

UNIVERSITY - NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

UNOLS ANNUAL MEETING

SUMMARY REPORT

20 September 1996

**National Science Foundation, Board Room 1235
4201 Wilson Boulevard
Arlington, VA 22230**



**Summary Report
UNOLS 1996 ANNUAL MEETING**

**Room 1235
National Science Foundation
4201 Wilson Boulevard
Arlington, VA
20 September 1996**

The UNOLS membership met for their Annual Meeting on 20 September, 1996 at the National Science Foundation, Board Room 1235, Arlington, VA. The meeting was called to order by Ken Johnson, UNOLS Chair at 8:30 a.m. The participants are listed in *Appendix I* and the meeting agenda is included as *Appendix II*. These minutes reflect the order in which items were addressed.

Appendices

- I. Meeting Participants
- II. Annual Meeting Agenda
- III. ALVIN/DSL Vehicle Plans/Schedules
- IV. DESSC - Upgrade List
- V. FIC Report
- VI. Ship Scheduling Summary & Costs
- VII. RVTEC Summary
- VIII. NSF Ocean Sciences Division - Budget
- IX. SECOR Update
- X. A 25 Year History of UNOLS
- XI. Ancient Albatross Award
- XII. UNOLS Charter - Annex VI
- XIII. UNOLS Council Slate
- XIV. UNOLS Directories
- XV. 1995 Cruise Report Summary

WELCOME & INTRODUCTION - Ken Johnson opened the 1996 Annual Meeting by welcoming the membership and announcing the 25th year anniversary of UNOLS. He reported that the past year has been exciting with the success in building new partnerships. UNOLS will continue their efforts to plan for the fleet of the future. UNOLS will work to match the fleet composition with the science needs of tomorrow. Ken noted that for a number of reasons the UNOLS ship scheduling process was extremely challenging this year. UNOLS is working to make this process proceed more smoothly in the future.

ACCEPTING MINUTES - The minutes from the 1995 Annual Meeting were accepted as written.

COMMITTEE REPORTS:

Research Vessel Operators' Committee (RVOC) - Mike Prince, RVOC Chair, provided the report for the committee. He began by saying that this would be his last Annual Meeting as RVOC Chair and that he has enjoyed his involvement in this capacity. Mike reviewed RVOC activities over the past year. The Research Vessel Safety Standards were reviewed and updated. A white paper about the UNOLS Fleet was written and distributed. The post cruise assessment form was reviewed and revisions are in process including development of an electronic form calls for more interaction between the marine operations and the scientists. RVOC plans to develop a safety orientation video to be reviewed at the beginning of each cruise. An RVOC subcommittee has been working to establish a set of medical standards for employment as a crew member. The operators can use these physical standards when hiring new crew.

Mike reviewed plans for the 1996 RVOC meeting to be hosted by Florida Institute of Oceanography (FIO) and the University of South Florida. The meeting will be held on 22-24 October. The first day of the meeting will be devoted to old and new business and reports from committees and agencies. Special reports will be provided by FIO, international marine operators and other marine organizations. Dennis Nixon will report on liability and insurance issues. On day two there will be a discussion on working with new partners and how these partnerships could impact UNOLS operations. They will try to determine what changes are necessary to accommodate these new users. Three workshops are planned to discuss: (1) Medical and physical standards for employment as crew, (2) strategies for maintaining a healthy and productive UNOLS fleet in an era of challenging budgets and (3) developing a safety orientation video to be shown to science parties before beginning science operations on a cruise. The last day of the meeting will host a round table discussion of the marine superintendents.

KEYNOTE ADDRESS

Rear Admiral Paul G. Gaffney, Chief of Naval Research and Commander, Naval Meteorology and Oceanography Command provided the keynote address for the 1996 UNOLS Annual Meeting. He began by discussing NAVO's new partnership with the UNOLS community. He introduced Captain Rudolph and Commander Trees who will be key liaisons between NAVO and UNOLS. Admiral Gaffney explained that he has great interest and a long standing commitment to oceanography. His first oceanographic cruise was on R/V TRIDENT. He is now splitting his time between ONR in Arlington, VA and CNMOC in Stennis, MS.

The number one issue for Admiral Gaffney is oceanographic research funding. The Navy has seen a downward trend in research funding. In 1968, there was approximately \$600M budgeted for 6.1 programs. In 1996, this number has dropped to approximately \$400 million and is still going down. Admiral Gaffney's goal is to put a floor on 6.1 funding. ONR will attempt to keep the budget stable at \$400M, then attempt for growth. Other issues that are of high importance to

Admiral Gaffney include the laboratory and test facility infrastructure and the science and technology marketing.

Admiral Gaffney continued by reviewing NAVO's ship operations. The Navy is completing their fleet modernization program. PATHFINDER, TAG-60, has been operating since summer and is planned to work in waters away from the U.S. for the next ten years. SUMNER and BOWDITCH (TAG-61 and TAG-62) are both in operation. SUMNER will be at MTS in September and will be open for tours. BOWDITCH will be in Washington, DC on 12-15 October for tours. HENSON, TAG-63, is scheduled to be launched in October. There is a chance that funds may be appropriated for a TAG-64 construction. All overhaul work to modify the vessel, WATERS, has been stopped. WATERS is an ex-cable layer which was transferred to NAVO for use as a survey platform.

Admiral Gaffney reviewed his concerns which included stability of research funding (6.1), program critical mass (is research at ONR becoming "cubicle" science?), the demanding workloads of the ONR program officers and his own workload.

Admiral Gaffney reported that the National Ocean Partnership Act (NOPA) has been appropriated \$20.5M (Note: since the Annual Meeting NOPA became law). The Act designates \$7.5M for support of the Navy's use of UNOLS vessels. Admiral Gaffney congratulated Captain Rudolph for his efforts in making this a success. The remaining \$13M is to support mainstream programs, such as: MEDEA, educational programs and general partnership interests. Steve Ramberg will be the custodian of the 6.2 funds.

Admiral Gaffney praised the construction effort of the AGOR vessels; THOMPSON, REVELLE and ATLANTIS. He reported that \$45M has been appropriated for the construction of a SWATH vessel. Admiral Gaffney explained that he doesn't think there are too many ships in the fleet and that it is time to try a SWATH design. In developing the design for the vessel as many ideas as possible should be considered.

In other platform news, Admiral Gaffney reported that FLIP will be changing its status. Support for the operation of FLIP in the past was subsidized by NAVSEA at approximately \$500K per year. This helps to lowers the day rate of FLIP to its users. At the end of FY97, FLIP will be transferred to ONR and the subsidy will end. Day rates will go up unless the user base is increased. FLIP has many years of good use as a research platform. The Navy also plans to retire SEACLIFF and TURTLE over the next two years. ONR has been asked to work with NOAA and NSF to find the best utilization of our deep sea assets.

Admiral Gaffney concluded by asking the community to start thinking about "NOPA-2." Basic research funding is important to everyone. We need to look for new funding to support both science and ship operations. The community needs to work with their respective university presidents and laboratory directors to talk to their representatives in Washington, DC and educate them on the importance of oceanography.

COMMITTEE REPORTS (Continued):

DEep Submergence Science Committee (DESSC) - Mike Perfit, DESSC Chair, provided the DESSC report. He began by reporting that this has been a very busy year with the construction and modification of ATLANTIS, ALVIN overhaul, retirement of ATLANTIS II and a full ROV schedule. DESSC held a meeting in May, then another meeting just prior to the UNOLS Annual Meeting. This second meeting gave DESSC representatives the opportunity to meet with the operator and agency program managers. ALVIN's overhaul period presented a good opportunity for integration and implementation of DESSC's prioritized list of upgrades. Mike presented a timeline of key ATLANTIS/A-II/ALVIN events, (see *Appendix III* for all view graphs presented by Mike). ALVIN is scheduled to be loaded aboard ATLANTIS in May 1997. The vessel and sub are scheduled to be ready for science operations by early June, 1997.

Mike presented a world map showing the areas of interest for ALVIN work. These areas included the mid-Atlantic, Juan de Fuca, off California, and the northern and southern East Pacific Rise. Mike showed a summary of funded programs for ALVIN in 1997. There are 136 ALVIN dives funded. The ROV funded requests for 1997 are for work in traditional areas plus operations in the Mediterranean and Western Pacific. They will visit the site of the wreck of the MV DERBYSHIRE, a vessel which sank in a typhoon in 1980. This is a UK/European funded cruise to perform a forensic survey of the vessel. The DERBYSHIRE cruise will enable ROV Jason (and R/V THOMPSON) to be in the western Pacific where Patty Fryer (U. Hawaii) has an approved NSF-funded cruise that otherwise could not have been efficiently scheduled. Mike presented the 1996/97 Jason/Argo/AMS-120 schedule. Seven cruises are scheduled to be performed over a 14 month period on five different vessels. This presents a full schedule since an average of six weeks is required for shipping the vehicles between sites. The ROV 1996 operations have been very successful. Dan Fornari's cruise to Lucky Strike over the summer went very well. A summary of his cruise operations and survey results is included in *Appendix III*. Currently JASON is operating from THOMPSON on Juan de Fuca for Paul Johnson. In this cruise, JASON completed 87 continuous hours of operation on the bottom during one lowering.

WHOI has prepared two schedule options for 1997 ATLANTIS operations. Option A was generally accepted by the UNOLS Ship Scheduling Committee. Under this scenario, ATLANTIS and ALVIN would begin operations in June in the Atlantic. At the end of July, the ship would transit through the Panama Canal and resume operations off San Diego. In the fall, one cruise is planned on the northern EPR to be followed by a series of cruises on the southern EPR. In October, the AMS-120 towed sonar system would be placed onboard ATLANTIS (integrating ALVIN with the towed vehicles for the first time on the same platform). The ship would return to San Diego in March 1998 to begin its required Post Shakedown Availability (PSA) period. If any additional proposals for work on the SEPR get funded, they would not be able to be scheduled for the early 1998 opportunity since the ship is required to return to the states to undergo its PSA.

Option B integrates the ROV and ALVIN operations earlier than option A. After completing operations off San Diego in August, ATLANTIS would transit to Juan de Fuca for three Jason cruises. In October, the ship would return to San Diego for one ALVIN cruise to be followed by a Jason cruise at the northern EPR. Option B moves the PSA to January 1998 before conducting operations at the Southern EPR. As a result, any additional proposals that get funded for the SEPR could get scheduled in 1998. Mike presented the cruise tracks for options A and B. Both option A and B leave one funded cruise unscheduled; Karson's cruise to Hess Deep.

Mike continued his report by discussing upgrade plans for ALVIN, see *Appendix IV*. In June 1995, the DESSC realized the potential opportunity to upgrade ALVIN systems during its 1996/97 overhaul period. Dan Orange and Cindy Van Dover solicited the community for input, then compiled a prioritized list of ALVIN upgrades. After a series of meetings and discussions with the operator and funding agencies, the list was revised. The revised priority list of upgrades was as follows:

1. Datalogger/video upgrade
2. Add syntactic foam
3. Power
4. (tie) Obtain dual head scanning sonar
4. (tie) Obtain 4 slurp pumps with chambers
5. Laser ring gyroscope
6. Image infrastructure
7. Improve the in-hull 35 mm cameras
8. Homer Probes
9. Pencil cameras
10. (tie) Obtain an improved CTD pump
10. (tie) Obtain a flat LCD monitor
11. Obtain a new set of push cores with core catchers

In addition to the prioritized list of upgrades, other suggestions included developing a power training video, upgrading the VB system, replacing the navigation receiver and increasing the number of science transponders. A few items have already been purchased and will be incorporated during this overhaul. These include the pan and tilt camera and the new 3-chip video camera.

Mike reported on ALVIN's overhaul schedule, see *Appendix IV*. About 95 percent of the recommended upgrades will be implemented during the overhaul. The overhaul is scheduled to be complete by 31 March 1997. In April, ALVIN will be put on ATLANTIS and the sub and ship will be ready for science in early June.

WHOI has prepared a draft management plan for the Deep Submergence Operations Group. The plan provides an organizational outline of the WHOI personnel, functional relationships and modes of operation for an integrated ALVIN/ROV facility. DESSC is reviewing the plan and will provide feedback to Woods Hole.

Mike concluded by reporting that the Navy plans to retire SEACLIFF and TURTLE. SEACLIFF is scheduled to retire in FY98 and TURTLE will retire in FY97. The Navy is preparing a letter which will request DESSC to survey the community on their needs for future deep submergence science operations (note: since the meeting DESSC has received this letter). DESSC is establishing a task force to address this issue.

Fleet Improvement Committee (FIC) - Eric Firing, FIC member, provided the Council with a status report prepared by Chris Mooers, FIC Chair, see *Appendix V*. Chris was unable to attend the meeting. FIC continues their ongoing efforts to make incremental improvements to the ships of the UNOLS fleet. They have placed a high priority on ensuring the capability of the fleet rather than maintaining a large fleet. As a result, FIC is studying the technological upgrading of the fleet as real-time data platforms. FIC has established a subcommittee to study various ship technologies such as; navigation systems, external and internal communications, data transfer, meteorology instrumentation, winches and wires and shipboard computers. The subcommittee includes Peter Betzer, Rich Findley, Eric Firing and Bess Ward. Over the past year FIC has been developing an Interim Fleet Improvement Plan (IFIP). The IFIP was initiated because of the funding shortfall projections predicted by the Betzer report. However, with the addition of new partnerships to the fleet, the report is a moving target and is not ready for release yet. FIC has begun preparations for the 1998 Fleet Improvement Plan (FIP98). The FIP98 will provide a vision of the fleet in the year 2010. FIC will focus its winter meeting on outlining science mission requirements for a mid-Pacific general purpose oceanographic vessel.

Ship Scheduling Committee (SSC) - Don Moller, SSC Chair, reported on the results of the ship scheduling meeting from 9 September. Approximately 95 percent of the scheduling issues have been resolved. The ship scheduling for 1997 evolved over a number of meetings. On 25 June 1996 there was a scheduling review meeting. Next, the NOAA fleet allocation meeting was held. Scott McKeller reported that with the lay-ups of DISCOVERER and MALCOLM BALDRIDGE NOAA needed time on the UNOLS ships. In 1997, approximately \$3M of NOAA ship time has been scheduled on UNOLS vessels. The NOAA programs include the FASTEX program to be carried out on KNORR in the North Atlantic. A FOCI program is planned in the Gulf of Alaska using WECOMA. A moorings program is scheduled using Harbor Branch's vessels in the South Atlantic and a program is scheduled on REVELLE in the Equatorial Pacific. On 17 July, Don and Jack Bash met with NSF and ONR representatives to address, GLOBEC, Coastal Mixing and Optics (CM&O) and large ship schedules. In August, Don and Jack visited NAVO at Stennis to review their scheduling needs. Eleven potential cruises were presented, ten of these were scheduled on UNOLS ships for a total of approximately \$7.5M. Five of these cruises are on large ships; two will be in the Atlantic and three will be in the Pacific. The remaining cruises are for physical oceanography. They are more seasonal in nature and require smaller vessels. Also in August, a meeting was held in Seattle to bring the large ship operators together to resolve a variety of scheduling issues.

Scheduling of the UNOLS intermediate and small vessels went smoothly. Scheduling the GLOBEC and CM&O cruises was challenging; however, all requests have been accommodated. Large ship scheduling was very dynamic and posed many challenges. Requests for the large ship

were spread across the globe and many had strict time constraints. These constraints included mooring retrievals and launches, ROV operations, seasonal weather windows and ODP survey work. Don presented a map showing the programs which had time constraints. Next, Don presented a view graph of the charge days for each UNOLS ship for the years 1995, 1996 and 1997 (see *Appendix VI*). All of the large ships had full schedules with the exception of REVELLE which is on the light side. The intermediates are all a bit undersubscribed for 1997. The small vessels, with the exception of SEA DIVER and LAURENTIAN have good schedules. The total charge days for 1997 is 4,774, however this number does not include ship time for BLUE FIN and URRACA which could add an additional 150 days to the total. This represents a big increase over last year. All ships will be in operation. As was shown in Don's final view graph, this increase can largely be accredited to the addition of NOAA and NAVO's ship time. The increase represents a lot of hard work in building new partnerships.

Research Vessel Technical Enhancement Committee (RVTEC) - Rich Findley, RVTEC Chair, gave the report for the committee. He began with an overview of RVTEC's activities for the past four years, see *Appendix VII*. They have conducted workshops at their annual meetings on salinity, dissolved oxygen, CTD/Hydro, networking, ADCP, and cables. An RVTEC home page has been established and includes equipment and technician lists. They have been publishing a newsletter, *Interface*, which is available on hard copy and electronically on the home page. The technician exchange/cross training program has been successful. There is an increased cooperative spirit of technical groups and key people have been employed through ship lay-ups

Rich reviewed plans for the upcoming RVTEC Annual Meeting. The meeting will be hosted by Harbor Branch Oceanographic Institution on 11-13 November in Fort Pierce, Florida. Discussions on new instrumentation and communications are scheduled. The communications discussion will address SeaNet, MSAT and Direct PC. Also planned is a conducting cable workshop and tours of HBOI's facilities and SEWARD JOHNSON. Other reports, updates and discussions planned include:

- Technician and Equipment Database Subcommittee Report
- Data Standards Workshop
- CHIRP Inter-comparison Update
- Show and Tell
- Elections of a Chair
- Long Range Instrumentation Planning
- NAVO Technician Requirements
- Updating of Action Plans

Rich encouraged all institutions to send as many of their technicians as they can to the meeting. Also, he encouraged NAVO and NOAA to send their technical representatives.

AGENCY REPORTS

Department of State (DOS) - Tom Cocke from the State Department reported that processing of post cruise clearance requirements within his office is going very smoothly. His office came up with a new policy a few years ago and it has been very successful. There has been a very good response by PI's in meeting post cruise obligations. The U.S. has made an agreement with the U.K. to require only three months advanced notice for clearances. This year, the first clearance for research in Cuban waters was granted. Tom's office will soon have a homepage on the World Wide Web. It will include instructions and policies. This year there have been problems with coastal states not responding to clearance requests. Ship captains are hesitant to proceed into coastal waters without papers. Clearances are rarely easy to obtain. France is now requiring four months advance notice for clearances. Mexico is requiring six months notice.

Naval Oceanographic Office (NAVO) - NAVO's report was covered by Admiral Gaffney's keynote address.

National Oceanographic and Atmospheric Association (NOAA) - Steve Piotrowicz, NOAA/OAR, reported on the status of NOAA's ships and plans to use UNOLS vessels. He is concerned with how NOAA is to maintain field programs with their ships going off line. DISCOVER and MALCOLM BALDRIDGE have been layed up. NOAA has activated KA'IMIMOANA, which has 90 days of TOGA-TAO work scheduled. NOAA has roughly 240 days of science and both oceans to cover. They will need support from the UNOLS ships to meet these obligations. Next year, when RON BROWN is on-line, NOAA's need for UNOLS ships is expected to drop to a half year of support.

NOAA's new AGOR, RON BROWN, has been launched and will be delivered in March 1997. It will be activated in mid June 1997 and is will represent one of the most complete meteorological platforms in the world. In 1999, the vessel is scheduled to operate in the Indian Ocean. BROWN will be homeported in Charleston, NC.

Oceanographer of the Navy (OON) - NAVO's report was covered by Admiral Gaffney's keynote address.

