

**UNOLS
Deep Submergence Science Committee
Planning Meeting**

SUMMARY REPORT

December 5, 1993

**California Room
Cathedral Hill Hotel
San Francisco, CA**



DEEP SUBMERGENCE SCIENCE COMMITTEE

PLANNING MEETING MINUTES

SUNDAY, DECEMBER 5, 1993

CATHEDRAL HILL HOTEL

CALIFORNIA ROOM

SAN FRANCISCO, CALIFORNIA

APPENDICES

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- X. Summary of ALVIN and ROV Letters of Interest
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- XIII. Jeff Fox's Summary Memo

INTRODUCTION - The meeting was called to order on December 5, 1993 at 9:00 a.m. by Jeff Fox, DEep Submergence Science Committee (DESSC) Chair. He stressed the importance of the meeting. It is an opportunity to hear from the operator, identify new technology needs, and plan the future use of the deep submergence facilities. The meeting agenda is enclosed as **Appendix I**. These minutes reflect the order in which the agenda items were addressed, except as noted. Jeff introduced the members of the DESSC. A list of the DESSC membership and the meeting participants is included as **Appendix II**.

DEEP SUBMERGENCE OPERATIONS AT WHOI

WHOI INTRODUCTION - Dick Pittenger provided an introduction of the status of WHOI operations. The merge of the ALVIN group with the deep submergence lab (DSL) which includes ROVs is coming along. Copies of his overheads are attached as **Appendix III**. A chart showing the functional relationships between the community, DESSC, agencies, and the operator of the Deep Submergence Facility was presented.

Over the year DESSC has been effective in working with the operator in coordinating ALVIN activities and developing an ALVIN imaging proposal. Dan Fornari has been hired to work as a liaison between science and operations. Additionally, an internal committee has been formed

at WHOI, the Deep Submergence Activities Committee (DSAC), to address deep submergence issues and provide institutional guidance.

In 1993, ALVIN completed her overhaul and returned to service with full schedules in 1993 and 1994. In response to a tectonic event on Juan de Fuca, NSF and NOAA added extra dives to ALVIN's schedule to study the event. ROV use-rate, unfortunately, is lower than expected. Only one ARGO II cruise is funded for 1994.

AGOR 25 is on track and a construction contract can be let in the next month.

THE YEAR IN REVIEW - ALVIN AND ROV OPERATIONS - Barrie Walden provided a report of the 1993 ALVIN and ROV activities. He presented a milestone chart for the past year's events, see **Appendix IV**. ALVIN's overhaul was completed in March with no major problems that warranted delay of the sea trial testing. Unfortunately, bad weather combined with a tightly constrained schedule resulted in the elimination of all post-overhaul engineering dives. Only a few certification dives could be achieved, with only one dive to 3,720 meters depth before resuming science operations. **Appendix IV** shows a summary of ALVIN's post-overhaul dives. The graph shows planned certification and engineering dives versus actual dives performed. **Appendix IV** also includes a chart showing engineering dives performed by year since 1978.

After resuming science operations, problems with ALVIN's recently installed pressure-tolerant motor controllers, which had minor problems during the overhaul, could not be solved. As a result, numerous controllers failed, leaving no spares onboard. Jeff Karson's dive program had to be terminated after seven dives and AII returned to Bermuda for investigation of the problems. The manufacturer of the controllers sent their design engineer to Bermuda, but he could not determine the exact cause of the failures. An overhead of the ALVIN dives lost versus total dives, showed that in 1993 the greatest number of dives had been lost due to weather and mechanical problems than had occurred since 1985.

When the cause of the motor controller failures could not be determined, the old motor controllers were reinstalled. They have worked fine. There was a loss of 250 pounds of payload when going back to the old motor controllers because the old motor controllers are housed in pressure vessels. Payload capability can be increased by adding syntactic foam, but this is not an easy modification. In the long term, the motor controllers will be housed in titanium units that are much lighter than the steel ones used presently.

ROV operations in 1993 included the Guaymas Workshop in March to premier JASON-MEDEA's science capabilities. Additionally, the ROV systems were used during an ONR-supported cruise to the Mid Atlantic Ridge. JASON-MEDEA was also used to survey the LUSITANIA during July under private sponsorship.

Plans for conversion of KNORR to a support platform for ALVIN are underway. The proceeds from the sale of ATLANTIS II will be used to support the conversion costs. Planning is critical because costs must be minimized. A UNOLS committee has been formed to oversee the conversion design plans. The committee has met once and a list of the members are listed on page 8.

Barrie reported that many of the hurdles to increase ALVIN's depth capability to 4,500 meters have been overcome, however, final approval by NAVSEA is still needed. The depth increase required new titanium housings for the motor controllers, and these have been constructed and installed. The second cruise in 1994 requires the deeper depth capability, and NAVSEA certification to 4,500 meters is expected in time to accomplish those dives. A graph showing the research area gained by increasing ALVIN's depth rating was shown and is included in **Appendix IV**.

Andy Bowen presented a video demonstrating the JASON-MEDEA ROV capabilities. Manipulative capabilities for coring are presently being dock tested. NOAA/NURP helped support this development effort via Fred Grassle at Rutgers University. The coring system is a lazy susan configuration which uses elevators to lift samples from the bottom. Andy indicated that a week each year for ROV engineering dives would be beneficial. DESSC encouraged Andy to request support for these dives from the funding agencies. Keith Kaulum stated that ONR is already spending \$250 K per year for support of the systems. Jeff Fox encouraged Andy to put together a document outlining the developmental engineering needs and submit it to DESSC for review. An outline of a priority of needs for field trials could then be developed and a strategy for implementation designed.

The merge of the DSL group and ALVIN group is continuing. WHOI is physically trying to find space near the ALVIN facilities to accommodate DSL. The sharing of personnel between the two groups has been difficult. The schedules are not often compatible.

THE 1994 SCHEDULE - Rick Chandler reviewed the ATLANTIS II and ALVIN operations schedule for 1994. The schedule is attached as **Appendix V**. It is a healthy schedule with 177 dives planned. (Note: ALVIN needs a minimum of 150 dives to maintain a viable operation and can accommodate 250 dives for a full year.) Operations end in 1993 with work on the northern East Pacific Rise. AII and ALVIN will return to Acapulco before resuming operations in 1994 on the northern EPR. Operations will continue in the areas off Costa Rica and on the northern EPR until the end of April. A standdown period is scheduled for May. Three engineering dives are planned for June, to be followed by science operations on Juan de Fuca until mid August. In early September, three additional engineering dives are scheduled. AII/ALVIN will head South for operations off the California coast through September. Continuing south, dives are planned through early December along the northern EPR. A second standdown period is scheduled for the remainder of the year. The location will depend on operational plans for 1995.

FUNDING AGENCIES

NATIONAL SCIENCE FOUNDATION (NSF) - Don Heinrichs presented the report for NSF. The 1994 OCE budget is becoming clear. Ocean Sciences will see a 6.3 percent increase in funding. Research will have a 8.1 percent increase, while facilities will only see a two percent increase. This will cause some strains. ODP can expect an increase of 7.6 percent. In 1993, NSF finished paying the amortization of EWING.

Don pointed out that the Memorandum of Agreement between NSF, NOAA, and ONR for support of the Deep Submergence Facility is for the years 1993, 94 and 95. The agreement called for the amalgamation of WHOI ROV assets and ALVIN. This means that the first third of the transition period is coming to an end.

ALVIN operations planned for 1994 are heavily supported by NSF funding. In 1993, NSF funded 101 science dives, while ONR and NOAA funded nine and 23 science dives, respectfully. In 1994, NSF plans to fund 144 science dives, ONR has 18 funded science dives and NOAA plans to fund 15 science dives. NSF is pleased with the science pressure, but may find difficulty in continuing this level of imbalanced support in the future.

NSF plans to call for the conversion of KNORR in late 1995, early 1996 time frame.

On a final note, NSF has moved to Arlington, VA. Their new address and phone number is:
Division of Ocean Sciences, National Science Foundation
4201 Wilson Avenue, Room 725
Arlington, Virginia 22230
Telephone: (703) 306-1580

OFFICE OF NAVAL RESEARCH (ONR) - Keith Kaulum gave the report for ONR. AGOR 25 is ready to proceed with a construction contract. The construction will be complete three years from the time the contract is let.

ONR is pushing hard for a timely conversion of KNORR to a support platform for ALVIN. They anticipate a speedy engineering design phase. The only funding available to support the conversion is to come from the sale of AII. KNORR must continue to have general purpose capabilities. There was concern from the meeting participants that the community needs to have input into KNORR conversion plans. DESSC will send out a flyer about the KNORR conversion subcommittee. See page 8 of minutes for a list of members. The comment was made from the floor that DESSC and the conversion subcommittee be sensitive to the important science and deep submergence vehicle (e.g. ROVs) handling requirements of the conversion and that the described finding limits may not be adequate/realistic.

ONR has agreed to fund procurement of a multibeam system for KNORR. The acquisition of a multibeam system is a high priority for WHOI. Installation can be expected by August of next year.

ONR is providing third year funds for the hardening of ROV instrumentation. ONR is not enthusiastic about supporting additional engineering dives.

Keith reported that ONR has recently been reorganized. The science and technology sections have been combined to couple basic and applied technologies. The new directorate is called Oceans, Atmosphere and Space Science and Technologies with Dr. James DeCorpo as Director.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION/NATIONAL UNDERWATER RESEARCH PROGRAM (NOAA/NURP) - Michael Ledbetter provided the report for NOAA/NURP and began by explaining that NOAA/NURP had jointly supported the research opportunity on the Arctic submarine cruise. There are presently ongoing discussions for additional cruises. NOAA also provided some support for two of the dives added to ALVIN's 1993 schedule to respond to the Juan de Fuca event.

The vessel KAIMIKAI-O-KANOLA (KOK) has been delivered to Hawaii. Next year will be a low field operational year for HURL because PISCES will be overhauled. Science operations are planned for 1995 on KOK.

In 1994, NOAA saw a budget increase. NURP's appropriation was approximately 18 million for support of its six regional labs plus the National Office. The National Office's portion of this budget is \$2.1M. The HURL program was earmarked for \$3.372 M, of this \$300 K was to be contributed by the NURP National Office. NURP funds will also be spent to support 19 days of ALVIN time. NURP is presently a yearly construct of congressional legislation and is, therefore, subject to the capricious political process. There is a bill working its way through Congress that would establish NURP as a established program within NOAA. If such a bill passed it could provide an opportunity to develop a more focussed national program.

In early 1994, SEA CLIFF will complete a major overhaul. TURTLE, an ROV called ATV, and NR-1 will be available for research. TURTLE and ATV will be on the West Coast and NR-1 will be on the East Coast.

On a final note, NURP has advertised for the position of Director.

UNITED STATES NAVY (USN) - LCDR Sam Nichols reported on the current status of the Navy deep submergence assets. SEA CLIFF has begun sea trials after undergoing a \$1.2 M overhaul. It should be ready for operations sometime in 1994. The Navy is focussing on improving the submersible's reliability. The manipulators are being replaced with a new design by Schilling. Testing to 20,000 feet is planned for March. Other improvements include upgrading the power controllers, adding HMI lighting, and adding syntactic foam.

TURTLE improvements totalling approximately \$1 M are just being completed. The improvements include HMI light modifications. TURTLE sea trials are planned for April, then based on proposal pressure, TURTLE may be deployed to Juan de Fuca for science operations. The Navy's ROV system, ATV, is fully operational after having its hydraulic motors overhauled. Other modifications to ATV included repairing its fiber optic cable and reworking its sonars. The submarine, NR-1, will be getting a new support vessel.

In 1993, TURTLE and its support ship participated in the Guaymas Basin science operations with JASON. Also in 1993, The Navy's submersible vehicle, SCORPIO, was used on the R/V NEW HORIZON for the recovery of an OBS. The remainder of the year has been spent on military operations using ROVs for equipment recoveries.

The Navy is on the verge of assigning two civilian technicians permanently to their deep submergence operations adding needed continuity to their program. They are also developing a user guide.

By 1996, the Navy hopes to offer two 60-day submersible deployments for science research per year. The particular vehicle or vehicles (SEA CLIFF, TURTLE, or NR-1) for these two 60-day opportunities would be determined by availability and locale for the time slot offered. However, any additional deployments of Navy assets will depend on the future funding picture. Presently, the Navy is only charging users for consumables.

In personnel news, CDR Jim Green has been assigned to Navy's Submarine Development Group at WHOI.

TECHNOLOGY IMPROVEMENTS FOR ALVIN

STATUS REPORT OF ALVIN'S IMAGING UPGRADE PROPOSAL - Dan Fornari gave a report on the current status of the user community initiated proposal to upgrade ALVIN's imaging capability. He began by showing a sketch of what equipment is currently on ALVIN, see **Appendix VI**. Last year the community was polled on what technology improvements were needed. Imaging improvements were the highest priority. A great deal of research was spent reviewing various imaging systems. Any proposed improvements would be able to be transferred to the JASON and ARGO systems.

Dan presented the principal components of the imaging upgrade proposal, see **Appendix VI**. The major components of the proposal include imaging hardware (1- and 3-chip color video cameras, HMI lighting, in-ball video system upgrades, small scaling lasers, and additional recorders), navigation software/hardware upgrades, and the requisite personnel time to implement those upgrades in a timely manner.

The proposal has been submitted to the three sponsoring agencies and requests funding of \$430K.

REVIEW OF ROCK DRILL STATUS/USER GUIDELINES - Dan Fornari reported that the rock drill, developed a few years ago by Stakes and Holloway as a third party tool, has been used on several occasions over the past year. Originally, it had been used in a horizontal drilling position when used with ALVIN. Presently the drill is being configured to also work in the vertical position. In addition, the ability to take multiple cores is being developed. With the development of tools by third parties, the operator, user community, and developers need to work together in assuring that all parties' needs are met. Maintenance issues need to be addressed. DESSC welcomes community input on operational models for how to proceed. Dan presented a flow chart showing a potential process for development steps of third party tools, see **Appendix VIII**.

Debra Stakes showed a slide of the latest development efforts with the rock drill. A Gatling gun configuration has been built with four barrels. It is ten feet long and can be installed on the external frame of an ROV or submersible. Debra showed a short video of the drill recently being used on MBARI's ROV VENTANA. Four separate holes were drilled, each one meter in length.

