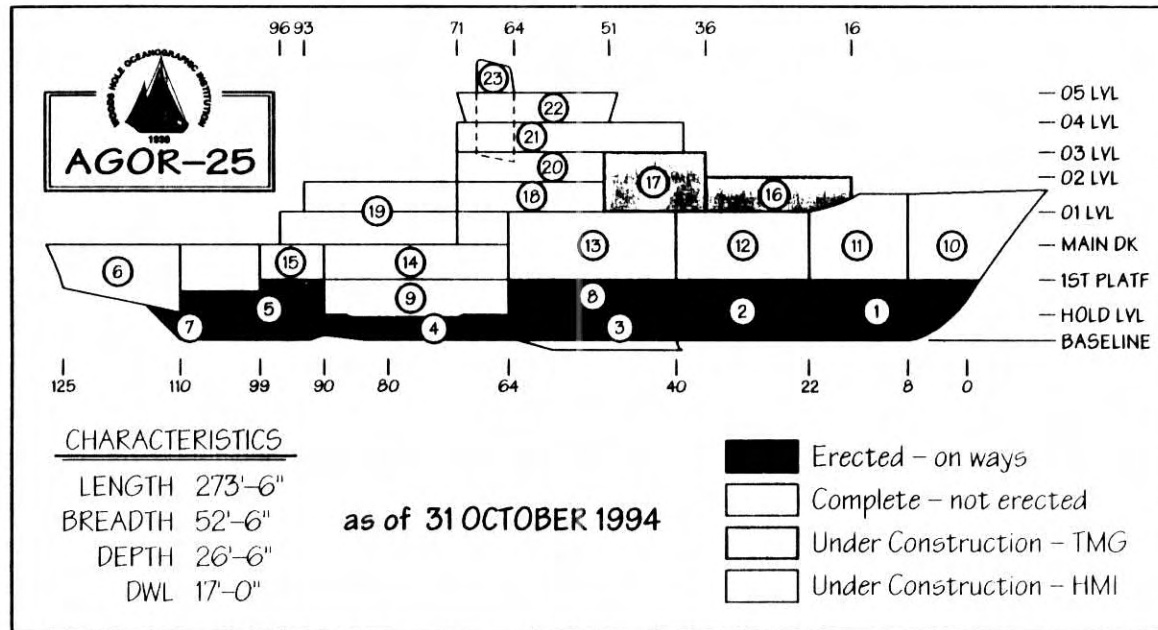


Atlantis II P-Code GPS Error Distribution



Atlantis

**The Tradition
Continues**



APPENDIX VIII

1994 NORPAC DEPLOYMENT

SCIENCE OPERATIONS
21 JULY - 2 OCTOBER



ENVIRONMENTAL MONITORING

21 - 28 JULY

- First detailed survey of dredge spoils at Navy ocean dump site (NODS). Video, photo and core samples
- Customers: Naval Facilities Engineering Command, Army Corps of Engineers, L.A. County Museum
 - ATV: 2 (39hr) SEA CLIFF: 2 (16hr)
- Max depth: 10,000 ft

Van Peter



RADIOACTIVE WASTE

NEAR PIONEER CANYON
28 JULY - 4 AUGUST

- Confirm USGS information regarding 47,000 barrels of radwaste dumped in the 1950s
- Customers: Naval Facilities Engineering Command, Moss Landing Marine Laboratory, Radiological Affairs Support Office, and USGS
- Located several hundred barrels of waste at 3,700 ft. Survey of plants and animals.
 - ATV: 2 (38hr) SEA CLIFF: 2 (8hr)



MENDOCINO RIDGE

8 - 16 AUGUST

- Video surveys, rock samples and detailed bathymetry. Radiometric dating of samples will be used to determine rate of strike-slip along fracture
- Customers: Univ. of Oregon, UC Santa Barbara
- 150 lbs of rock samples and 340 sq. mi. of precision bathymetric surveys.
 - ATV: 2 (41hr) TURTLE: 1 (5hr)

Fisk



RESEARCH TRIPODS

17 - 25 AUGUST

- Four tripods deployed on Juan de Fuca Ridge in 1992 to measure rate of spreading of sea floor. Three fell over when deployed. Only one of these was uprighted in 1992.
- This past summer the two remaining tripods were uprighted and equipment worth \$25,000 was salvaged.
- Customers: USGS
 - ATV: 4 (42hr) TURTLE: 2 (23hr)

Martin



BLANCO RIDGE

28 AUGUST - 2 September

- First-ever expedition of this 5,000 ft ridge
- Customers: USGS, NOAA
- Phase I: Video surveys and rock collection from steep cliff faces. 300 lbs of rocks. 900 miles of bathymetry tracks.
 - ATV: 4 (67hr) TURTLE: 2 (8hr)
- Phase II: Discovered hydrothermal vent field
 - ATV: 1 (34hr)

Krebs/Embley





LAVA FIELDS

9 - 23 September

- Continuing survey of 1993 volcanic eruption on Juan de Fuca Ridge. Gravity/magnetic field measurements and collection of aggregates called "marine snow".
- Video survey of ENDEAVOR site. Giant (40-75 ft) hydrothermal chimneys called "black smokers" supporting of bacteria, worms, sponges and crabs
- Customers: Univ. of Washington, Univ. of Hawaii
 - ATV: 4 (40hr) TURTLE: 3: (15hr)

Thompson / Cove



SALVAGE OF ATOC

28 - 30 September

- Acoustic Thermometry of Ocean Climate (ATOC). \$37M international project to monitor global warming
- 1,800 lb. array, valued at \$250K, broke and sank off of Pt Sur in March 94
- Customers: Scripps Institution of Oceanography
- ATV recovered ATOC in a single 6 hr dive.

John Woods



ATV SUMMARY

- 21 dives
 - 10 dives with no material issues
- 308 hrs total bottom time
- Longest dive: 35hr 38m
- Deepest dive: 11,909 ft
- Lessons learned
 - vehicle reliability is fundamental to success
 - improvement is possible through root cause analysis



TURTLE SUMMARY

- 9 dives
- 50 hrs total bottom time
- Longest dive: 15hr 41m
- Deepest dive: 7,800 ft
 - variable ballast pressurization
 - nitrogen absorption
 - procedure modification
 - planning yard assistance
 - trim canister compensation and leakage
 - new TEMPMOD



SEA CLIFF SUMMARY

- 4 dives
- 24 hrs total bottom time
- Longest dive: 12hr 40m
- Deepest dive: 10,001 ft



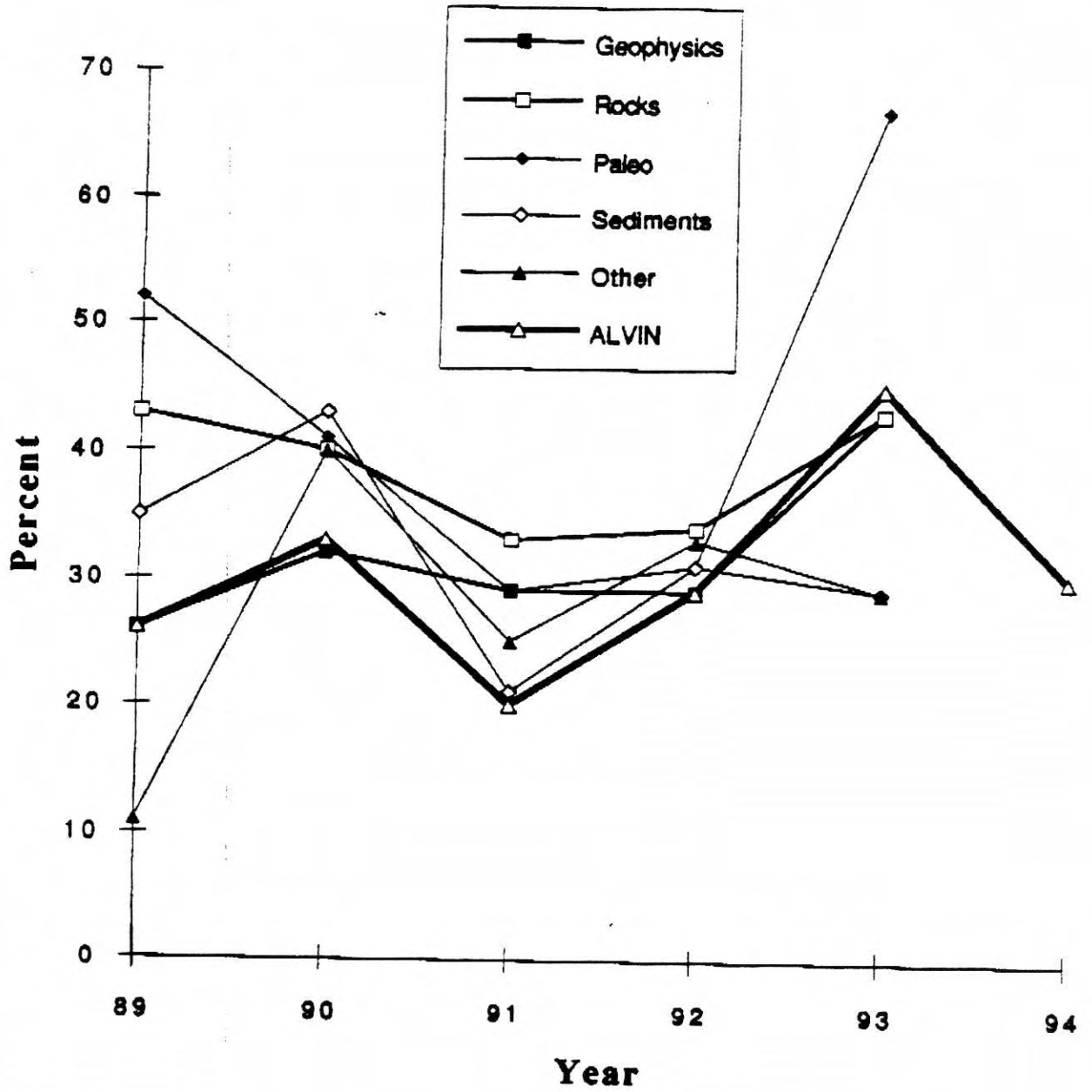
NORPAC 94 SUMMARY

- Environmental monitoring role established
- U.S. Navy is a player in ocean science
- 9 straight weeks of reliable operations in deep water
- Scientific community is calling for more
- Success invites investment: significant improvements already funded and more on the way

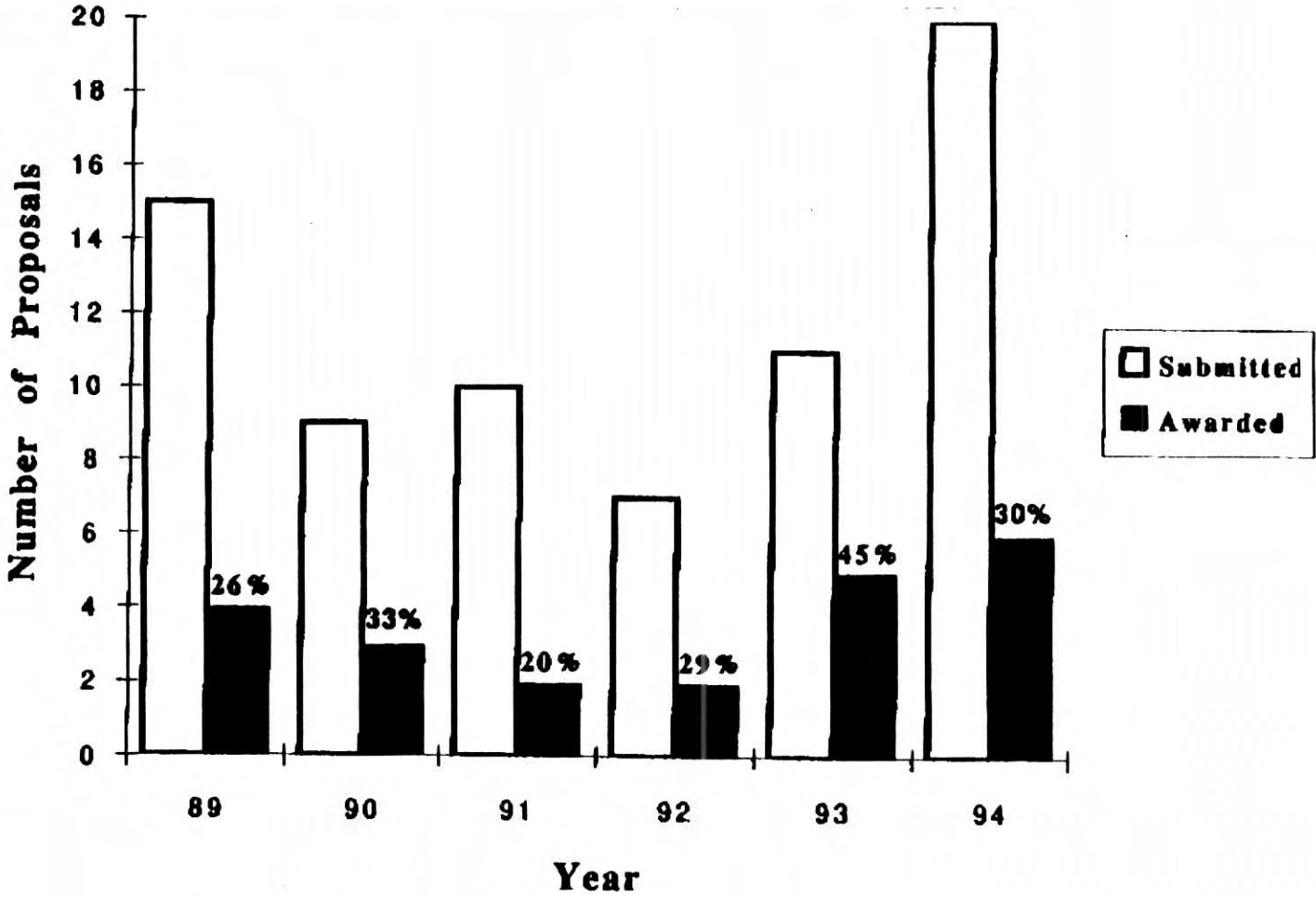


APPENDIX IX

Awards Within Field



MGG ALVIN Proposals



APPENDIX X

NSF FY 1995 BUDGET

OCEAN SCIENCES

- . Request was \$207.9 Million
- . Appropriation is \$193.4 Million
- . Increase of \$4.4 Million or 2.4%