Naval Research Lab (NRL) - Norm Cherkis reported that NRL cruises this year included work off of the UNOLS vessels CAPE HENLOPEN, SEWARD JOHNSON and WEATHERBIRD II. Next year, operations are planned from CAPE HENLOPEN, EDWIN LINK and WEATHERBIRD II. NRL has scaled down its 6.1 research support, however, funds are still available for ship time support. Scientists with 6.1 programs can't support the travel expenses necessary for field work and as a result they are becoming armchair scientists. Research support for 6.2 projects remains level. NRL is attempting to arrange a ship time matching program similar to the matching program for 6.1 ship time. Norm explained that he is still looking for 1997 NRL ship users. There are potential users for Pacific work using MOANA WAVE. Another potential program may be scheduled for CAPE HATTERAS in the fall of 1997. The 6.1 budget for facilities support remains level at approximately \$1M.

National Science Foundation (NSF) - Dolly Dieter reported on NSF's budget, see *Appendix VIII*. Facilities support was down in FY96 as compared with FY95. In 1995, the Infrastructure Program budgets took cuts so that funds would be available to support the ship operations in the Indian Ocean. For 1996, the Infrastructure Program budgets were increased and the ship operations budget was decreased. NSF science funding was also increased in 1996. Facilities funding for 1997 is expected to be flat to slightly decreasing.

Office of Naval Research (ONR) - Sujata Millick provided the report for ONR. She began by giving a budget summary. ONR oceanography support is at approximately \$75M. Navy's ship support for 1997 operations is estimated to be between \$6M and \$7M. This includes their matching support for NRL operations. In facility issues, Sujata reported that the Navy plans to retire SEACLIFF and TURTLE in the next two years. Navy will seek input from the DESSC on their future platform needs for deep submergence science. Sujata also reported that Navy's annual operating support for FLIP will end at the end of FY97. Over the past few years, FLIP has been subsidized by NAVSEA at approximately \$500K per year. This helps to lower the day rate of FLIP to its users. At the end of FY97, FLIP will be transferred to ONR and the subsidy will end. Support for FLIP will need to be recovered through its day rates. Bill Gaines (SIO/MPL), operator of FLIP, plans to hold an open house on FLIP on 13 December at Scripps. He will also have a booth at the AGU conference in San Francisco in the hopes of attracting new FLIP users. Sujata also reported that plans for construction of a Navy SWATH may become a reality in the very near future.

United States Geological Survey (USGS) - Peter Barnes, from the Coastal and Marine Geological Program provided the report for USGS. USGS is completing the budget planning for next year. There is potential ship time needs in the Gulf of Mexico and along the East Coast. USGS still holds title to a large ship which is presently on loan to the army. The budget for their program is \$37M and level funded is expected. Included in this budget is \$7M for operational support.

Office of Polar Programs (OPP) - Al Sutherland reported on OPP ship operations. NATHANIEL PALMER is conducting JGOFS operations through November in the southern oceans. In 1997, a series of JGOFS cruises are planned beginning in the fall using both THOMPSON and PALMER. Construction of GOULD is going smoothly. Delivery is expected on schedule in early fall of 1997. GOULD will devote 30 percent of its operations time to resupplying Palmer Station. The remaining 70 percent of its time will be devoted to research cruises in the Antarctic Peninsula.

ISSUES BEFORE UNOLS:

Ship Scheduling Review - Ken Johnson reported that an ad-hoc committee will be formed to review the UNOLS scheduling process. The committee will include two agency representatives, two schedulers and two scientists. This year's scheduling process was particularly challenging. It needs to be determined whether this trend will continue and the process will get more difficult with each year. There have been integral changes in the scheduling process as UNOLS has

evolved. In the early 1970's, 75 percent of the ocean going scientists used ships from their own operating institution. This percentage has dropped significantly. There is a changing user group with more users from institutions from in-land states. There are also more users from institutions other than the operator institution. Other issues facing the Ship Scheduling Committee today are:

- Reduced funding levels from the traditional funding agencies,
- Introduction of NAVO and NOAA ship time requests,
- Multi-agency support,
- Increased equipment needs,
- PIs with multiple cruises per year and
- E-mail and network communications scheduling process.

The community needs educating on the scheduling process. Ken will draft a charge for the ad-hoc committee and recruit volunteers.

Congressional Funds for a SWATH Vessel - Ken Johnson reported that the appropriation to construct a SWATH vessel is in conference. (Note: Since the meeting the appropriation bill was made into law. The Conference language recommended an increase to the budget request of \$45M to provide the additional funding needed to build a SWATH based on the TAGOS-23 class. The committee directs the Navy to negotiate a time sharing agreement with the university or institute that will operate it, whereby a certain portion of the ship's annual operating time would be dedicated to meeting the Navy's needs. The Navy is to report on its progress in achieving this agreement by December 15, 1997.) Ken pointed out that in the UNOLS Fleet Improvement Plan there is no requirement for a SWATH, however, we must start considering new replacement vessels.

NSF was asked by the conference committee for their input regarding this appropriation. Ken wrote a letter to NSF at their request to provide the UNOLS view regarding this matter. Ken's letter was appended to NSF's response. (note: since the Annual Meeting, the NSF response was released to the committee.)

Arctic Icebreaker Coordinating Committee (AICC) - Ken Johnson reported that at the request of NSF and USCG a committee has been formed to schedule and coordinate Arctic research facilities and provide oversight to the construction of the Icebreaker HEALY. Presently there is no formalized method for requesting ship time in the Arctic. Jim Swift has agreed to chair the AICC. The committee's focus will be to work with the U.S. Coast Guard to gain access to the Arctic for oceanography. The committee held an organizational meeting on 11-12 September at NSF. Another meeting is scheduled on 5-7 November to review the design of HEALY. Members of the committee include Lisa Clough, Joe Coburn, Glenn Cota, Kelly Faulkner, Lawrence Lawver, Dan Lubin, Jim Swift and Tom Weingartner. The committee is reviewing the National Research Council report, "Arctic Ocean Research and Supporting Facilities, National Needs and Goals." They will meet at least twice a year. Funding to support the committee will come from the USCG and NSF.

Preliminary 1998 Fleet Improvement Plan (FIP98) - Ken Johnson reported that FIC has been tasked to develop a preliminary FIP98. The report will look at various budget scenarios from the funding agencies. It will look at the distribution of the UNOLS fleet and determine what can be afforded. It will determine the composition of the fleet. FIC met in July and is working on the IFIP. FIC is also continuing to work on FIP98. It is a long-range plan with a focus on fleet needs in the year 2010. Among other things, it will look at coastal vessels needs, replacement for the small and intermediate class and science needs for the mid Pacific. NSF's Geoscience long-range plan includes a coastal vessel.

UNOLS Review - NSF requested that the UNOLS Office prepare a pre-proposal for their office support and circulate it for review by the Council. With minor changes, the Council approved the pre-proposal. Ken will prepare a letter to go along with the proposal before submission to the National Science Foundation.

NOAA/UNOLS Cooperation - Ken Johnson reported that the NOAA/UNOLS cooperation process is evolving. This summer, NOAA's OAR program put together a coordination team. The team was co-chaired by Ken Johnson and Alan Thomas of NOAA and included members of the UNOLS Council and NOAA representatives. Some of the questions under discussion included:

- Should NOAA labs be included as UNOLS members?
- How should NOAA and UNOLS share/use ship time?
- Should NOAA ships be included in the UNOLS scheduling process?

Steve Piotrowicz from NOAA has been communicating with UNOLS on these issues. He reported that NOAA will only have one oceanographic research vessel to cover three oceans. Steve reported that there are three branches within NOAA; OAR, Fisheries and Charting and Survey. UNOLS should concentrate on working with the OAR program. Some fraction of the fisheries research could be performed using UNOLS vessels. Steve reported that NOAA recently activated a fisheries vessel, HALCYON in the Great Lakes. The vessel will be operated throughout the ice free year by GERL. It is a 60-foot by 30-foot SWATH.

Steve praised Peter Betzer, Bob Knox, Bob Wall and Ken Johnson for their help in providing input for Jim Baker's testimony to Congress.

UNOLS/NAVO Partnership - Another important partnership that has developed over the year is between UNOLS and NAVO. In addition to providing ship time, there has been a beneficial sharing of technology between the two organizations.

The Status of a UNOLS Vessel (100-foot limit) - A subcommittee, chaired by Bob Wall, is examining what it means to be a UNOLS vessel. Other committee members include Steve Rabalais and Tom Royer. In particular, they are looking at the small vessels to determine whether or not they should be considered UNOLS vessels. The small vessels normally do not create

scheduling conflicts since they operate regionally. However, UNOLS vessels get funding through NSF Facilities program instead of the science programs. By adding small vessels to the UNOLS fleet, there would be more vessels to fund from the same NSF facilities budget. This topic will be brought up for further discussion at the RVOC meeting.

Post Cruise Assessments - Mike Prince reported that he and Peter Betzer have been redesigning the Post Cruise Assessment report. They have drafted an on-line questionnaire to be filled out by the cruise PI, technician and ship captain. Once completed, the form would be submitted electronically to the marine operator and the UNOLS Office. The operator would be responsible for responding to all reports received. UNOLS will provide a yearly summary of all reports. The report is meant to provide constructive feedback for future operations. It asks the user if there is anything that he/she would like to see done to the vessel before they sail on the vessel again. It is also an important tool in identifying equipment which may need replacement or upgrade. Ken Johnson will write a cover letter to the form indicating why it is important to submit. Mike will put the draft form on the World Wide Web at color.mlml.calstate.edu/WWW/marineops/draft.html. He encouraged all to demo the form and provide feedback.

New Ship Construction:

REVELLE - Bob Knox reported that REVELLE is now operating out of Scripps. The cruise from the shipyard to San Diego went well and is described in the UNOLS Newsletter, Volume 13, No. 2, page 4.

ATLANTIS - Dick Pittenger reported that delivery of ATLANTIS is expected in the February/March 1997 timeframe and science operations are expected to begin in early June. Construction is going along smoothly. ATLANTIS II was removed from service in July. After a retirement ceremony at Woods Hole (see UNOLS Newsletter, Volume 13, No 2, page 5), the ship transited to New Orleans for removal of the A-frame. The A-frame is being refurbished and will be installed on ATLANTIS. AII was sold and will be used for fisheries research in the Pacific and Gulf of Alaska.

Mid-Life Refits:

POINT SUR - Mike Prince reported that the overhaul of POINT SUR went well and the ship resumed operations in April.

NEW HORIZON - Bob Knox reported the mid life refit of NEW HORIZON went well. The mid-life changes were aimed at increasing the load carrying capability and the range of the vessel.

Additions/Deletions to the Fleet -

REVELLE - entered the UNOLS fleet in July at Scripps

URRACA - entered the UNOLS fleet in July and is operated by the Smithsonian Tropical Research Institute. It will serve as a coastal vessel.

ATLANTIS II - was sold during the summer, 1996.

COLUMBUS ISELIN - a contract is pending for its sale.

UNOLS at AGU - UNOLS is planning to have a booth at AGU. The booth will have posters describing UNOLS, committee activities and the newly formed AICC. We will be looking for volunteers from the UNOLS community to staff the booth.

UNOLS Dues - Jack Bash reported that in 1996, \$1,450 was collected in UNOLS membership dues. This brings the total account to \$4,679.50. Dues for 1997 will remain at \$50 for operator institutions and \$25 for non-operator institutions.

SECOR Update - Virginia Newell, Assistant Dean from the University of Miami, gave a report on the status of the South Eastern Consortia of Oceanographic Research (SECOR), see *Appendix IX*. The consortia, originally formed in 1988, has recently become revitalized. They have three full members: University of Texas, University of Miami and Texas A&M. The NOAA OAR lab has joined as an Associate Member. The Consortia covers the Intra-Americas Sea region which consists of the Gulf of Mexico, the Southeast U.S. coast, Florida Straights and the Caribbean. They are establishing a framework within which to structure ship and technical support. Their emphasis will be on science needs and a workshop is planned for early 1997. Recently in response to an RFP from Antarctic Support Associates (ASA), SECOR won a contract with ASA to provide technician support for PALMER and POLAR DUKE. The contract is with the University of Miami with the other SECOR institutions listed as subcontractors. Last fall SECOR submitted a proposal to NOAA for the operation of their vessels, BROWN and DELAWARE II.

Bob Dinsmore Remembers 25 Years of UNOLS History - Bob Dinsmore provided the UNOLS membership with an enlightening review of UNOLS over the past 25 years. Bob began by reporting on the 1960's, "the golden years of oceanography" when the funds flowed freely and labs were expanding. In 1969, the President's Stratton Commission recommended an oceanographic partnership between the federal government and the academic institutions. This eventually evolved into "UNOLS." In September, 1971, the UNOLS founding meeting was held and the Charter was established. Bob was appointed to serve as the Executive Secretary. The UNOLS emphasis was placed on scheduling and coordination. In 1972, the first general meeting of UNOLS was held. The original make-up included 17 labs and 30 ships. As UNOLS grew so has its role. A transcript of Bob's entire report is provided as *Appendix X*.

Presentation of the Ancient Albatross Award - Bob Dinsmore announced the first presentation of the Ancient Albatross Award to ALPHA HELIX. Tom Royer accepted the award on behalf of the ship. The award signifies the oldest and longest operating research vessel in the UNOLS fleet. ALPHA HELIX began operations in 1966. In addition to the award, Bob presented Tom with instructions on "How to prepare a proposal," a can of rustoleum and a check for \$100, see *Appendix XI*.

UNOLS Membership Votes - Ken Johnson introduced the proposed Annex VI to the UNOLS Charter. Annex VI provides the terms for a new standing committee, the Arctic Icebreaker Coordination Committee. Ken read changes to sections 2 and 3 of the Annex VI. The changes were recommended by the UNOLS Council. The UNOLS membership voted to adopt Annex VI as modified. See *Appendix XII* for the modified Annex VI.

UNOLS Elections - Elections were held to fill four UNOLS Council positions. The slate is enclosed as *Appendix XIII*. Jack Bash announced the names of the elected Council members:

Ken Johnson, UNOLS Chair
 Tom Royer, UNOLS Vice Chair
 Clare Riemers, Member at-large
 Dennis Hansell, Operator Representative

UNOLS Appointments - Ken Johnson announced the appointments to the UNOLS standing committees over the past year:

DESSC: Jim Bellingham (re-appointed)
 Robert Collier (re-appointed)
 Dan Orange (re-appointed)
 Marvin Lilley
 Patty Fryer

FIC: Tom Crowley
 Bill Smethie

AICC: Jim Swift, Chair
 Lisa Clough
 Joe Coburn
 Glenn Cota
 Kelly Falkner
 Larry Lawver
 Dan Lubin
 Tom Weingartner

CALENDAR -

<u>Meeting</u>	<u>Date</u>	<u>Location</u>
RVOC	22-24 October	St. Petersburg, FL
AICC	5-7 November	New Orleans, LA
RVTEC	11-13 November	Ft. Pierce, FL
FIC	12-13 December	San Francisco, CA
DESSC	14 December	San Francisco, CA
Council	16-17 January 1997 (tentative)	Biosphere, Arizona

The meeting was adjourned at 3:00 p.m.

APPENDIX I

Annual Meeting

- Sep. 20, 1996

<u>NAME</u>	<u>AFFILIATION</u>	<u>TELEPHONE</u>	<u>FAX</u>	<u>EMAIL ADDRESS</u>
Tim Askew	HBOI	(407) 465-2400 x262	(407) 2116	taskew@hboi.edu
Harry Barnes	STRI	011 (507) 227-5211	011 (507) 232-6197	STRI.TIVOLI.BARNESH @ic.si.edu
Peter Barnes	USGS	(703) 648-6422	(703) 684-5464	pbarnes@usgs.gov
John Bash	UNOLS	(401) 874-6825	(401) 874-6486	unols@gso.sun1.gso.uri.edu
Peter Betzer	U of So Florida	(813) 553-3940	(813) 893-9189	betzer@marine.usf.edu
David Brooks	Texas A&M	(409) 845-7211	(409) 845-6331	dbrooks@ocean.tamu.edu
Jeffrey Callahan	U of Rhode Island	(401) 874-6110	(401) 874-6578	callahan@gso.sun1.gso.uri.edu
Norman Cherkis	NRL	(202) 404-1103	(202) 767-0167	cherkis@nrl.navy.mil
M. Elizabeth Clarke	OSB/NRC	(202) 334-2712	(202) 334-2885	lclarke@nas.edu
Joseph Coburn	WHOI	(508) 289-2624	(508) 540-8675	jcoburn@whoi.edu
W. Thomas Cocke	Department of State	(202) 647-0240	(202) 647-1106	tcocke@state.gov
Michael Dagg	LUMCON	(504) 851-2802	(508) 851-2874	mdagg@coco.lumcon.edu
Patrick Dennis	Navy Support/JOI	(202) 653-1295	(202) 653-1435	dennis@onrhq.onr.navy.mil
Annette DeSilva	UNOLS	(401) 874-6825	(401) 874-6486	desilva@gso.sun1.gso.uri.edu
Dolly Dieter	NSF	(703) 306-1577	(703) 306-0390	ed Dieter@nsf.gov
Robertson Dinsmore	WHOI	(508) 289-2510	(508) 457-2185	rdinsmore@whoi.edu
David Epp	NSF/MGG	(703) 306-1586		depp@nsf.gov
Rich Findley	U of Miami	(305) 361-4175	(305) 361-4174	rfindley@rsmas.miami.edu
Eric Friing	U of Hawaii	(808) 956-7894	(808) 956-4104	efriing@soest.hawaii.edu
RADM Paul Gaffney	ONR			
Linda Goad	U of Michigan	(313) 763-5393	(313) 747-2748	lgoad@umich.edu
Douglas Hammond	U of So California	(213) 740-5837	(213) 740-8801	dhammond@usc.edu
Dennis Hansell	BBSRJ	(441) 297-1880 x210	(441) 297-8143	dennis@bbsr.edu
Dennis Hayes	LDEO	(914) 365-8470	(914) 365-8156	dph@ideo.columbia.edu
Richard Jahnke	Skidaway	(912) 598-2491	(912) 598-2310	rick@skio.peachnet.edu