There was a strong consensus from the geologists present at the meeting that continued developmental engineering for an ALVIN/JASON rock drill should be a high priority. In addition, a rock drill greatly enhances the sampling capability of a deep submergence vehicle in a number of significant geologic environments and, as such, should become a standard capability. DESSC would like the opportunity to hear from those interested in the use of the drill and will work with the operator and Debra Stakes to develop a utilization strategy.

SUGGESTIONS FOR SCIENCE SENSOR IMPROVEMENTS & STRATEGY FOR ACQUISITION -

Jeff Fox requested suggestions for science sensor improvements from the floor. Using the same procedure that was used in developing the imaging proposal, DESSC would like to hear from the community to determine the next group of improvements needed. A strawman list of priorities for new capabilities could then be developed. DESSC would work with the operator in preparing a proposal.

One suggestion from the floor was for improved sonar. The CTFM sonar system is old and works less than half the time. A capability is needed for the 100 meter to 1 km range. Other suggested improvements included having the ability to achieve neutral buoyancy with ALVIN. This capability is now possible, however, it uses a great deal of energy.

One consistent suggestion from the floor was for DESSC to work with the operator and devise a long range vision on where we would like ALVIN and ROVs to be in the future. Then develop an acquisition strategy to achieve these goals. This Spring DESSC will begin to work with the operator to develop such a plan to present to the community. As a starting point, DESSC will use the input already received from the community.

DEEP SUBMERGENCE SCIENCE AT MBARI

(Note: This section is recorded out of the sequence in which it was reported.)

Peter Brewer, director of MBARI, provided an overview of activities at the Monterey Bay Aquarium Research Institute. A new laboratory and dock facility are planned and ground is to be broken this month. MBARI is also building a SWATH vessel designed to handle ROVs. The ship will be all aluminum construction, have berths for 12 scientists (24 total berths) and should be ready for operation by mid 1995. Peter also described the new ROV, TIBURON, which is under development. This vessel will have a 4000 meter depth capability, have a hover capability and carry a 750 lb payload. A copy of the TIBURON brochure is attached as **Appendix VII**. MBARI presently does not have a policy for outside users of this ROV, but plans to start developing one in mid 1994. It will most likely be a full two years before they will be ready to entertain outside users for TIBURON.

DEEP SUBMERGENCE ISSUES

COMMITTEE REPORT ON KNORR'S CONVERSION TO SUBMERSIBLE SUPPORT SHIP - Fred Spiess, a member of the subcommittee for oversight of KNORR's conversion plans, provided the status of their work. The purpose of the subcommittee is to serve as an advisory group for WHOI on the conversion of KNORR to a submersible support platform. The subcommittee has representation from both the DESSC and UNOLS Fleet Improvement Committee as well as the user community. Members include Ken Johnson, Chair; Peter Betzer; Jeff Fox; Richard Lutz; Fred Spiess; and Karen VonDamm.

The subcommittee met with Glostn and Woods Hole representatives aboard KNORR at WHOI on the 21st of September 1993. Funds for the conversion are to come from the sale of ATLANTIS II which is currently on the market. A conceptual design for the new configuration was provided by Glostn and reviewed by the group. The committee stressed the need to retain the general purpose capability of KNORR and to add additional science berths if possible. They also would like to see an exercise room and additional storage. The meeting report should be available to the community in the near future.

Dick Pittenger then provided view graphs depicting the new design and the proposed timetable for the conversion, see **Appendix IX**. Design issues of concern include:

- Installing the ALVIN hangar without sacrificing too much lab space
- A-frame structural installation design
- Stern slamming
- Installation of a traction winch for fiber optic cable deployment
- Multibeam installation
- Increasing science berths.

Woods Hole is awaiting ONR funding for the preliminary design. The preliminary design is expected to be completed 60 days after start. Optimistic plans call for the KNORR conversion to take place in early to mid 1996 with a backup plan of late 1995 or early 1996.

THE TITLE TRANSFER OF AII'S SEABEAM SYSTEM - At the June DESSC meeting, DESSC recommended that the responsibility for operation and maintenance of the AII SeaBeam system be transferred from URI to WHOI. In the early Fall, Bob Tyce from URI met with WHOI representatives to establish a process for transfer. There are three cruises in late 1993 and early 1994 that will utilize the SeaBeam system and these cruises will serve as a transition period during which time WHOI assumes responsibility. Because of the minimal use of the full operational mode of the AII SeaBeam it was not economically feasible for URI to maintain staff to support this equipment. WHOI is developing an in-house capability for the SeaBeam support.

THE STATUS OF ALVIN'S CERTIFICATION FOR INCREASED DEPTH CAPABILITY - This was discussed in Barrie Walden's report above.

SUMMARY OF THE DEEP SUBMERGENCE SCIENCE WORKSHOP REPORT RECOMMENDATIONS - Jeff Fox reported on the status and content of the Deep Submergence Science Workshop report. The report will be divided into three sections: 1) Deep Submergence Science - A Sampling (Biology, Chemistry, G&G ...) 2) Capabilities that are available in the US for conducting deep submergence science and 3) An assessment of the state of deep submergence science. This third section will be divided further into two parts: short term and long term problems that face the community. The report will express the concern that deep submergence science needs are not well served because we lack a National plan and that the funding for deep submergence science is fragmented between a number of funding agencies. This report will be the first step in establishing a comprehensive plan.

NEW FUNDING PARADIGM FOR DEEP SUBMERGENCE SCIENCE - Jeff Fox reported that the DESSC has been concerned with the erratic and unpredictable funding pattern for deep submergence science and is investigating various strategies for strengthening support. One avenue would be to have a line item for deep submergence support in the federal budget. Because NOAA is the only agency that has a specific charge for undersea research, the NOAA/NURP program would be a logical home for the deep submergence support. It is envisioned that this would be managed at the national level. Exploratory dialog has been initiated with NOAA. The community will be kept abreast and consulted as the process unfolds. A UNOLS subcommittee of Jeff, Bob Wall and David Karl have been tasked by the UNOLS Council to explore options.

Jeff also reported that he had testified before two congressional committees in the past year. The first was a House committee that was looking at the NOAA/NURP program and the second was a Senate committee that is considering legislation to fund increased levels of support for sea floor characterization in order to better assess mineral potential. His message to both committees was that a coordinated National plan for funding and management of deep submergence science is needed.

ASSESSMENT OF ALVIN COMMENTS - DESSC serves as a focal point to collect assessments of ALVIN. Investigators that used ALVIN in 1993 have contacted Jeff with their comments.

Jeff reported that a recurrent theme has been the sense that the ALVIN operation has been doing an excellent job in support of science. Several investigators have, however, expressed their concern for the work burden of the ALVIN Group. The tasks required of this group versus the time and manpower available to do these tasks seems out of balance. Overtime has been restricted as well as the limited availability of personnel. These problems are the direct result of funding limitations and cutbacks. Operating in this mode will compromise science and present hardware questions. A current plan for 1994 to add a marine technician may ameliorate some of this problem. DESSC urges recent users of ALVIN to submit to DESSC their assessment of the strengths and weaknesses of the facility. These data will be folded into an operation review that DESSC, the operator and the funding agencies will hear in 1994.

DEVELOPMENT OF AN OUTLINE FOR ALVIN AND ROV WORK 1995 AND BEYOND

A REVIEW OF LETTERS OF INTEREST - Jeff Fox provided a summary of letters of interest for ALVIN and ROV use in 1995 and beyond. See **Appendix X** for a summary of ALVIN and ROV letters of interest. **Appendix XI** provides a regional summary of the ALVIN interests along with a graphical description. To date, 57 ALVIN dives are proposed and two funded for 1995 work in the Atlantic. There is strong interest in the Juan de Fuca area in 1995 with 201 dives proposed and 16 additional dives funded. The Northern EPR has 111 dives proposed and ten funded. In addition to these traditional ALVIN operating areas, there is significant interest in the Southern EPR. This comes from US investigators as well as a cooperative effort under discussion with Japan.

OUTLINE OF ALVIN OPERATIONS FOR 1995 AND 1996 - A rough outline of the 1995 schedule might be to work in the Atlantic and Gulf of Mexico in the first part of the year then to the Juan de Fuca area to catch the best operating season in summer and early fall. ALVIN could then move south to the Northern EPR followed by the Southern EPR. This proposal to work south of the equator could continue into 1996 if there are funded science programs and if the operator secures extensions to the A-II and ALVIN certification/overhaul schedules. The primary problem with the 1995/96 proposed schedule is that it is almost exclusively driven by NSF supported programs. This condition also prevails in 1994.

GLOBAL FIELD WORK/POST KNORR CONVERSION OPERATIONS - Letters of interest define a large community who wish to address a range of mature science problems. DESSC is recommending that after the overhaul, ALVIN heads west to carry out a Western Pacific program. Such an excursion from the traditional areas will cause the time series science projects, primarily the Juan de Fuca and East Pacific Rise work areas, to seek alternative platforms for their work. ROVs and possibly the Navy assets of SEACLIFF and TURTLE should be considered as an alternative to ALVIN. After considerable discussion it was the consensus of the gathering that a foray into the western Pacific in late 1996 should be considered. Based on these deliberations, the DESSC will issue an announcement to the entire community concerning these plans. The Western Pacific community will be asked to codify

their plans by late Spring 1994 for DESSC review. A final decision about whether or not to commit to a Western Pacific Program will be made at that time.

ROV OPERATIONS IN 1995 AND 1996 - Jeff Fox summarized interests for use of ROVs in 1995 and 1996, see **Appendix XII**. The graphical overview shows that the interests are dispersed globally.

OTHER BUSINESS

A Navy Proposal for Science Aboard a Nuclear Submarine - It was announced that a meeting is scheduled for 1800 hrs Monday 6 December in Room 408 of the Civic Auditorium where the Navy is expected to lay out its plans to offer the availability of a nuclear submarine for under ice science in the Arctic. The plan calls for a five year effort starting in 1995. The funding agencies would provide a baseline of \$500,000 per year under a Memorandum of Agreement and the Navy will provide the submarine operating costs as long as it was conducting other work in the Arctic. A daily rate of \$17,000 would be charged if the sub had to divert from other operating areas.

The meeting was adjourned at 1715 hrs. An executive session of the DESSC was scheduled to convene immediately following.

Jeff Fox has summarized the matters arising during the meeting in a memorandum to the community. A copy of this memo is included as Appendix XIII.

APPENDIX I

DEEP SUBMERGENCE SCIENCE COMMITTEE
Agenda
PLANNING MEETING
SUNDAY, DECEMBER 5, 1993, 9:00 a.m. - 5:00 p.m.
CATHEDRAL HILL HOTEL - CALIFORNIA ROOM - SAN FRANCISCO, CA

- 0900 Meeting convenes, Welcome, Introductions and Meeting Goals (J. Fox, DESSC)**
- 0915 Deep Submergence Operations at WHOI**
- a. Introduction (D. Pittenger)
 - b. The year in review - ALVIN and ROV Operations (B. Walden)
 - c. Status of ALVIN/ROV Merge (B. Walden)
 - d. The 1994 schedule (R. Chandler)
 - e. AGOR 25/KNORR/ATLANTIS II Status (D. Pittenger)
- 1015 Break**
- 1030 Agency and Program Management Report: Review of Issues Pertinent to Deep Submergence Science**
- a. NSF (M. Reeve)
 - b. ONR (K. Kaulum)
 - c. NOAA (M. Ledbetter)
 - d. USN (LCDR Nichols)
- 1100 Summary of the Deep Submergence Science Workshop Report Recommendations (J. Fox)**
- 1115 Technology Improvements for ALVIN**
- a. A status report of ALVIN's Imaging Upgrade Proposal: Phase 1 (D. Fornari)
 - b. Review of Rock Drill Status/User Guidelines (D. Fornari)
 - c. Suggestions for science sensor improvements from the floor
 - d. Identification of improvements of critical importance: A short list
 - e. Strategy for acquisition.
- 1200 - 1330 Break for Lunch**
- 1330 Deep Submergence Science at MBARI (P. Brewer)**
- 1345 Deep Submergence Issues**
- a. Committee report on KNORR's conversion to submersible support vessel (K. Johnson)
 - b. The title transfer of AII's SeaBeam system (J. Fox)
 - c. The status of ALVIN's certification for increased depth capability
 - d. A new funding paradigm for Deep Submergence Science (J. Fox)
 - e. Assessment of ALVIN comments. Identification of any themes that warrant attention (J. Fox)
- 1430 The Development of An Outline for ALVIN and ROV Work in 1995 and Beyond (J. Fox)**
- a. A review of letters of interest - areas of research and timing; comments and discussion
 - b. Assessment of programs for global field work (scientific maturity, critical mass, timing, etc.)
 - c. The creation of outline of ALVIN and ROV operations for 1995 and 1996
 - d. Planning recommendations for post ALVIN Overhaul/KNORR Conversion operations
- 1545 Other Business Arising**
- 1600 DESSC Executive Session**
- a. Review results of meeting
 - b. Development of timetable and delegation of responsibilities
 - c. Schedule for upcoming meetings

APPENDIX II

DESSC Meeting - Dec. 5, 1993

ATTENDEES

<u>NAME</u>	<u>AFFILIATION</u>
John Bash	UNOLS
Keir Becker	U of Miami
Jim Bellingham	MIT Sea Grant
Andy Bowen	WHOI
Garry Brass	U of Miami/RSMAS
Peter Brewer	MBARI
Rick Chandler	WHOI
Bob Collier	OSU/COAS
Robert Correll	NSF
Keith Crook	U of HI/HURL
J. Paul Dauphin	NSF/ODP
John Delaney	U of WA
Annette DeSilva	UNOLS
Robert Embley	NOAA/PMEL
David Epp	NSF
Dick Fiske	Smithsonian
Dan Fornari	WHOI
Jeff Fox	URI
Chris German	IOS, OK
CDR John Green	USN
H. Gary Greene	USGS
Don Heinrichs	NSF
David Kadko	U of Miami/RSMAS
Jill Karsten	U of HI
Keith Kaulum	ONR
D.V. Kent	LDEO
Marty Kleinrock	WHOI
Gary Klinkhammer	OSU
Lawrence Lawver	U of TX, Austin
Michael Ledbetter	NOAA/NURP
Bruce Malfait	NSF/ODP
Flyod McCoy	U of HI
Hugh Milburn	NOAA/PMEL
Michael Mottl	U of HI/SOEST
John Mutter	LDEO
David Naar	U of So FL
Jim Newman	MBARI