	<u>FY 1994</u>	<u>FY 1995</u>	<u>INCREASES</u>
OCEAN SCIENCES RESEARCH	\$100.0 M	\$ 102.9 M	\$ 2.9 M OR 2.9 %
OCEANOGRAPHIC CENTERS & FACILITIES	50.3 M	\$ 50.6 M	0.6 M OR 0.6 %
OCEAN DRILLING PROGRAM	38.7 M	\$ 39.9 M	1.2 M OR 3.1 %
. Major Research Initiatives			
GLOBAL CHANGE PROGRAMS	\$ 53.7 M	\$ 57.7 M	\$ 4.1 M OR 7.6%
BIOTECHNOLOGY	4.0 M	3.6 M	-0.4 M OR -10.0%
HIGH PERFORMANCE COMPUTING	0.4 M	0.8 M	0.4 M OR 97.6%
ENVIRONMENTAL RESEARCH	7.3 M	7.7 M	0.4 M OR 0.69%
SMETE (EHR)	<u>2.1 M</u>	<u>2.1 M</u>	<u>NO CHANGE</u>
	\$ 67.5 M	\$ 71.9M	\$ 4.5 M OR 6.7%
OTHER RESEARCH ACTIVITIES	\$121.5 M	\$ 121.4 M	\$ -0.1 M OR -0.0%

OCEAN SCIENCES DIVISION

	<u>FY 1993</u>	<u>FY 1994</u>	<u>Estimated FY 1995</u>
Ocean Sciences Division	\$177.7 M	\$ 188.9 M	\$193.4 M
Ocean Sciences Research	92.5 M	100.0 M	102.9 M
Ocean Drilling Program	36.0 M	38.7 M	39.9 M
Oceanographic Facilities	49.2 M	50.2 M	50.6 M

OCEANOGRAPHIC FACILITIES DETAIL

Operations			
Ship Operations	29.4 M*	32.7 M*	35.2 M*
ALVIN, Aircraft, etc.	1.4 M	2.2 M	2.4 M
Marine Techs	<u>4.2 M</u>	<u>4.2 M</u>	<u>4.2 M</u>
	\$ 35.0 M	\$ 39.1 M	\$ 41.8 M
Infrastructure			
Science Instruments	1.3 M	2.5 M	2.3 M
Shipboard Equipment	2.1 M	2.1 M	1.4 M
Ships, Upgrades	7.2 M	2.6 M	0.4 M
UNOLS, Misc.	<u>0.5 M</u>	<u>0.5 M</u>	<u>0.6 M</u>
	\$ 11.1 M	\$ 7.7 M	\$ 4.7 M
Centers and Reserves			
AMS Center	1.0 M	1.2 M	1.4 M
Cross Directorate/Reserves	<u>2.1 M</u>	<u>2.2 M</u>	<u>2.7 M</u>
	\$ 3.1 M	\$ 3.4 M	\$ 4.1 M

*Plus \$1.6 M from ODP (1993 and 1994), \$1.8 M (1995)

APPENDIX XI

ALVIN REGIONAL SUMMARY - 1995

#	Investigator	Disc.	Spons	95		96/97	
				P	F	P	F
ATLANTIC:							
1	Casey & Bryan	G&G	NSF			23	
2	Shultz	UNK	OTHER		2		
3	K. Becker	G&G	NSF				4
4	R.P. Von Herzen	G&G	NSF		6		
5	J. Karsen	G&G	NSF		15		
6	Chave	G&G	NSF				6
7	Klinkhammer	G&G	NSF				20
8	E.J. W. Jones	G&G	Other				3
Total				0	23	53	0

GULF OF MEXICO:							
No Current Projects							
Total				0	0	0	0

MONTEREY/SAN DIEGO:							
10	J.E. Eckman	Biol	NSF				12
11	K.L. Smith	Biol	NSF		10		
12	C. Harrold	Multi	NSF	12		12	
13	Nittrouer	G&G	ONR				12
14	C.R. Smith	Chem	NSF				13
Total				12	10	49	0

JUAN DE FUCA:							
15	H.P. Johnson	G&G	NSF		13		
16	Chave	B&C	NSF				6
17	Sansone	G&G	NSF			8	
18	Tivey	B&C	NSF		2		
19	J. Delaney	G&C	NSF		20		
20	J. Delaney	Multi	NSF/NOAA	84	10	34	
21	M. Mottl	B&C	NSF		16		
Total				84	45	42	6

NORTHERN EAST PACIFIC RISE:							
22	Wirsen & Taylor	Chem	NSF	5			5
23	R. Batiza	G&G	NSF		9		
24	C. Cary	Biol	NSF		4		
25	C.L. Von Dover	Biol	NSF				8
26	R.A.Lutz	Multi	NSF				14
27	R.A.Lutz	Multi	NSF		12		
28	Lilley & VonDamm	B&C	NSF		4		
29	Mullineaux	Biol	NSF		9		
30	Mullineaux	Biol	NSF		9		
Total				5	47	27	0

EQUATORIAL PACIFIC:							
9	Karson	G&G	NSF				20
Total				0	0	20	0

SOUTHERN EAST PACIFIC RISE:							
31	Gee	G&G	NSF	10			
32	Naar	G&G	NSF				28
33	Tivey	GCHM		15			
34	Edmond	Chem	NSF				30
35	Lilley	G&C	NSF				25
36	Lupton	G&G	NOAA				25
37	Michael	G&G	NSF				15
38	Lutz	Biol	NSF				14
Total				25	0	112	25

TOTALS	95		96/97	
	P	F	P	F
	163	125	809	31

GRAND TOTAL: 1128

ALVIN REGIONAL SUMMARY - 1995

#	Investigator	Disc.	Spons	95	96	96/97	96/97	#	Investigator	Disc.	Spons	95	96	96/97	96/97
				P	F	P	F					P	F	P	F

SOUTHERN OCEANS:							
67	Lawver	Multi	NSF			50	
Total				0	0	50	0

NORTHERN PACIFIC							
68	H.P. Johnson	G&G	SF/MG&G			24	
Total				0	0	24	0

TETHYAN/ARABIAN/INDIAN:							
43	Brooks/MacDonald/Sasse	Multi	NSF			5	
44	Rickard	Multi				6	
45	Ullman & Kastens	G&G				12	
46	Cita/Camerlenghi/M	G&G				10	
47	Druffel	G&G				4	
48	Arthur	G&C				20	
49	Bonatti & Cochran	G&G				25	
50	Edmond	Chem	NSF			5	
51	Lutz&Vrijenhoek	Biol				8	
Total				0	0	95	0

HAWAII:							
39	Garcia	G&G	NSF			7	
40	Sansone	UNK	NSF				13
41	Bryan	G&G	NSF				14
42	D.K.Smith	G&G	NSF				10
Total				7	0	37	0

WESTERN PACIFIC:							
52	Binns & Scott	Mine	RO/NSF/NS			15	
53	Hawkins	G&G	NSF			15	
54	Lutz & Vrijenhoek	Biol	NSF				8
55	Sager & Johnson	G&G	NSF				28
56	Silver	G&G	NSF				15
57	Winterer	G&G	NSF				10
58	Stern	G&G	NSF/NOAA				15
59	Bloomer	G&G	NSF/NOAA				14
61	Fryer & Fujioka	G&G	NSF +				18
61	Fryer	G&G	NSF/NOAA				19
62	McMurtry	G&G	NSF/NOAA				8
63	Gill & Fryer	G&G	NSF/NOAA				16
65	Mahoney	G&G	NSF				24
66	Arculus et al.	G&G	NSF				53
	Other Projects						72
Total				30	0	300	0

ROV REGIONAL SUMMARY - 1995

#	Investigator	Disc.	Spons	95 P	95 F	96/97 P	96/97 F	#	Investigator	Disc.	Spons	95 P	95 F	96/97 P	96/97 F
---	--------------	-------	-------	---------	---------	------------	------------	---	--------------	-------	-------	---------	---------	------------	------------

ATLANTIC:

R1	Smith, Gillis, Humphris	G&G	NSF			13	
R2	Sempere	G&G	NSF			35	
R3	Fornari	G&G	NSF			30	
R4	Klinkhammer	G&G	NSF			20	
Total				0	0	98	0

JUAN DE FUCA:

R6	J. Delaney	Multi	NSF/NOAA	4		20	
R7	Embley	G&G	NSF			25	
Total				4	0	45	0

GULF OF MEXICO:

R5	Roberts & Aharon	Multi	NSF/MSF	11			
Total				11	0	0	0

WESTERN PACIFIC:

R11	Binns & Scott	Mine	CSIRO	15			
Total				15	0	0	0

SOUTHERN EAST PACIFIC RISE:

R9	Haymon	G&G	NSF			21	
R10	Michael	G&G	NSF			24	
Total				24	0	21	0

EQUATORIAL PACIFIC

R12	Silver	G&G	NSF			10	
Total				0	0	10	0

HAWAII:

R13	Butler	Other	NSF			7	
R14	W.B. BRYAN	G&G	NSF			14	
Total				0	0	21	0

TETHYAN/ARABIAN/INDIAN:

R15	Dick	G&G	NSF			?	
R16	Fornari	Multi	NSF			30	
Total				0	0	30	0

NORTHERN EAST PACIFIC RISE

R8	Lutz	Multi	NSF			14	
Total				0	0	14	0

	95 P	95 F	96/97 P	96/97 F
TOTALS	50	0	219	0

GRAND TOTAL

269

ALVIN Letters of Interest - Summary 1995 - 1997

Investigator	Associates	Area	Purpose	Sponsor	Date	Alternate	Dives	Remarks	Disc.	
NOTE: Items that are indicated as "new" were letters of interest received in the Fall of 1994. All other items are carryovers from previous meetings. "R" numbers indicate the ROV project associated with the ALVIN										
ATLANTIC:										
1.	J.F. Casey, U. Houston W. Bryan, WHOI	W. Bryan, WHOI R. Hekinian	MAR 33 - 34 N	Detailed mapping and sampling of Magma starved and Magma - productive second order Ridge Segments to the North and South of the Hayes Transform: A FARA ALVIN/NAUTILUS Joint submersible program.	NSF RIDGE MG&G proposal In review	Summer 96 or 97		23	G&G	
2.	Schultz	Cambridge	MAR 24N,46W		Other	Mar 1995		2	?	
3.	K. Becker, U.Miami	E. Davis, PGC	TAG: 26 08'N, 44 49' W and Hole 395A 22 45'N, 46 05'W	Recovery of Data/Fluid Samples from Instrumented ODP Bore Holes at TAG Hydrothermal field and Hole 395A	NSF 9301995 ODP	Feb-Mar 1995		4	G&G	
4.	R.P. Von Herzen, WHOI	A. Schultz, UW C. Van Dover, WHOI J. Edmond, MIT D. Kadko, U.Mia	TAG: 26 08'N, 44 49' W	The TAG Hydrothermal Site (Mid-Atlantic Ridge): Monitoring Temporal Variability and the Effect of Drilling.	NSF 9314542	Feb-Mar 1995	1995	6	G&G	
5. New	J. Karson, Duke		MAR 24N,46W	Field program was cut short due to mechanical problems with ALVIN. Only a portion of the planned dives could be successfully completed.	NSF	Feb 1995		15	G&G	
6. New	A. Chave	C. L. Van Dover	TAG: 26 08'N, 44 49' W	ALISS: Ambient Light Imaging and Spectral System Design/checkout/test ambient light imaging system to characterize properties of vent light.	NSF 9407774 Tentative	Oct - Nov 1997	Jan - Feb 1998	6	G&G	
7. New R4	Klinkhammer	J.-C. Sempere R.Lutz C.German M.Sinha L.Parson	MAR 36 15.1'N 33 53.3'W	Detailed Deep Submergence Studies of Rainbow Hydrothermal Area, Amar Segment, Mid-Atlantic Ridge	NSF	July-Sept 1996		20	Project also calls for MEDIA-JASON, Argo II and 120 KhZ ROVs	G&G
8. New	E.J.W. Jones	University College London	MAR 10S - 20N	Petrological and Geophysical studies of the fracture zone and aseismic areas	Other	1996	1997	3	G&G	