Paul Jessen	NPS	(408) 656-2974	(408) 656-2712	jessen@oc.nps.navy.mil
Ken Johnson	MLML	(408) 755-8657	(408) 753-2826	johnson@mlml.clastate.edu
Philip King	NSF/CPO	(703) 306-1246	(703) 306-0280	pking@nsf.gov
Robert Knox	SIO/UCSD	(619) 534-4729	(619) 535-1817	rknox@ucsd.edu
Cindy Lee	SUNY, Stony Brook	(516) 632-8741		cindylee@ccmail.sunysb.edu
Bruce Malfait	NSF	(703) 306-1581	(703) 306-0370	bmalfait@nsf.gov
Scott McKellar	NOAA	(301) 713-3435x135	(301) 713-1541	SMcKellar@RDC.NOAA.GOV
Sujata Millick	ONR	(703) 696-4530	(703) 696-2007	millick@onrhq.onr.navy.mil
Don Moller	WHOI	(508) 289-2277	(508) 457-2185	dmoller@whoi.edu
Virginia Newell	U of Miami/RSMAS	(305) 361-4967	(305) 361-4711	vnewell@rsmas.miami.edu
Michael Perfit	U of Florida	(904) 392-2128	(904) 392-9294	perf@nervm.nerdc.ufl.edu
Timothy Pfeiffer	U of Delaware	(302) 645-4341	(302) 645-4006	pfeiffer@udel.edu
Stephen Piotrowicz	NOAA/OAR	(301) 713-2465x124	(301) 713-0163	spiotrowicz@oar.noaa.gov
Richard Pittenger	WHOI	(508) 289-2597	(508) 457-2185	rpittenger@whoi.edu
David Powell	U of Miami	(305) 361-4832	(305) 361-4174	dpowell@rsmas.miami.edu
J. Michael Prince	MLML	(408) 633-3534	(408) 633-4580	prince@mlml.calstate.edu
Steve Rabalais	LUMCON	(504) 851-2808	(504) 851-2874	srabalais@coco.lumcon.edu
Steve Rambang	ONR	(312) 696-4358		rangers@onrhq.onr.navy.mil
Steve Ramp	ONR	(312) 696-4533		ramps@onrhq.onr.navy.mil
Clare Reimers	Rutgers	(908) 932-6555 x236	(908) 932-8578	reimers@ahab.rutgers.edu
Donald Robertson	Naval Sea Systems Command	(703) 602-3510	(703) 602-5606	robertson_don @hq.navsea.navy.mil
Tom Royer	U of Alaska	(907) 474-7835	(907) 474-7204	royer@jms.alaska.edu
Capt. Dieter Rudolph	Naval Oceanographic Off.	(601) 688-4203	(601) 688-5287	dkr@navo.navy.mil
RADM John Seesholtz (Ret)	Johns Hopkins	(703) 516-6026	(703) 516-6060	seesholtz@hs1.pvc.com
Edwin Shaar, Jr.	Texas A&M	(409) 862-3290	(409) 845-6331	eshaar@ocean.tamu.edu
Alexander Shor	NSF/ODP	(703) 306-1578	(703) 306-0390	ashor@nsf.gov
Al Sutherland	NSF/OPP	(703) 306-1032	(703) 306-0139	alsuther@nsf.gov
Brian Taylor	U of Hawaii	(808) 956-6649	(808) 956-2538	taylor@soest.hawaii.edu
CDR Jim Trees	Naval Oceanographic Off.	(601) 688-4370	(601) 688-5514	jtrees@navo.navy.mil

Joe Ustach
Robert Wall
Richard West
Denis Wiesenburg

Duke
U of Maine
NSF
Stennis Space Center

(919) 504-7579
(207) 581-1435
(703) 306-1579
(601) 688-3177

(919) 504-7651
(207) 581-1426
(703) 306-0139
(601) 688-1121

joeu@duncoc.ml.duke.edu
robert_wall@umeres.maine.edu
rwest@nsf.gov
denis@sunfish.st.usm.edu

2 7

APPENDIX II

AGENDA

25th Anniversary
UNOLS ANNUAL MEETING

8:30 A.M., Friday, 20 September 1996
National Science Foundation, Room 1235
4201 Wilson Boulevard
Arlington, VA

Introduction and Welcome: Ken Johnson, UNOLS Chair will call the meeting to order and report on 1995-1996 activities, current issues and issues continuing into 1997.

Accept Minutes the 1995 Annual Meeting.

KEYNOTE ADDRESS

Rear Admiral Paul G. Gaffney, II CHIEF OF NAVAL RESEARCH and COMMANDER, NAVAL METEOROLOGY AND OCEANOGRAPHY COMMAND will provide the keynote address for the 1996 UNOLS Annual Meeting.

COMMITTEE REPORTS

Research Vessel Operators' Committee - Mike Prince, Chair, will review the activities of RVOC for 1995-1996 and the issues planned for the 22-24 October Annual RVOC meeting.

DEep Submergence Science Committee - Mike Perfit, Chair, will report on the DESSC activities, equipment/instrumentation upgrades and improvements for the National Deep Submergence Facility and the integration of ALVIN and ROVs with the new ATLANTIS. He will report on the operations of ALVIN and ROVs for 1996 and those planned for 1997.

Fleet Improvement Committee - Chris Mooers, Chair, will report on the FIC activities for the year including the status of the Preliminary FIP98 (extended discussion on the Preliminary FIP98 will occur later in the meeting).

Ship Scheduling Committee - Don Moller, Chair, will summarize the 9 September Ship Scheduling and Schedule Review meetings highlighting those ships with less than optimum schedules for 1997. He will discuss the impact of additional ship time provided by NOAA and the proposed NAVOCEANO use of UNOLS ships.

Research Vessel Technical Enhancement Committee - Rich Findley, Chair, will provide an updated report on the progress of RVTEC including the plans for their annual meeting scheduled for 11-13 November in Ft. Pierce, FL.

Federal Agency Reports - Information from Federal Agencies (DOE, DOS, MMS, NAVO, NOAA, NOO, NRL, NSF, ONR, USCG and USGS) on 1996 funding and forecast for 1997 and beyond.

12:00 - 1:00 Lunch Break 12:00 -1:00

Issues Before UNOLS: Various issues of interest to UNOLS Members have arisen during the year. The UNOLS Chair will introduce these issues for discussion:

- Congressional Funds for a SWATH Vessel
- Arctic Icebreaker Coordination Committee
- Preliminary FIP98
- UNOLS Review
- NOAA/UNOLS Cooperation
- Rethinking the Status of a UNOLS Research Vessel (100' limit?)
- Post Cruise Assessments
- New Ship Construction
- Mid-Life Refits
- Additions/deletions to the UNOLS Fleet
- Open meeting at AGU
- UNOLS Dues Accounting
- SECOR Update

UNOLS Members may wish to raise additional issues.

Robertson Dinsmore remembers 25 Years of UNOLS' History

UNOLS Membership Votes: The following issues require a membership vote for approval:

- Annex VI to the UNOLS Charter *Arctic Icebreaker Coordination Committee* (**Enclosure 1**).

UNOLS Elections: Election for the following UNOLS Council positions will be held (the slate of nominees is enclosed (**Enclosure 2**):

UNOLS Chair (2-year term)

UNOLS Vice Chair (2-year term)

UNOLS Council Member, (3-year term) At-large, affiliated with any Member Institution

UNOLS Council Member, (3-year term) Operator representative, from among designated representatives of UNOLS Operating Institutions.

UNOLS Appointments to Committees: The UNOLS Chair will announce new appointments to AICC, DESSC, FIC, RVOC, RVTEC, and SSC in accordance with the UNOLS Charter.

Calendar for UNOLS Meetings -

Meeting Schedule

MEETING	LOCATION	DATES
UNOLS Council	Arlington, VA	19 September 1996
UNOLS Annual	Arlington, VA	20 September 1996
RVOC	St. Petersburg, FL	22-24 October 1996
RVTEC	Ft. Pierce, FL	11-13 November 1996
FIC	TBD	TBD
DESSC	San Francisco, CA	14 December 1996

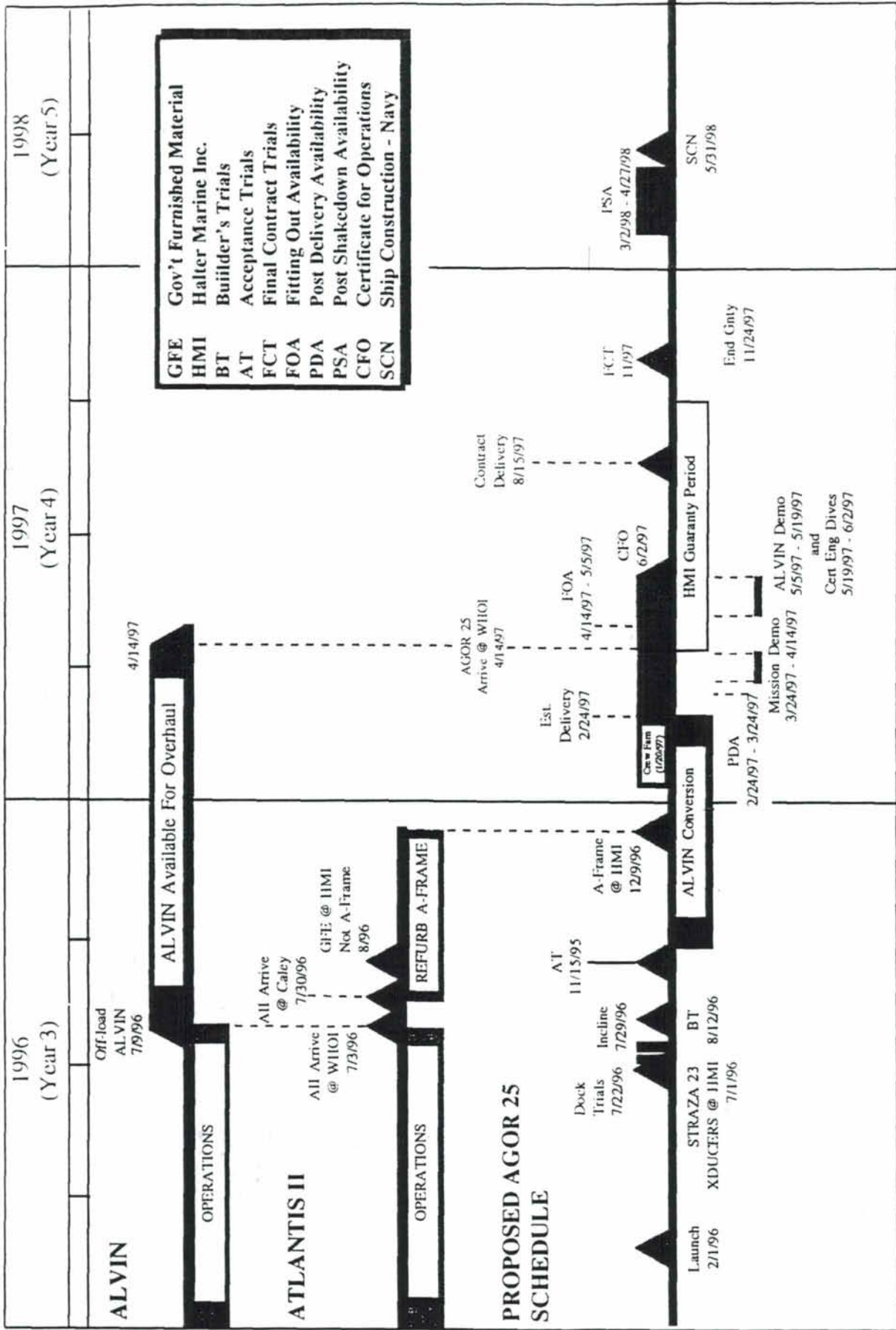
Adjournment

4 3

APPENDIX III

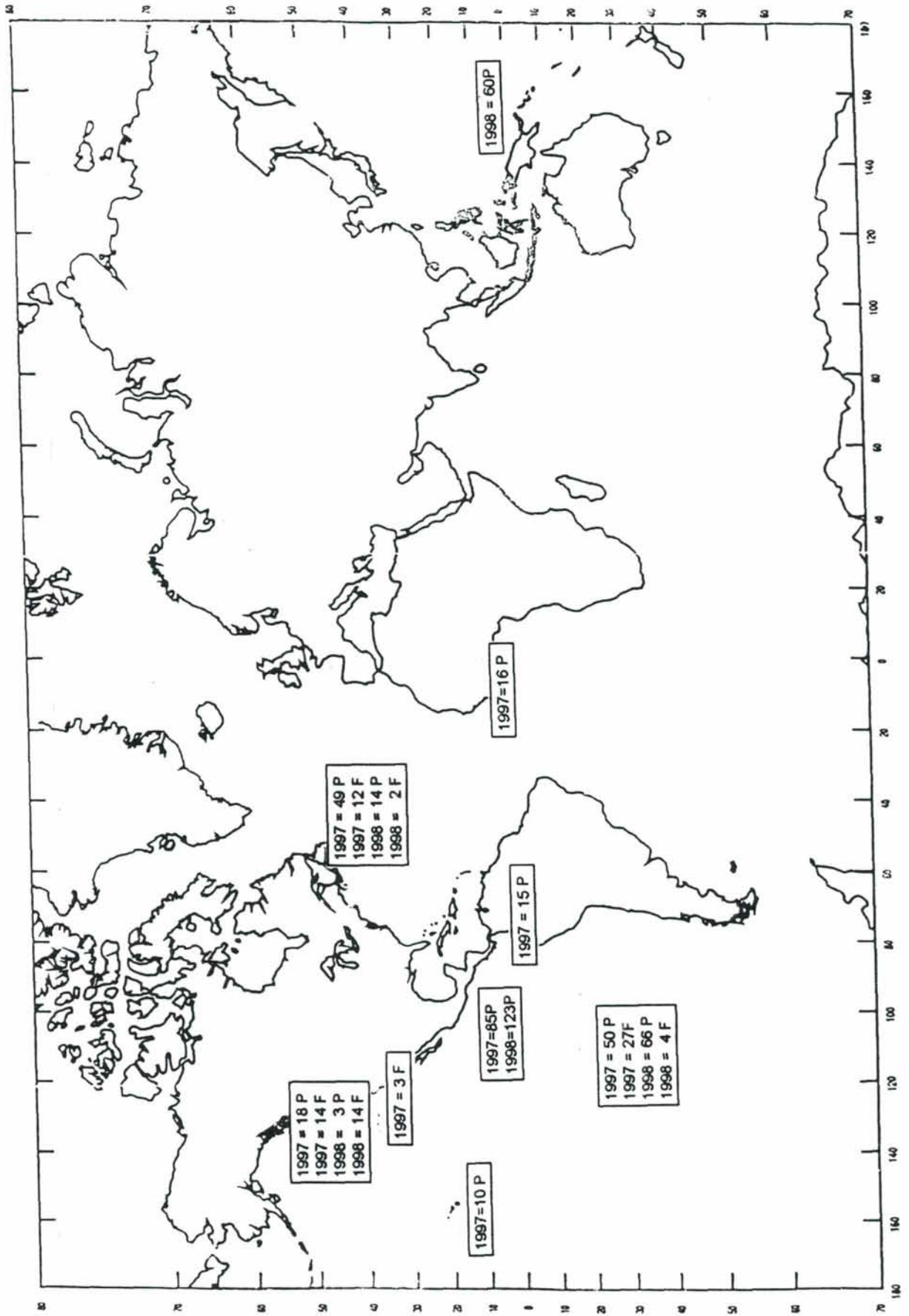
AGOR 25/ATLANTIS II/ALVIN Schedule

(Estimated Delivery - 24 Feb 97)



▲ - MILESTONES ▲ - TESTS & TRIALS/OPERATIONS ■ - YARD PERIODS

ALVIN AREAS OF INTEREST - 1997 AND BEYOND



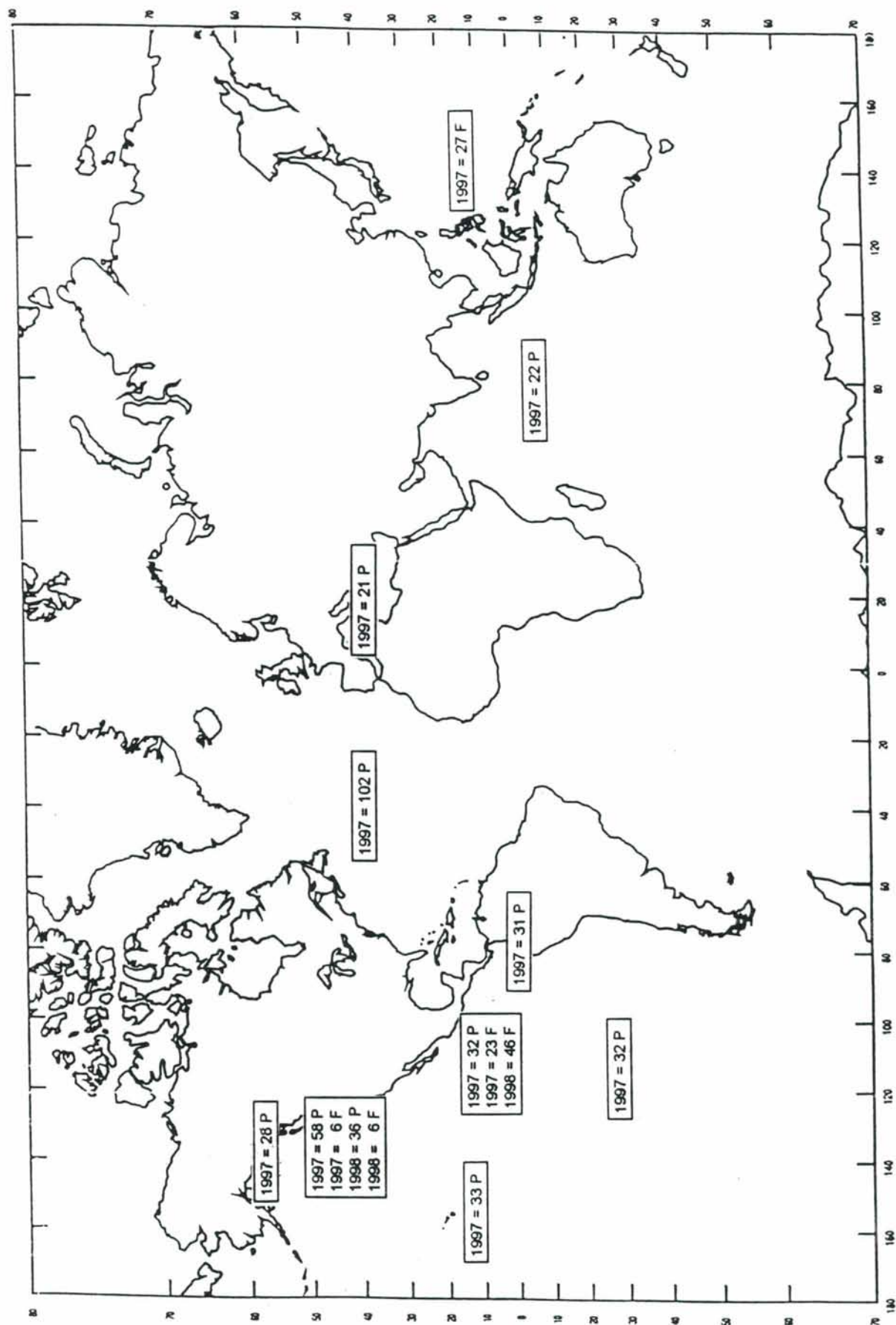
1997

Funded Alvin Dive Requests

<u>Area</u>	<u>P.I.</u>	<u># dives</u>	<u>Comments</u>
Atlantic, NA6	D.Calder/Ont.	2	Bermuda
NA7	Chave/WHOI	6	TAG (w/vanDover)
NA7	Vrijenhoek/RUTG	14	MAR, 37N to 15N
NA7	BRIDGE/UK	<u>5</u>	Lucky Strike
		27	
<u>Area</u>	<u>P.I.</u>	<u># dives</u>	<u>Comments</u>
No. EPR,10N	Taylor,Wirsen/WHOI	5	NSF/IBN
2N(Hess Deep)	J. Karson/Duke	<u>15</u>	w/Jason
		20	
<u>Area</u>	<u>P.I.</u>	<u># dives</u>	<u>Comments</u>
Juan de Fuca Region	Chave/WHOI	6	w/VanDover
		6	
<u>Area</u>	<u>P.I.</u>	<u># dives</u>	<u>Comments</u>
California Coast	C.Smith/Haw	<u>3</u>	3rd of 3 cruises
		3	
<u>Area</u>	<u>P.I.</u>	<u># dives</u>	<u>Comments</u>
So. EPR, 17-22S	Vrijenhoek/Rutgers	14	Gene flow
"	Chave/WHOI	6	w/VanDover
"	M. Lilley/UW	27	w/vonDamm,Lupton
"	J.Sinton/Haw	27	w/AMS-120
"	J.Childress/UCSB	<u>6</u>	
		80	
Total dives on books		136	