NAME**AFFILIATION**

LCDR Sam Nichols	USN
Dan Orange	MBARI
Mike Perfit	U of FL
Dick Pittenger	WHOI
Veronique Robigou	U of WA
Bruce Robison	MBARI
Peter Rona	NOAA/AOML
Frank Sansone	U of HI/SOEST
Adam Schultz	Cambridge U
Eli Silver	UCSC
Ginny Smith	USGS
Fred Spiess	SIO
Debra Stakes	MBARI
Ken Stewart	WHOI
Gary Taghon	Rutgers
David Vanko	Georgia State U
Barrie Walden	WHOI
Geoff Wheat	U of HI
Carl Wirsén	WHOI

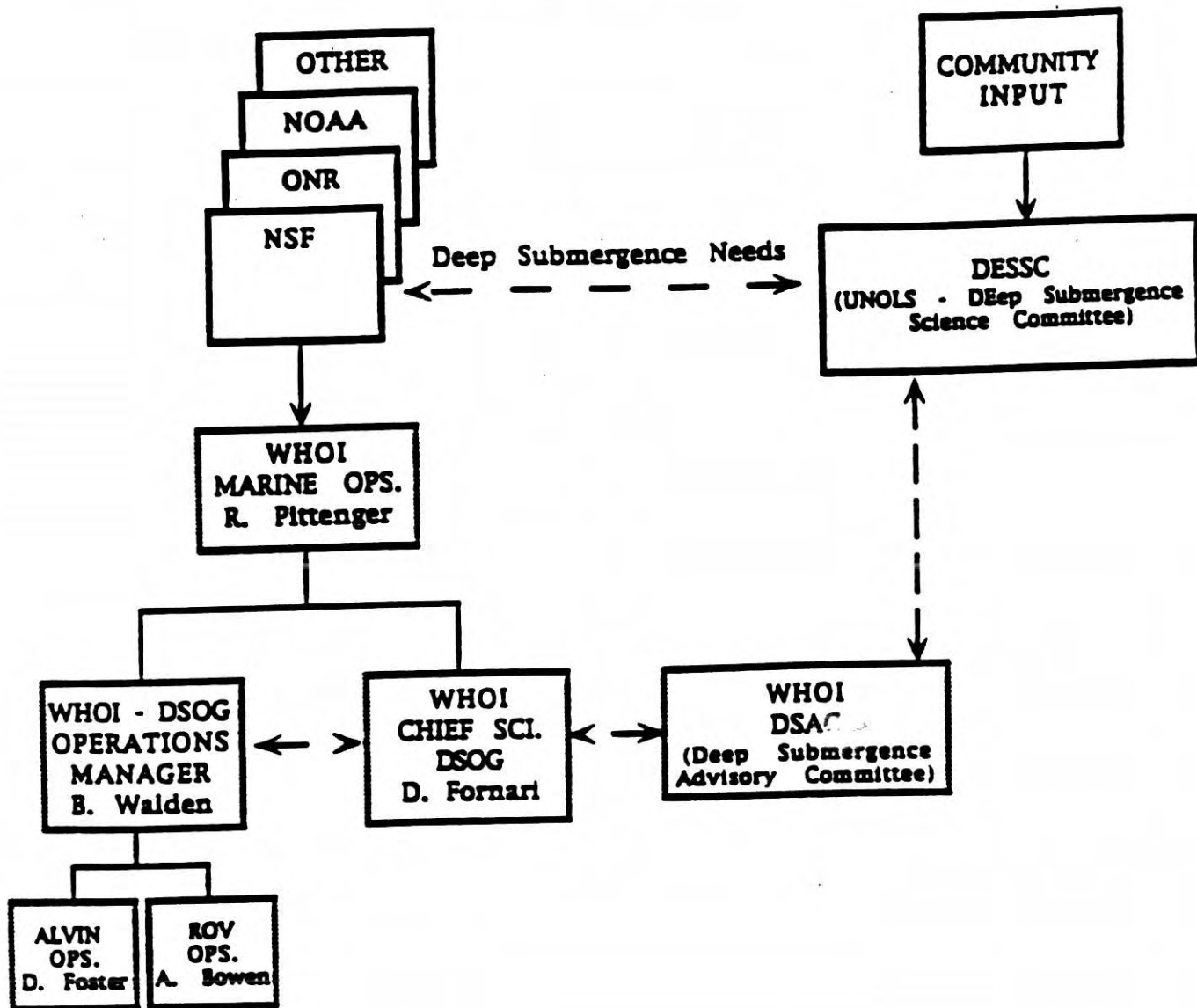
APPENDIX III

Deep Submergence Operations
at the
Woods Hole Oceanographic Institution



DESSC Meeting @ San Francisco, CA
5 December 1993

DEEP SUBMERGENCE FACILITY
Functional Relationships
Between DESSC, WHOI and U.S. Funding Agencies



Overview

- **DESSC effective**
- **DSAC spinning-up**
- **Fornari on-board**
- **One ARGO II cruise funded (TAG-94)**
 - **ROV use-rate lower than expected**
- **ALVIN returned to service**
 - **Juan de Fuca event response**
- **AGOR-25 on track!**
- **KNORR conversion planning begun**

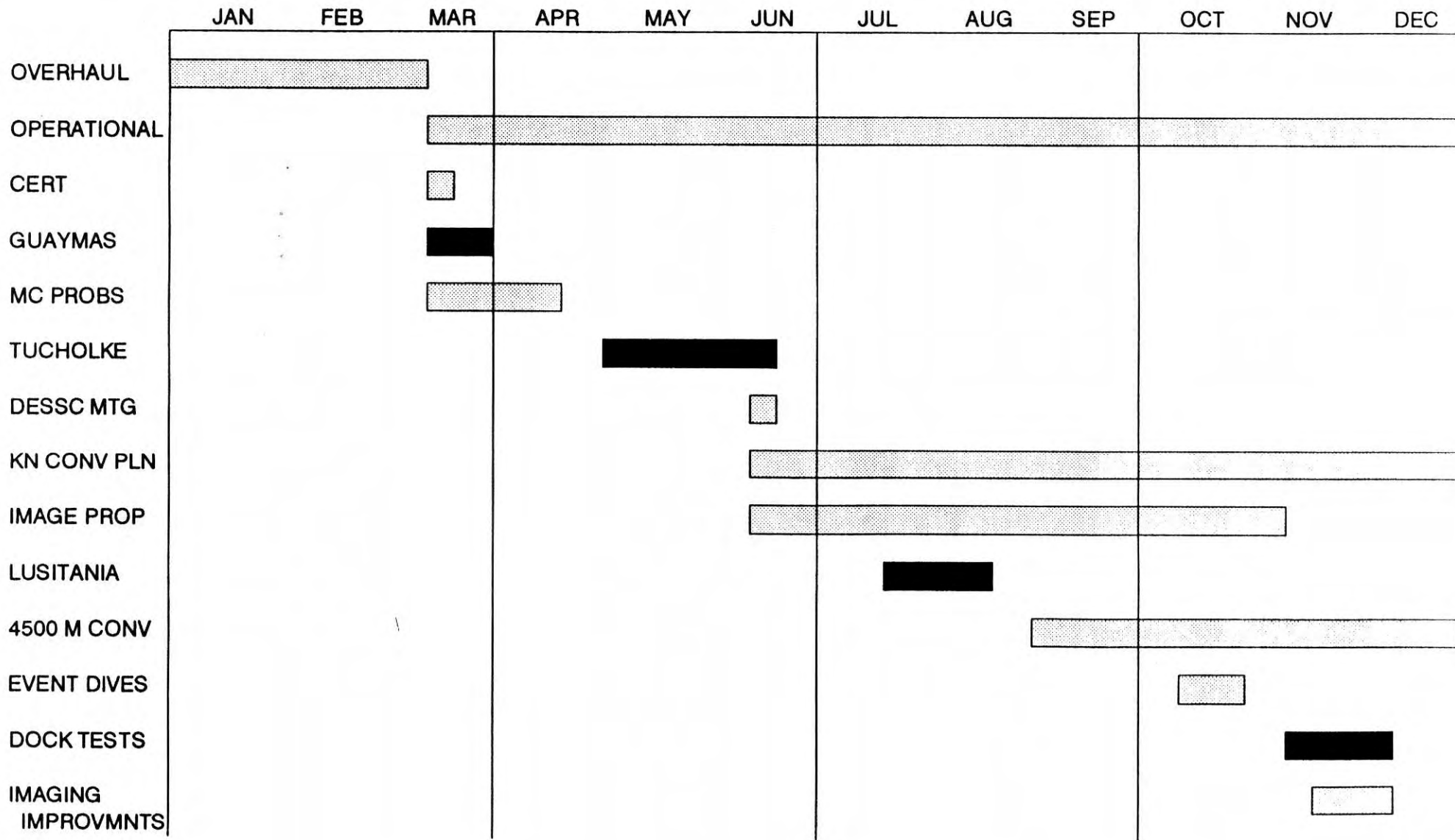
To Follow:

- **ALVIN Review**
- **ALVIN Upgrades**
- **ALVIN/ROV Merge**
- **1994 Schedule**