ALVIN Letters of Interest - Summary 1995 - 1997

Investigator	Associates	Area	Purpose	Sponsor	Date	Alternate	Dives	Remarks	Disc.
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"R" numbers indicate the ROV project associated with the ALVIN

GULF OF MEXICO

No Current Project

OFF COSTA RICA

No Current Project

EQUATORIAL PACIFIC

9.	J. Karson, Duke	S. D. Hurst S. Agar C. McLeod	N. Wall of Hess Deep Rift 0 N, 102 W	Internal Structure of the Uppermost Oceanic Crust Exposed at the Hess Deep Rift: Manifestations of Waxing and Waning Magmatism Along the EPR.	NSF MG&G & ODP submitted	Sum 96/97	20		G&G
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SAN DIEGO TROUGH/MONTEREY CANYON

10.	J. Eckman, Skidaway	D. Thistle G.L.J. Parson	San Diego Trough 32 51 N, 117 46 W	"Evaluating impacts of predation by large, motile epifauna on macrofauna and meiofauna in the deep sea: A test of cage performance." This study would use ALVIN to deploy 75 x 75 cages on the sea floor in San Diego Trough to assess cage artifacts in using cages to exclude large motile epifauna. This would be a precursor study to a future study of effects of predator/disturbance by the large motile epifauna on the infauna.	NSF Biol submitted Nov-93 oce-9401764	1997 Second series of dives 5-7 months after first series.	6 6		Biol
11.	K.L. Smith, SIO	A.F. Carlucci C.E. Reimers P.M. Williams E.R.M. Druffel J. Bauer, FSU	34 50'N, 123 W	Temporal variations in the deep-sea benthic boundary layer communities, long time series measurements.	NSF FUNDED OCE-9217334	Nov-94 Apr- May 1995	10 10		Biol.
12.	C. Herold	J.P. Barry C.H. Baxter H.G. Greene H.W. Jannasch R.E. Kochever J. Nybakken G.I. Matsumoto B.H. Robison	Monterey Submarine Canyon	Investigations of Chemosynthetic cold seep communities in the Monterey Canyon System.		1995 1996	12 12		multi

ALVIN Letters of Interest - Summary 1995 - 1997

Investigator	Associates	Area	Purpose	Sponsor	Date	Alternate	Dives	Remarks	Disc.
NOTE: Items that are indicated as "new" were letters of interest received in the Fall of 1994. All other items are carryovers from previous meetings. "R" numbers indicate the ROV project associated with the ALVIN									
13. New	C.A. Nittrouer	D. Orange	Continental slope between Cape Mendocino George	Micromorphology and sampling on the Eel River Continental shelf in support of the STRATAFORM Program	ONR	Summer 1997	12		G&G
14. New	C.R. Smith	D.J. DeMaster	Santa Catalina Basin 33 12°N 118030°W	Age dependent mixing of deep-sea sediments tests of mechanisms at three bathyal sites	NSF	1996 75-120 days after first series 9-15 months after first series	7 3 3		Chem
JUAN DE FUCA									
15.	H.P. Johnson, UW	M.A. Tivey M.C. Holes	Juan de Fuca 46 30 N 129 30 W	Time dependent changes in very young ocean crust	NSF RIDGE	1995 Jun-95	13		G&G
16.	A. Chave	C.L. Van Dover J.A. Tyson	Endeavour Vent Field Juan de Fuca	ALISS: Ambient Light Imaging and Spectral System - - Ambient Light at Deep-Sea Hydrothermal Vents. A set of 4 charge-coupled device (CCD) cameras developed for extremely low light imaging will be used as 1) an ambient light imaging tool, 2) a simultaneous, multispectral scanner using selectable interference bandpass filters, and 3) as a low resolution spectrometer using fiber optic coupling to close proximity of the source and a grating-prism located in front of the detector. This is not a general purpose CCD camera array. The instrument is designed to make critical measurements of ambient light characteristics at high T vents that will enable us to determine the spectral composition of the light and evaluate its potential spectral composition of the light and evaluate its potential role in photobiochemical reactions.	NSF 9407774 Tentative	Jun - Jul 1997 Jul -Aug 1997	6		bio-chem
17.	F. Sansone, UH		Juan de Fuca: Northern Cleft Segment and Monolith 44-57.8 to 44-58.8 N	In-situ Hydrogen Measurements at Ridge Crest Hydrothermal Vents.	NSF RIDGE submitted	Sum 96 Fall 96	8		G&G

ALVIN Letters of Interest - Summary 1995 - 1997

Investigator	Associates	Area	Purpose	Sponsor	Date	Alternate	Dives	Remarks	Disc.
NOTE: Items that are indicated as "new" were letters of interest received in the Fall of 1994. All other items are carryovers from previous meetings. "R" numbers indicate the ROV project associated with the ALVIN									
18.	M. Tivey, WHOI	Juan de Fuca: Cleft Segment	Monitoring Temperature at hydrothermal vent sites Deployment and Recovery of Instruments.		1) Jun 1995 2) Jul 95		2		Biol Chem
19	J. Delaney	R. McDuff M. Lilley D. Butterfield V. Robigou J. Deming R. Thomson M. Hannington K. Juniper A. Schultz J. Baross	Juan de Fuca Endeavour Seg 47 N, 129 W	Detailed mapping and Sampling of vent field to establish high-resolution spatial definition of co-variation in fluid chemistry and geological environment; testing and deployment of temperature salinity probes.	NSF	May - Jun 1995		20 Will submit proposal	Geol Chem
20	J. Delaney, UW et al.	Cleft Segment of Juan de Fuca Ridge	The Ridge Seafloor Observatory ROBE experiment - three work groups: Segment scale, vent/hydroth, water column	NSF NOAA	Sept 1995		84 + 4 34/20	4 can be ROV 20 are ROV	all
21	M. Mottl, SOEST	C. G. Wheat, E. Baker, E. Davis, R. Thomson, V. Tunnicliff, M. Whiticar,	Eastern flank of Juan de Fuca Ridge Within 10 km of 47 47'N 127 44'W	Hydrothermal venting through outcrops on the eastern flank of the Juan de Fuca Ridge near 48 N: a manned-submersible study. Heat flow, coring for pore waters, temperature and flow velocity of springs to estimate fluxes. Sampling of rocks, deposits, organisms.	NSF 9314632	Jun - Sep 1995	16	This was funded last year, but not scheduled	Chem thermal Biol

ALVIN Letters of Interest - Summary 1995 - 1997

Investigator	Associates	Area	Purpose	Sponsor	Date	Alternate	Dives	Remarks	Disc.
NOTE: Items that are indicated as "new" were letters of interest received in the Fall of 1994. All other items are carryovers from previous meetings.									
"R" numbers indicate the ROV project associated with the ALVIN									
<u>NORTHERN EAST PACIFIC RISE</u>									
22.	C. Wirsen, WHOI C. Taylor, WHOI	S. Molyneux	9-10 N EPR	Using time series instrumentation along with in situ che analyzer and flow meter, will assess short term (days) and long term (months) variability in vent discharge rate chemosynthetic activity, temperature, and chemical ene content of warm diffuse flow vents.	NSF RIDGE submitted Nov-93	Spring 96	6		Chem
23.	R. Batiza, U.Hawaii	GPL Walker S. Self D. Bencovini L. Wilson	E. Pac. Color Plate (200km east of EPR axis) 12 45 N, 120 35 W	"The dynamics of Basalt Eruptions in the Deep Sea: Detailed Study of Eruptive hyaloclastites Deposits with ALVIN." Video/photography (FOCAS), drilling and ALVIN sampling of hyaloclastite deposits.	NSF 9314288	Oct - Nov 1995	9		G&G
24.	C. Cary, OSU	J. Stein, Agouron Inst.	EPR 13 N site: 12 48' N x 103 56' W	A molecular dissection of an epibiotic symbiosis in a highly thermotolerant metazoan - To determine the functional role of epibiotic bacterial microflora associated with the pompeii worm, Alvinella pompejana.	NSF	Nov 1995	Open 4	The proposal is submitted as an ancillary project to the Lutz funded work.	Biol.
25.	C.L. Van Dover new	J. Cann H. Jannasch	EPR 9 50"N	Deployment of linear arrays of sulfide generators along transects from vent communities to monitor colonization characteristics vs. distance	NSF	1996 1997	3 5	Two dive series separated by 3-4 months Two dive series separated by 3-6 months	Biol
26.	R.A. Lutz New	D. Fornari R. Heesler R. Haymon K. Von Damm D. Desbruyeres T. Shank M. Lilley	EPR 9 50"N	"Temporal changes in Biological Community structure and Associated Geological Features at newly-formed hydrothermal vents on the EPR crest" and related biological/geochemical studies	NSF	Late 1996 1997	Late 14	Project includes the use of MEDIA-JASON	Multi

ALVIN Letters of Interest - Summary 1995 - 1997

Investigator	Associates	Area	Purpose	Sponsor	Date	Alternate	Dives	Remarks	Disc.
NOTE: Items that are indicated as "new" were letters of interest received in the Fall of 1994. All other items are carryovers from previous meetings.									
"R" numbers indicate the ROV project associated with the ALVIN									
27	R. Lutz, Rutgers	R. Hessler, SIO D. Fornari, LDGO R. Haymon, UCSB K. Von Damm M. Lilley, UW J. Stein, SIO H. Felbeck, SIO C. Smith, U Hawaii L. Mullineaux, WHOI J. Childress, UCSB C. Peterson, UNC C. Fisher, Penn. St.	10 N, along East Pacific Rise	Temporal changes in biological community structure and associated geological features at newly-formed hydrothermal vents along the East Pacific Rise.	NSF- RIDGE FUNDED *	Nov - Dec 1995	12 14		Geochem Biol
28	M.D. Lilley, UW K.L. Von Damm, UNH		East Pacific Rise 9 N 104 17' W	Coupled temporal changes in biological community structure and water chemistry at newly-formed hydrothermal vents on the EPR Crest.	NSF	Nov - Dec 1995	4	Addition to schedule of Lu Biol.	Chem
29	Mullineaux	WHOI	EPR 9 45-52'N	?	NSF	Apr-95	9		Biol.
30	Mullineaux	WHOI	EPR 9 45-52'N	?	NSF	Dec-95	9		Biol.
SOUTHERN EAST PACIFIC RISE:									
31	J. S. Gee, L-DEO	D. Kent C. Langmuir S. Miller J. Karsen	19.5 S EPR	Rapid Alteration and the Central Anomaly Magnetic High: Implications for Ridge Crest Processes.	NSF	Fall 1995	Spring 1996	10	G&G
32	D.F. Near, USF	R. Batiza, R. Ducan, east of K. Fanning, R. Hey, Easter Island J. Francheteau, R. Searle, P. Stoffers, L. Mullineaux J-G. Schilling,	27 S 80-113 W	Detailed geochemical, geological, and geophysical sampling and mapping of critical areas of the Easter Seamount Chain defined by several swath mapping and dredging cruises.	NSF-MG&G Mar-94	Austral Summer 1996/97	Austral Summer 1997/98	28	G&G
33	M. Tivey, WHOI S. Humphris		EPR: 17 S and 22 S	Studies of the Mineralogy and Geochemistry of Hydrothermal deposits between 17 S and 22 S on the East Pacific Rise.		1995		15	Geo Chem