DAM -9/12/96

ROV AREAS OF INTEREST - 1997 AND BEYOND



1997

Funded ROV/ARGO/AMS-120 Requests

<u>Area</u>	<u>P.I.</u>	<u># sci.days</u>	<u>Comments</u>
Atlantic		0	
<u>Area</u>	<u>P.I.</u>	<u># sci.days</u>	<u>Comments</u>
No. EPR, 10N	R.Lutz/Rutgers	23	Jason
2N(Hess Deep)	J. Karson/Duke	<u>15</u> 38	Jason, w/Alvin
<u>Area</u>	<u>P.I.</u>	<u># sci.days</u>	<u>Comments</u>
Juan de Fuca Region	K.Becker/Miami	6	Jason
"	W.Chadwick/OSU	5	Jason
"	JP.Johnson/UW	4	Jason
"	R.Embly/PMEL	<u>10</u> 25	Jason (PENDING)
<u>Area</u>	<u>P.I.</u>	<u># sci.days</u>	<u>Comments</u>
So. EPR, 28-32S	R. Hey/Haw	30	AMS-120
17-18S	J.Sinton/Haw	<u>3</u> 33	AMS-120, w Alvin
<u>Area</u>	<u>P.I.</u>	<u># ops.days</u>	<u>Comments</u>
West. North Pacific	Derbyshire/UK	35	ARGO, Jason, AMS-120
Mariana ForeArc	P.Fryer/Haw	<u>27</u> 62	Jason
<u>Area</u>	<u>P.I.</u>	<u># sci.days</u>	<u>Comments</u>
Mediterranean	R. Ballard/WHOI	<u>22</u> 22	Jason

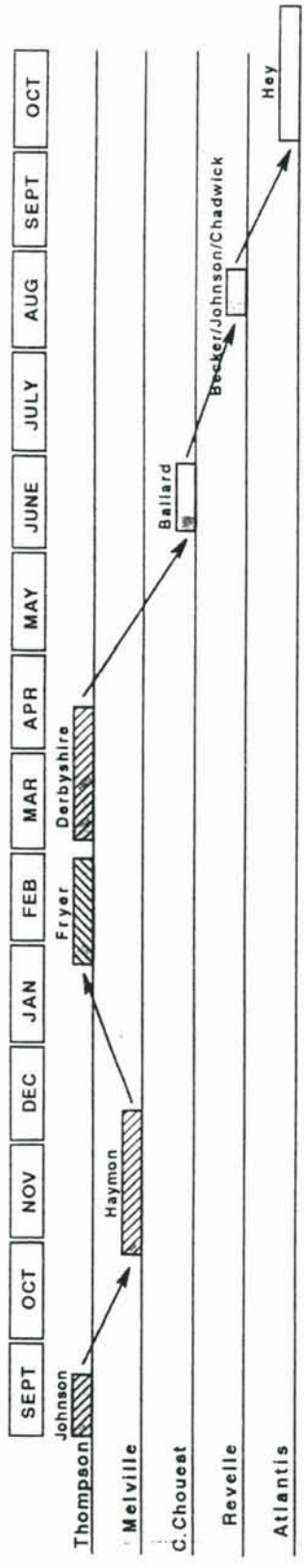
Total days on sta. on books 180





DAM -9/12/96

'96, '97

Jason/Argo/AMS-120

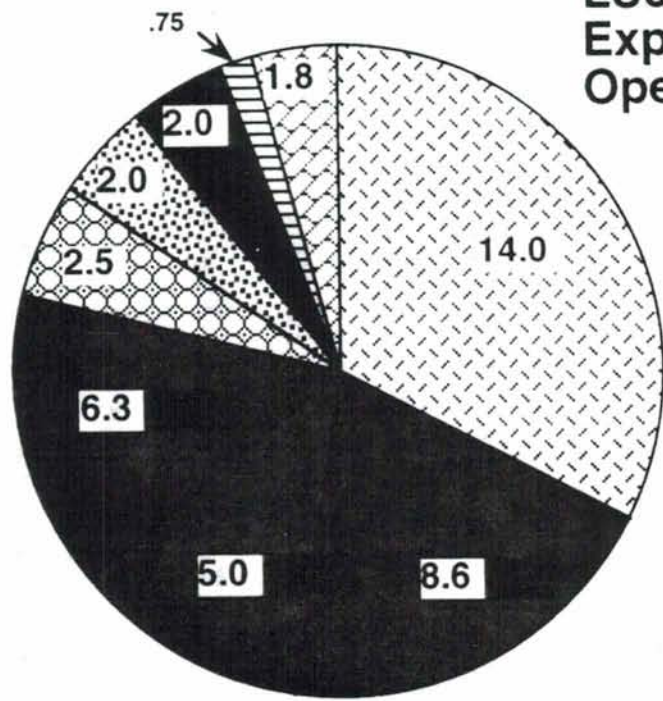
'95, '97



- Jason 
- Argo II 
- AMS-120 
- F.O. Winch 

Moller - 9/15/96

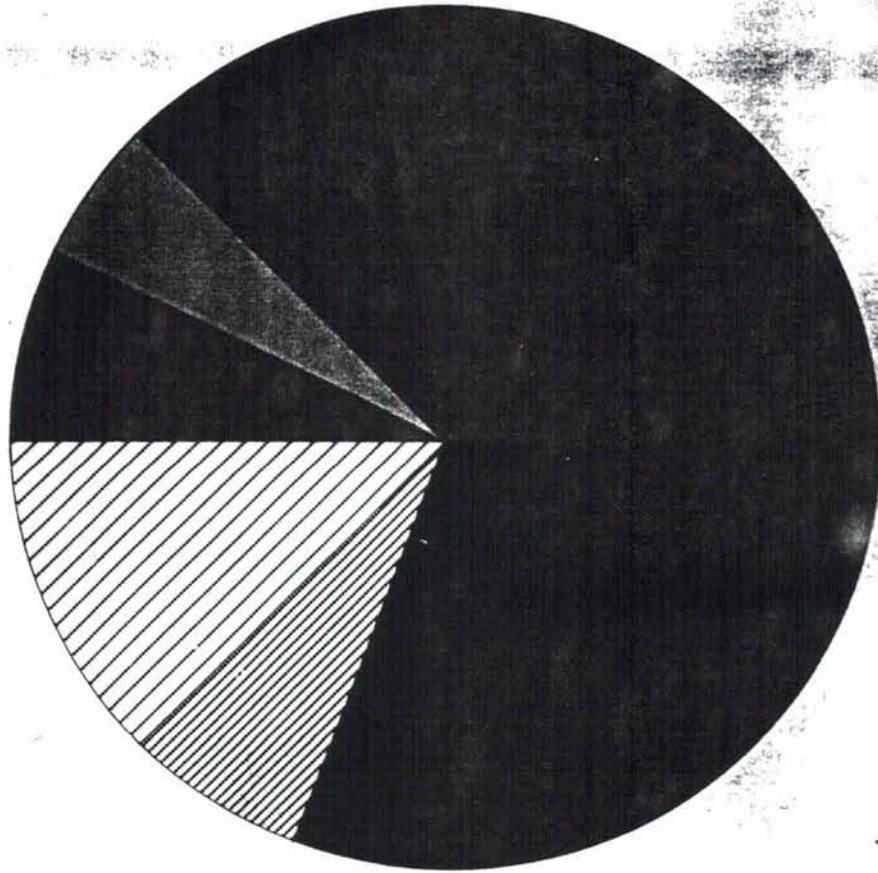
**LUSTRE '96
Lucky STRike
Exploration 1996
Operational Summary**



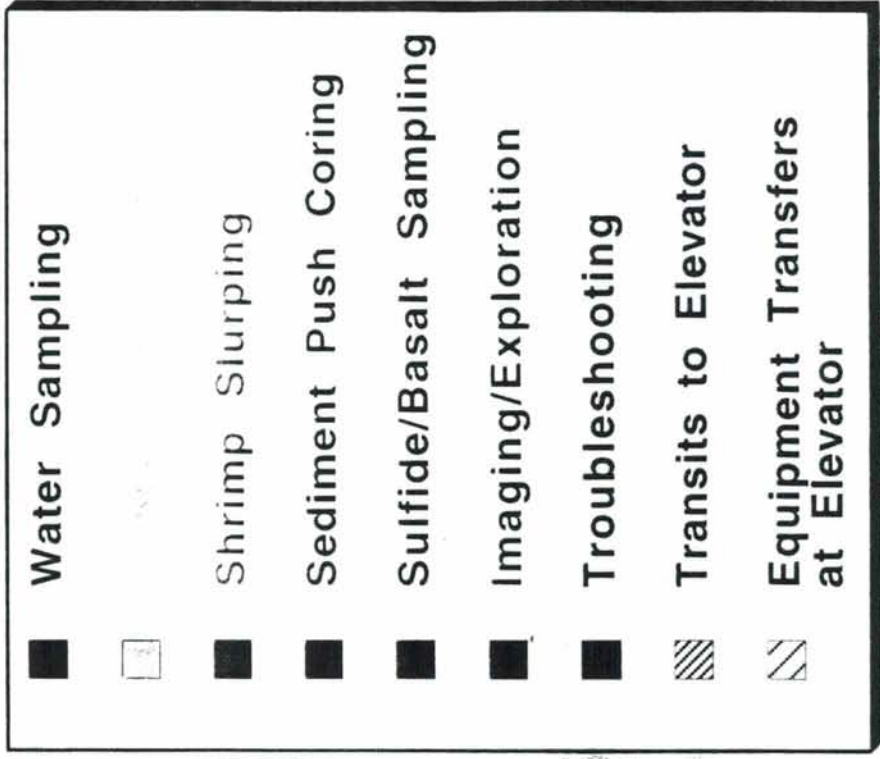
Time (days)

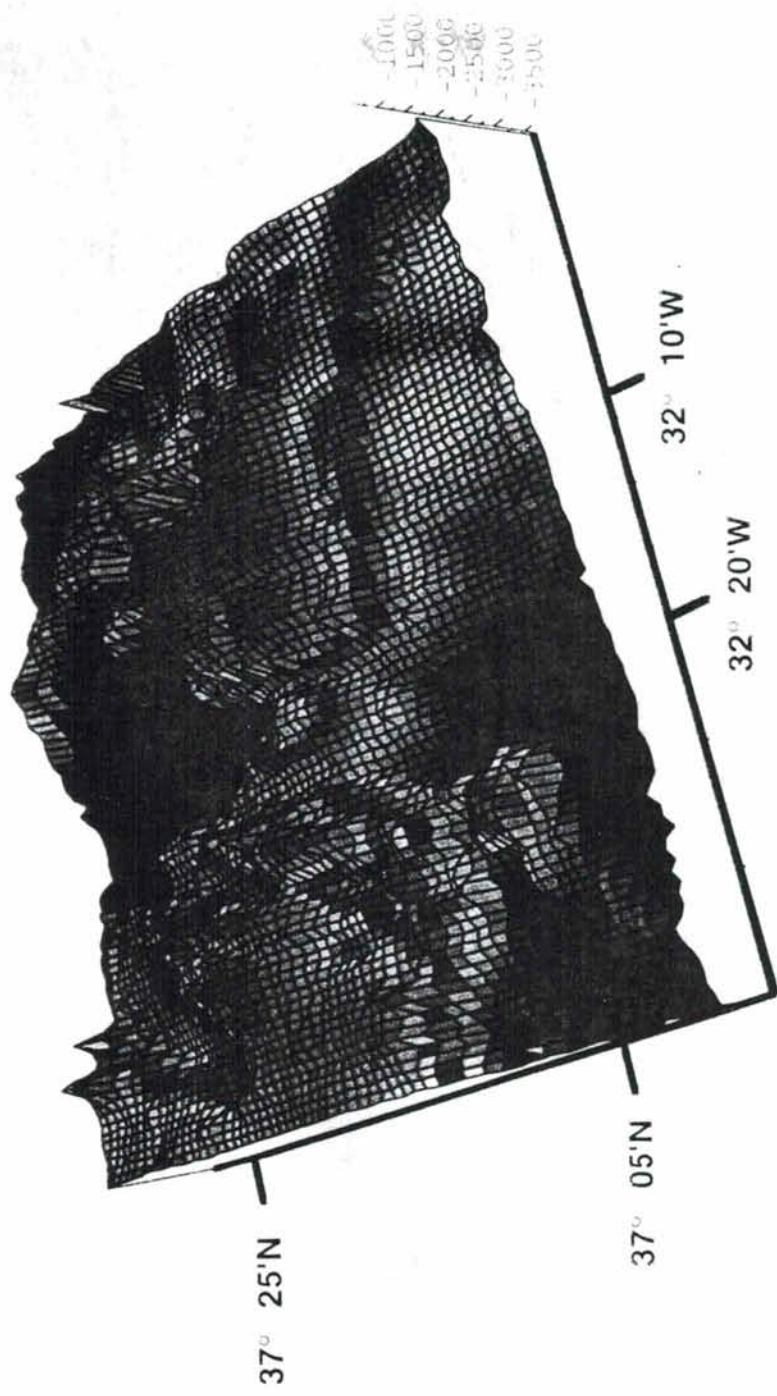
- Port-to-Port Transits
- 120 Sonar
- ARGO-II
- Jason
- Transponders
- Dredging/Rock Coring
- Vehicle Repairs
- Science Transits
- Vehicle Transfers

**Summary of Science and Vehicle Operations
 For All Jason Lowerings LUSTRE '96
 Lucky Strike - 1996 R/V Knorr 145-19**



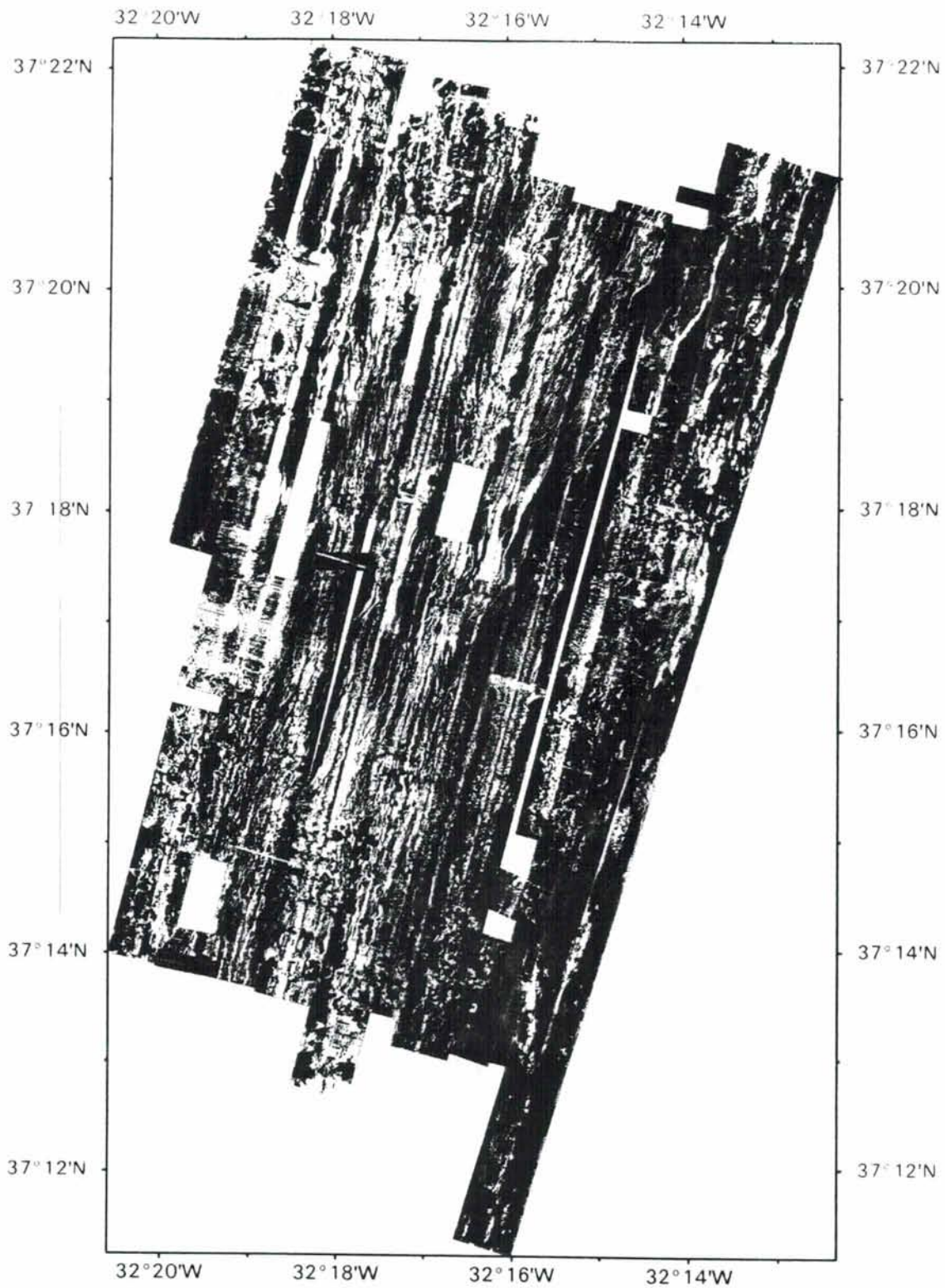
Total On-Bottom Time: 89hr 31min



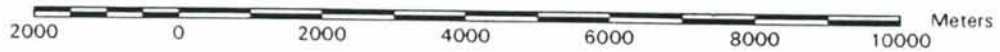


LUSTRE '96

DSL 120 Northern Survey - Along Axis



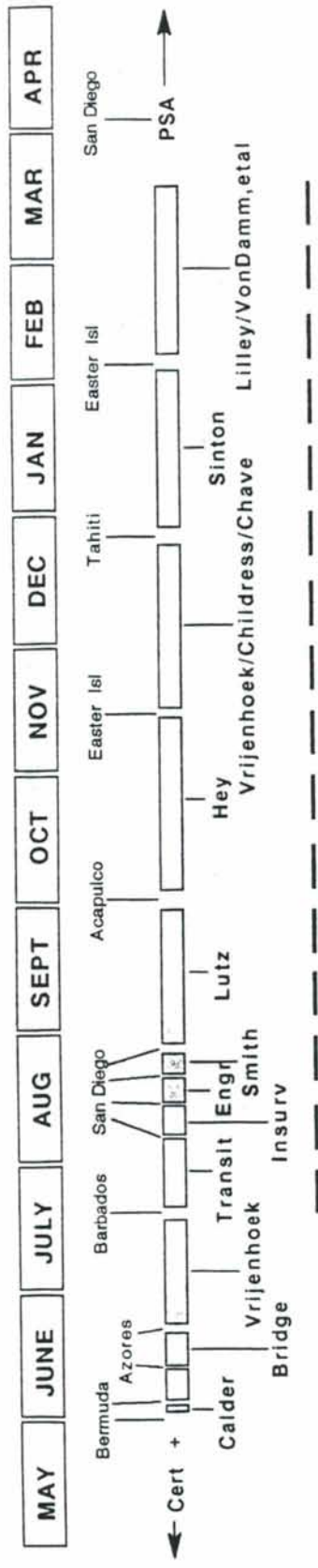
Scale 1:100000



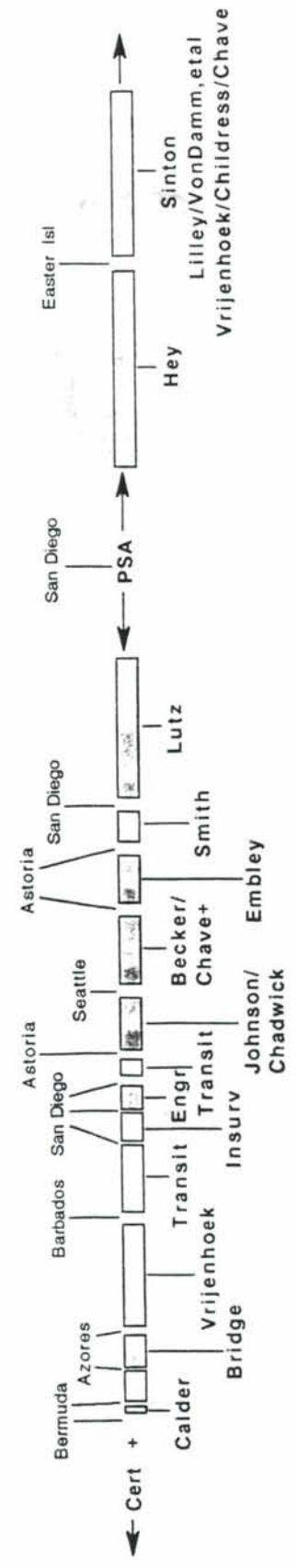
1997 ATLANTIS 1997

(Dated: 15 Sept. '96)