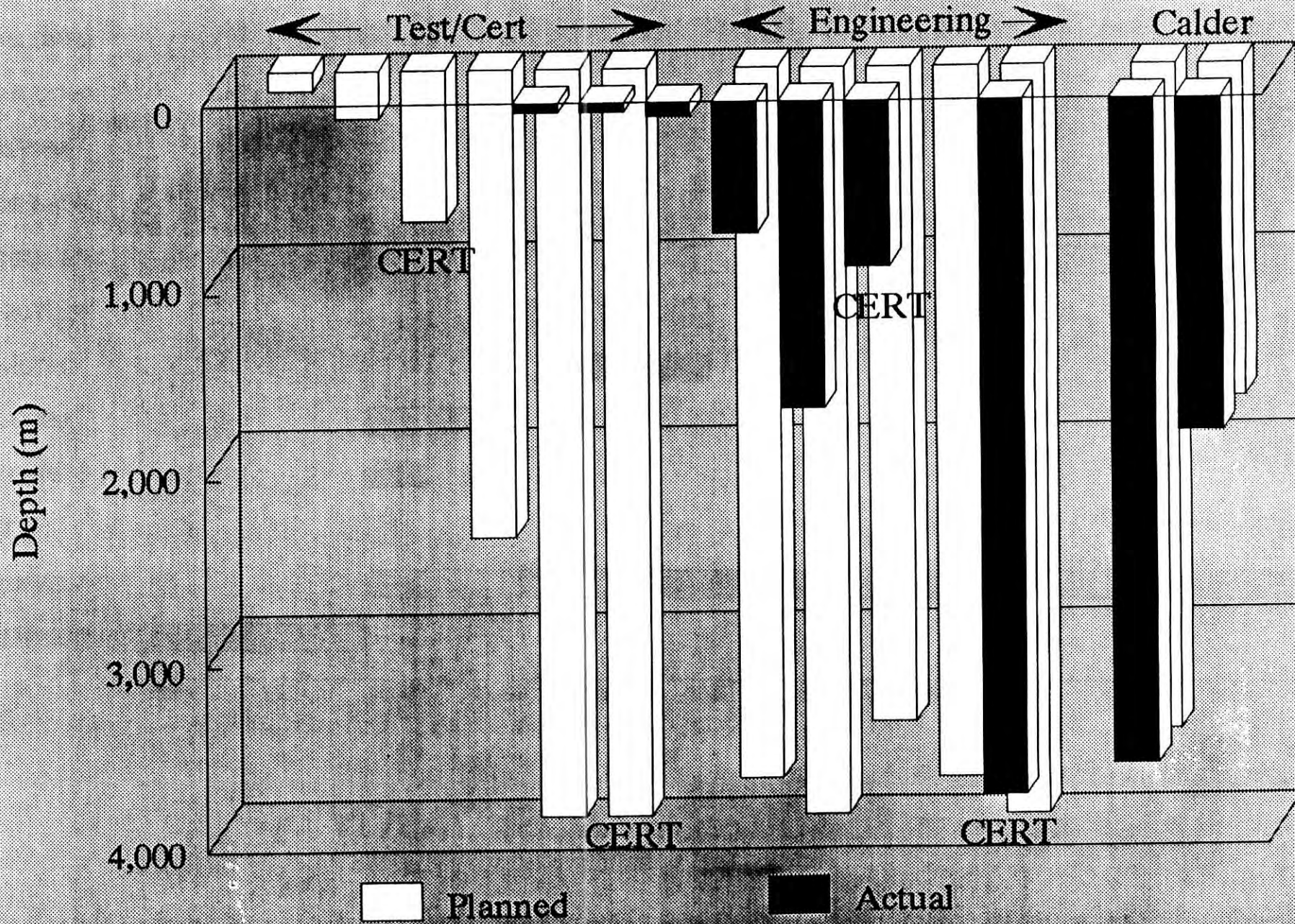
APPENDIX IV

ALVIN/JASON MILESTONES – 1993

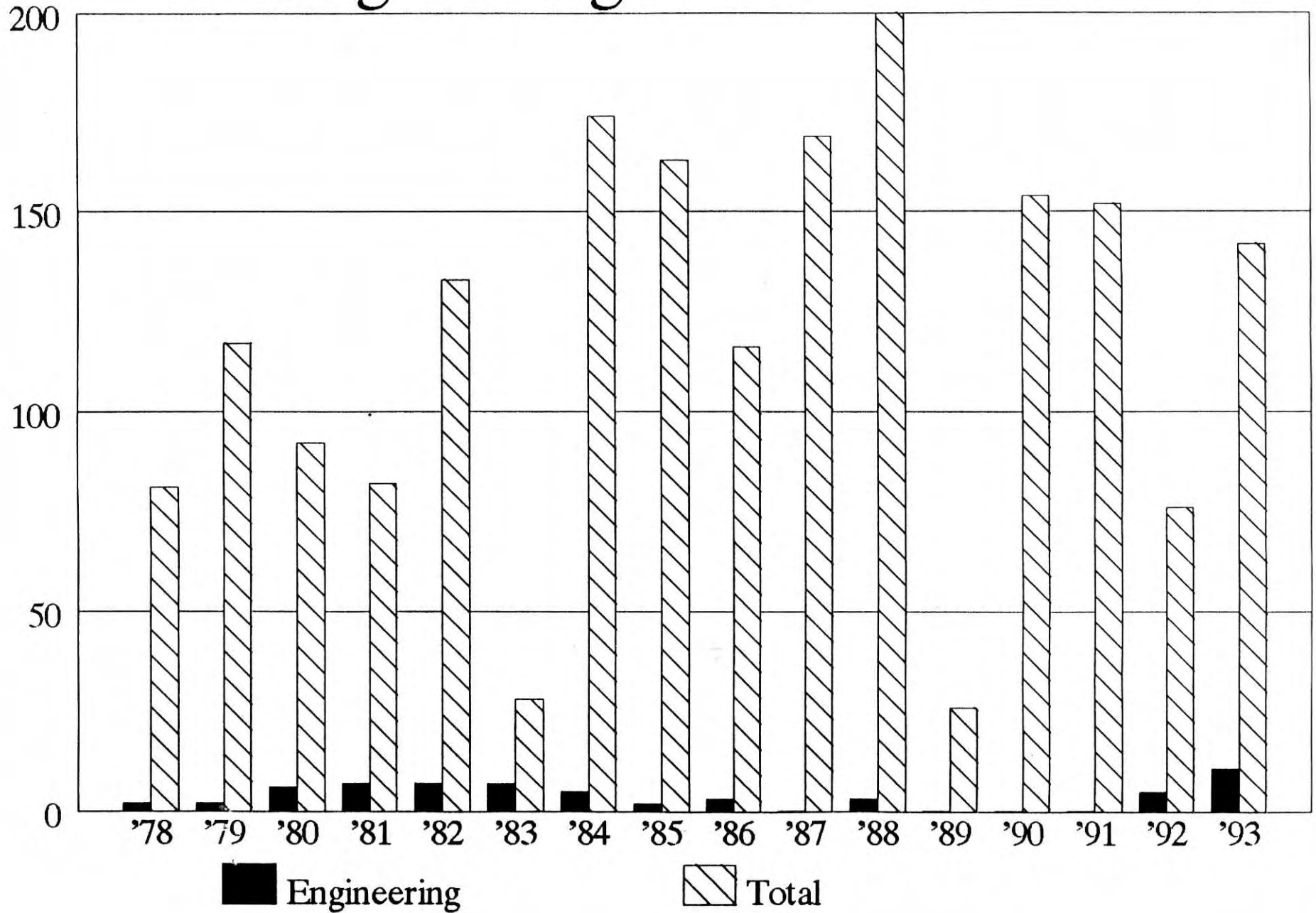
ALVIN
 JASON



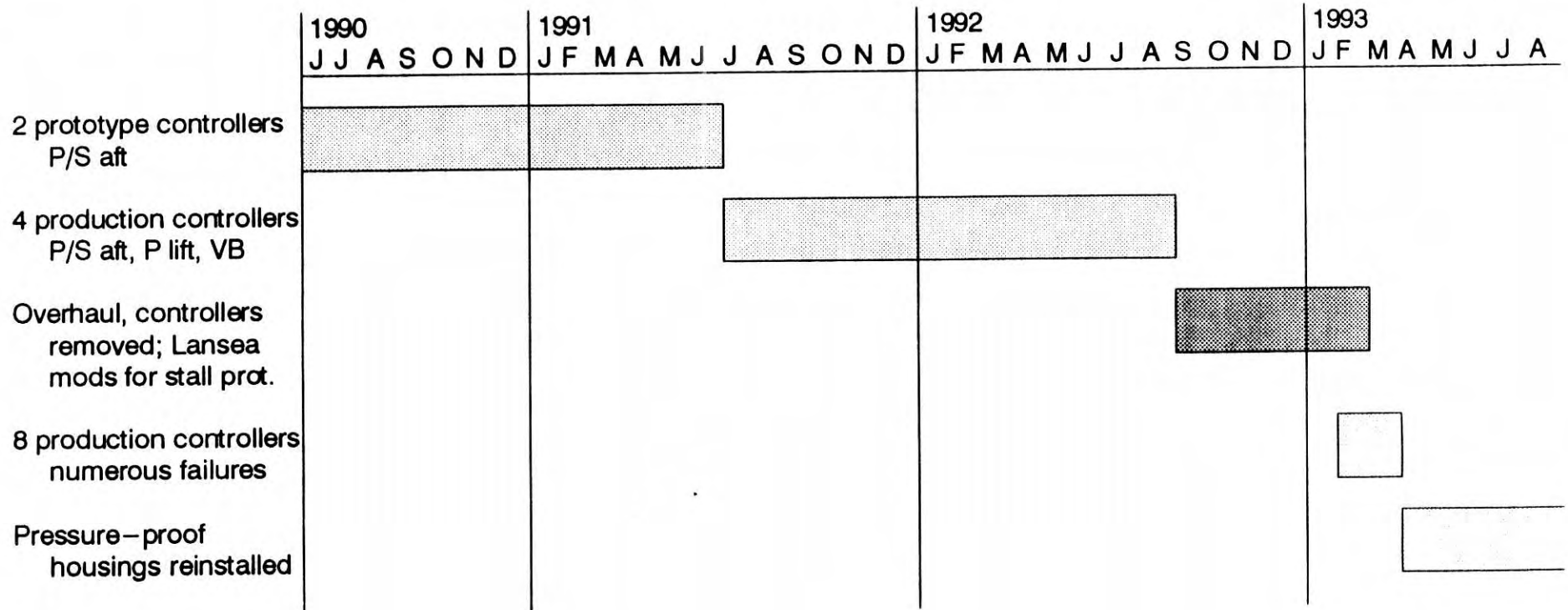
Post-Overhaul ALVIN Dives



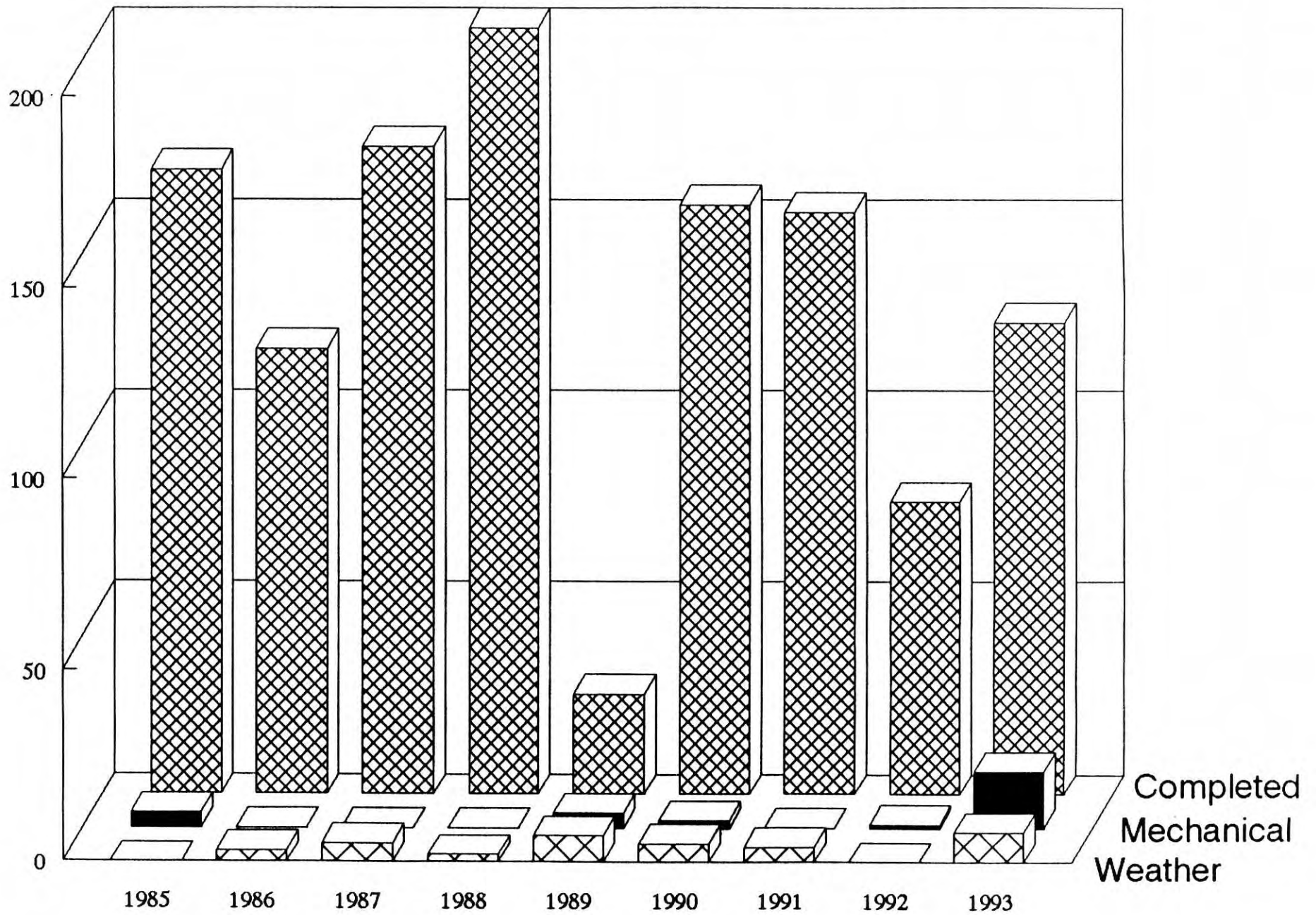
Engineering Dives 1978–93



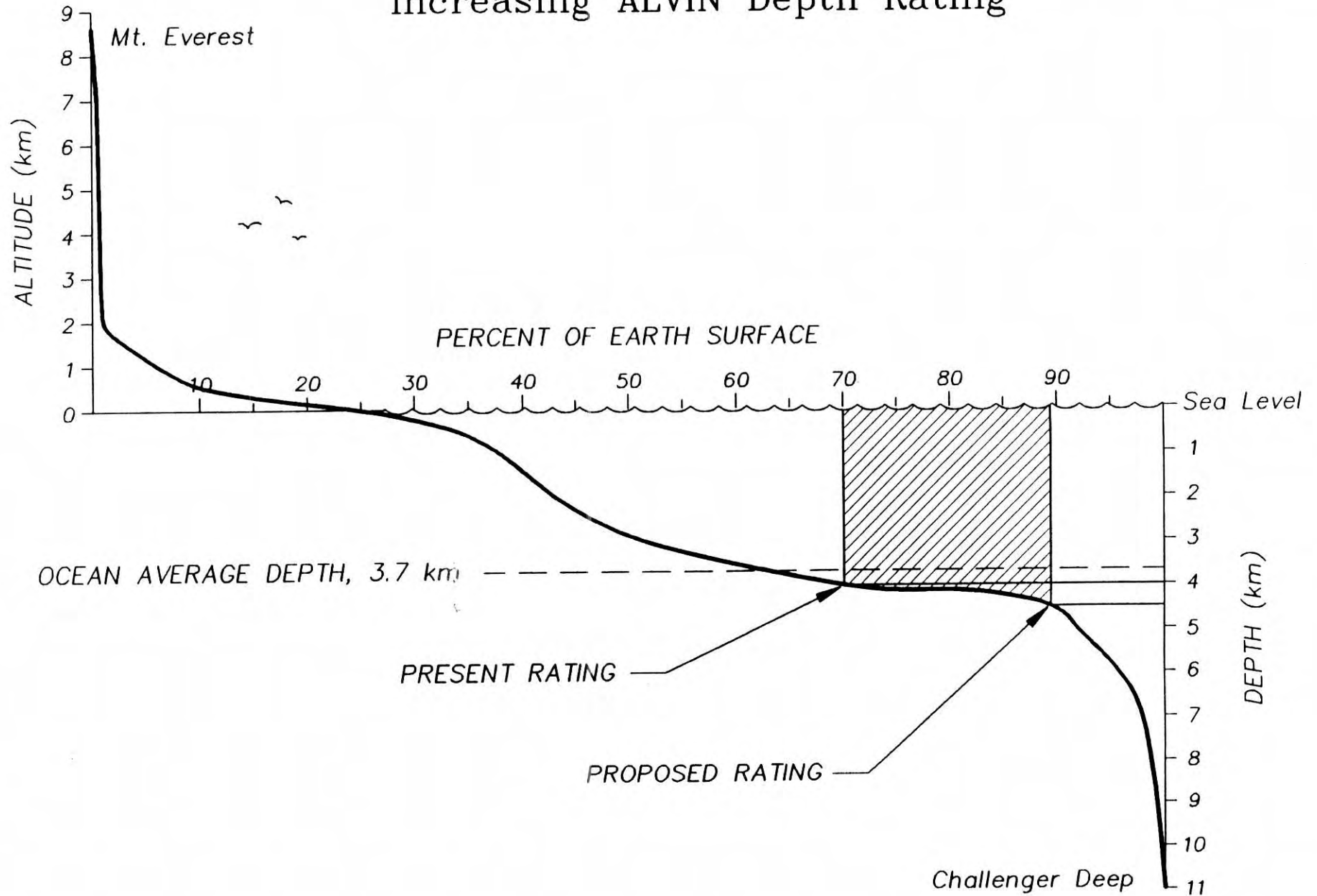
ALVIN Pressure-Tolerant Motor Controller History