ALVIN Letters of Interest - Summary 1995 - 1997

Investigator	Associates	Area	Purpose	Sponsor	Date	Alternate	Dives	Remarks	Disc.
NOTE: Items that are indicated as "new" were letters of interest received in the Fall of 1994. All other items are carryovers from previous meetings. "R" numbers indicate the ROV project associated with the ALVIN									
34. J.M. Edmond, MIT	J.G. Schilling, URI R. Poreda, Purdue M. Lilley, UW H. Elderfield, UK	Southern EPR Easter Island and vicinity	Hydrothermal Studies on the Easter Microplate.	NSF 9312950	Austral Summer 1996/7		30		Chem
35. M.D. Lilley, UW	J.L. Von Damm J.E. Lupton	Southern East Pacific Rise	Chemical and geological characterization of hydrothermal vent fields, at this very fast spreading ridge.	NSF 9417121	Austral Summer 1996/97		20-25		Chem Geol
36. J. Lupton, NOAA	R. Embly, NOAA E. Baker, NOAA G. Massoth, NOAA R. Feely, NOAA W. Chadwick, OSU D. Butterfield, UW M. Lilley, UW R. Collier, OSU G. Klinkhammer, OSU	S. EPR 13.5 - 20 S, 112-113 W	Investigation of hydrothermal systems	NOAA	Oct-Mar 1996-1997		25	Part of 4 phase project	G&G
37. P.J. Michael, U. Tulsa	D. Fornari, LDGO M.R. Perfit, U. Flori	Southern EPR: 8 S on EPR - SP3 7S 108 W, 9S 108 W	Petrologic and Morphologic Study of a Giant Lava Field at 8 S, EPR: A Snapshot of a Magma Chamber? Detailed study of flow contacts and thicknesses and volumes for the giant lava field. Determination of collapse structures. Sampling within "stratigraphic" sequence. The study is anticipated as a follow-up to an ARGO-II + 120 kHz study in 1995.	NSF MG&G	early 1996		15		G&G
38. R.A. Lutz, R.C. Vrijenhoek, Rutgers		17-22s	Gene flow, dispersal, and systematics of deep-sea hydrothermal vent organisms	NSF	1996	1997	14	Dives should be combined with proposed geological expeditions	Biol.
HAWAII									
39. M.O. Garcia, U. Hawaii	J. Mahoney, U. Hawaii M. Kurz, WHOI	Loihi Seamount, South of the Island Hawaii	Collection of stratigraphic sequence of lavas from the deeply dissected east flank of the seamount to test models for the geochemical evolution of Hawaiian volcanoes and to evaluate the melting history of hotspot volcanoes.	NSF-OCE 9012030 exp 12/31/93	July-Aug	Sept-Oct	7		G&G

ALVIN Letters of Interest - Summary 1995 - 1997

Investigator	Associates	Area	Purpose	Sponsor	Date	Alternate	Dives	Remarks	Disc.
NOTE: Items that are indicated as "new" were letters of interest received in the Fall of 1994. All other items are carryovers from previous meetings.									
"R" numbers indicate the ROV project associated with the ALVIN									
40.	F. Sansone								
New		Hawaiian Is		NSF	Jun Jan 1996		13		
41.	W.B. Bryan	J.G. Moore	West flank of	Age and transport mechanisms of the giant	NSF	Oct-96	14	Program requires	G&G
New		D.J. Fornari	the island of	landslides of Hawaii		Nov-97		the use of MEDIA-	
R14			Hawaii					JASON	
42.	D.K. Smith	W.B. Bryan	Southeastern	Morphology of volcanic eruptive centers,	NSF	Oct-96	10		G&G
		D.J. Fornari	side island of	Puna Ridge, Hawaii		Nov-97			
			Hawaii						
<u>TETHYAN/ARABIAN/INDIAN SEA</u>									
43.	J.M. Brooks		Offshore Saudi	To investigate chemosynthetic fauna at hydrocarbon	Aramco,		5	Piston coring during monsoon geoche	
	I.R. MacDonald		Arabia or	seeps in the Arabian Sea. Hydrocarbon geochemistry	Saudi Arabia			season, ALVIN dives durin	Blol.
	R. Saasen		offshore Oman	and benthic ecology will be explored.	Industry sources NSF			post monsoon leg.	
44.	D. Rickard		Palluro Seamount,	Sample sulphide deposits and microbial mats			67		Geochem
			Tyrrhenian Sea						Blol.
45.	Ullman,		Bacino Bannock,	Eastbound: SeaBeam, SLS & photo			12		G&G
	Kastens, et al.		Eastern Med.	Westbound: ALVIN					
46.	M.B. Cita,		Med. Ridge	Map and sample mud diapirs.			10		G&G
	A. Camerlenghi,								
	Y. Mart, et al.								
47.	E. Druffel		offshore Greece	Sample giant long-lived black corals for isotopic studies.			4		G&G
48.	M. Arthur, et al.		Black Sea	Sampling anoxic sediments and overlying water column			20		Chem
				for geochemical and stratigraphic studies.					Geol
49.	Bonatti,		Red Sea	Mapping and sampling Red Sea spreading centers,			25		G&G
	Cochran			fracture zones and mantle protrusions.					
50.	J. Edmond	W. Shanks, USGS	18-26 N, 38 E	Chemical sampling of hydrothermal fluids	NSF	Oct-March	5		Chem
		W. Zierenberg	Red Sea	associated with the seeps of the Red Sea.					

ALVIN Letters of Interest - Summary 1995 - 1997

Investigator	Associates	Area	Purpose	Sponsor	Date	Alternate	Dives	Remarks	Disc.
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"R" numbers indicate the ROV project associated with the ALVIN									
51.	R.A. Lutz, R.C. Vrijenhoek, Rutgers	Mediterranean Black Sea Red Sea Indian Ocean	Gene flow, dispersal, and systematics of deep-sea hydrothermal vent organisms	NSF	Jun-06	1997	4	Dives should be combined with proposed geological expeditions	Biol.
						1996	1997	4	
WESTERN PACIFIC									
52.	R.A. Binns, CSIRO S.D. Scott, U.Toronto	K.A.W. Crook Bismark Sea SW Pacific 3 44 S, 151 40 E	PACMANUS HYDROTHERMAL FIELD, EASTERN MANUS BASIN, SOUTHWEST PACIFIC. Submersible and ROV investigation of active Cu-Zu-Au rich massive sulfide and Fe-Mn oxide deposition associated with siliceous volcanism: analog for ancient volcanogenic massive sulfide ore environments. Major aim is to collect surface data relevant to interpreting deeper hydrothermal system. Precision geological mapping of PACMANUS field; examination of fault scarps for 3D sections through deposits; sampling with emphasis on vent fluids and altered volcanic rocks at high-T (central) to low-T (fringing) sites.	CSIRO (Australia), NSERC (Canada), NSF	ASAP		15-20	ALVIN MEDEA-JASON 120 kHz	Expl & Mining
53.	J. W. Hawkins, SIO	P. Lonsdale P. Castillo L. Parson, IOS	Lau Basin Western Pacific 19 20'S, 176 30' W	Investigation of backarc basin axial ridge systems - Lau Basin Focus - propagating ridge and overlap region of Central and Eastern Lau spreading centers. Use zero age crust samples to understand petrologic segmentation and its scale to look for variations in suprasubduction zone mantle sources. Relate petrologic, peltonic and morphologic variations.	NSF	Jan - Mar 1995	15		G&G
54.	R.A. Lutz, R.C. Vrijenhoek, Rutgers	Western Pacific	Gene flow, dispersal, and systematics of deep-sea hydrothermal vent organisms	NSF	1996/97		8 5	Dives should be combined with proposed geological expeditions	Biol.
55.	W.W. Sager, Texas A&M H.P. Johnson, UW	Emperor Seamount Chain	Determine the paleomagnetic directions for extrusive rocks at 3 sites along the Emperor Seamount Chain, between 45 to 75 My. This is to be a test for True Polar Wander vs. long-term, non-dipole field effects.	NSF			28		G&G
56.	E. A. Silver R12	Huon Gulf Solomon Sea SW Pacific	Drowned reefs, dynamic flexure of continental shelf/subduction	NSF	Early 97		15	Project includes use of MEDIA-JASON	G&G

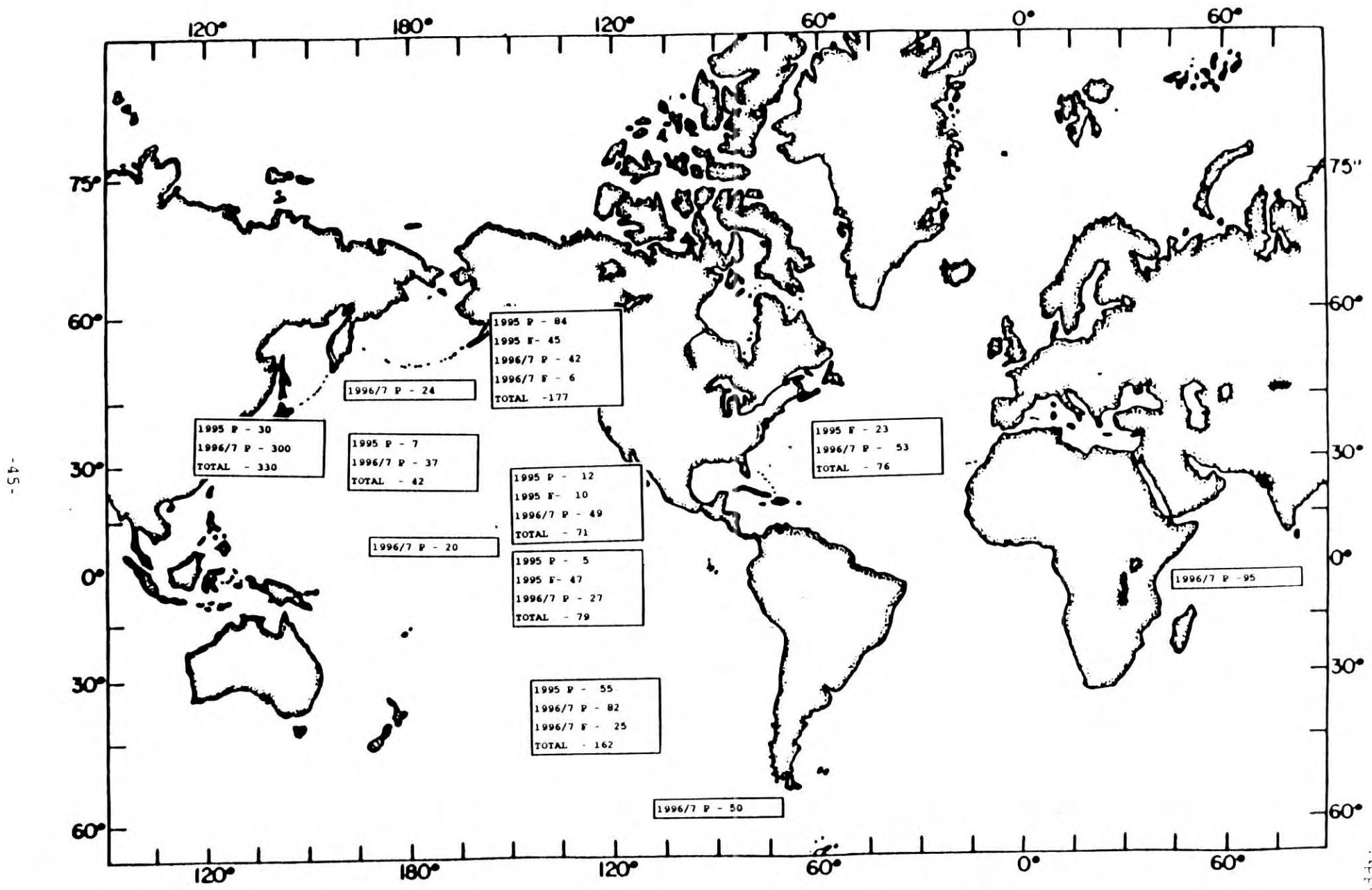
ALVIN Letters of Interest - Summary 1995 - 1997