OPTION A



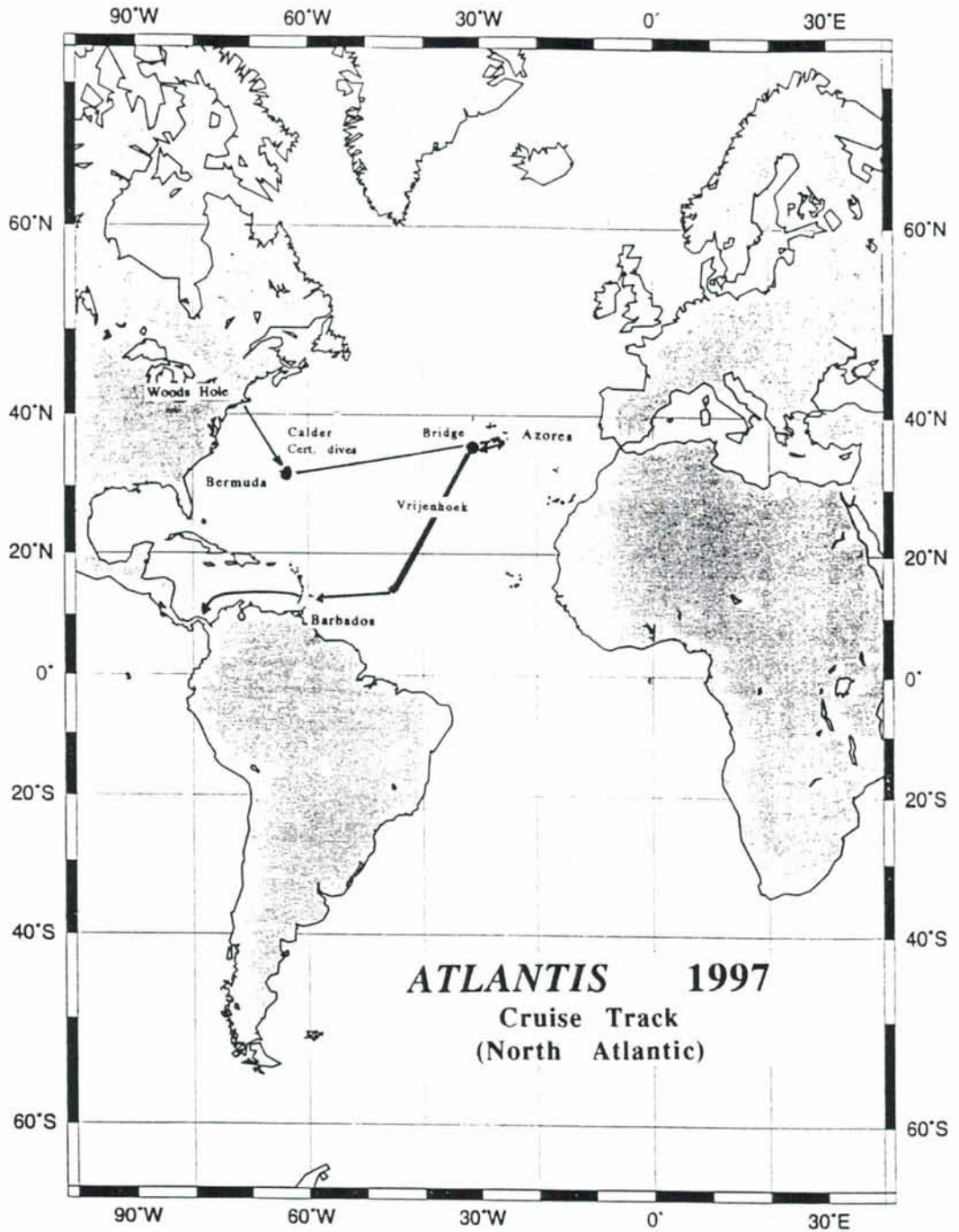
OPTION B



Jason AMS-120

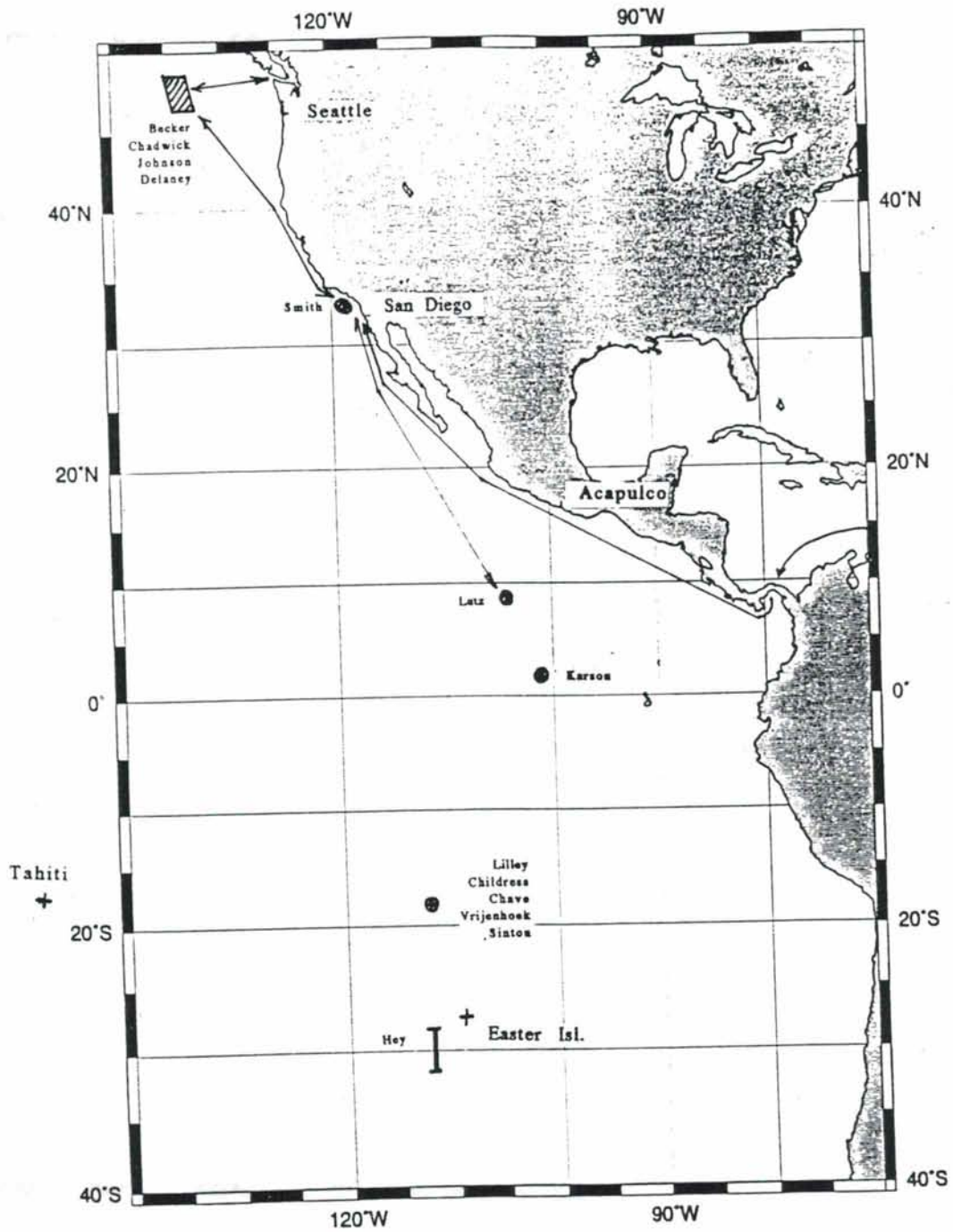
Argo II Alvin

D.Moller · 9/15/96



MO004: Atlantic Ocean

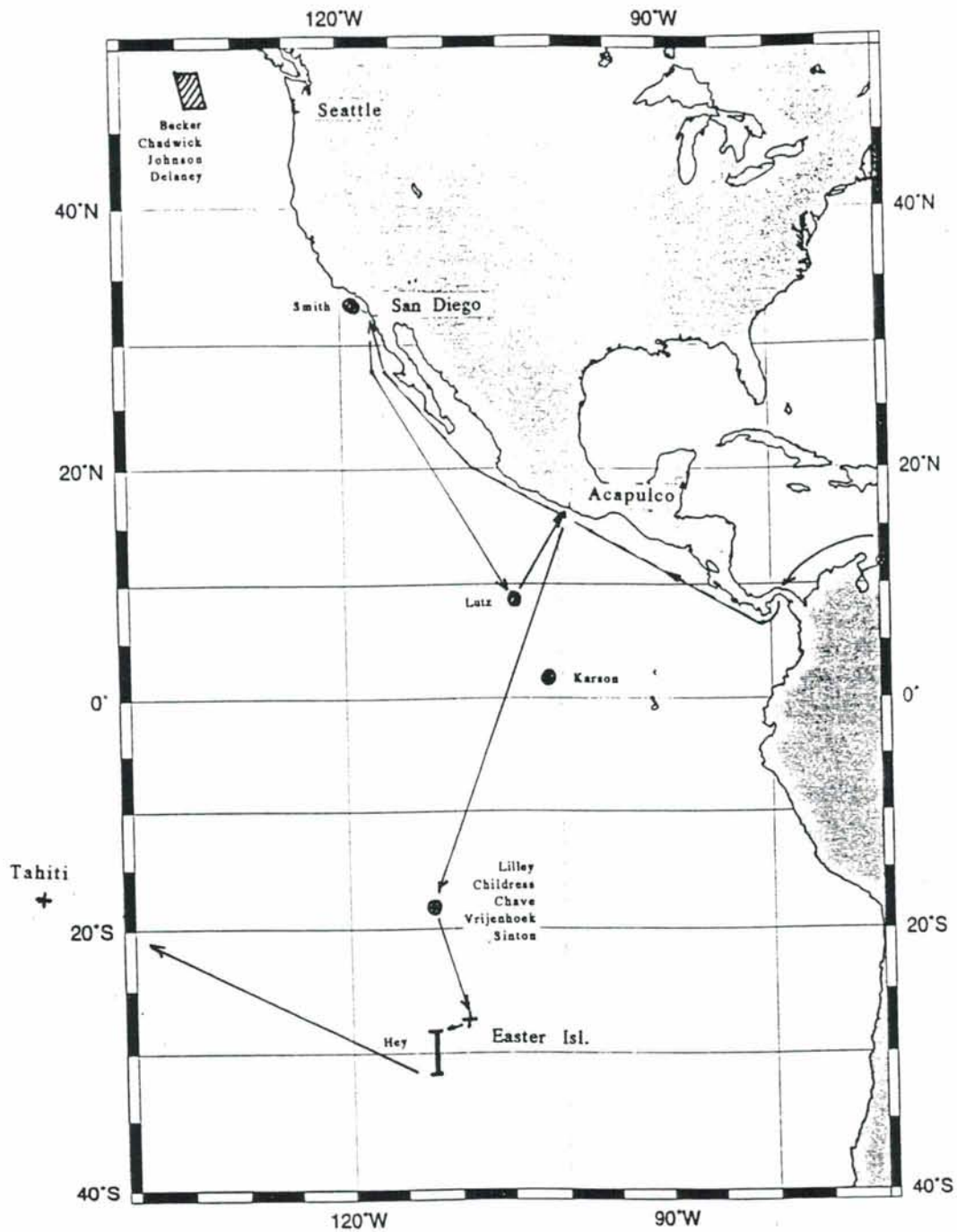




MOC11: Equatorial Pacific Ocean

ATLANTIS 1997
 Cruise Track
OPTION A





MOC11: Equatorial Pacific Ocean

ATLANTIS 1997
 Cruise Track
OPTION 13



APPENDIX IV

ALVIN UPGRADE/OVERHAUL - ITEMS AND ISSUES
Dan Orange and Cindy Van Dover
17 September 1996

HISTORY

- June '95 Discussion at DeSSC Meeting - early overhaul and integration with Atlantis present an opportunity to increase functionality/upgrade systems.
- Fall '95 Solicitation to community for input. Responses to Van Dover and Orange by Jan '96.
- Feb '96 Preliminary list to WHOI for comment. Replies incorporated.
- Spring '96 DeSSC (Perfit) discussions with funding agencies, DeSSC.
- May '96 Prioritized list to DeSSC. Lengthy discussion at DeSSC meeting with operator, agencies.
- Aug. '96 Schedule special DeSSC meeting with agencies, operator to discuss overhaul opportunities.
- Sept. '96 Revised priority list, suggestions.

PRIORITIES (in order of importance)

1. Datalogger/video upgrade.

This is essential for ALL kinds of science using ALVIN and needs to be matched to JASON. Data format needs to be user friendly, overlays for all video need to be standardized (with inherent flexibility), delivery to scientists needs to be routine and flexible, there needs to be a minimum standard of training for science users so that all scientists and pilots, including new users and trainees, are aware of all capabilities.

2. Add syntactic foam.

This is my second priority because available science payload often does not match demand. This is an upgrade that ALL scientists can use to advantage -- no discriminating by discipline here. One of several #1 priorities of original DESSC list.

3. Power.

Add wiring as needed to 3rd battery compartment. Power limitation is a big issue -- having a test bed seems valuable from both science and operator's view. DSOG also needs to collate post-dive data: (why were dives terminate? Pilot/battery stats?) to allow for power analysis.

4. (tie) Obtain dual head scanning sonar
4. (tie) Obtain 4 slurp pumps with chambers
Relatively low costs put these items higher on our list than they otherwise might be -- big gain, small bucks.
5. Laser ring gyroscope.
The existing gyro is archaic, and all scientists depend on good heading information.
6. Image infrastructure.
Incorporate the infrastructure (wiring, beta deck at no cost, etc.) necessary to upgrade imaging over the next three years (digital cameras, etc.).
7. Improve the in-hull 35 mm cameras.
All users identified that this is an essential component of the post-dive data, and that the present system needs upgrading. Although digital photography is on the horizon, the need for basic film photography will remain for some time.
8. Homer Probes
Obtain and incorporate Homer Beacon and 2-5 Responders. These allow a trivial return to a site of interest. Batteries last for 5 years.
9. Pencil cameras
Obtain 2 pencil video cameras and wiring for flexible placement on the sub.
10. (tie) Obtain an improved CTD pump
10. (tie) Obtain a flat LCD monitor
11. Obtain a new set of push cores with core catchers

Van Dover/Orange Essential List

Items 1-7 must be incorporated at a minimum. 8-9 offer substantial capabilities at a relatively low cost. 10-11 are important, and should be included if the work is required during overhaul.

Comments/Other Issues:

Power training sessions.

DeSSC strongly recommends that the operator and the committee utilize the AGU meeting to raise the issue of power usage with the community. Furthermore, a power training video would be a great benefit to the scientists, and could be viewed in the galley immediately following the exposure suit video at the beginning of the cruise.

VB System

The VB system will need to be upgraded in the near future, although we hope that the current system works until the next overhaul. DSOG needs to design and plan for VB replacement this overhaul.

Navigation

The number of transponders available "free" (transparent cost) to science needs to be increased. The current number of 4 for 15 dives is inadequate. This may require the purchase of some transponders now.

In-Hull Navigation Receiver

The existing receiver is a custom-built box, and is outdated and difficult to repair. We need to replace this with an off-the-shelf, well-documented and supported system. This was identified as a high priority among the community and the committee. This may not be covered in the navigation proposal and needs to address during this overhaul.