ALVIN Dives Lost vs. Total Dives



Research Area Gained by Increasing ALVIN Depth Rating



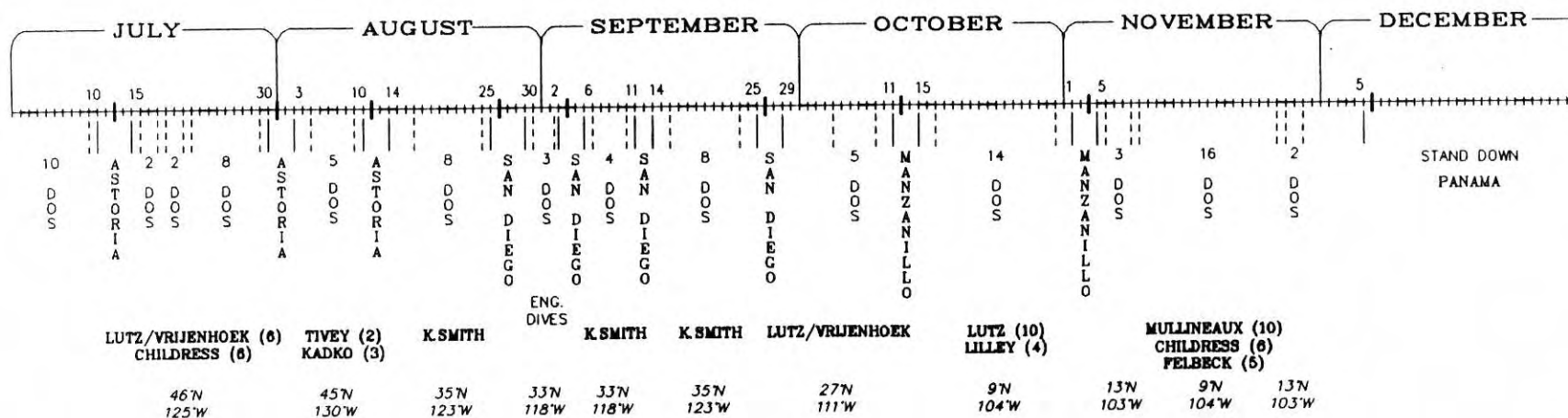
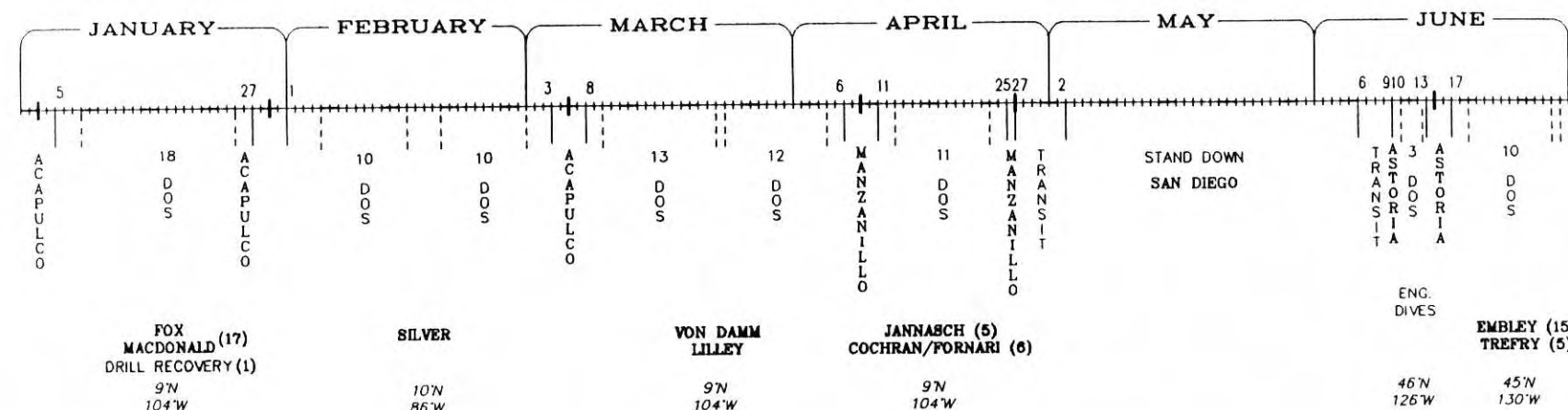
APPENDIX V

R/V ATLANTIS II & ALVIN OPERATIONS

1994

OPERATIONAL SCIENTIFIC SERVICES
WOODS HOLE OCEANOGRAPHIC INSTITUTION

01 DEC 93
18 NOV 93
28 SEP 93



ALVIN Dives	
Science	171
Cert./Eng.	6
Total	177

APPENDIX VI

**PRINCIPAL COMPONENTS OF ALVIN
IMAGING UPGRADE PROPOSAL**

I. Data Management Systems and Components

- A. Macintosh computer and monitor, NEC PC and monitor, and Laser printer (11" x 17")
- B. Evaluation software, disk media for evaluation of commercial imaging data management programs and transfer systems for duplicating ALVIN dive 35 mm films to CD ROM

II. Sea Water Measurements, Sampling and Analysis

None

III. Sea Floor Sampling and Analysis

None

IV. Acoustic Signaling Systems and Components

None

V. Instrument Deployment, Tracking and Retrieval

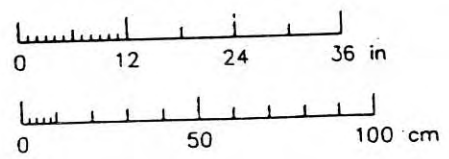
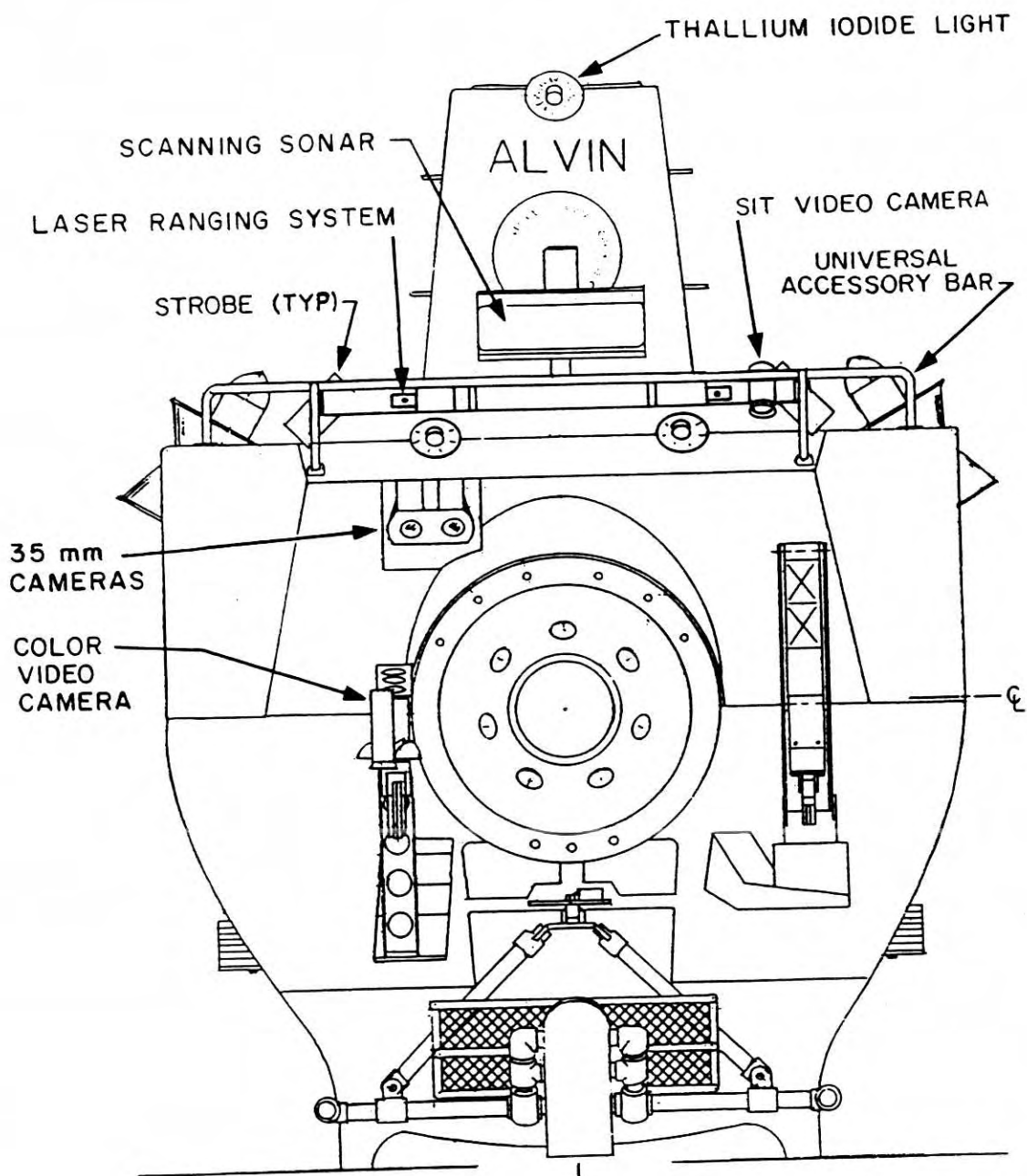
- A. ALVIN long-baseline navigation system upgrade
- B. EXACT Acoustic Navigation System

VI. Shore Laboratory Instrumentation

None

VII. Other

- A. Two CCD video cameras (Osprey 1365)
- B. One pan-and-tilt mechanism for video cameras
- C. One three-chip CCD (broadcast quality) video camera (Osprey 1910) and (1) cable set
- D&E. Video recordings and monitors for additional in-hull recording capability and shipboard science duplicating and viewing stations
- F&G. Six 400 watt HMI underwater lights with two spare ballasts, cables and connectors
- H. Four quartz-iodide underwater lights
- I. Four lasers for manipulator video camera image scaling
- J. One external relay high current switching assembly for additional lighting circuits



APPENDIX VII

Tiburon Instrumentation (partial list)

- High resolution color video with zoom, high accuracy pan/tilts
- HMI lighting
- Acoustic Doppler Speed log
- Conductivity
- Temperature
- Pressure
- Dissolved Oxygen
- Transmissometer
- Imaging sonar
- Altimeter (echo sounder)
- Hydrophones
- Manipulator arm

Reference:

J.B. Newman and B.H. Robison,
"Development of a Dedicated ROV for Ocean
Science", MTS Journal Vol 26, No 4, (Winter
92-93) p 46.

Contact:

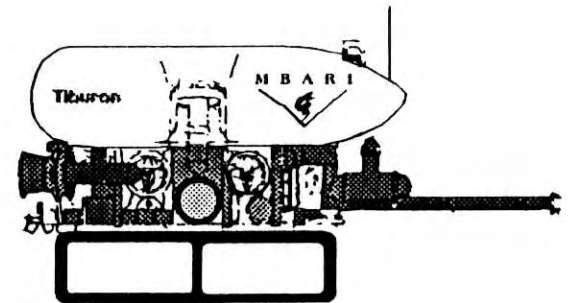
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Monterey Bay Aquarium Research Institute

TIBURON



FACT SHEET

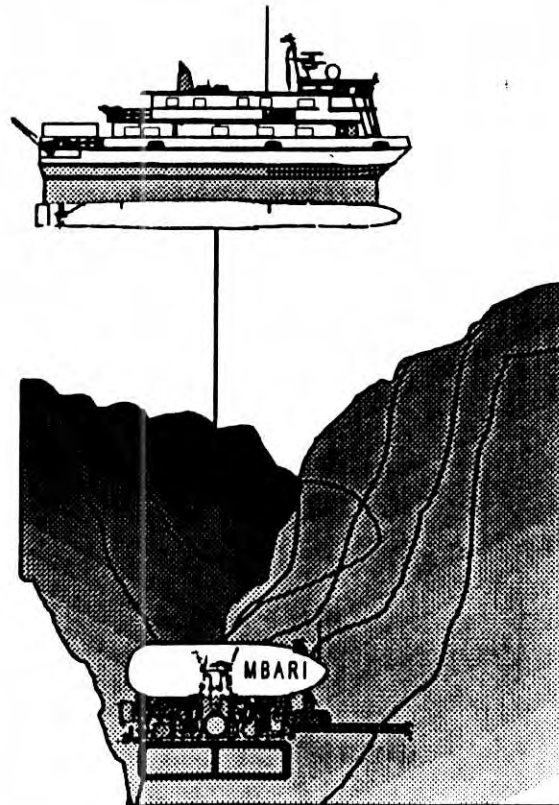
Tiburon is a unique new ROV under development at MBARI. The system breaks new ground in providing an integrated unmanned submersible research platform, with many powerful features providing efficient, reliable and precise sampling and data collection in a wide range of missions.

Features include:

- Modular, mission-specific toolled packages that can be changed out quickly and easily.
- High resolution video cameras with zoom and pan/tilt. Fiber optic telemetry.
- Powerful electric thrusters to combine precise control, high thrust levels and relatively quiet operational capabilities.
- Variable buoyancy system to allow low disturbance operation at all depths and during sampling operations.
- Scientific sensors and data logging integrated into the core vehicle system.
- Internet compatible data transmission and user displays. Provision for placement, servicing and retrieval of bottom-mounted instrument packages.

Tiburon will be operated from MBARI's SWATH research vessel, the Western Flyer, now under construction. Together these systems will represent an important new asset to the Ocean Science community.

The full system will be operational in 1996.



Tiburon Specifications:

Depth capability

- 4000 meters (13,123 feet)

Forward speed

- no tether drag: 1.5 knots
- Full system transit at: 0.75 knots

Vertical speed

- 1.0 knots (100 feet/minute)

Payload

- Max. Toolled weight: 750 lbs.
- Max. Toolled weight in SW 250 lbs.
- Variable Buoyancy capability: 150 lbs
- Adjust buoyancy at: 5 lbs/minute

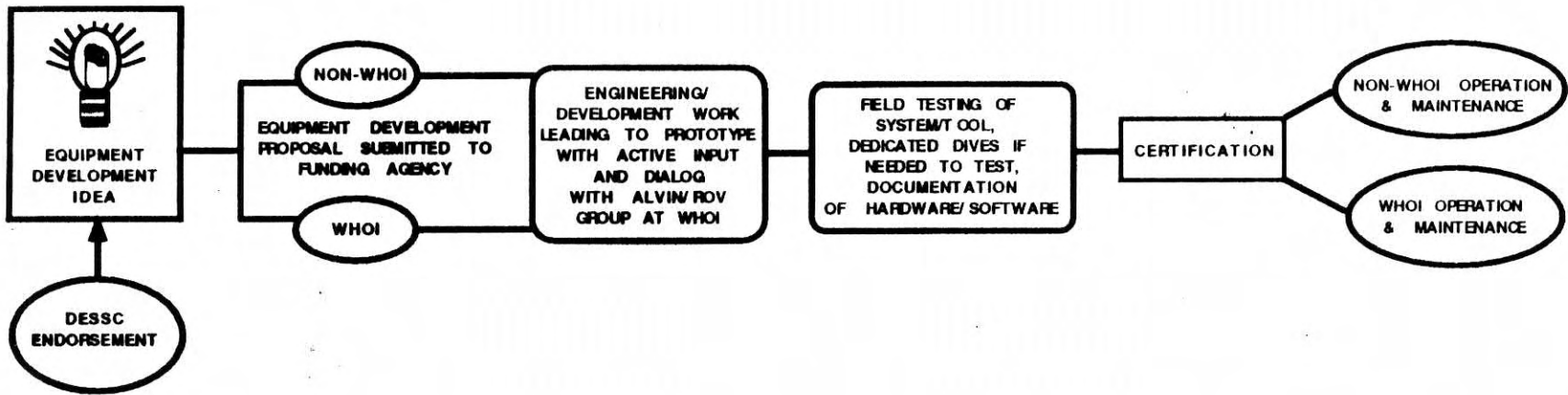
Power

- Thruster motors
6 @ 3.7 KW (5 HP) each
220 lbs. thrust each
- distribution
15 KW total
240 VDC +/- 15%
48 VDC +/- 15%