Investigator	Associates	Area	Purpose	Sponsor	Date	Alternate Dives	Remarks	Disc.
NOTE: Items that are indicated as "new" were letters of interest received in the Fall of 1994. All other items are carryovers from previous meetings.								
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67.	E.L. Winterer	Western Pacific Seamounts	Limestone caps, karst formation.	NSF	Jun-Jan 96	10		G&G
68.	Stern	Hiyasehi Seamounts N. Marianas	Arc volcanology, petrogenesis	NSF/ NOAA	Jan-Aug 96	15		G&G
69.	S.H. Bloomer	Southern Mariana Arc	Arc Volcanology, petrogenesis, hydrothermal systems.	NSF/ NOAA	Jan-Apr 96	14		G&G
60.	P. Fryer K. Fujioke	Mariana Forearc	Serpentine seamount genesis, fluid flux accreted terranes.	NSF Jamstec	Jan-May 96	18	ALVIN & SHINKAI 6500	G&G
61.	Fryer	Mariana backarc basin	Spreading center, volcanology, tectonic activity, petrogenesis	NSF/ NOAA	Jan-Apr 96	19	ALVIN	G&G
62.	McMurtry	Northern Mariana Arc	Hydrothermal deposits & fluids at arc volcanoes.	NSF/ NOAA	Jan-Aug 96	8		G&G
63.	J.B. Gill P. Fryer	Northern Mariana Arc	Arc volcanology/tectonic control over magma genesis.	NSF/ NOAA	Jan-Aug 96	16		G&G
64.	Cavanaugh	Any seep & vent location	Symbiotic associations between invertebrates and bacteria at cold seeps and hot vents.	NSF	1996			Biol
65.	Mahoney, SOEST	Manihiki Plateau SW PAC	Exposures of basement for Ocenebic plateau studies	NSF	Apr-Oct 97	24		G&G
66.	R. Arculus et al.	Woodlark Basin/ Manus Basin North Fiji Basin Macquarie Ridge Australia-Antarctica	Hydrothermal activity, petrogenesis Major Au deposit on land-submarine equivalent Interaction of southern spreading center with Mathew-Hunter FZ spreading center and hydrothermal activity	NSF	Apr-Dec 97	53		G&G

ALVIN Letters of Interest - Summary 1995 - 1997

<u>Investigator</u>	<u>Associates</u>	<u>Area</u>	<u>Purpose</u>	<u>Sponsor</u>	<u>Date</u>	<u>Alternate</u>	<u>Dives</u>	<u>Remarks</u>	<u>Disc.</u>
NOTE: Items that are indicated as "new" were letters of interest received in the Fall of 1994. All other items are carryovers from previous meetings.									
"R" numbers indicate the ROV project associated with the ALVIN									
<u>SOUTHERN OCEANS (HIGH LATITUDES)</u>									
67. L. A. Lawver		Bransfield Strait	Study volcanic sites in Bransfield Straights	NSF	Jan-Mar 1996	95-96	2 legs: 25 25		Multi
<u>NORTHERN PACIFIC</u>									
68. H.P. Johnson New	W.W. Sager	Emperor Seamount Chain- 40N 170 W	An investigation of the True Polar Wander on the Emperor SEamount Chain	MG&G NSF	1996 1997		21-24		G&G

ALVIN PROPOSED DIVES BY REGION



ROV Letters of Interest - Summary 1995 - 1997

Investigator	Associates	Area	Purpose	Sponsor	Date	Alternate	Dives	Remarks	Disc.
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ATLANTIC									
R1 New	D.K. Smith, WHOI	S.E. Humphris W.B. Bryan M.A. Tivey	MAR 25 40N 25 50N	Investigate the formation of an Axial Volcanic Ridge at the MAR 25 50'n	NSF	Mar-Jul 1996	13	ARGO II 120kHz side-looking sonar	G&G
R2 New	J.-C. Sempere UW	L. Parson	Central Atlantic 29N 43W	Fine scale segmentation and structural variability within a slow spreading segment	NSF	Summer 1996/97	Anytime 1996/97	35 ARGO II 120kHz side-looking sonar	G&G
R3	D.J. Fornari, WHOI	S. Humphris C. Langmuir D. Colodner K. Von Damm D. Desonie	MAR 37 N, 32 W	Investigation of the relations between volcanic, tectonic and hydrothermal activity within a segment of the Mid-Atlantic Ridge influenced by the Azores hotspot: the Lucky Strike Segment at 37 N.	NSF RIDGE submitted Nov-93	Jul-95	Aug-Sep 1995	30 ARGO II & 120 Khz side-lo sonar	G&G
R4 New 7.	C. Klinkhammer	J.-C. Sempere R. Lutz C. German L. Parson M. Sinha	MAR 36 15.1'N 33 53.3'W	Detailed Deep Submergence Studies of Rainbow Hydrothermal Area, Amar Segment, Mid-Atlantic Ridge	NSF	July-Sept 1996	20	Project also calls use of ALVIN	G&G
GULF OF MEXICO									
R5	H.H. Roberts P. Aharon, LSU	J. Larkin R. Carney R. Sassen E. Aguayo-Camargo M. Taviani H. Schwarcz	Sigsbee Knolls, Gulf of Mexico Alaminos Canyon, Northern Gulf of Mexico	Reconstruction of the history of venting and chemosym in the deep Gulf of Mexico. Principal objectives for the ALVIN dives are to explore and sample vent deposits occurring on top of the Sigsbee Knolls in the Central Gulf and in the Alaminos Canyon at the base of the Sigs Escarpment in order to establish the history of venting and chemosymbiosis in the deep Gulf and link it with venting occurring on the slope.	NSF Apr-94 Mexican Science Foundation Council, Jun-94	Summer 95	Spring 95	11 ALVIN 120 kHz	Geo- Chem Biol
JUAN DE FUCA									
R6	J. R. Delaney, UW et al.		Cleft Segment of Juan de Fuca Ridge	The Ridge Seafloor Observatory ROBE experiment - three work groups: Segment scale, vent/hydroth, water column	NSF NOAA	Sum 95 Sum 96	64 + 4 34/20	4 can be ROV 20 are ROV	all

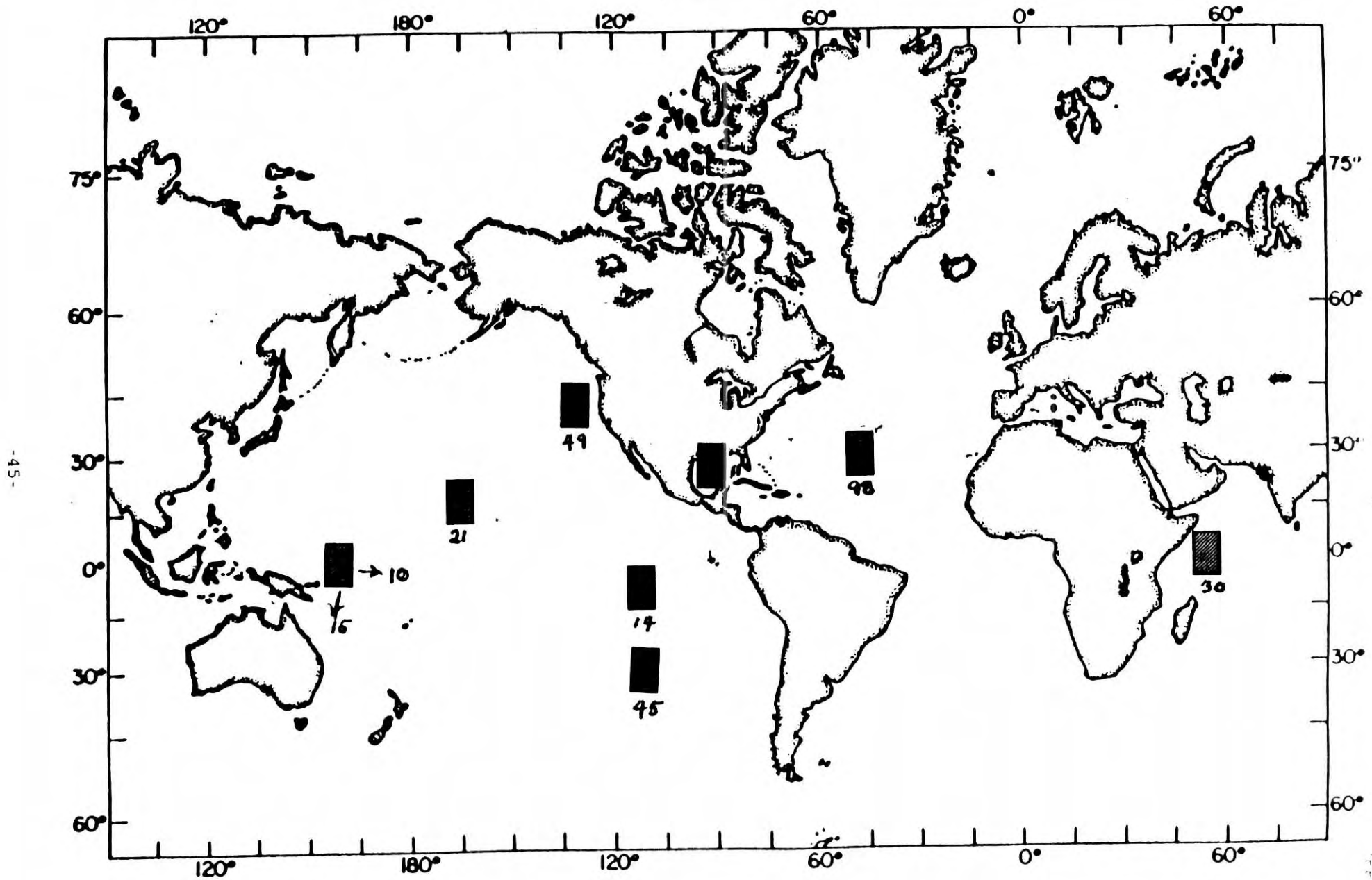
ROV Letters of Interest - Summary 1995 - 1997

Investigator	Associates	Area	Purpose	Sponsor	Date	Alternate	Dives	Remarks	Disc.	
NOTE: Items that are indicated as "new" were letters of interest received in the Fall of 1994. All other items are carryovers from previous meetings. Numbers below "R" number refer to ALVIN projects										
R7	R.W. Embley	W. Chadwick Jr.	Juan de Fuca	Mapping of accretion units of intermediate	NOAA	Summer	25	ARGO II &	G&G	
New		W. Wilcox	Ridge, CoAxial	spreading rate of mid-ocean ridge segment	NSF	1996		120 Khz side-lo sonar		
			Segment							
NORTHERN EAST PACIFIC RISE										
R8	R.A. Lutz	D. Fornari	EPR	"Temporal changes in Biological Community	NSF	Late	Late	14	Project includes	Multi
New		R. Hessler	9 50°N	structure and Associated Geological Features		1996	1997		the use ALVIN	
26.		R. Haymon		at newly-formed hydrothermal vents on the						
		K. Von Damm		EPR crest" and related biological/geochemical						
		D. Desbruyeres		studies						
		T. Shank								
		M. Lilley								
SOUTHERN EAST PACIFIC RISE										
R9	R. Haymon, UCSB	K. Macdonald	SEPR	Hydrothermal Vent distribution along the axial zone of t	NSF	Winter 96		21	ARGO II	G&G
			17-18 S	ultrafast-spreading EPR at 17-18 S: a near bottom						
				fish-optic photo/acoustic survey using ARGO II.						
R10	P.J. Michael, U. Tulsa	D. Fornari, LDGO	Southern EPR:	Petrologic and Morphologic Study of a Giant	NSF	Nov/Dec	Oct 94 to	24	ARGO II &	G&G
		M.R. Perfit, U. Florida	8-9 S, 7-9 S,	Lava Field at 8 S, EPR: A Snapshot of a	MG&G	1994	Mar-95		120 Khz side-lo sonar	
			107 30'-108 10'W	Magma Chamber? Mapping, imaging and	RIDGE		or 1 year			
				sampling of a 220km lava flow using ARGO II,	submitted		later			
				rock coring & dredging: (transponders in place).	Nov-93					
				& 120 khz side-looking sonar						
PACIFIC										
R11	R.A. Binns, CSIRO	K.A.W. Crook	Bismark Sea	PACMANUS HYDROTHERMAL FIELD, EASTERN	CSIRO	ASAP		15-20	ALVIN	Expl
60.	S.D. Scott, U.Toronto		SW Pacific	MANUS BASIN, SOUTHWEST PACIFIC. Submersible	(Australia),				MEDEA-JASON	&
			3 44 S,	and ROV investigation of active Cu-Zu-Au rich massive	NSERC				120 khz	Mining
			151 40 E	sulfide and Fe-Mn oxide deposition associated with	(Canada),					
				siliceous volcanism: analog for ancient volcanogenic	NSF					
				massive sulfide ore environments. Major aim is to collect						
				surface data relevant to interpreting deeper hydrothermal						
				system. Precision geological mapping of PACMANUS						
				field; examination of fault scarps for 3D sections through						
				deposits; sampling with emphasis on vent fluids and altered						
				volcanic rocks at high-T (central) to low-T (fringing) sites.						
R12	E.A. Silver		Huon Gulf	Drowned reefs, dynamic flexure of continental	NSF	Early 97		10	Project includes	Multi
New			Solomon Sea	shelf/subduction					ALVIN dives	
58			SW Pacific							