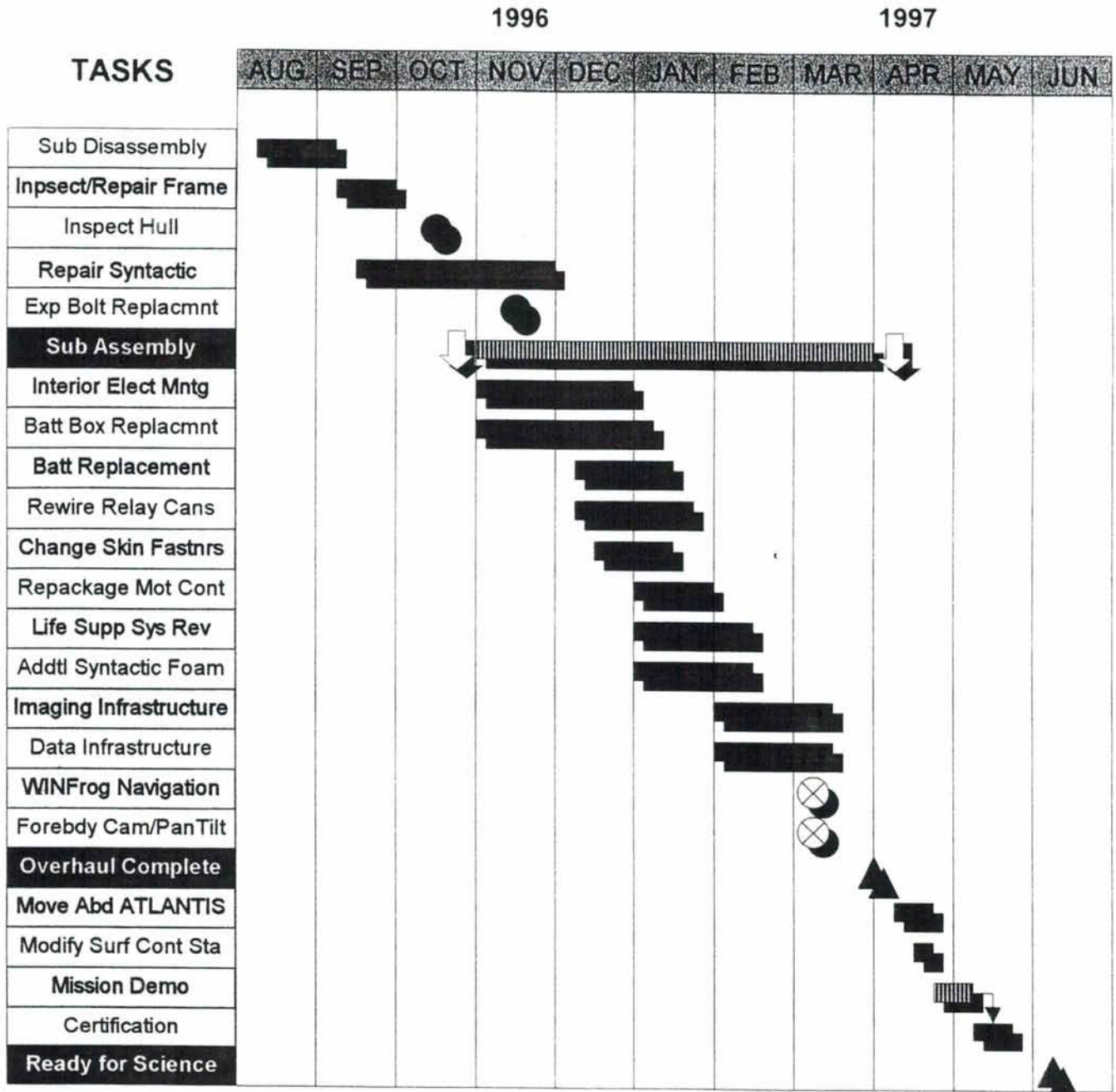
Already paid for; to be incorporated during overhaul:

- pan and tilt
- new 3 chip video camera
- Domed housing for video cameras (Ballard to acquire, available to DSOG?)

Other items discussed at the May '96 DeSSC meeting:

- Digital imaging for ALVIN/Jason/ARGO (separate proposal)
- Remote data logging via inductive coupling (see Fornari memo)
- Acquire next-generation GeoCompass (utilizes fluxgate magnetometer)

ALVIN OVERHAUL SCHEDULE



ROV Cruises

- 
Johnson
- 
Haymon
- 
Fryer
- 
Derbyshire
- 
Ballard

APPENDIX V

UNOLS FIC Report

Prepared by Chris Mooers, 5 Sep 96

1. FIC has been engaged in contingency planning in case downsizing of the UNOLS Fleet becomes necessary. It has prepared a draft Interim Fleet Improvement Plan (IFIP), as a follow-up to the "Betzer Report", that outlines generic options. However, the IFIP awaits updates on NAVO's and NOAA's likely demand for the UNOLS Fleet and other revisions.
2. FIC has been laying the groundwork for FIP98 and several important factors have come to light in the process of developing the IFIP that suggest a strong need to focus FIP98 on the UNOLS Fleet of 2010. For example, while our attention has been focused on the short-term problem of excess capacity, many of our present vessels will be retired by 2010. Hence, the clearest possible vision of the fleet needed for 2010 is required to lay the groundwork for new construction early in the next decade.
3. FIC has been placing a higher priority on ensuring a highly capable fleet rather than necessarily maintaining a large size for the fleet. To this end, it has groups studying the evolution of the fleet as real-time data platforms and the technological upgrading of the fleet. (Eric, please discuss the ideas you and Rich Findley have been developing.) Also, it has received briefings from ONR program managers on developmental programs for AUV's and RPV's, which have the potential to extend the experimental capacity of R/Vs.
4. FIC will focus its (early) winter meeting on outlining science mission requirements for a mid-pacific general purpose oceanographic vessel. Scientific representatives from the Univ. of Hawaii and California institutions will be invited to participate. Placing such a vessel in the context of overall regional needs for the fleet in 2010 will be an important step. If this process is effective, similar consideration of the future scientific needs of the other three major regions will be attempted as input to defining national needs for the fleet of 2010.
5. Overall, the lack of long-range ocean science planning, especially for large science projects/programs, is a serious limitation for planning the future fleet. Fortunately, the OSB has recently initiated a large ocean science planning effort that should help in that regard.

APPENDIX VI

Charge/Operating Days (1995-1996-1997)

	1995 Total	1996 Total	1997 Total
Atlantis II	319	93 *	206 *
Ewing	310	304	270
Knorr	350	279	284
Melville	297	297	276
Revelle		98 *	222
Thompson	333	248	291
Edwin Link	175 *	187	200
Endeavor	228	156	208
Gyre	122	229	@100
Moana Wave	195	145	186
New Horizon	240	190 *	216
Oceanus	187	178	202
Seward Johnson	271	305	204
Wecoma	145	197	195
Alpha Helix	144	73	161
Cape Hatteras	175	0	278
Cape Henlopen	198	189	170
Longhorn	72	128	118
Pelican	182	180	@200
Pt. Sur	164	136	203
Sea Diver	180	134	33
Sproul	183	192	136
Weatherbird	154	170	134
Barnes	77	84	134
Bluefin	75	101	?
Calanus	48	70	102
Laurentian	91	52	45
Days	4915	4415	4774

* Overhaul or partial service

Note: Based on data presented at Sept 9 '96 scheduling meeting

D.A.M.- 9/11/96

UNOLS FLEET CHARGE DAYS
(by Agency & Year)

	1996		1997	
	<u>DAYS</u>	<u>%</u>	<u>DAYS</u>	<u>%</u>
NSF	2763	62.6	2787	58.3
ONR	565	12.8	554	11.6
NOAA	160	3.6	342	7.2
NAVO	0	0	419	8.8
OTHER	<u>927</u>	21.0	<u>672</u>	14.1
TOTALS	4415		4774	

Note: Based on data presented at Sept 9 '96 scheduling meeting

D.A.M.- 9/11/96

APPENDIX VII

Meetings

- Washington, DC
- Scripps Institution of Oceanography
- Rosenstiel School of Marine and
Atmospheric Science
- Moss Landing / MBARI
- Harbor Branch Oceanographic Institute

Technician Exchange/ Cross Training

- Increased cooperative spirit of technical groups
- Kept key people employed through lay ups
- Provided interchange of knowledge base

Workshops

- Salinity
- Dissolved Oxygen
- CTD/ Hydro
- Networking
- ADCP
- Conductor/ Fiber-Optic Cables

Newsletter

- **Interface**
 - Originally E-Mail
 - Currently hard copy
 - Also posted on home page

Home Page

- **Equipment Lists**
 - Lists all equipment in shared use pools
- **Technician Lists**
 - Provides points of contact
 - Biographies
 - Listings of areas of expertise for each technician

APPENDIX VIII

NSF OCEAN SCIENCES DIVISION

	FY 1994	FY 1995	FY 1996
Ocean Sciences Research	\$100.0M	\$102.6M	\$104.9M
Oceanographic Centers & Facilities	50.3M	50.4M	48.9M
Ocean Drilling Program	38.7M	39.8M	39.9M
	\$189.0M	\$192.8M	\$193.7M
Oceanographic Facilities Detail			
Operations			
Ship Operations*	\$32.2M	\$35.1M	\$31.1M
ALVIN, Aircraft, etc.	2.2M	2.1M	2.4M
Marine Techs	4.2M	4.4M	3.8M
	\$38.6M	\$41.6M	\$37.3M
Infrastructure			
Science Instruments	2.5M	1.9M	1.9M
Shipboard Equipment	2.1M	1.1M	1.6M
Ships, Upgrades	2.1M	0.2M	1.5M
UNOLS, Misc.	0.5M	0.5M	0.3M
	\$7.2M	\$3.7M	\$5.3M
Centers and Reserves			
AMS	1.2M	1.0M	1.4M
IAI	1.3M	2.0M	1.9M
Cross Directorate/Reserves	2.0M	2.1M	3.0M
	\$4.5M	\$5.1M	\$6.3M

*Plus \$1.6M from ODP (1994), \$1.8M (1995), \$2.1M (1996)

(June 1996)

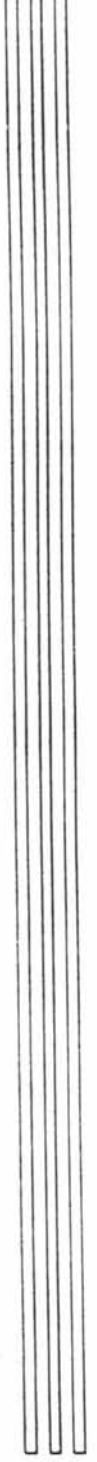
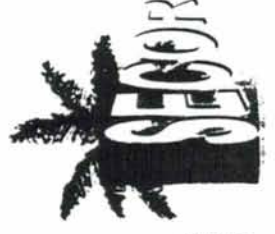
APPENDIX IX

SECOR Update

UNOLS Annual Meeting

Virginia Newell

9/20/96



SECOR: Membership

- Open to academic and government laboratories in the Southeastern United States which meet the following criteria:
- They are an academic institution having graduate level marine science programs or a government laboratory whose primary mission involves substantial marine science research activities.
- They operate or use seagoing oceanographic facilities supported to a significant degree by federal funds.

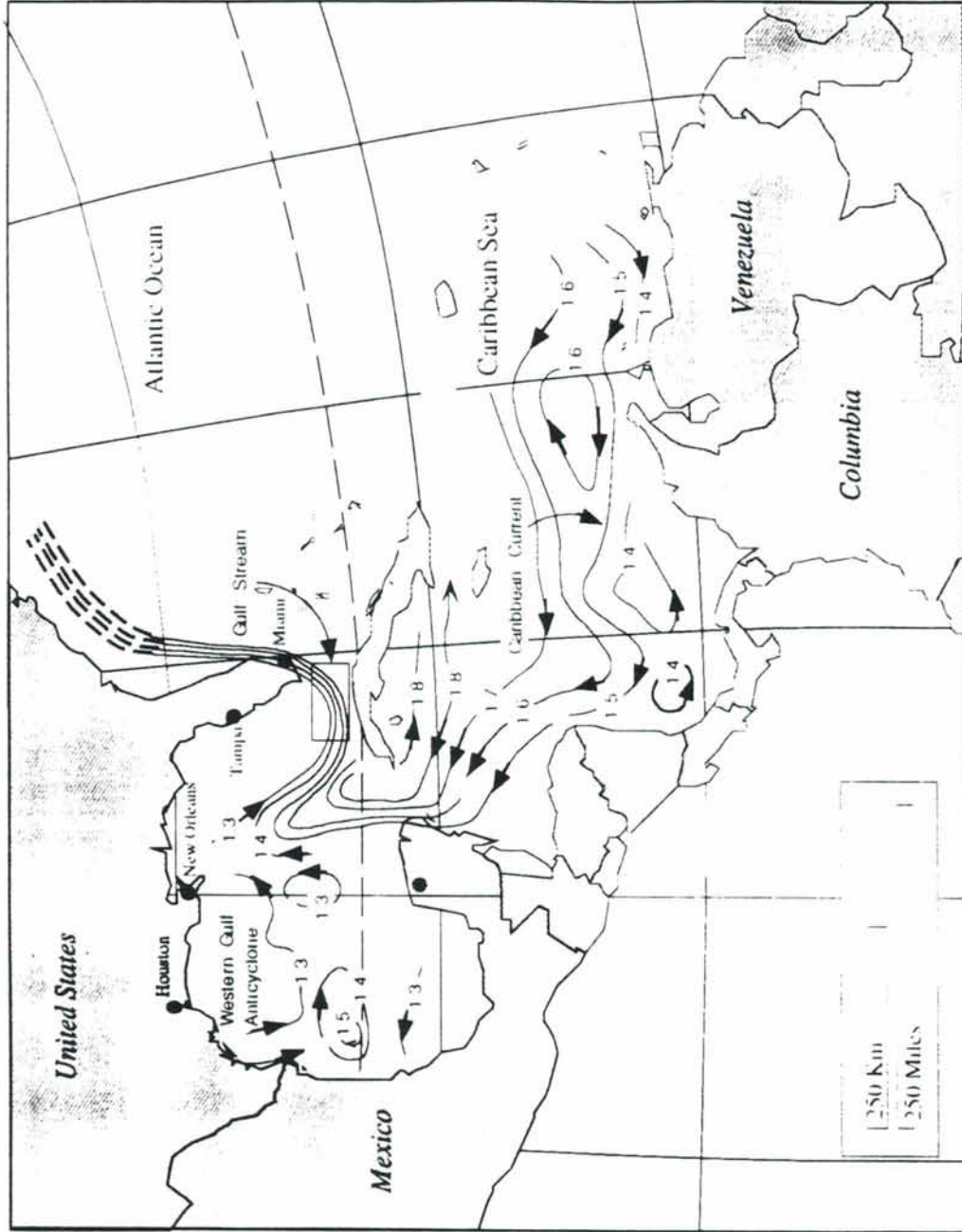


SECOR: Membership Update

- **NOAA OAR Laboratory (Associate Member)**
 - Atlantic Oceanographic and Meteorological Laboratory
 - **University of Miami**
 - Rosenstiel School of Marine and Atmospheric Science
 - **University of Texas**
 - Institute of Geophysics
 - **Texas A&M University**
 - College of Geosciences and Maritime Studies
-
-
-



IAS Region: Current Systems



SECOR Regional Science Workshop

- Tentatively planned early 1997 in New Orleans
- Develop long-term science initiatives focused on Southeast coast and Florida Straits, Gulf of Mexico, and Caribbean (Intra-Americas Sea)
- Plan multidisciplinary efforts in Coastal Ocean / Inter-American Sea fisheries and ocean science
- Establish a framework within which to structure ship and technical support



SECOR & ASA

- **First SECOR Contract -- with Antarctic Support Associates (ASA)!**
- **Cooperative proposal between 3 SECOR academic institutions**
- **Contract to provide technical support aboard R/V Nathaniel B. Palmer and R/V Polar Duke for Antarctic operations**
- **SECOR awarded 2-year contract with two 1-year options**



APPENDIX X

Subject: "History of UNOLS" by Bob Dinsmore

Robertson P. Dinsmore
25 October 1996

History of UNOLS

On the occasion of the 25th anniversary of UNOLS, it appears appropriate to reflect on the origins of the system and its history in order to see how far we have come over the past quarter century. There are some who doubted UNOLS would be here now, and a "Sunset Clause" was hurriedly added to the first draft charter for UNOLS to expire unless periodically renewed by a vote of the members. And renewed it was - time and time again - until here we are.

What we see now is a larger, stronger, and more aggressive UNOLS: 57 members compared to the original 17; and a fleet of larger, newer, and more capable vessels, almost totally replaced from the original.

The roots of UNOLS go back to the 1960's, called by many, the golden years of oceanography. Marine science was in; funding flowed freely; existing labs were expanding and new labs were being established. More and more research ships were putting to sea (some of which should not have). In order to support operations in some new big programs such as the Indian Ocean Expedition, Biological Expeditions, Education, and submersible extravaganzas, several ships were being block-funded (Alpha Helix, Williamsburg, Te Vega, Eastward, Alvin, etc.). This was an expediency limited to special uses, but proved to be an interesting concept. Several individuals, namely Dick Bader and John Lyman of NSF and Ned Ostenso of ONR thought this idea might be applied to general purpose academic ships. It was started and thus began the program of annual support grants for ship operations. It soon caught on; by 1969 there were 33 vessels from 17 academic labs all eating at the federal trough. More were looking on.

About this same time, in 1969, the President's Commission on Marine Science and Engineering (called the Stratton Commission) in its classic report set forth a recommendation for National Oceanographic Laboratories intended to be a partnership between federal agencies and academic institutions for a full range of research, facilities and funding support. However, unlike other aspects of the Report (such as the establishment of Sea Grant and NOAA), it was not well-defined. Viewed by the Feds as "control" and by academia as "send-more-money, it did not progress very far.

By 1970 the support of research ships was becoming big business: more users, more ships, and rising costs. Investigators from non-ship-operating labs were demanding more access to ship time. Federal agencies, particularly NSF, started looking for some element of coordination - even control. The idea of National Oceanographic Laboratories (NOLS) was dusted off as a means to direct and schedule the academic fleet. The Labs viewed this as a takeover and were horrified. A group including Art Maxwell of WHOI, Bill Nierenberg of SIO, John Knauss of URI, Maurice Ewing of LDGO, John Byrne of OSU, and others worked out a counter proposal for a University-National Oceanographic System (UNOLS). This would be a loose, self-governing academic association to exercise the coordination and controls desired by the Feds. Working with Tom Owen and Mary Johrde of NSF, Ned Ostenso of ONR, and others, an arrangement was agreed upon.

On 22 September 1971, the seventeen labs which operated federally funded vessels met at Lamont and drew up a charter for UNOLS. Key provisions included were efficient ship scheduling, accommodation for all

investigators, and adherence to uniform standards. Art Maxwell was elected chairman; a UNOLS Office was established at Woods Hole to be funded by several federal agencies, chiefly NSF and ONR; and Bob Dinsmore, an ex-Coast Guard oceanographer and former staff member of the Stratton Commission was hired as Executive Secretary. The Charter was adopted at the first regular UNOLS meeting at Texas A & M, College Station, in May 1972.

At the outset, the main thrust of UNOLS was coordinated ship scheduling and the placement of federally funded investigators on federally funded ships. The shiptime request forms still in use today were the earliest products of UNOLS. Ship scheduling has continued over the years as a major role. In order to achieve the optimum procedure, various sundry practices have been tried. These included: centralized scheduling, East Coast - West Coast, expeditionary, big-ship/little-ship, lottery, computerized and smoke-filled room sessions. The search for the perfect scheme appears to be continuing even now.

A hidden agenda in the formation of UNOLS was fleet replacement. Over two-thirds of the ships then sailing were mission obsolete; that is, not adequate to the tasks coming along. Most were becoming platform obsolete as well. The agenda did not remain hidden very long. By the Fall of 1972, working groups were formed leading to the replacement of the intermediate ships - mostly wartime cargo ships; and construction of new coastal vessels. These working groups later were consolidated into a Fleet Replacement Committee - now our permanent Fleet Improvement Committee. That these groups did their job well is a matter of record.

The original makeup of UNOLS comprised seventeen labs operating thirty vessels. These were:

Alaska	Acona
Hawaii	Kana Keoki, Teritu
Washington	Thompson, Hoh, Onar
Oregon State	Yaquina, Cayuse
Stanford	Proteus
S. California	Velero IV
Scripps	Melville, Washington, Agassiz, E. B. Scripps
Michigan	Inland Seas
Texas A & M	Alaminos
Woods Hole	Knorr, Atlantis II, Chain, Gosnold
Rhode Island	Trident
Lamont	Conrad, Vema
Johns Hopkins	Warfield, Maury
Duke	Eastward
Skidaway	Kit Jones
Miami	Gilliss, Calanus
Florida State	Tursiops

From this list there have been dropouts, retirements, and replacements. Only three of the original fleet remain and credit for much of this goes to the replacement efforts within UNOLS.