Toolled Interfaces

- Electrical Power
20 Amps @ 250 volts (5 KW)
- Communications
RS485 serial bus, RS232c, Ethernet
(802.3)
- Hydraulic Power
3.5 GPM @ 2500 psi

APPENDIX VIII



APPENDIX IX

KNORR RECONVERSION ENGINEERING PLAN

• SCHEDULE & STATUS

- Preliminary Design**
 - » Kick-off mtg 22 September**
 - » Awaiting ONR funding**
 - » Completion about 60 days after start**
 - » PDR report to include**
 - outline specs**
 - Drawings**
 - Cost Estimate**
- Computer model studies of stern slam**
 - » Authorized**
- Contract drawings & specifications**
 - » 3 to 4 months for completion**

KNORR RECONVERSION ENGINEERING PLAN

• OBJECTIVES

- Support Alvin at least as well as currently supported on A-II**
- Support ROV's, using Jason & Medea as guide**
- Maximize capacity for general oceanographic science**

• DESIGN ISSUES

- Alvin hangar & workshop without sacrificing too much lab space**
- A-Frame**
 - » structural installation design**
 - » refurbish or renew decision**
- Stern slamming**
 - » high speed ballast system**
 - » structural mods to after bottom shape**
- Install Traction winch vs old trawl winch**
 - » fiber-optic capability**
- Seabeam installation**
- General habitability**
 - » stores**
 - » exercise room**
- Increase science berths**
 - » offset loss to Deep Sub. team**

TIMETABLES FOR PLANS A & B

	19 94				19 95				19 96				19 97			
	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
PLAN A																
Traditional East Pacific: Northern EPR Pacific Coast of Central America Monterey/San Diego	XXX	XXX		XXX		XXX						XX				
Juan de Fuca			XXX			XXX										
Mid Atlantic Ridge					XXX											
Southern East Pacific Rise							XXX	XXX								
ALVIN Overhaul & KNORR Conversion									000	000						
Shakedown Post Overhaul											0					
Engineering Dives	X		X		X		X									
Global Field Program: W. Pac &/or Tethyan													XXX	XXX	XXX	XXX
	19 94				19 95				19 96				19 97			
	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
PLAN B																
Traditional East Pacific: Northern EPR Pacific Coast of Central America Monterey/San Diego	XXX	XXX		XXX		XXX		X		X	XXX					
Juan de Fuca			XXX			XXX										
Mid Atlantic Ridge					XXX											
Southern East Pacific Rise											XXX	XXX				
ALVIN Overhaul & KNORR Conversion								000	000							
Shakedown Post Overhaul									0							
Engineering Dives	X		X		X				X				X			X
Global Field Program: W. Pac &/or Tethyan													XXX	XXX	XXX	

FIGURE 1

APPENDIX X

ALVIN and ROV Letters of Interest - Summary 1995

NOTE: Items that are indicated as "new" were letters of interest received in the Fall of 1993. All other items are carryovers from previous meetings.

<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>
ATLANTIC:									
1. new	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/NAUTILE Joint submersible program.	NSF RIDGE MG&G proposal in review	Summer 94 or 95	23		G&G
2.	S. Humphris, WHOI	long list	MAR: TAG site 26 N	Variability in the structure, fluid chemistry, mineralogy and biology of the active TAG hydrothermal mound caused by drilling.	NSF	Mar - May 1995	20	Needs to be coordinated with drilling schedule.	G&G Chem Biol
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 FUNDED 9301995 ODP	Spring/ Summer 1995	Spring/ Summer 1996	2	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	Jan-Mar 1995	1995	14	G&G
**	J. Karson, Duke		MAR	Field program was cut short due to mechanical problems with ALVIN. Only a portion of the planned dives could be successfully completed.	NSF	1995?	?		G&G
GULF OF MEXICO									
5. new	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	GeoChe Biol
6.	F. Muller-Karger	K. Fanning J. Torres K. Carder, P. Coble	Cariaco Basin 10 35'N, 64 4'W	Biology, chemistry, physics and geology of the oxic/anoxic interface and bottom water column/sediment chemistry and geology.	NSF				all

ALVIN and ROV Letters of Interest - Summary 1995

Investigator	Associates	Area	Purpose	Sponsor	Date	Alternate	Dives	Remarks	Disc.
OFF COSTA RICA									
7.	A. Droxler	Northern Nicaragua Rise	Sampling of the exposed cliffs of observed drowned banks						G&G
EQUATORIAL PACIFIC									
8. new	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 95	20		G&G
SAN DIEGO TROUGH/MONTEREY CANYON									
9. new	J. Eckman, Skidaway	D. Thistle	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	Apr-95 Oct-95	Feb-Jun 95 Sep-Nov 95	5 6	Biol
10.	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	Sep-94 Nov-94 Feb-95	10 10 10		Biol.
40.	C. Harrold	J.P. Barry C.H. Baxter H.G. Greene H.W. Jannasch R.E. Kochevar J. Nybakken G.I. Matsumoto B.H. Robison	Monterey Submarine Canyon	Investigations of Chemosynthetic cold seep communities in the Monterey Canyon System.		1994 1995 1996	12 12 12		multi

ALVIN and ROV Letters of Interest - Summary 1995

	<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>
JUAN DE FUCA										
11.	D. Orange, MBARI new		60 mi West of Newport, OR	Origin of submarine canyons - geomorphology, structural geology, hydrology. Detailed observations of headless canyons, and measurement of sediment physical properties and pore pressure gradients. Particular emphasis on canyons/ cold seeps discovered in 1993 dive program.	ONR	late sum- early fall 1995	1996	15		G&G
12.	H. P. Johnson, UW new	M.L. Holmes	Juan de Fuca 44 30N, 130 W 44 N, 127 W	An experimental determination of the density of upper oceanic crust as a function of depth.	NSF submitted Nov-93	Sum 94	May-Oct 1994	15		G&G
13.	H.P. Johnson, UW new	M. Yamano	Juan de Fuca 46 30 N 129 30 W	The development of the Capability to measure bare rock heat flow on the seafloor	NSF Ocean-Inst	Sum 94	May-Oct 1994	1		G&G
14.	H.P. Johnson, UW new	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	Sum 94 Sum 95	Dec-94 Jun-95	12 6		G&G
15.	A. Chave new	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 role in photobiochemical reactions.	NSF	1) Spring 95 2) Fall 95	1) Summer 95 2) Winter 95	6 6		bio- chem
16.	C. Fisher, Penn S. new	K. Juniper I. MacDonald V. Tunnicliffe F. Williams	Endeavour Segmen at the Juan de Fuca Ridge	"Modeling Energy Flow in a Deep-Sea Autotrophic Community" Requires extensive photo-surveys, photo-mosaics, quantitative collections, and manipulation of hydrothermal-vent fauna.	NSF Bio Oce RIDGE submitted	Late Sum- Fall 95 and 1996		16 16		Biol

ALVIN and ROV Letters of Interest - Summary 1995

	<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>
17.	F. Sansone, UH nsw		Juan de Fuca: Nothorn Cleft Segment and Monolith 44-57.8 to 44-58.8 N	In-situ Hydrogen Measurements at Ridge Crest Hydrothermal Vents.	NSF RIDGE submitted	1) Sum 95 2) Sum 96	Fall 95 Fall 96	8 8		G&G
18.	R.A. Lutz, R.C. Vrijenhoek, Rutgers		17-22 S along EPR Guaymas Basins Juan de Fuca Ridge Oregon Subduction Zone Gorda Ridge Western Pacific, Tethyan Region Indian Ocean	Gene flow, dispersal, and systematics of deep-sea hydrothermal vent organisms	NSF	Jan-94 mid 1994 Jul-95 1995 1995 early 1996 1996 1996	Mar/Apr-94 Aug/Sept-95 late 1996	14 5 6 6 6 8 4 4	All of the dives should be combined with proposed geological expeditions to any of all of the regions as part of an anticipated "world tour".	Biol Chem
19.	M. Tivey, WHOI		Juan de Fuca: Cleft Segment	Monitoring Temperature at hydrothermal vent sites Deployment and Recovery of instruments.		1) May-Jul 1995 2) late 95		2		Biol Chem
20.	J.R. 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	Jul & Aug 1994 1995	Jun & Sep 1994 1995	20 20	Will submit proposal	Geol Chem
21.	C.R. Fisher, Penn. State	R. Lutz, Rutgers	Juan de Fuca	Ecological physiology of vestimentiferans and mussels at cold seeps and hydrothermal vents	NSF renewal proposal	1994-5-6		1 week each year		Biol
22.	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	Sum 94 Sum 95 Sum 96		81 + 13 84 + 4 34/20	13 can be ROV 4 can be ROV 20 are ROV	all

ALVIN and ROV Letters of Interest - Summary 1995

	<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>
42	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 Funded	Jun - Sep 1995		16	This was funded last year, but not scheduled	Chem thermal Biol
<u>NORTHERN EAST PACIFIC RISE</u>										
23 new	C. Wirsén, 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	Fall 95 Spring 96		5 5		Chem
24 new	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 Desposits with ALVIN." Video/photography (FOCAS), drilling and ALVIN sampling of hyaloclastite deposits.	NSF 9314288 Funded	early 95		10		G&G
25	K. Wishner, URI	J. Deming, UW M. Gowing, UCSC A. Hanson, URI D. Kester, URI L. Levin, SIO L. Mullineaux, WHOI C. Turley, PML (UK)	Volcano 7, 12 N, 102 W	OMZI- Effects of the Oxygen Minimum Zone on Pelagic and Benthic Communities, Processes, and Chemistry in the Eastern Tropical Pacific.	NSF	1994-5		leg 1: 28 leg 2: 14	3-6 month separation between legs	Biol Chem
26	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, <i>Alvinella pompejana</i> .	NSF	Apr-94 Apr-95	Open	1 2	The proposal is submitted as an ancillary project to the Lutz funded work.	Biol

ALVIN and ROV Letters of Interest - Summary 1995

	<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>
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 *	May-94 May-95		35 35	* 12 DIVES ARE FUNDED IN 1994, WITH 23 PROPOSED	Geoche 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	1993 1994 1995		4 4 4	Addition to schedule of Lu Biol.	Chem
29.	J.J. Childress, UCSB	H. Felbeck C. Fisher D. Desbruyeres	13 N East Pacific Rise	Studies on the physiological ecology of hydrothermal vent chemoautotrophic symbioses. Also studies of changes in environmental conditions over time and the coupling between environmental conditions and symbiotic primary production. Studies will be in collaboration with a French group from IFREMER.	NSF	Early 1995		18	The French will seek to br Nautila to this site later in 1995 as part of this project.	Biol
30.	D.C. Nelson, UC-Davis	R. Lutz K. Von Damm	EPR 9 45-52' N	To study free living bacteria at newly formed hydrothermal vents. Productivity, impact on sulfide, succession and trophic interactions will be investigated.	NSF	1994 1995		5 5	Dives should be 12 month after 1993 dives and then 12 months after the 1994 dives	Biol.
<u>SOUTHERN EAST PACIFIC RISE:</u>										
31. new	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. new	D.F. Naar, USF	R. Batiza, R. Ducan, K. Fanning, R. Hay, J. Francheteau, J. O'Connor, P. Stoffers, L. Parson, R. Poreda, J-G. Schilling, R. Searle,	east of Easter Island 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	Spring 94-95		20		G&G

ALVIN and ROV Letters of Interest - Summary 1995

Investigator	Associates	Area	Purpose	Sponsor	Date	Alternate	Dives	Remarks	Disc.
33. P.J. Michael, U. Tulsa new	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
34. 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
35. J.M. Edmond, MIT	J.G. Schilling, URI R. Poreda, Perdue M. Lilley, UW H. Elderfield, UK	Southern EPR Easter Island and vicinity	Hydrothermal Studies on the Easter Microplate.	NSF 9312950	Austral Summer 1995		30		Chem
36. M.D. Lilley, UW	D. Butterfield	Southern East Pacific Rise	Chemical and geological characterization of hydrothermal vent fields, at this very fast spreading ridge.	NSF	late '94 to early '95		20-25		Chem Geol
37. Mahoney, SOEST		Manihiki Plateau SW Pac	Exposures of basement for Oceneaic plateau studies	NSF	Apr-Oct 97		24		G&G
38. 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 1994-1995		20		G&G
39. L.S. Mullineaux, WHOI P.H. Wiebe, WHOI		S. EPR	Mechanisms for dispersal of larval of vent invertebrates to be investigated by comparing the fluxes of larvae in the lateral plume to the near bottom currents, investigating larval accumulation in plume vortices and documenting far-field dispersal.	NSF-RIDGE	1994 or 1995		15		Biol.

ALVIN and ROV Letters of Interest - Summary 1995

<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>
<u>HAWAII</u>									
41.	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
<u>TETHYAN/ARABIAN/INDIAN SEA</u>									
43.	G. W. Luther, III, U Del D. B. Nuzzio, Analytical Instrument Systems		Black Sea	In situ use of prototype solid state electrodes which are capable of measuring a variety of soluble redox species. This requires development of a new potentiostat which can be adapted to ALVIN's power and/or space requirements.				letter of interest	chem, testing
44.	R.W. McCoy	G. Heiken S. Sparks T. Druitt E. McClelland J. Huijismans	Aegean Sea Eastern Mediterranean Sea Thira Island	Stratigraphy and structure of Thira Volcano, Greece	NSF				G&G
45.	R.W. McCoy		Eastern Mediterranean Sea Erastosthenes Seamount	Geological structure and sampling of Erastosthenes Seamount; Investigation of potential brine basins on the lower Nile Cone.	NSF BSF (Israel)				G&G
46.	K. Wishner, URI	M. Gowing, UCSC	Omani Coast, Arabian Sea	Effects of the oxygen minimum zone on the fate of organic matter in the Arabian Sea. This will be in conjunction with JGOFS cruises in the Arabian Sea.	NSF	May Sep-Oct, 1994 or 1995	11 11	The southwest monsoon season is June to August.	Biol.
47.	G. Rowe	J. Morse	Arabian Sea	Seasonal studies of the oxic-anoxic zone along the continental margin to relate heterotrophic metabolism of entire benthic community biomass on a seasonal basis.	NSF JGOFS			Planned in collaboration with the Arabian Sea JGOFS effort	Biol.
48.	J.R. Curray, SIO		Northeastern Indian Ocean	To understand the topography, structure, volcanic activity, faulting and/or reef growth by correlation from cores to geophysical data.	NSF	anytime			G&G
49.	J.M. Brooks I.R. MacDonald R. Sassen		Offshore Saudi Arabia or offshore Oman	To investigate chemosynthetic fauna at hydrocarbon seeps in the Arabian Sea. Hydrocarbon geochemistry and benthic ecology will be explored.	Aramco, Saudi Arabia industry sources NSF		5	Piston coring during monsoon season, ALVIN dives during post monsoon leg.	Biol.