ROV Letters of Interest - Summary 1995 - 1997

Investigator	Associates	Area	Purpose	Sponsor	Date	Alternate	Dives	Remarks	Disc.	
NOTE: Items that are indicated as "new" were letters of interest received in the Fall of 1994. All other items are carryovers from previous meetings.										
Numbers below "R" number refer to ALVIN projects										
7S 147E										
HAWAII										
R13	R. Butler	A. Chave F. Duennebler R. Watts A. Schultz D. Yoerger	28 N, 141 W Hawaii	The Hawaii - 2 Observatory: A Deep Ocean Facility Re-using the Hawaii-2 Cable Description: Cut and recover end of submarine cable; install junction box on end and redeploy; install instruments by ROV.	NSF Submitted	Jul-96	Jun or Aug 1996	7	MEDEA-JASON	Other
R14	W.B. Bryan New 41.	J.G. Moore D.J. Fornari	West flank of the island of Hawaii	Age and transport mechanisms of the giant landslides of Hawaii	NSF	Oct-96 Nov-97		14	Program requires the use of ALVIN	G&G
INDIAN OCEAN										
R15	H. Dick	H. Kleinrock, WHOI M. Tivey, WHOI G. Hirth, WHOI P. Robinson, J. Franklin, M. Salisbury, J. Melpas, Canada	SW Indian Ridge 57 10' - 57 20' E 32 35' - 32 55' S	"The Plutonic Foundation of A Very Slow- Spreading Ridge" ODP Site survey at the ATLANTIS II F.2. using a sidescan (AMS 120) & Canadian ROV of a 30 km2 wavecut platform exposing plutonic basement around the location of Site 735 B. Program will include deep-towed magnetometer.	NSF ODP	late or early 1995		120 Khz	G&G	
R16	D.J. Fornari New	C. Van Dover S. Humphris R. Collier M. Lilley C. Cavanaugh K. Von Damm	Central Indian Ocean Ridge 24S 69.6E	Conduct detailed biological, chemical and geological investigations of hydrothermal vents on the central Indian Ocean Ridge	NSF	Jan-Mar 1996		30	ARGO II 120Khz side-looking sonar MEDIA-JASON	Multi

ROV REGIONS OF INTEREST - 1996/7



APPENDIX XII

1 Summary of Targets for Western Pacific Submersible Studies (US PR's)

PI	#dives	transit	port	Region	Objectives
1 W. B. Bryan/J. B. Moore	24	2 to 3	Honolulu	Hawaiian Islands	Land slides, East Rift of Kilauea, tectonics, petrology
2 M. O. Garcia	7	1	Honolulu	Loihi Seamount	Petrogenesis, volcanology
3 W. Sager/P. Johnson	24	4 to 5	Honolulu	Emperor Seamounts	Hot spot evolution, polar wander
4 F. Sansone	13	1 to 2	Honolulu	Hawaiian Islands	submarine volcanology
5 E. L. Winterer	10	6	Honolulu/ Guam	Western Pacific Seamounts	Limestone caps, karst formation
Total # Dives	78			Hawaii and Central Pacific	
6 S. H. Bloomer/R. J. Stern	14	2	Guam	Southern Mariana Arc	Arc Volcanology, Petrogenesis, hydrothermal systems
7 P. Fryer/ K. Fujioka	18	4	Guam	Mariana Forearc	Serpentine seamount genesis, fluid flux, mass balance (cooperative with Japanese)
8 P. Fryer	19	1	Guam	Southern Mariana backarc basin	Spreading center, tectonic activity, volcanology, petrogenesis
9 J. B. Gill/P. Fryer	16	5	Guam	Northern Mariana Arc	Arc Volcanology, tectonic control over volcanism
10 G. McMurtry	8	4 to 5	Guam	Northern Mariana Arc	Hydrothermal deposits and fluids
11 R. J. Stern	15	6	Guam	Hiyoshi Smts., N. Marianas	Arc Volcanology, alkaline petrogenesis
Total # Dives	90			Mariana region	
12 E. A. Silver	18	1 to 2	Lae or Rabaul	Huon Gulf, Solomon Sea	Drowned reefs, dynamic flexure of continental shelf/subduction
13 J. Hawkins	24	4	Suva or Pago Pago	Lau Basin	Petrogenesis, Tectonics, volcanology
14 J. Mahoney	24	4 to 5	Samoa or Tahiti	Manihiki Plateau	Exposures of basement for oceanic plateau studies
15 B. McInnes/K. Farley	15	1 to 2	Rabaul Guadalcanal	New Ireland/ Solomon	forearc submarine volcanism, hydrothermal activity, particularly alkaline volcanism
Total # Dives	81			Southwestern Pacific	
16 R. Lutz/Vrijenhoek	8	NA	any	any biological community sites	Biological studies, evolution, distribution etc.
17 C. M.s Cavanaugh	var	NA	any	any seep.vent localities	Symbiotic associations between invertebrates and bacteria at cold seeps and hot vents
TOTAL DIVES	257			ALL REGIONS	

1. Summary of Targets (US PI's) (continued)

PI	Vehicle	Funding	Rating*	
1	W. B. Bryan/J. B. Moore	Alvin	NSF	3
2	M. O. Garcia	Alvin	NSF	5
3	W. Sager/P. Johnson	Alvin	NSF	2
4	F. Sansone	Alvin	NSF	3
5	E. L. Winterer	Alvin	NSF	3
6	S. H. Bloomer/R. J. Stern	Alvin	NSF	3
7	P. Fryer/ K. Fujioka	Alvin & Shinkai 6500	NSF/ JAMSTEC	4
8	P. Fryer	Alvin	NSF	4
9	J. B. Gill/P. Fryer	Alvin	NSF	4
10	G. McMurtry	Alvin	NSF	4
11	R. J. Stern	Alvin	NSF	2
12	E. A. Silver	Alvin	NSF	3
13	J. Hawkins	Alvin	NSF	3
14	J. Mahoney	Alvin	NSF	3
15	B. McInnes/K. Farley	Alvin	NSF	3
16	R. Lutz/Vrijenhoek	Alvin	NSF	depends
17	C. M. Cavanaugh	Alvin	NSF	depends

2. Summary of Targets for Western Pacific Submersible Studies (non-US PI's)

PI	#dives	transit	port	Region	Objectives
18 K. Fyjioka/P. Fryer	15	4	Guam	Mariana forearc	Serpentine Seamounts, fluid seeps, structures
19 R. Arculus et al.	15	2	Rabaul	Eastern Manus	Hydrothermal activity, petrogenesis
20 (people from	12	2 to 3	Rabaul	Western Woodlark	Hydrothermal activity, petrogenesis
21 Western Australia	6	1 to 2	Rabaul	Tabar-Lihir-Tanga-Feni	Major Au deposit on land = submarine environment
22 who want to do	10	2 to 3	Suva	Lau Basin	Hydrothermal activity, petrogenesis
23 joint work with	10	2	Suva	N. Fiji Basin	Interaction of southern spreading center with Mathew-Hunter FZ
24 Alvin)	6	2?	Pinang or Port Blair	Andaman Sea	spreading center and hydrothermal activity
25 S. Scott et al.	20	3 to 4	Rabaul Guam	Woodlark & Manus Basins Seamounts	Hydrothermal structures, volcanology (possible coop work with the MIR submersible)
26 P. A. Berkman/ I. Dalziel/H. Hotta	?	4 to 5	Falklands or Tierra Del Fuego	Scotia Arc	
Total # coop Dives	94			Hawaii and Central Pacific	
TOTALS	351	79		ALL REGIONS	

2. Summary of Targets (non-US PI's) (continued)

PI	Vehicle	Funding	Rating*
18 K. Fyjioka/P. Fryer	Alvin/ Shinkai 6500	NSF/ JAMSTEC	4
19 R. Arculus et al.	Alvin	NSF	3?
20 (people from		NSF	3?
21 Western Australia		NSF	3?
22 who want to do	Alvin	NSF	3?
23 joint work with		NSF	3?
24 US people, using Alvin)	Alvin	NSF	3?
25 S. Scott et al.	Alvin	NSF	3
26 P. A. Berkman/ I. Dalziel/H. Hotta	ROV/ Shinkai 6500	NSF/ JAMSTEC	2
TOTALS			

*Rating for Maturity level:

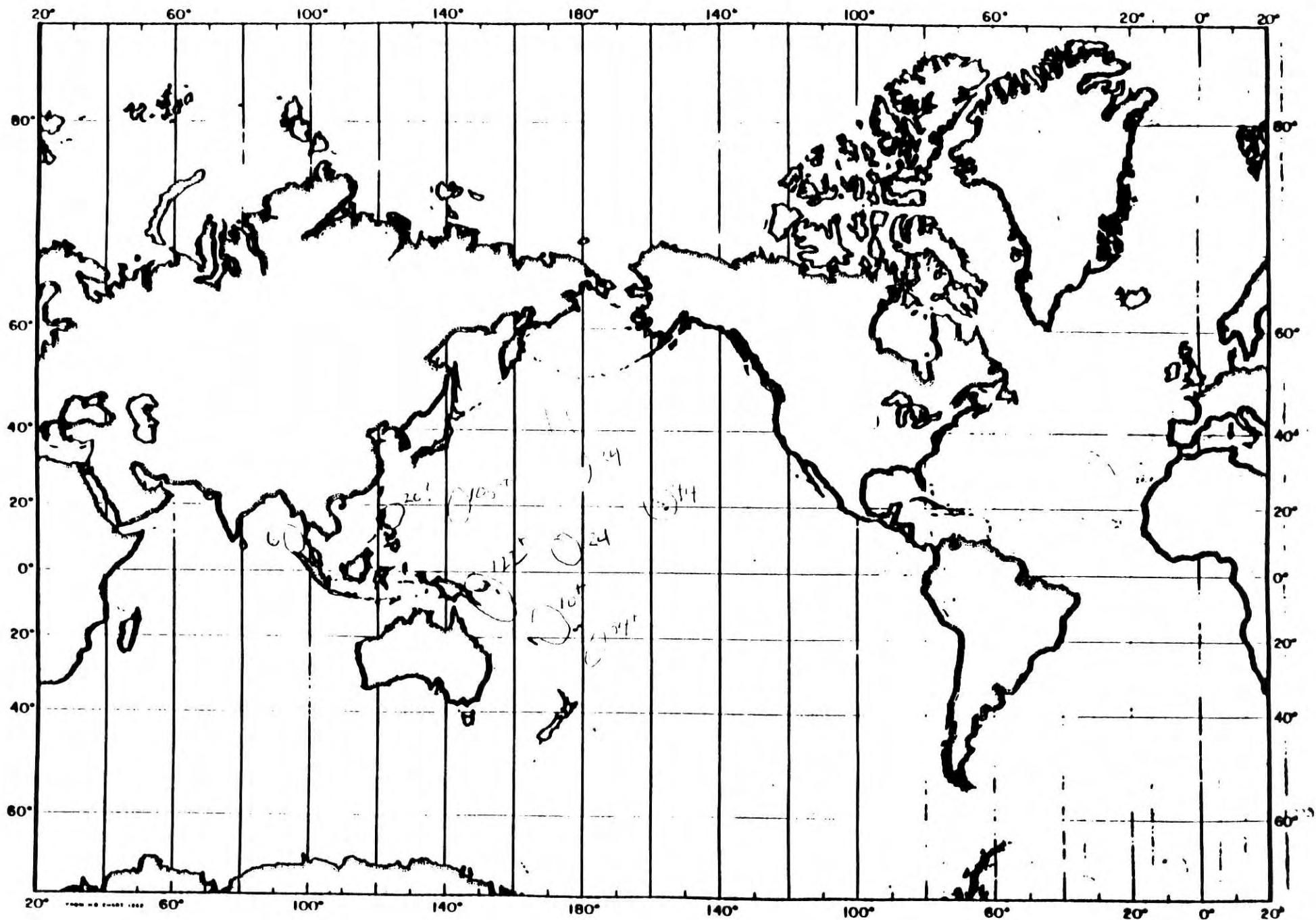
5 = Funded

4 = extremely mature - previous work in area includes seafloor mapping, bottom photography, published work on samples collected, previous diving or previous use of ROV in the area.

3 = mature - previous work in area includes seafloor mapping, bottom photography, published work on samples collected.

2 = preliminary - additional field work may be required before diving proposal is viable.

1 = dependant - previous work of the type proposed has been published but proposed diving will augment other funded cruises. Cannot stand alone.