When organized, the UNOLS Members dedicated themselves to keeping everybody else out. Naturally, non-members were suspicious and wanted in. Other operators having or acquiring vessels thought membership was an open door to funding. (How wrong they were). Investigators and users wanted better access and a say in the System. There were some real battles for awhile. Some original members departed with their ships: Stanford, Florida State, Nova. New members began to join: Texas, Delaware, Moss Landing. Associate Memberships were created in order to placate the community. This ultimately has led to the now present single membership more representative of the community.

Shortly following the establishment of UNOLS, the Research Vessel Operators Council (RVOC), which was an older body by eight years, was incorporated into UNOLS. RVOC originally was established to work with the Coast Guard in developing and implementing the Research Vessels Act. This role completed, RVOC as a part of UNOLS was able to bring together much of the working elements of research ship operations. In this capacity, RVOC has become an essential part of UNOLS.

At the Fall 1972 meeting at Scripps, there were sown the seeds of UNOLS efforts which have come to fruition and continue to this day: Coastal Ships, Uniform Standards, Foreign Clearances, Technical Services, National Facilities and, of course, Fleet Replacement.

In accordance with the early direction, attention was turned to specialized facilities. A Charter Annex established National Oceanographic Facilities. These included the Expeditionary Vessel Alpha Helix; the Deep Submersible Alvin; and the Scripps Aircraft (uniquely designated as one-half a facility). Other candidates included Buoy Groups, Technician Groups, MG&G Facilities, and special platforms such as FLIP. For the duration of support needed, the efforts were successful. Economy, however, placed reins on increasing the number. The only continuing one is the Deep Submergence Facility which appears highly successful and is growing in scope.

Additional thrusts generated by UNOLS include Safety Standards and Foreign Clearances. Safety Standards were brought about in response to the tragic loss of R/V Gulf Stream in 1954 and have been incorporated into the Research Vessel Inspection Program. These Standards have been recognized by the National Transportation Safety Board as a unique and hallmark contribution to maritime safety. We at UNOLS can be proud of this.

Foreign Clearance procedures was borne amidst the Law of the Sea chaos in the early 70's. Procedures were spearheaded by UNOLS to facilitate the conduct of research in the burgeoning areas of the ocean being claimed by coastal nations. The orderly arrangements set up by UNOLS have been highly successful and have been copied worldwide.

Many of these events have not been without their humorous side. Safety Standards were expedited when one of our ships almost sawed itself in half by hauling in 4,000 meters of hydrowire across its bottom. And Foreign clearances were given a push when one of our ships pulled into Angola and inadvertently hoisted a rebel flag (sold to them by a devious ship chandler).

In summary, UNOLS has come a long way since the sunset clause was added to its charter in 1971. We can take pride in what has been accomplished over the past 25 years. There is a lot more to do, so the next 25 years should be just as productive.

APPENDIX XI

Order of the Ancient Albatross



TO ALL MARINE SCIENTISTS wherever they may be: know that the current holder of this award, **THE ORDER OF THE ANCIENT ALBATROSS**, signifies the oldest and longest operating research vessel in the University-National Oceanographic Laboratory System.

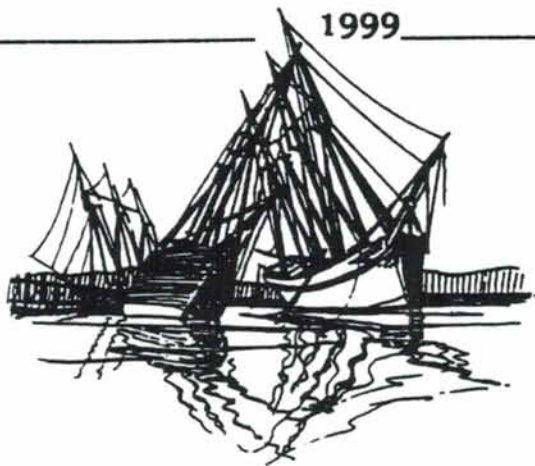
THEREFORE the current holder is entitled to the respect, awe, and privileges due a ship of its advanced age and service, and

WHEREAS this vessel may not last much longer, the attention of all **FUNDING AGENCIES**, whoever and wherever they may be, is directed to the urgent need to replace this vessel before it falls apart.

THIS AWARD is made annually in the name of the UNOLS Council.

R/V ALPHA HELIX
1996 Univ. of Alaska 1998 _____

1997 _____ 1999 _____



APPENDIX XII

ANNEX VI TO THE CHARTER

ARCTIC ICEBREAKER COORDINATING COMMITTEE

1. INTRODUCTION

The U.S. Coast Guard, NSF and UNOLS have agreed to establish a UNOLS Committee that will address research support for U.S. academic science investigators carrying out Arctic research aboard U.S. Coast Guard icebreakers. Particular concerns of this Committee are the USCG icebreakers POLAR SEA, POLAR STAR and HEALY. It is envisioned that these vessels will represent the major focus of the Committee.

The Arctic Icebreaker Coordinating Committee shall operate pursuant to appointment by UNOLS and in accordance with the UNOLS Charter. This annex will be incorporated as Annex VI to the Charter.

2. PURPOSE

The purpose of the AICC is to provide polar science projects with planning and scheduling assistance, facilitate communications between scientists, science funders and facility providers. It is to provide oversight and advice to the U.S. Coast Guard for the purpose of enhancing facilities and science aboard their icebreaker fleet. Incumbent in this is fulfilling an ombudsman role for the arctic science community, insuring efficient and effective utilization of U.S. icebreakers. It is also the responsibility of the AICC to promote new technology for arctic assets and to maintain cutting edge capability for these facilities.

The Charter is intended to promote the best utilization of arctic facilities, provide sufficient lead time for planning purposes, and provide incentives for the scientific community to organize the needed critical mass of research projects. The AICC will work with the user community, Federal sponsors and the operators of other polar facilities to encourage expeditions using U.S. Coast Guard icebreakers in a phased manner that meets the needs of a wide spectrum of arctic scientists. Additionally, the AICC will encourage the advancement of cooperative international programs for the enhancement of multidisciplinary arctic science throughout the academic community.

3. MEMBERSHIP

The Committee will include eight polar scientists with diverse disciplines serving three year-terms (except for the make up of the original committee whose term will be staggered with two two-year members, three three-year members and three four-year members). Individuals may not serve more than two consecutive terms. Representatives from the USCG, NSF, ONR, NOAA and the Arctic Research Commission will be expected to participate in the committee's meetings and activities. The Chair of this Committee will be an ex-officio member of the UNOLS Council and will keep the Council and the UNOLS membership informed of its activities.

4. SPECIFIC TASKS FOR THE AICC

Specific tasks of the Committee will be:

- Provide construction oversight for HEALY's scientific spaces and outfitting.
- Provide coordination for ice breaker scientific program scheduling.
- Participate in initiating and planning arctic science projects.
- Facilitate liaison between scientists and science funding agencies to support icebreaker utilization. The AICC will fulfill an ombudsman role for the arctic science community.
- Respond to requirements relating to the scientific mission for HEALY.
- Critique science operations for all USCG icebreakers.
- Provide advice on science equipment needs.
- Provide advice on technical support.
- Provide advice concerning international cooperation of scientific programs and facilities in the Arctic.

5. MEETINGS

The AICC will meet no less than twice annually to discuss issues within its charge. Funding for these meetings will be administered similar to that of other UNOLS standing committees.

6. COORDINATION

The AICC will include the UNOLS Fleet Improvement Committee, the UNOLS Research Technical Enhancement Committee and the UNOLS Research Vessel Operators' Committee on issues appropriate to these committees.

APPENDIX XIII

BALLOT

UNOLS COUNCIL ELECTIONS

September 20, 1996

The UNOLS Nominating Committee has assembled the following slate of candidates for the UNOLS Council positions to be filled at the 1996 Annual Meeting. This election will be held in accordance with the UNOLS Charter as adopted September, 1995. One representative from each UNOLS institution is eligible to vote. Please vote for only one candidate to fill each position. Vitae is included on backside.

UNOLS COUNCIL SLATE

UNOLS CHAIR (2 year term):

Ken Johnson
Moss Landing Marine Laboratory

UNOLS VICE-CHAIR (2 year term):

Tom Malone
University of Maryland

Tom Royer
University of Alaska

AT-LARGE (3 year term) - individual affiliated with any UNOLS Member Institution:

Clare Reimers
Rutgers University

Richard Feely
PMEL/University of Washington

OPERATOR REPRESENTATIVE (3 year term) - from among designated representatives of Member Operator institutions:

Dennis Hansell
Bermuda Biological Station for Research

Eric Firing
University of Hawaii

VITAE

- Ken Johnson** Professor of Chemical Oceanography, Moss Landing Marine Laboratories,
Chemical Oceanography: Development of analytical tools for trace metal and in situ chemical analyses in seawater, application of these tools to studies of chemical processes in hydrothermal vents, sediments and the oceanic water column.
- Tom Malone** Professor and Director, Horn Point Environmental Laboratory of The University of Maryland System Center for Environmental and Estuarine Studies
Biological Oceanography; Dynamics of coastal ecosystems; phytoplankton ecology; eutrophication.
- Tom Royer** Professor of Marine Science, Institute of Marine Science, University of Alaska
Physical Oceanography; Circulation of North Pacific Ocean and Air/Sea Interactions.
- Richard Feely** Senior Scientist at NOAA's Pacific Marine Environmental Laboratory and
Adjunct Professor of Oceanography, University of Washington
Hydrothermal Vent Chemistry and Global Studies of Carbon Dioxide Distributions in Surface Seawater
- Clare Reimers** Associate Professor of Oceanography, Rutgers University
Sediment Diagenesis and Carbon Cycling
- Dennis Hansell** Associate Research Scientist, Bermuda Biological Station for Research, Inc.
Chemical Oceanography; Carbon and nitrogen biogeochemistry.
- Eric Firing** Associate Professor of Oceanography, University of Hawaii at Manoa.
Physical Oceanography; equatorial circulation, ocean currents and their variability on time scales from hours to years, ocean current profiling technology.

APPENDIX XIV

UNOLS DIRECTORY (with designated representatives)
Operator Institutions in BOLD

Rev. 9/96

ALABAMA MARINE ENVIRONMENTAL SCIENCES CONSORTIUM
Dr. George F. Crozier

UNIVERSITY OF ALASKA Dr. Thomas Royer

**BERMUDA BIOLOGICAL STATION for RESEARCH,
Inc.** Dr. Dennis Hansell

BIGELOW LABORATORY FOR OCEAN SCIENCES
Dr. David Townsend

BROOKHAVEN NATIONAL LABORATORY Dr. Creighton D. Wirick

**UNIVERSITY OF CALIFORNIA, SAN DIEGO,
SCRIPPS INSTITUTION OF OCEANOGRAPHY**
Dr. Robert Knox

UNIVERSITY OF CALIFORNIA, SANTA BARBARA
Dr. James P. Kennett

CAPE FEAR COMMUNITY COLLEGE Mr. Raymond P. Brandi

**COLUMBIA UNIVERSITY, LAMONT-DOHERTY
EARTH OBSERVATORY** Dr. Dennis Hayes

UNIVERSITY OF CONNECTICUT Capt. Lawrence Burch

UNIVERSITY OF DELAWARE Dr. Carolyn A. Thoroughgood

**DUKE UNIVERSITY/UNIVERSITY OF NORTH
CAROLINA** Dr. Daniel B. Albert

FLORIDA INSTITUTE FOR OCEANOGRAPHY Dr. John C. Ogden

FLORIDA INSTITUTE OF TECHNOLOGY Dr. Richard Gerfick

FLORIDA STATE UNIVERSITY Dr. William C. Burnett

HARBOR BRANCH OCEANOGRAPHIC INSTITUTION
Mr. Richard Herman

HARVARD UNIVERSITY Dr. Michael B. McElroy

UNIVERSITY OF HAWAII Dr. Brian Taylor

HOBART & WILLIAM SMITH COLLEGES Dr. Donald L. Woodrow

THE JOHNS HOPKINS UNIVERSITY Dr. Gordon D. Smith

LEHIGH UNIVERSITY Dr. Bobb Carson

LOUISIANA UNIVERSITIES MARINE CONSORTIUM
Dr. Michael Dagg

UNIVERSITY OF MAINE Dr. Robert E. Wall

THE MARINE SCIENCE CONSORTIUM Dr. Darlene Richardson

UNIVERSITY OF MARYLAND Dr. Tom Malone

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Dr. John M. Edmond

**UNIVERSITY OF MIAMI, ROSENSTIEL SCHOOL OF
MARINE & ATMOSPHERIC SCIENCES**
Dr. Otis Brown

**UNIVERSITY OF MICHIGAN, CENTER FOR GREAT
LAKES & AQUATIC SCIENCES** Dr. Theodore C. Moore, Jr.

MONTEREY BAY AQUARIUM RESEARCH INSTITUTE
Dr. Bruce Robison

MOSS LANDING MARINE LABORATORIES
Dr. Kenneth Johnson

NAVAL POSTGRADUATE SCHOOL Dr. Robert Bourke

UNIVERSITY OF NEW HAMPSHIRE
Dr. Wendell Brown

STATE UNIVERSITY OF NEW YORK AT STONY BROOK
Dr. Charles A. Nittrouer

UNIVERSITY OF NORTH CAROLINA AT WILMINGTON
Mr. Robert I. Wicklund

NOVA UNIVERSITY Dr. Julian P. McCreary

OCCIDENTAL COLLEGE Dr. John S. Stephens, Jr.

OLD DOMINION UNIVERSITY Dr. Larry Atkinson

OREGON STATE UNIVERSITY Dr. G. Brent Dalrymple

UNIVERSITY OF PUERTO RICO Dr. M.L. Hernandez-Avila

UNIVERSITY OF RHODE ISLAND Dr. Jeffrey E. Callahan

RUTGERS UNIVERSITY Dr. Clare Reimers

SAN DIEGO STATE UNIVERSITY Dr. Clive Dorman

SEA EDUCATION ASSOCIATION Capt. Philip Sacks

SMITHSONIAN TROPICAL RESEARCH INSTITUTE
Mr. Howard Barnes

UNIVERSITY OF SOUTH CAROLINA Dr. Robert Thunell

UNIVERSITY OF SOUTH FLORIDA Dr. Peter R. Betzer

UNIVERSITY OF SOUTHERN CALIFORNIA Dr. Douglas Hammond

UNIVERSITY OF SOUTHERN MISSISSIPPI Dr. Denis Wiesenburg

**UNIVERSITY SYSTEM OF GEORGIA, SKIDAWAY
INSTITUTE OF OCEANOGRAPHY** Dr. Richard Jahnke

UNIVERSITY OF TEXAS Dr. Terry E. Whittedge

TEXAS A&M UNIVERSITY Dr. Ed Shaar, Jr.

VIRGINIA INSTITUTE OF MARINE SCIENCE Dr. L. Doneison Wright

UNIVERSITY OF WASHINGTON Dr. Arthur Nowell

UNIVERSITY OF WISCONSIN AT MADISON Dr. Anders W. Andren

UNIVERSITY OF WISCONSIN AT MILWAUKEE
Dr. David E. Edgington

UNIVERSITY OF WISCONSIN AT SUPERIOR Dr. Mary Balcer

WOODS HOLE OCEANOGRAPHIC INSTITUTION
RADM Richard Pittenger

UNOLS COUNCIL/COMMITTEES

UNOLS COUNCIL (UC)

(408) 755-8657	Kenneth Johnson, MLML, (Chair)	10/94-10/98
(907) 474-7835	Thomas Royer, U Alaska, (V-Chair)	10/93-10/98
(914) 359-2900	Dennis E. Hayes, L-DEO	10/91-10/97
(619) 534-4729	Bob Knox, SIO	10/94-10/97
(516) 632-8741	Cindy Lee, SUNY	10/94-10/97
(508) 289-2597	Richard Pittenger, WHOI	09/92-10/98
(207) 581-1110	Robert Wall, U Maine	09/92-10/98
(908) 932-6555 x236	Clare Reimers, Rutgers	09/96-09/99
(441) 297-1880 x210	Dennis Hansell, BBSR	09/96-09/99
(305) 361-4175 x9	Richard Findley, U Miami, (Chair, RVTEC)	09/92-10/9X
(904) 392-2128	Mike Perfit, U Florida (Chair, DESSC)	04/95-10/9X
(305) 361-4088	Christopher Mooers, U Miami (Chair, FIC)	10/94-10/9X
(508) 289-2277	Don Moller, WHOI, (Chair, Ship Scheduling)	10/94-10/9X
(408) 633-3534	Michael Prince, MLML, (Chair, RVOC)	09/92-10/9X

DEEP SUBMERGENCE SCIENCE COMMITTEE (DESSC)

(352) 392-2128	Mike Perfit, U Florida (Chair)	07/95-06/98
(617) 253-7136	James Bellingham, MIT	07/93-06/99
(541) 737-4367	Robert Collier, OSU	07/93-06/99
(508) 289-2857	Daniel Fornari, WHOI, (ex-officio)	07/92-XXXX
(206) 526-6169	Hugh Milburn, NOAA	07/92-06/98
(408) 775-1761	Dan Orange, MBARI	07/93-06/99
(206) 543-0859	Marvin Lilley, U Washington	06/96-06/99
(907) 474-5870	Cindy Van Dover, NURP/U Alaska	06/95-06/98
(508) 289-2307	Carl Wirsén, WHOI	07/92-06/98
(808) 956-3146	Patricia Fryer, U Hawaii	02/96-06/99
(508) 289-2597	Richard Pittenger, WHOI, (ex-officio)	06/91-XXXX

RESEARCH VESSEL OPERATORS' COMMITTEE (RVOC)

(914) 359-2900 x245	Paul Ljunggren, L-DEO, (Chair)	10/96-10/98
504-851-2808	Steve Rabalais, LUMCON, (V-Chair)	10/96-10/98

FLEET IMPROVEMENT COMMITTEE (FIC)

(305) 361-4088	Christopher Mooers, U Miami, (Chair)	10/94-10/97
(360) 293-2188	Suzanne Strom, Western Washington U	10/94-10/97
(808) 956-7894	Eric Firing, U Hawaii	02/92-05/98
(804) 683-4926	Larry Atkinson, ODU	07/95-10/96
(408) 459-3171	Bess Ward, UCSC	09/95-09/98
(907) 474-7993	Tom Weingartner, U Alaska	09/95-09/98
(409) 845-0795	Tom Crowley, Texas A&M	10/96-10/99
(914) 365-8155	Bill Smethie, LDEO	10/96-10/99
(508) 289-2624	Joseph Coburn, WHOI, (ex-officio)	10/92-10/9X

RESEARCH VESSEL TECHNICAL ENHANCEMENT COMMITTEE (RVTEC)

(305) 361-4175 x9	Richard Findley, U Miami, (Chair)	10/92-10/96
(541) 737-4622	Marc Willis, OSU	02/96-11/97

UNOLS COUNCIL/COMMITTEES

SHIP SCHEDULING COMMITTEE (SSC)

(508) 289-2277
(206) 543-5062

Don Moller, WHOI, (Chair)
Robert Hinton, U Washington, (V-Chair)