ALVIN and ROV Letters of Interest - Summary 1995

	<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>
50.	L.P. Madin, WHOI	J.E. Craddock, WH S.M. Bollens, WHOI P. Kremer, USC	Arabian Sea	The role of the meso- and benthic-pelagic fauna in the transformation and vertical flux of organic matter. This will be in conjunction with JGOFS Arabian Sea research.	NSF-JOGFS	Mar-Apr 94-5 Oct-Nov 94-5		6 6	During the transition periods after the NE and SW monsoons.	Biol.
51.	D. Rickard		Palinuro Seamount, Tyrrhenian Sea	Sample sulphide deposits and microbial mats				6?		Geoche Biol.
52.	Ullman, Kastens, et al.		Bacino Bannock, Eastern Med.	Eastbound: SeaBeam, SLS & photo Westbound: ALVIN				12		G&G
53.	M.B. Cita, A. Camerlenghi, Y. Mart, et al.		Med. Ridge	Map and sample mud diapirs.				10		G&G
54.	E. Druffel		offshore Greece	Sample giant long-lived black corals for isotopic studies.				4		G&G
55.	M. Arthur, et al.		Black Sea	Sampling anoxic sediments and overlying water column for geochemical and stratigraphic studies.				20		Chem Geol
56.	Bonatti, Cochran		Red Sea	Mapping and sampling Red Sea spreading centers, fracture zones and mantle protrusions.				25		G&G
57.	Y. Mart F. W. McCoy		Eastern Mediterranean	Sampling of the Eratosthenes Seamount to study details of continental collision.						G&G
58.	J. Edmond	W. Shanks, USGS W. Zierenberg	18-26 N, 38 E Red Sea	Chemical sampling of hydrothermal fluids associated with the seeps of the Red Sea.	NSF	Oct-March		5		Chem

WESTERN PACIFIC

59. new	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
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ALVIN and ROV Letters of Interest - Summary 1995

	<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>
60. new	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
61.	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
62.	E. A. Silver		Huon Gulf Solomon Sea SW Pacific	Drowned reefs, dynamic flexure of continental shelf/subduction	NSF	Apr-Oct 97		18		G&G
63.	E.L. Winterer		Western Pacific Seamounts	Limestone caps, karst formation.	NSF	Jun-Jan 96		10		G&G
64.	Stern		Hiyashi Seamounts N. Marianas	Arc volcanology, petrogenesis	NSF/ NOAA	Jan-Aug 96		15		G&G
65.	S.H. Bloomer		Southern Mariana Arc	Arc Volcanology, petrogenesis, hydrothermal systems.	NSF/ NOAA	Jan-Apr 96		14		G&G
66.	P. Fryer K. Fujioka		Mariana Forearc	Serpentine seamount genesis, fluid flux accreted terranes.	NSF Jamstec	Jan-May 96		18	ALVIN & SHINKAI 6500	G&G
67.	Fryer		Mariana backarc basin	Spreading center, volcanology, tectonic activity, petrogenesis	NSF/ NOAA	Jan-Apr 96		19	ALVIN	G&G
68.	McMurtry		Northern Mariana Arc	Hydrothermal deposits & fluids at arc volcanoes.	NSF/ NOAA	Jan-Aug 96		8		G&G
69.	J.B. Gill P. Fryer		Northern Mariana Arc	Arc volcanology/tectonic control over magma genesis.	NSF/ NOAA	Jan-Aug 96		16		G&G
70.	Cavanaugh		Any seep & vent location	Symbiotic associations between invertebrates and bacte at cold seeps and hot vents.	NSF	1996				Biol

ALVIN and ROV Letters of Interest - Summary 1995

<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>
71.	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

SOUTHERN OCEANS (HIGH LATITUDES)

72.	L. A. Lawver new	Bransfield Straight	Study volcanic sites in Bransfield Straights	NSF	Jan-Mar 1996	95-96	2 legs: 25 25		Multi
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ALVIN and ROV Letters of Interest - Summary 1995

ROV LETTERS OF INTEREST

	<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>
73. new	R. Haymon, UCSB	K. Macdonald	SEPR 17-18 S	Hydrothermal Vent distribution along the axial zone of t ultrafast-spreading EPR at 17-18 S: a near bottom fish-optic photo/acoustic survey using ARGO II.	NSF	Winter 96		21	ARGO II	G&G
59. new	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
75. new	D. Smith, WHOI K. Gillis, WHOI S. Humphris, WHOI	W. B. Bryan	MAR 24 58 N. 25 20 W	Relating small scale morphology, Petrology and Geochemistry within and between contrasting segments of the Mid-Atlantic Ridge.	NSF OCE-MG&G submitted Nov-93	Mar-Jul 1995		28	ARGO II & 120Khz	G&G
76. new	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, tectoni 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		ARGO II & 120 Khz side-to sonar	G&G
77. new	R. Butler	A. Chave F. Duennebier 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 redploy; install instruments by ROV.	NSF Submitted	Jul-96	Jun or Aug 1996	7	MEDEA-JASON	Other
78. new	H. Dick	H. Kleinrock, WHOI M. Tivey, WHOI G. Hirth, WHOI P. Robinson, J. Franklin, M. Salisbury, J. Malpas, 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

ALVIN and ROV Letters of Interest - Summary 1995

	<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>
79. new	H. Dick	D. Fornari, WHOI J. Casey P. Kelameir S. Hall	MAR: 15 40' - 14 55' N 44 50' - 46 50' W	A SIDESCAN SONAR SURVEY of the MAR at 15 N. High resolution AMS 120, ARGO and magnetics survey of the MAR N & S of the 15 20' F.2.	NSF MG&G RIDGE 9315702	1995			120 Khz ARGO II	G&G
80. new	P.J. Michael, U. Tulsa	D. Fornari, LDGO M.R. Perfit, U. Flori	Southern EPR: 8-9 S, 7-9 S, 107 30'-108 10'W	Petrologic and Morphologic Study of a Giant Lava Field at 8 S, EPR: A Snapshot of a Magma Chamber? Mapping, imaging and sampling of a 220km lava flow using ARGO II, rock coring & dredging: (transponders in place). & 120 kHz side-looking sonar	NSF MG&G RIDGE submitted Nov-93	Nov/Dec 1994	Oct 94 to Mar-95 or 1 year later	24	ARGO II & 120 Khz side-lo sonar	G&G
5. new	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 pf the Sigsbee Knolls in the Central Gulf and in theAlaminos 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-Jan	ALVIN 120 kHz	GeoChe Biol
22.	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	Sum 94 Sum 95 Sum 96		81 + 13 84 + 4 34/20	13 can be ROV 4 can be ROV 20 are ROV	all

APPENDIX XI

ALVIN REGIONAL SUMMARY - 1995

#	Investigator	Disc.	Spons	94*	95	95	96	97	#	Investigator	Disc.	Spons	94*	95	95	96	97
				P	P	F	P	P					P	P	F	P	P
ATLANTIC:									NORTHERN EAST PACIFIC RISE:								
1	Casey & Bryan	G&G	NSF		23				23	Wirsen & Taylor	Chem	NSF		5			5
2	Humphris	G&G	NSF		20				24	R. Batiza	G&G	NSF			10		
3	K. Becker	G&G	NSF			2			25	Wishner	B&C	NSF		42			
4	R.P. Von Herzen	G&G	NSF		14				26	C. Cary	Biol	NSF		2			
**	J. Karson	G&G	NSF		?				27	Lutz	Multi	NSF		35			
Total				0	57+	2	0	0	Total				0	111	10	5	0
GULF OF MEXICO:									EQUATORIAL PACIFIC:								
5	Roberts & Aharon	Multi	NSF/MSF		11				8	Karson	G&G	NSF		20			
6	Muller-Karger	Multi	NSF						Total				0	20	0	0	0
Total				0	11	0	0	0	SOUTHERN EAST PACIFIC RISE:								
MONTEREY/SAN DIEGO:									SOUTHERN EAST PACIFIC RISE:								
9	J.E. Eckman	Biol	NSF		11				31	Gee	G&G	NSF		10			
10	K.L. Smith	Biol	NSF			10			32	Naar	G&G	NSF		20			
40	C. Harrold	Multi	?	12	12		12		33	Michael	G&G	NSF				15	
Total				12	23	10	12	0	34	Tivey	GCHM			15			
JUAN DE FUCA:									35	Edmond	Chem	NSF		30			
11	Orange	G&G	ONR		15				36	Lilley	G&C	NSF		25			
12	H.P. Johnson	G&G	NSF		15				37	Mahoney	G&G	NSF					24
13	H.P. Johnson	G&G	NSF	1					38	Lupton	G&G	NOAA		20			
14	H.P. Johnson	G&G	NSF	12	16				39	Mullineaux & Wiebe	Biol	NSF		15			
15	Chave	B&C	NSF		12				Total				0	135	0	15	24
16	Fisher	Biol	NSF		16		16		HAWAII:								
17	Sansone	G&G	NSF		8		8		41	Garcia	G&G	NSF		7			
18	Vrijenhoek & Lutz	Biol	NSF		18				Total				0	7	0	0	0
19	Tivey	B&C			2				TOTALS								
20	Delaney	G&C	NSF		20								94*	95	95	96	97
21	Fisher	Biol	NSF		5		5						P	P	F	P	P
22	J.F. Delaney	Multi	NSF/NOAA	81	84		34										
42	M. Mottl	B&C	NSF	0	0	16	0										
Total				94	201	16	63	0									

GRAND TOTAL: 1244

ALVIN REGIONAL SUMMARY - 1995

#	Investigator	Disc.	Spons	94*	95	95	96	97	#	Investigator	Disc.	Spons	94*	95	95	96	97
				P	P	F	P	P					P	P	F	P	P

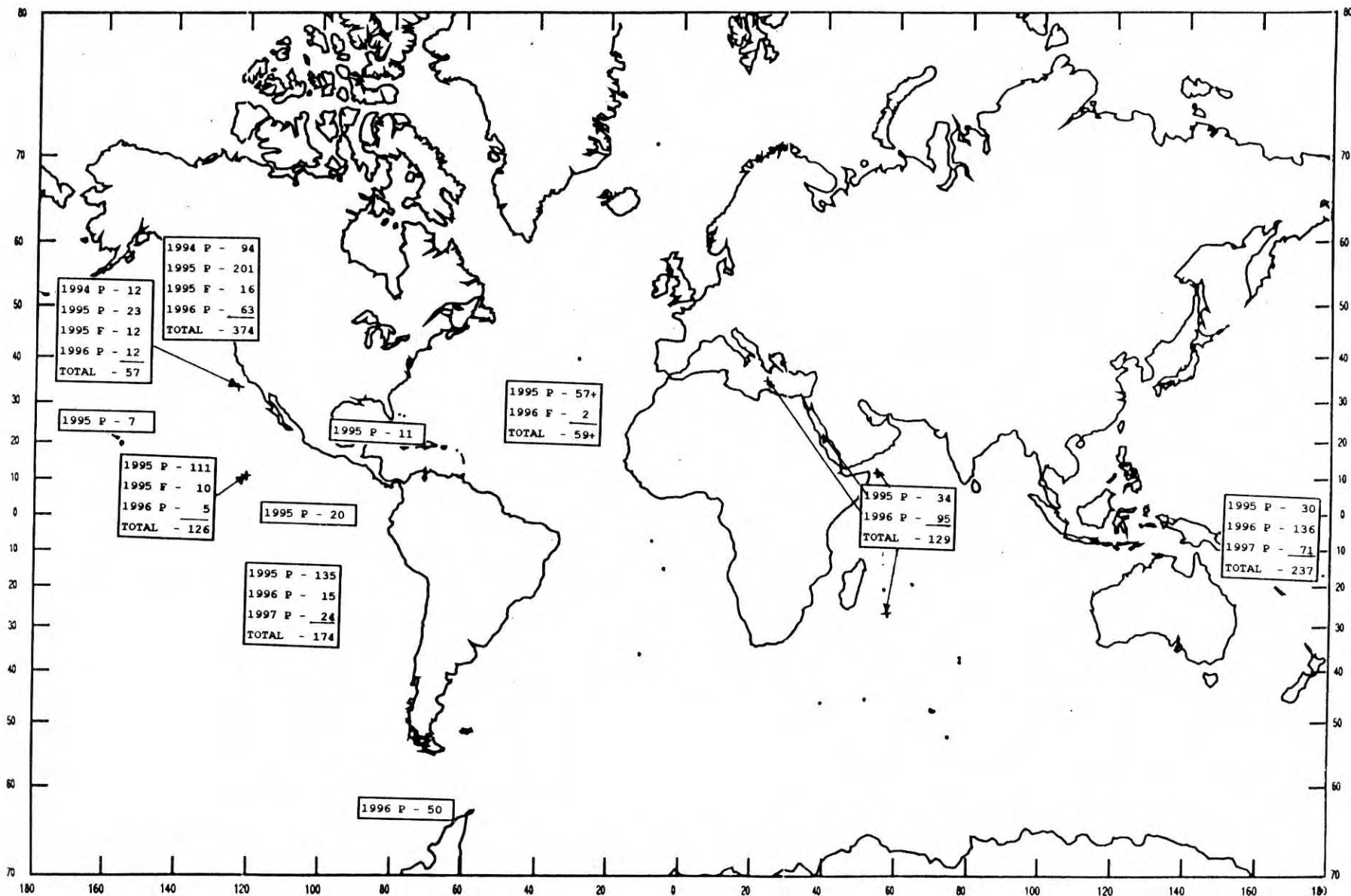
TETHYAN/ARABIAN/INDIAN:								
18	Lutz & Vrijenhoek	Biol	NSF					8
46	Wishner	Biol	NSF		22			
49	Brooks/MacDonald/Sasse	Multi	NSF					5
50	Madin	Biol	NSF		12			
51	Rickard	Multi						6
52	Ullman & Kastens	G&G					12	
53	Cita/Camerlenghi/M	G&G					10	
54	Druffel	G&G					4	
55	Arthur	G&C					20	
56	Bonatti & Cochran	G&G					25	
58	Edmond	Chem	NSF					5
				0	34	0	95	0

WESTERN PACIFIC:								
59	Binns & Scott	Mine	RO/NSF/NSERC		15			
60	Hawkins	G&G	NSF		15			
18	Lutz & Vrijenhoek	Biol	NSF					8
61	Sager & Johnson	G&G	NSF				28	
62	Silver	G&G	NSF					18
63	Winterer	G&G	NSF				10	
64	Stern	G&G	NSF/NOAA				15	
65	Bloomer	G&G	NSF/NOAA				14	
66	Fryer & Fujioka	G&G	NSF +				18	
67	Fryer	G&G	NSF/NOAA				19	
68	McMurtry	G&G	NSF/NOAA				8	
69	Gill & Fryer	G&G	NSF/NOAA				16	
71	Arculus et al.	G&G	NSF					53
Total				0	30	0	136	71

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

* A few new notices were received that indicated interest for use of ALVIN in 1994.