APPENDIX XIII

ALVIN IMPROVEMENTS

	PRIOR TO END OF NEXT OVERHAUL	LONG TERM (> 3 YEARS)
IMAGING	<p>Provide video camera pan and tilt mechanism.</p> <p>Provide spare light control relay assembly.</p> <p>Provide color monitors for observers.</p> <p>Provide general use mini-cams.</p> <p>Provide additional 3-chip camera.</p> <p>Incorporate SMPTE and closed-caption in video system.</p>	<p>Provide to HDTV format capability.</p>
NAVIGATION	<p>Replace navigation software.</p>	<p>Replace long-baseline navigation system with hull mounted short/medium baseline.</p> <p>Integrated terrain mapping and navigation.</p>
DATA LOGGER	<p>Expanded LAN system.</p>	<p>Total replacement (hardware and software).</p> <p>Acoustic telemetry.</p>

ALVIN IMPROVEMENTS

	PRIOR TO END OF NEXT OVERHAUL	LONG TERM (> 3 YEARS)
SENSORS & SAMPLERS	<p>Obtain spare gyro.</p> <p>Provide two-head capability for Mesotech and obtain "imaging head".</p> <p>Replace/supplement major samplers with new design.</p>	
DIVE DURATION		<p>Replace main batteries (NiCd?)</p> <p>Redesign personnel sphere interior (viewport locations?)</p>
SUBMERSIBLE SYSTEMS	<p>Upgrade obstacle avoidance sonar (possibly complete replacement).</p> <p>Provide motor controller spares.</p> <p>Replace VB system piping and fittings.</p>	<p>Replace major components of variable ballast system.</p> <p>Increase hydraulic system horsepower.</p> <p>Redesign forward frame to increase manipulator/science basket payload.</p> <p>Improve hydrodynamics.</p>

APPENDIX XIV

JASON/MEDEA-ARGO II-DSL 120

NEAR TERM IMPROVEMENTS

- REFINE JASON MANIPULATOR FUNCTIONS AND TEST
 1. SAMPLE COLLECTION: SEDIMENT TUBE CORES
ROCKS
BIOTA
HYDROTHERMAL FLUIDS
 2. INSTRUMENT MANIPULATION AND DEPLOYMENT
 3. ADVANCED MEASUREMENTS AND CAPABILITIES

- RECONFIGURATION OF DSL 120 VEHICLE:
 1. TOW BODY
 2. POWER DISTRIBUTION

- INSTALL AND TEST IMPROVED VEHICLE ATTITUDE SENSORS

- INTEGRATION OF REAL-TIME PHASE BATHYMETRIC PROCESSING FOR 200KHz AND 120KHz SIDE SCAN SYSTEMS.

- DEFINE IMPROVED ELEVATOR TO AID SAMPLE RECOVERY AND INSTRUMENT DEPLOYMENT

- ACTIVELY MONITOR PLANNING AND DEVELOPMENTS FOR SEABEAD OBSERVATORIES

12/2/94

APPENDIX XV

Navigation Review Objectives

- upgrade Alvin navigation capabilities
- upgrade ease of use
- support Jason, Medea, Argo and potential AUV systems as well as Alvin.

Constraints

- upgrade should not disable present system until new system is functioning
- operator must have source code for all navigation software
- upgrade should not increase work-load of operator
- volume and power should stay within present system envelop in-hull
- use off-the-shelf hardware (and software)

Concerns

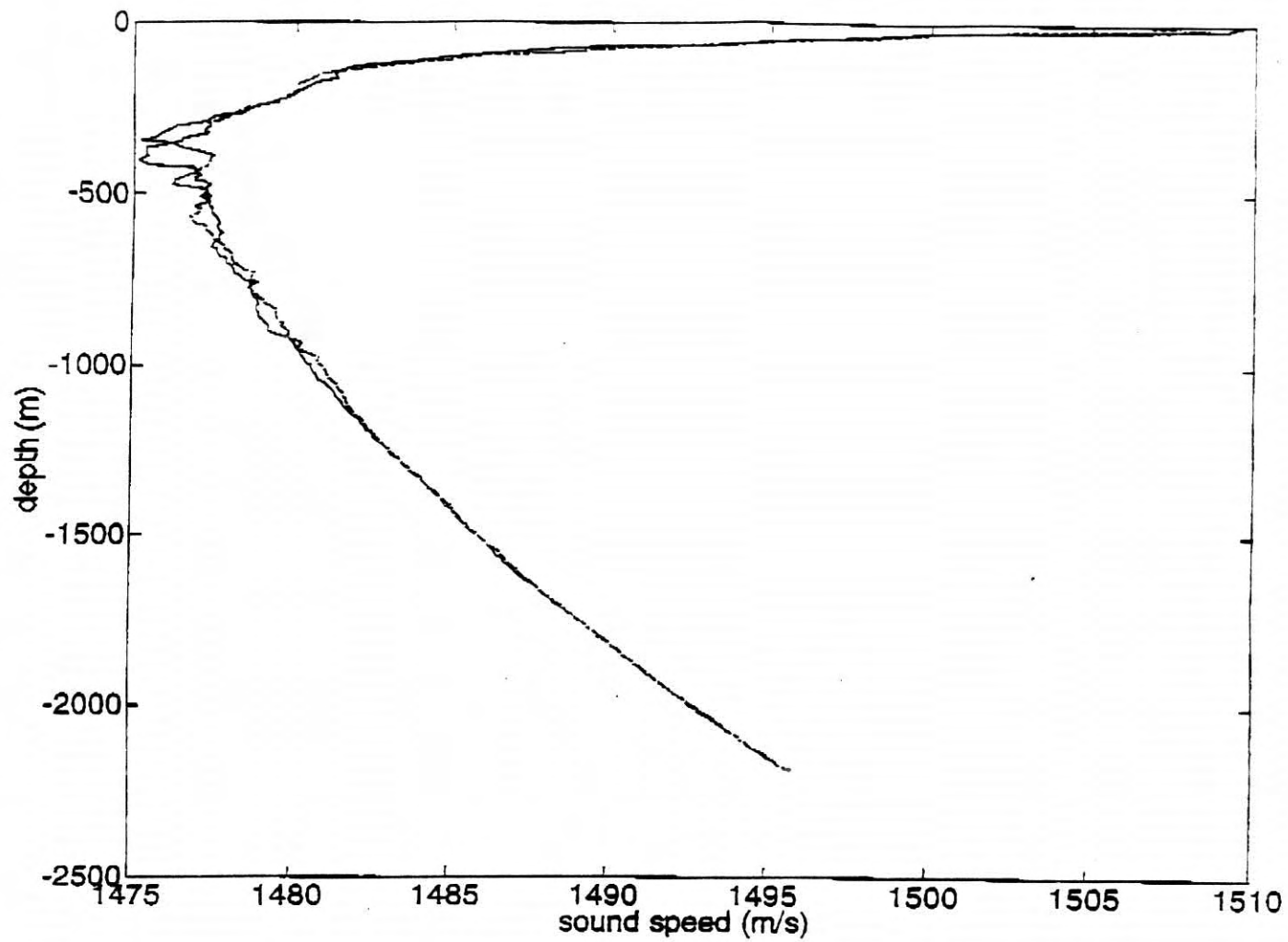
- large position jumps observed when switching between transponders
- navigation software difficult to use
- in-hull displays not as versatile as desired
- array deployment responsibilities not well defined
- post-processing requirements of scientists not well supported

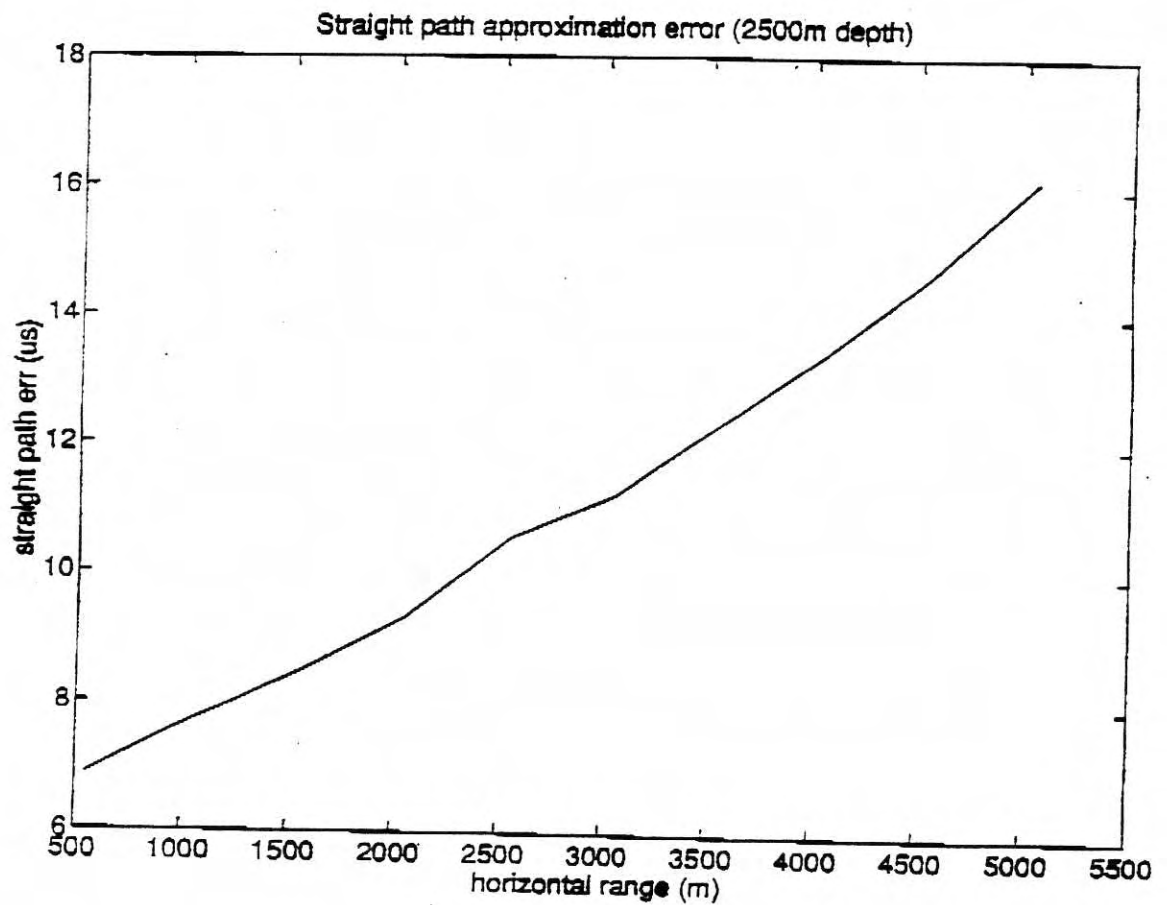
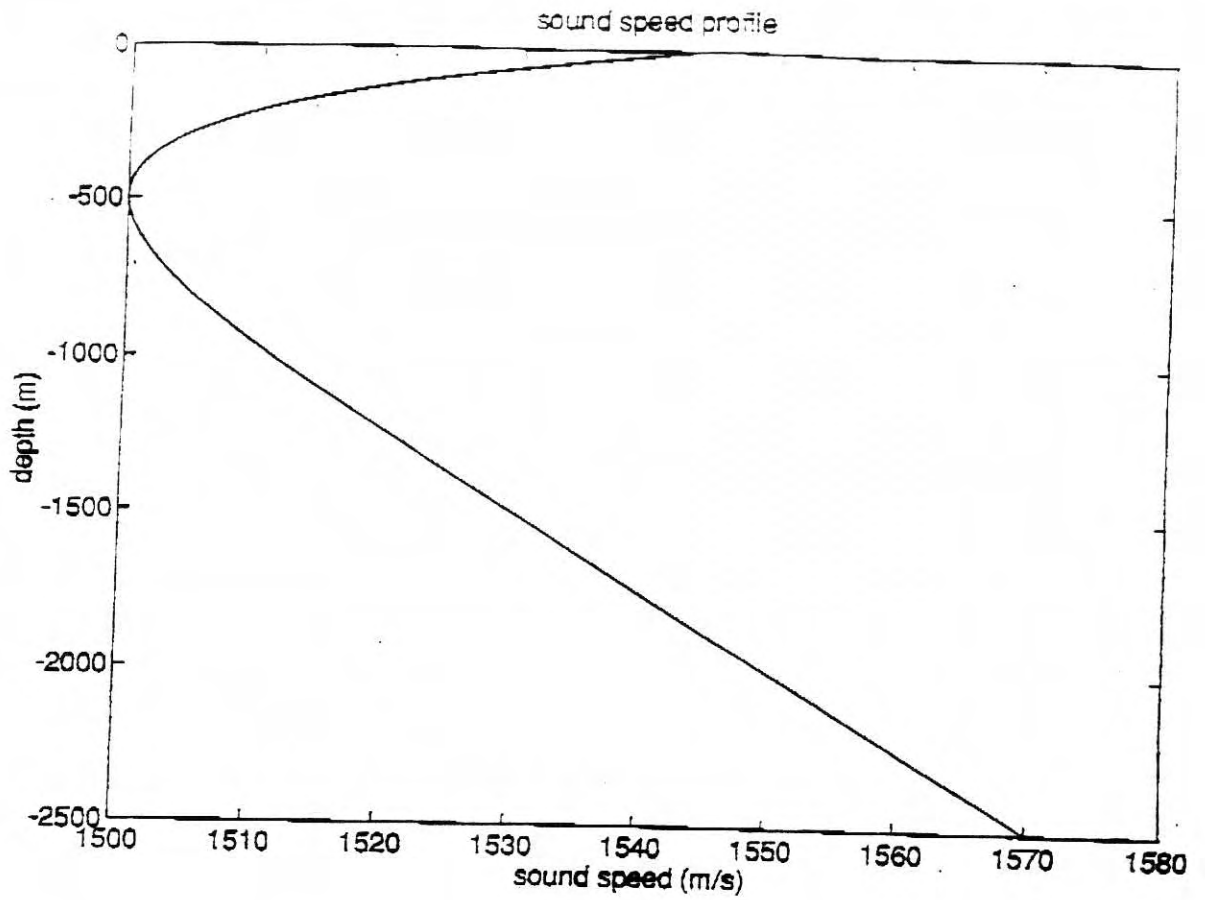
LBL Upgrade

- Common hardware/software across Alvin surface and in-hull navigation & Argo/Jason/Medea/AUV navigation (modular hardware/software components)
- Software upgrade -> commercial vendor/WHOI cooperative effort (acquisition, logging, display, computation, outlier rejection, etc.)
- Improved array calibration
- Provide post-processing tool set for scientists in well supported environment
- DOCUMENTATION

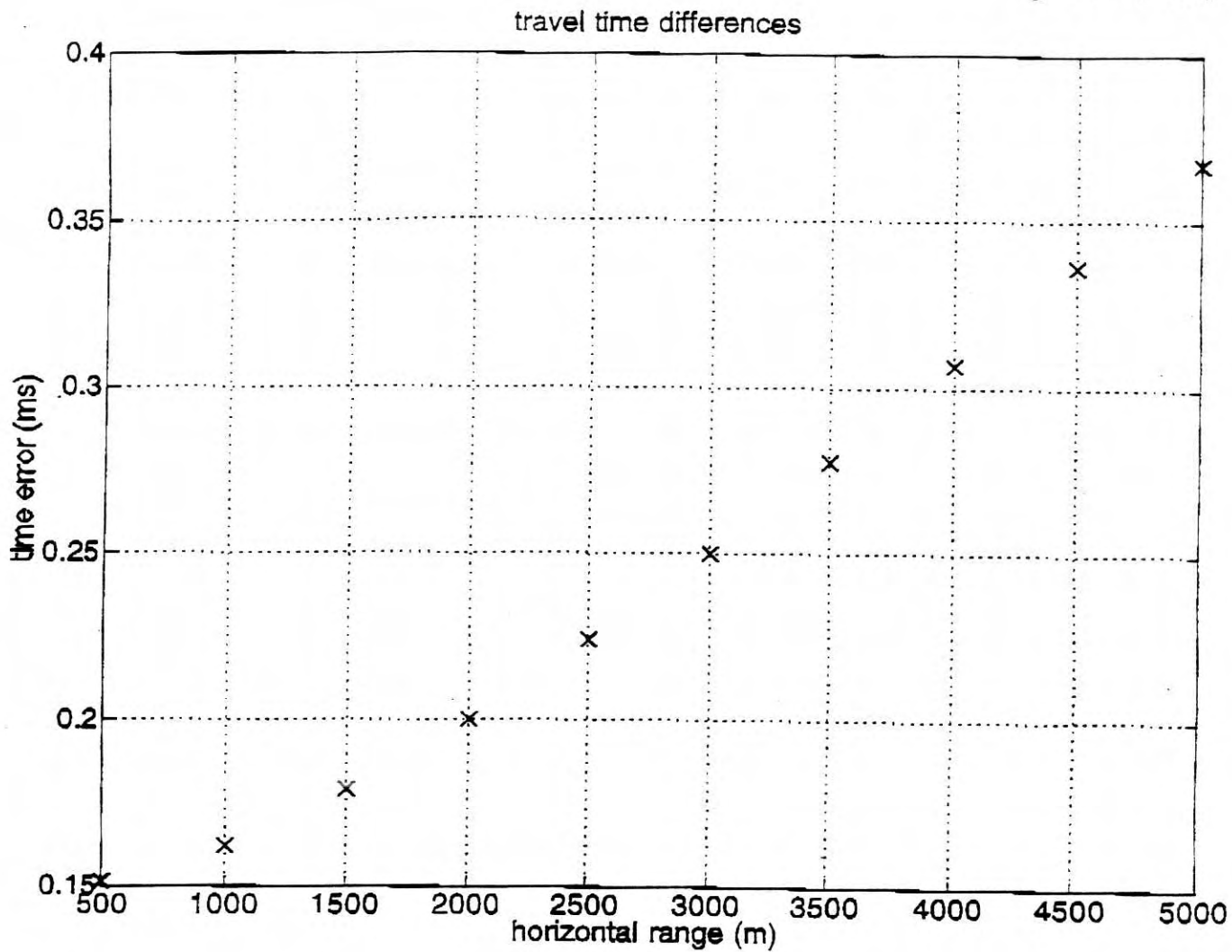
Transponderless Navigation

- Ensure navigation software supports integration of new systems (DVL, etc.)
- Provide well documented data files with raw values
- Provide post-processing tool set for scientists in well supported environment
- Merging of surface and in-hull data files





2200 m depth.



based on sound speed profiles from

Juan de Fuca experiments 5 and 7, Aug 2, 199

APPENDIX XVI

Woods Hole Oceanographic Institution
Woods Hole, MA 02543
Phone: (508) 548-1400
Telex: 951679



November 29, 1994

Dr. Donald F. Heinrichs
Oceanographic Centers and Facilities
National Science Foundation
4201 Wilson Boulevard
Arlington, VA 22230

Ms. Lisa Rom
Oceanographic Instrumentation
and Shipboard Technology
National Science Foundation
4201 Wilson Boulevard
Arlington, VA 22230

Dear Don and Lisa:

In response to your letter of February 15, 1994, we have made considerable progress on the subject of formulating a policy and guidelines for third party scientific instrumentation use on the submersible and ROV vehicles available to the US scientific community. As detailed below, this work includes both evaluating operational guidelines and implications of third party tool use on ALVIN and the WHOI-DSOG ROV/towed vehicles, and in furthering the testing and operational readiness of the Stakes/Holloway rock drill for use with ALVIN; a prime candidate for third party tool development.

Historically, third party tools have been developed for use on ALVIN because of a specific requirement for collection of scientific data or samples. More recently, various types of scientific sensors (e.g., transmissometers, fluid pressure recorders [PSIPs]), digital still cameras, doppler sonars, laser scanners, geocompass, inductive subsea data links, acoustic modems) have been used with submersibles and different towed and remotely operated vehicles (ROVs); the driving force for doing this is the necessity to collect high-resolution scientific information by taking advantage of improvements in deep ocean sensor/engineering technology. These tools and sensors are required for the increasingly complex and multidisciplinary nature of deep submergence-based research in mid-water, hard-rock and soft-sediment environments, and the advent of deep ocean seafloor observatories and time series studies. We agree that it is important to provide scientists and engineers with up-to-date specifications of various deep submergence vehicles available to the US community and define the criteria required for the implementation of those sensors on the vehicles. Equally important is the need to provide guidance to the funding agencies as to the broader scientific applicability of various tools, establish appropriate operational policies that will help ensure the safe and reliable use of these tools, and to determine the long-term costs of operation and maintenance of these devices.

We envision a multi-step procedure that involves scientific and technical review and assessment by the DESSC of proposals for third party tools, and an operational assessment and recommendation by WHOI-DSOG with respect to the implementation of the proposed technology on its vehicles. Ideally this process should be iterative, with proposing scientists and engineers interfacing with a DESSC Technology subcommittee, and with WHOI-DSOG on the operational requirements and ramifications of the proposed sensors relative to the national facility vehicles. Similar dialog needs to take

place with other deep submergence facility operators. The criteria which should be established for evaluating the scientific merit of the proposed sensor technology, its operational viability, and its general applicability to a wide spectrum of deep submergence facility users, must be carefully crafted to ensure that all disciplinary objectives and requirements are considered.

As a starting point we outline below a straw-plan that will be presented to the DESSC at their December meeting to stimulate discussion and help in formulating a policy. We will also propose to the committee that a Technology Subcommittee be established to assist in developing this policy and in providing guidance to the Operator in regards to science sensors and upgrades on the national facility vehicles.

1. Letter proposals for third party tool development should be submitted to the DESSC - Technology Subcommittee for initial review to determine operational applicability of the tool or sensor for deep submergence vehicle use. DESSC and the Operator will comment on the letter proposal and provide both the funding agency and the proposer with suggestions and comments. Based on feedback on the letter proposal, the proposer would decide to submit a formal proposal to the funding agency for peer review.
2. Proposals submitted to the funding agencies for development of scientific instruments or tools for use on deep submergence vehicles would be reviewed under the applicable agency peer review system. The scientist must include the anticipated long-term maintenance costs (including hardware, software and personnel) and use-expectations for the equipment in their proposal.
3. The DESSC Technology Subcommittee would evaluate the general use as outlined in the formal proposal and would seek technical implementation recommendations from the intended vehicle operator, or multiple operators if the equipment is proposed for use on multiple platforms. These inputs and recommendations would be forwarded back to the funding agency for use in final funding considerations. If the agency funds equipment destined for general use, it should be prepared to support the added maintenance costs in subsequent research proposals for use of this equipment by the science community.
4. Because instrumentation involved in this type of proposal may be of a non-standard nature, scientists that develop the equipment for general community usage should also be prepared to support the continued maintenance of the equipment or include a long term maintenance plan as part of their proposal. The instrument proposal should specify approximate usage costs to third parties which includes pre-cruise preparations, post-cruise maintenance, repair and typical shipping costs. The DESSC Technology subcommittee will be responsible for maintaining a file of third party equipment available for various vehicles and the primary contact for its usage. The PI desiring to use the equipment will contact the owner for current usage costs, and scheduling considerations, for inclusion in their respective science proposals.
5. The responsibilities of the vehicle operator should not go beyond providing interface specifications, and being responsible for installing the equipment to those specifications. The operators have expertise in the areas of their vehicle systems and standard sensors, but not necessarily in all fields of instrumentation. At sea repair, maintenance and spare parts for third party equipment should be provided by the user or by a qualified technician whose expenses have been budgeted for in the PI's science budget.

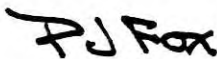
6. If, based on community demand and review by the DESSC Technology subcommittee, equipment developed by a third party becomes a permanent addition to a vehicle system, then it should be considered for transfer to the assets of the vehicle operator for long-term operation and maintenance, and the appropriate support costs should be added to the annual operating budget of the operator.

We noted in your letter comments relating to the importance of DSOG participation in the planning and implementation process for science tools that fall into the third party category. DESSC and WHOI-DSOG agree that this is a critical component of the process and it will play an important role in the eventual success of any tool development and utilization program. The 1995 DSOG Operations Proposal has included, within the scope of work for both ALVIN and the ROV/towed vehicles, the efforts that must be undertaken to provide and disseminate the vehicle systems criteria to interested parties in the deep submergence community, and the eventual work required to interface with those scientists and engineers.

With respect to engineering work carried out for the testing of the Stakes/Holloway rock drill we are pleased to report that the test, conducted off San Diego in early September, was judged to be successful by all concerned. A considerable amount of time and energy was expended by the ALVIN group with Stakes/Holloway/Batiza in coordinating the technical requirements of the drill and its integration into ALVIN systems. The at-sea ALVIN operations group was instrumental in providing key fall-back equipment and making onsite modifications which were essential to the success of the test. DSOG is committed to continuing to work with the Stakes/Holloway as they finalize some aspects of the drills operation with ALVIN in advance of the Batiza science program scheduled for October 1995. A presentation of the test results using the rock drill from ALVIN will be made by Stakes/Holloway at the December DESSC.

If you have any questions on this subject in advance of our meeting please do not hesitate to contact us.

Yours sincerely,



P.J. Fox, Chairman
Deep Submergence Science Committee



Barrie B. Walden, Manager
Submersible Engineering and Operations

/kifh

cc: R. Pittenger
D. Foster
A. Bowen
D. Fornari ✓