ALVIN PROPOSED DIVES BY REGION

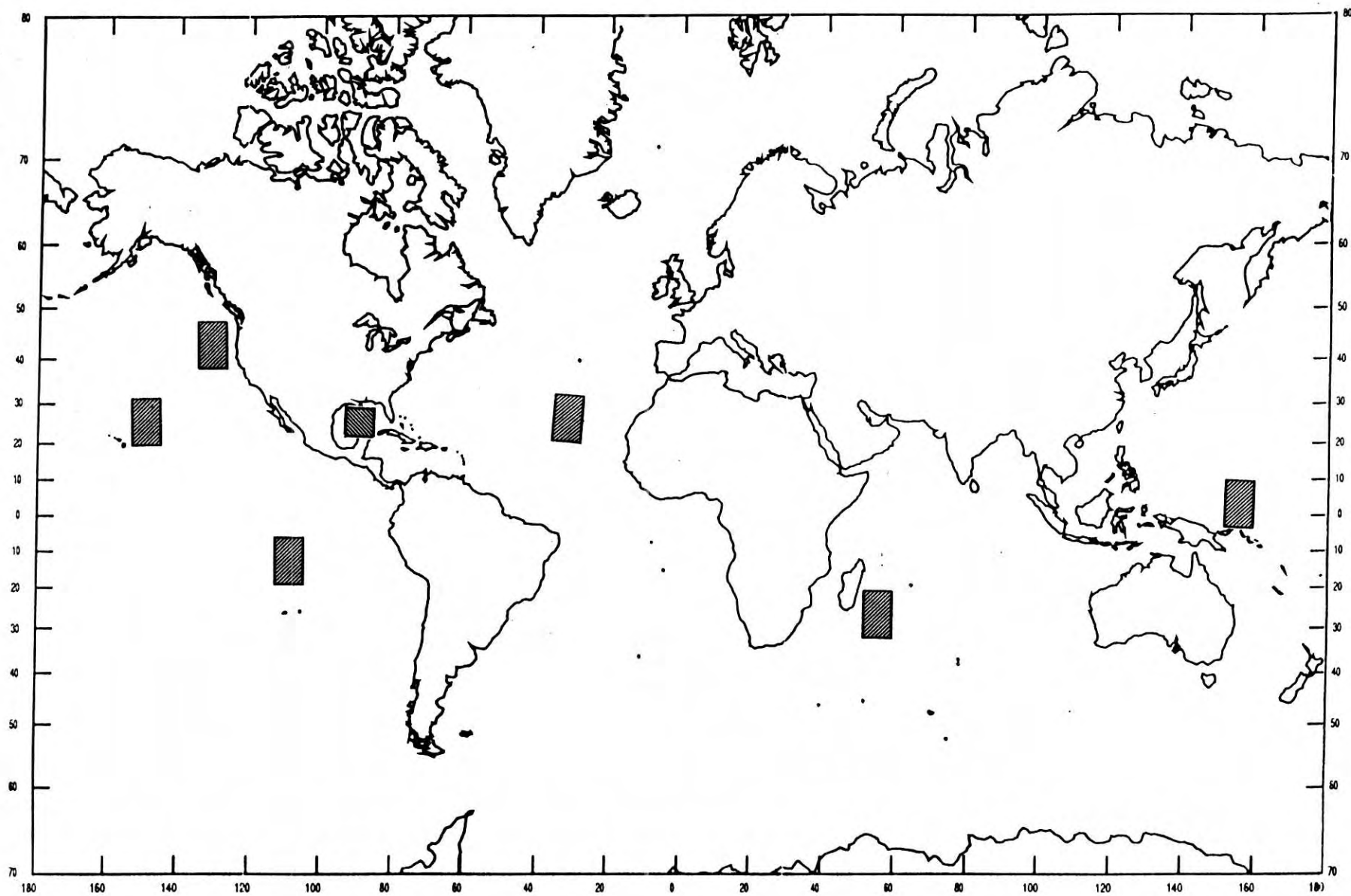


APPENDIX XII

ROV REGIONAL SUMMARY - 1995

#	Investigator	Disc.	Spons	94	95	95	96	97	#	Investigator	Disc.	Spons	94	95	95	96	97
				P	P	F	P	P					P	P	F	P	P
ATLANTIC:									JUAN DE FUCA:								
75	Smith, Gillis, Humphris	G&G	NSF		28				22	J.F. Delaney	Multi	NSF/NOAA	13	4		20	
76	Fornari	G&G	NSF		?				Total								
79	Dick	G&G	NSF		?								13	4	0	20	0
Total				0	28	0	0	0									
GULF OF MEXICO:									WESTERN PACIFIC:								
5	Roberts & Aharon	Multi	NSF/MSF		?				59	Binns & Scott	Mine	CSIRO		15			
Total				0	?				Total								
				0	15	0	0	0									
SOUTHERN EAST PACIFIC RISE:																	
73	Haymon	G&G	NSF					21									
80	Michael	G&G	NSF		24												
Total				0	24	0	21	0									
HAWAII:																	
77	Butler	Other	NSF					7									
Total				0	0	0	7	0									
TETHYAN/ARABIAN/INDIAN:																	
78	Dick	G&G	NSF		?												

ROV REGIONS OF INTEREST - 1995



APPENDIX XIII

UNIVERSITY - NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

MEMORANDUM

DATE: January 5, 1994
TO: Deep Submergence Science Community
FROM: P.J. Fox, DESSC Chair
SUBJECT: The Annual Deep Submergence Science Community Gathering and Matters Arising

On December 5, DESSC hosted the annual meeting of deep submergence science investigators in San Francisco prior to the start of the Fall AGU. The meeting was well-attended although the number of attendees (56) was less than last year, and those who did attend were very well behaved as evidenced by subdued discussions. I hope that the diminished level of participation and the relatively pacific dialogue during the meeting does not reflect complacency on the part of the community because, as my comments below suggest, we face a host of challenges that will require a concentrated effort by the user community, operator and sponsors. These issues must be addressed, if we wish to remain in a competitive position to address world-class deep submergence science problems during the next 5 to 10 years.

JASON-MEDEA Use: With sustained support of ONR during a developmental phase of considerable duration, a state-of-the-art ROV system is in the process of being transitioned from the initial developmental phase to an operational asset that is a new and necessary component of the National Deep Submergence Facility at WHOI. To date, there has not been strong community pressure to use the system, and those proposals that have been submitted to use the system have not fared well in the review process. I believe this reflects a number of problems. First, the community at large has needed documentation of the system's capabilities in order to establish the credibility of this new asset. This need was partially addressed in the form of a first release technical document that describes the unmanned vehicle assets offered by WHOI (*WHOI - ROV and Towed Vehicles Information and Technical Specifications, Version 1.0*, distributed by the UNOLS Office in August 1993). This problem has been compounded because the performance characteristics of the JASON-MEDEA system are still evolving and science products of early cruises have been slow to reach the market place. Considerable progress, however, has been made in areas of data management and integration of various sensors, and science products documenting the system's capabilities should be forthcoming soon. Second, we are facing very competitive times and this superb new, but costly, technology has been brought to the table in the absence of additional resources for support. It is not clear how we will solve this problem of ROV support, but solve it we must because ROVs, both at the National Facility and other institutions, are essential to the future of deep submergence science.



Letter of Interest Pressure and NSF: The good news is that there appears to be strong community interest, as expressed in letters of intent, to use the ALVIN in 1995 and 1996. Two strongly supported themes are emerging: time series work on the Juan de Fuca and EPR in established natural laboratories; and work in the global arena. The worrisome news is that more than 80% of the letters of intent identify NSF as the sponsoring agency, and a majority of these NSF programs are directed at the MG&G program. This proposal pressure profile is a very de-stabilizing situation because NSF budgets in the facilities and science directorates are not growing fast enough to support ALVIN at these increased levels. As a community we must work to find a more balanced support profile and we strongly encourage NOAA and ONR to look closely at providing science and facility support to programs which meet their varied programmatic objectives.

Status of Engineering Dives: Both the operator and the user community have gone on record supporting the efficacy of engineering dives. Unfortunately, dives scheduled for engineering and development are often the first dives to be negotiated away when there are scheduling problems. DESSC takes the position that, like seed corn to a viable farming operation, these dives are critical to the continued health of deep submergence science, both submersible and ROV, and will continue to articulate this position to the funding agencies. In this regard, DESSC will work with the operator to define a set of engineering and technology developmental goals on a yearly basis that can be proposed to the three Federal funding partners.

Equipment Development: The majority of the user community would agree that ALVIN, although remarkably reliable, has fallen off the cusp of optical, manipulative and interactive capabilities. This past year, in response to community concern, DESSC identified an immediate need to upgrade aspects of ALVIN's imaging and data management capabilities. Dan Fornari served as a link between the user community and the operator and a WHOI proposal was submitted to the agencies this Fall to substantially improve ALVIN as an investigative platform. This process was effective to address a serious and immediate problem. It is now appropriate, however, to take a longer range view of developmental needs for both ALVIN and the JASON-MEDEA ROV and to place these needs in the context of a phased acquisition strategy. DESSC will work with the operator to develop a model for community consideration by the Dec. 1994 meeting.

Post 1996 Overhaul and the Global Arena: Based on community input, derived from interest letters and discussions at the 1992 and 1993 Annual Deep Submergence Science meeting in San Francisco, DESSC is recommending that in 1996 when the submersible comes out of overhaul and KNORR is converted as the support ship, the deep submergence facility will embark on an expedition to the Western Pacific. This recommendation is not without challenges: the loss of ALVIN, and possibly JASON-MEDEA, as assets to carry out time series experiments in the on-going natural laboratories located in the traditional work areas means that plans for suitable alternatives must be developed before the end of 1994; the community of Western

Pacific investigators must begin to move this program from a collection of letter proposals to a more codified program with definition and integration to give some assurance that there will be sufficient proposal pressure at the appropriate time to assure a viable program in the 1996/97 time frame. DESSC will ask the Western Pacific Community to have a definition of a program plan ready for evaluation by the time of its planning meeting in June 1994. A firm recommendation to the agencies about the 1996 post-overhaul schedule will be made at that time. How KNORR will return from the Western Pacific is yet to be decided and DESSC encourages investigators to submit plans for the return (e.g. global transect through Indian Ocean - Red Sea - Mediterranean; southern Pacific return). DESSC's goal will be to continue to work with the community, operator and funding agencies to define an integrated and phased deep submergence science utilization schedule that best serves the communities' needs.

Rock Drill: The Stakes-Holloway rock drill is an example of technology development that vastly increases the sampling capability of a submersible or ROV, and makes possible the solution of compelling hard rock/tectonic problems that were heretofore beyond the capabilities of deep submergence investigations. The drill is presently a third party tool that is still under development by Stakes and Holloway. Based on community input, DESSC believes that a rock drill should be a capability that is routinely available for use on ALVIN and JASON-MEDEA and that at some point in time it will make sense that the rock drill move from a third party tool to a WHOI-supported tool. DESSC will work with the operator and Stakes/Holloway to develop an evolutionary plan that best serves community needs and respects the considerable contribution made by Stakes and Holloway.

ALVIN Operations and Community Concerns: The ALVIN operations at sea continue to be remarkably productive and the ALVIN Group receives high marks from investigators who have used the facility this past year. A few investigators, however, have expressed concern about the excessive work load being born by the ALVIN pilots and technical support group at sea, and the long-term effect that this will have on performance and personnel continuity. In order to properly address this, as well as other issues (points already raised in preceding paragraphs), DESSC has scheduled a meeting in May to review our Deep Submergence Science program. DESSC welcomes and encourages comments regarding all aspects about the ALVIN program by recent users of the facility.

A New Funding Mechanism: It is not at all obvious that deep submergence science, with its need for a unique set of specialized assets and its diverse community of scientists and engineers, is well served by a funding model that involves three different agencies, each with very different agendas and concerns. Deep submergence science, which holds title to 70% of the earth's surface and a vast volume of water, is fragmented by the present support-structure model and a competitive edge at the funding trough is lost in the process. In recognition of this concern, the UNOLS Council has set up an ad hoc committee (Bob Wall, Dave Karl, Jeff Fox) to explore other possible models with the funding agencies and appropriate legislative committees.

Discussions have only just started, the community will be kept informed of progress, and no decision will be taken without community involvement.

Multibeam Systems for the Deep Submergence Support Ship:

ATLANTIS II - Based on discussions last Fall between the funding agencies, WHOI and Prof. R. Tyce of URI/GSO, WHOI was directed to assume responsibility for managing multibeam operations and support on the R/V ATLANTIS II for the remainder of its service as the ALVIN support vessel. Individuals interested in using the SeaBeam system on ATLANTIS II for either ancillary or extensive mapping programs should contact Mr. Barrie Walden at WHOI for information and costs associated with using the system.

KNORR - It is appropriate to end on a high note and the plan to acquire a SeaBeam 2112 system for KNORR in 1994 with ONR support is a high note indeed. Such an asset will enhance the capability of KNORR to function as a deep submergence science platform, and will expand the marketability of the KNORR as a multi purpose oceanographic ship when the ship is used in this capacity. The multibeam system on R/V KNORR is expected to be installed and operational by Fall, 1994.