10/94-10/98
10/94-10/98

ARCTIC ICEBREAKER COORDINATING COMMITTEE (AICC)

(619) 534-3387
(919) 328-1834
(508) 289-2624
(804) 683-5835
(541) 737-3625
(512) 471-0433
(619) 534-6369
(907) 474-7993

Jim Swift, SIO, (Chair)
Lisa Clough, East Carolina U
Joe Coburn, WHOI
Glenn Cota, ODU
Kelly Falkner, OSU
Larry Lawver, U Texas
Dan Lubin, SIO
Tom Weingartner, U Alaska

MARINE OPERATIONS CONTACT

THE UNIVERSITY-NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM LIST OF RESEARCH VESSELS (>20M) OPERATED BY UNOLS INSTITUTIONS

UNOLS Homepage: <http://www.gso.uri.edu/unols/unols.html>

Rev. (9/96)

OPERATOR	NAME	LOA (FT/M)	BUILT/ CONVERTED	CREW	NO. of SCI.	OWNER	MARINE OPS. CONTACT
University of Hawaii Marine Center #1 Sand Island Road Honolulu, HI 96819 Homepage: http://www.soest.hawaii.edu/umc/	MOANA WAVE	210/64	1973/1984	16	19	NAVY	Capt. J.W. Coste Marine Superintendent PHONE: (808) 847-2661 FAX: (808) 848-5451 INTERNET: snug@ pohs.soest.hawaii.edu
University of Alaska Seward Marine Center PO Box 730 Seward, AK 99664 Homepage: http://www.ims.alaska.edu:8000/helix.html	ALPHA HELIX	133/41	1966	9	15	NSF	Mr. Thomas Smith Marine Superintendent PHONE: (907) 224-5261 FAX: (907) 224-3392 INTERNET: fnts@aurora. alaska.edu
University of Washington School of Oceanography, WB-10 Seattle, WA 98195 Homepage: http://www.ocean.washington.edu/ships/ships.html	T. G. THOMPSON C.A. BARNES	274/84 66/20	1991 1966/1984	22 2	36 6	NAVY NSF	Mr. Robert Hinton Marine Superintendent PHONE: (206) 543-5062 FAX: (206) 543-6073 INTERNET: hinton@ocean. washington.edu
Oregon State University College of Oceanography Newport, OR 97365 Homepage: http://lubber.oce.orst.edu/Wecoma/WecomaHome.html	WECOMA	185/56	1976/1994	13	20	NSF	Capt. Fred Jones Marine Superintendent PHONE: (541) 867-0224 FAX: (541) 867-0294 INTERNET: jonesf@ucs. orst.edu
Moss Landing Marine Laboratories PO Box 450 Moss Landing, CA 95039 Homepage: http://color.mlml.calstate.edu/www/	POINT SUR	135/41	1981	9	12	NSF	Mr. Michael Prince Marine Superintendent PHONE: (408) 633-3534 FAX: (408) 633-4580 INTERNET: prince@mlml. calstate.edu
University of California, San Diego Scripps Institution of Oceanography La Jolla, CA 92093-0210 Homepage: http://sio.ucsd.edu/supp_groups/shipsked	MELVILLE ROGER REVELLE NEW HORIZON R.G. SPROUL	279/86 274/84 170/52 125/38	1969/1990-1 1996 1978 1981/1985	23 22 12 5	35 37 13 12	NAVY NAVY U.C. U.C.	Capt. Thomas S. Althouse Marine Facilities Code P-0705 PHONE: (619) 534-1643 FAX: (619) 534-1635 INTERNET: talthouse@ ucsd.edu
University of Michigan Center for Great Lakes & Aquatic Sciences 2200 Bonisteel Boulevard Ann Arbor, MI 48109-2099 Homepage:	LAURENTIAN	80/24	1974	6	8	U.M.	Dr. Linda Goad Marine Superintendent PHONE: (313) 763-5393 FAX: (313) 747-2748 INTERNET: linda.m.goad@ umich.edu
Texas A&M University Department of Oceanography PO Box 3145 Galveston, TX 77843 Homepage: http://www.ocean.tamu.edu/gyre.html	GYRE	182/55	1973/1980	10	23	TAMU	Dr. Ed Shaar, Jr. Operations Manager PHONE: (409) 862-3290 FAX: (409) 845-6331 INTERNET: eshaar@ocean. tamu.edu

OPERATOR	NAME	LOA (FT/M)	BUILT/ CONVERTED	CREW	NO. of SCI.	OWNER	MARINE OPS. CONTACT
University of Texas Marine Science Institute Port Aransas, TX 78373 Homepage: http://www.utmsi.zo.utexas.edu/hornspec.htm	LONGHORN	105/32	1971/1986	4	12	U.T.	Mr. John Thompson Assoc. Director, Admin. PHONE: (512) 749-6760 FAX: (512) 749-6777 INTERNET: thompson@ utmsi.zo.utexas.edu
Louisiana Universities Marine Consortium Marine Research & Education Center Star Route Box 541 (Cocodrie) Chauvin, LA 70344 Homepage: http://www.lumcon.edu/educate.html	PELICAN	105/32	1985	5	15	LUMCON	Mr. Steve Rabalais Marine Ops. Supervisor PHONE: (504) 851-2808 FAX: (504) 851-2874 INTERNET: srabalais@ coco.lumcon.edu
Harbor Branch Oceanographic Institution 5600 US 1 N Ft. Pierce, FL 34946 Homepage: http://www.hboi.edu/	SEWARD JOHNSON EDWIN LINK SEA DIVER	204/63 168/51 113/34	1984/1994 1982/1988 1959/1992	11 10 6	29 20 12	H.B. H.B. H.B.	Mr. Tim Askew Marine Operations PHONE: (561) 465-2400 x262 FAX: (561) 465-2116 INTERNET: taskew@hboi.edu
University of Miami, RSMAS Marine Department 4600 Rickenbacker Causeway Miami, FL 33149 Homepage: http://www.rsmas.miami.edu/support/calanus.html	COLUMBUS ISELIN CALANUS	170/52 64/20	1972 1971	12 2	24 6	U.M. U.M.	Mr. David Powell Marine Operations PHONE: (305) 361-4832 FAX: (305) 361-4174 INTERNET: dpowell@ rsmas.miami.edu
University System of Georgia Skidaway Institute of Oceanography 10 Ocean Science Circle Savannah, GA 31416 Homepage: http://www.skio.peachnet.edu/bluefin.html	BLUE FIN	72/22	1972/1975	5	8	U.G.	Mr. Steven Carignan Supt. of Plant & Marine Ops PHONE: (912) 598-2456 FAX: (912) 598-2310 INTERNET: steve@skio. peachnet.edu
Duke/UNC Oceanographic Consortium Duke University Marine Laboratory Beaufort, NC 28516 Homepage: http://www.env.duke.edu/marinelab/vessels.html	CAPE HATTERAS	135/41	1981	10	12	NSF	Mr. Quentin Lewis Marine Superintendent PHONE: (919) 504-7580 FAX: (919) 504-7651 INTERNET: quentini@ duncoc.ml.duke.edu
University of Delaware College of Marine Studies 700 Pilottown Road Lewes, DE 19958 Homepage: http://www.udel.edu/marine_operations/	CAPE HENLOPEN	120/37	1976	7	12	U.D.	Mr. Tim Pfeiffer Director, Marine Operations PHONE: (302) 645-4341 FAX: (302) 645-4006 INTERNET: pfeiffer@ udel.edu
Lamont-Doherty Earth Observatory Columbia University Palisades, NY 10964 Homepage: http://www.ldeo.columbia.edu/Ewing/home.html	MAURICE EWING	239/73	1983/1990	18	32	NSF	Capt. Paul Ljunggren Marine Superintendent PHONE: (914) 365-8845 FAX: (914) 359-6817 INTERNET: marsupt@ ldeo.columbia.edu
University of Rhode Island Graduate School of Oceanography Narragansett, RI 02882 Homepage: http://www.gso.uri.edu/endeavor/endeavor.html	ENDEAVOR	184/56	1977/1993	12	18	NSF	Mr. William Hahn Marine Superintendent PHONE: (401) 874-8554 FAX: (401) 874-6574 INTERNET: b_hahn@ gsosun1.gso.uri.edu

OPERATOR	NAME	LOA (FT/M)	BUILT/ CONVERTED	CREW	NO. of SCI.	OWNER	MARINE OPS. CONTACT
Woods Hole Oceanographic Institution Woods Hole, MA 02543 Homepage: http://www.whoi.edu/marine-ops/	KNORR OCEANUS DSRV ALVIN	279/85 177/54 25.8	1970/1989 1976/1994 1964	25 12	34 15 2	NAVY NSF NAVY	Capt. Joe Coburn Manager, Marine Ops. PHONE: (508) 289-2624 FAX: (508) 540-8675 INTERNET: jacoburn@whoi.edu
Bermuda Biological Station for Research Inc. 17 Biological Station Lane Ferry Reach St. George's GE-01 BERMUDA Homepage: http://www.bbsr.edu/wbird.html	WEATHERBIRD II	115/35	1993	10	12	BBSR	Capt. C. Lee Black Marine Superintendent PHONE: (441) 297-1880 x208 FAX: (441) 297-1839 INTERNET: iblack@bbsr.edu
Smithsonian Tropical Research Institute Box 2072 Balboa, Republic of Panama APO AA 34002-0948 Homepage:	URRACA	96/30	1986/1994	5	10	STRI	Mr. Howard Barnes Assistant Director PHONE: 011-227-6022 FAX: 011-232-6197 INTERNET: STRI.TIVOLI. BARNESH@ic.si.edu

SHIP SCHEDULING CONTACT

THE UNIVERSITY-NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM LIST OF RESEARCH VESSELS (>20M) OPERATED BY UNOLS INSTITUTIONS

UNOLS Homepage: <http://www.gso.uri.edu/unols/unols.html>

Rev. (9/96)

OPERATOR	NAME	LOA (FT/M)	BUILT/ CONVERTED	NO. of SCIENTISTS	OWNER	SHIP SCHED. CONTACT
University of Hawaii Marine Center #1 Sand Island Road Honolulu, HI 96819 Homepage: http://www.soest.hawaii.edu/umc/	MOANA WAVE	210/64	1973/1984	19	NAVY	Capt. Stan Winslow Ship Scheduler PHONE: (808) 847-2661 FAX: (808) 848-5451 INTERNET: snut@poha.soest.hawaii.edu
University of Alaska Institute of Marine Science Fairbanks, AK 99775 Homepage: http://www.ims.alaska.edu:8000/helix.html	ALPHA HELIX	133/41	1966	15	NSF	Dr. Thomas Royer Chair, Ship Committee PHONE: (907) 474-7835 FAX: (907) 474-7204 INTERNET: royer@ims.alaska.edu
University of Washington School of Oceanography, WB-10 Seattle, WA 98195 Homepage: http://www.ocean.washington.edu/ships/ships.html	T. G. THOMPSON C.A. BARNES	274/84 66/20	1991 1966/1984	36 6	NAVY NSF	Mr. Robert Hinton Marine Superintendent PHONE: (206) 543-5062 FAX: (206) 543-6073 INTERNET: hinton@ocean.washington.edu
Oregon State University College of Oceanography Newport, OR 97365 Homepage: http://lubber.oce.orst.edu/Wecoma/WecomaHome.html	WECOMA	185/56	1976/1994	20	NSF	Capt. Fred Jones Marine Superintendent PHONE: (541) 867-0224 FAX: (541) 867-0294 INTERNET: jonesf@ucs.orst.edu
Moss Landing Marine Laboratories PO Box 450 Moss Landing, CA 95039 Homepage: http://color.miml.calstate.edu/www/	POINT SUR	135/41	1981	12	NSF	Mr. Michael Prince Marine Superintendent PHONE: (408) 633-3534 FAX: (408) 633-4580 INTERNET: prince@miml.calstate.edu
University of California, San Diego 9500 Gilman Drive, Dept. 0210 Scripps Institution of Oceanography La Jolla, CA 92093-0210 Homepage: http://sio.ucsd.edu/supp_groups/shipsked	MELVILLE ROGER REVELLE NEW HORIZON R.G. SPROUL	279/86 274/84 170/52 125/38	1969/1990-91 1996 1978 1981/1985	35 37 13 12	NAVY NAVY U.C. U.C.	Ms. Rose M. Dufour/ Elizabeth Rios Ship Scheduler(s) Code A-0210 PHONE: (619) 534-2841 FAX: (619) 535-1817 INTERNET: shipsked@ucsd.edu
University of Michigan Center for Great Lakes & Aquatic Sciences 2200 Bonisteel Boulevard Ann Arbor, MI 48109-2099 Homepage: http://	LAURENTIAN	80/24	1974	8	U.M.	Dr. Linda Goad Marine Superintendent PHONE: (313) 763-5393 FAX: (313) 747-2748 INTERNET: linda.m.goad@umich.edu
Texas A&M University Department of Oceanography PO Box 3145 Galveston, TX 77843 Homepage: http://www.ocean.tamu.edu/gyre.html	GYRE	182/55	1973/1980	23	TAMU	Dr. Ed Shaar, Jr. Operations Manager PHONE: (409) 862-3290 FAX: (409) 845-6331 INTERNET: eshaar@ocean.tamu.edu

OPERATOR	NAME	LOA (FT/M)	BUILT/ CONVERTED	NO. of SCIENTISTS	OWNER	SHIP SCHED. CONTACT
University of Texas Marine Science Institute Port Aransas, TX 78373 Homepage: http://www.utmsi.zo.utexas.edu/hornspec.htm	LONGHORN	105/32	1971/1986	12	U.T.	Mr. John Thompson Assoc. Director, Admin. PHONE: (512) 749-6760 FAX: (512) 749-6777 INTERNET: thompson@ utmsi.zo.utexas.edu
Louisiana Universities Marine Consortium Marine Research & Education Center 8124, Highway 56 Chauvin, LA 70344 Homepage: http://www.lumcon.edu/educate.html	PELICAN	105/32	1985	15	LUMCON	Mr. Steve Rabalais Marine Ops. Supervisor PHONE: (504) 851-2808 FAX: (504) 851-2874 INTERNET: srabalais@ coco.lumcon.edu
Harbor Branch Oceanographic Institution 5600 US 1 N Ft. Pierce, FL 34946 Homepage: http://www.hboi.edu/	SEWARD JOHNSON EDWIN LINK SEA DIVER	204/63 168/51 113/34	1984/1994 1982/1988 1959/1992	22 20 12	H.B. H.B. H.B.	Mr. Tim Askew Marine Operations PHONE: (561) 465-2400 x262 FAX: (561) 465-2116 INTERNET: taskew@hboi.edu
University of Miami, RSMAS Marine Department 4600 Rickenbacker Causeway Miami, FL 33149 Homepage: http://www.rsmas.miami.edu/support/calanus.html	COLUMBUS ISELIN CALANUS	170/52 64/20	1972 1971	24 6	U.M. U.M.	Mr. David Powell Marine Operations PHONE: (305) 361-4832 FAX: (305) 361-4174 INTERNET: dpowell@ rsmas.miami.edu
University System of Georgia Skidaway Institute of Oceanography 10 Ocean Science Circle Savannah, GA 31416 Homepage: http://www.skio.peachnet.edu/bluefin.html	BLUE FIN	72/22	1972/1975	8	U.G.	Mr. Steven Carignan Supt. of Plant & Marine Ops PHONE: (912) 598-2456 FAX: (912) 598-2310 INTERNET: steve@skio. peachnet.edu
Duke/UNC Oceanographic Consortium Duke University Marine Laboratory Beaufort, NC 28516 Homepage: http://www.env.duke.edu/marinelab/vessels.html	CAPE HATTERAS	135/41	1981	12	NSF	Mr. Quentin Lewis Marine Superintendent PHONE: (919) 504-7580 FAX: (919) 504-7651 INTERNET: quentinl@ duncoc.ml.duke.edu
University of Delaware College of Marine Studies 700 Pilottown Road Lewes, DE 19958 Homepage: http://www.udel.edu/marine_operations/	CAPE HENLOPEN	120/37	1976	12	U.D.	Mr. Tim Pfeiffer Director, Marine Operations PHONE: (302) 645-4341 FAX: (302) 645-4006 INTERNET: pfeiffer@ udel.edu
Lamont-Doherty Earth Observatory Columbia University Palisades, NY 10964 Homepage: http://www.ldeo.columbia.edu/Ewing/home.html	MAURICE EWING	239/73	1983/1990	32	NSF	Mr. Michael Rawson Marine Sci. Coordinator PHONE: (914) 365-8367 FAX: (914) 359-6817 INTERNET: rawson@ ldeo.columbia.edu
University of Rhode Island Graduate School of Oceanography Narragansett, RI 02882 Homepage: http://www.gso.uri.edu/endeavor/endeavor.html	ENDEAVOR	184/56	1977/1993	18	NSF	Mr. William Hahn Marine Superintendent PHONE: (401) 874-6554 FAX: (401) 874-6574 INTERNET: b_hahn@ gsosun1.gso.uri.edu

OPERATOR	NAME	LOA (FT/M)	BUILT/ CONVERTED	NO. of SCIENTISTS	OWNER	SHIP SCHED. CONTACT
Woods Hole Oceanographic Institution Woods Hole, MA 02543 Homepage: http://www.whoi.edu/marine-ops/	KNORR	279/85	1970/1989	34	NAVY	Mr. Donald Moller
	OCEANUS	177/54	1976/1994	15	NSF	Marine Ops. Admin.
	DSRV ALVIN	25.8	1964	2	NAVY	PHONE: (508) 289-2277 FAX: (508) 457-2185 INTERNET: dmoller@whoi.edu
Bermuda Biological Station for Research Inc. 17 Biological Station Lane Ferry Reach St. George's GE-01 BERMUDA Homepage: http://www.bbsr.edu/wbird.html	WEATHERBIRD II	115/35	1993	12	BBSR	Capt. C. Lee Black Marine Superintendent PHONE: (441) 297-1880 x208 FAX: (441) 297-1839 INTERNET: lblack@bbsr.edu
Smithsonian Tropical Research Institute Box 2072 Balboa, Republic of Panama APO AA 34002-0948 Homepage:	URRACA	96/30	1986/1994	5	STRI	Mr. Howard Barnes Assistant Director PHONE: 011-227-6022 FAX: 011-232-6197 INTERNET: STRI.TIVOLI. BARNESH@ic.si.edu

APPENDIX XV

AGENCY	PRELIMINARY										UNOLS OFFICE DATE: 11/13/96	PAGE 1			
	UNOLS RESEARCH VESSELS FLEET OPERATIONS - 1995 -					CRUISE DAY PROFILES									
	PHYS. OCEAN	ACOUS- TICS	CHEM. OCEAN	BIOL. OCEAN	ENVIR. ECOL.	FISH. INVT	CLIM. METEO	GEOLO GEOPH	MAP CHRTG	OCEAN ENGIN			TRAIN- ING	TRANS. MONSCI	POLL. ASSESS
National Science Foundation	909.30	2.00	263.00	1074.50	.00	.00	.00	786.00	.00	10.00	12.00	16.00	.00	176.00	3248.80
Office of Naval Research	319.00	29.00	43.00	14.00	.00	.00	85.00	.00	107.00	.00	.00	.00	.00	35.00	632.00
U.S. Geological Survey	.00	.00	.00	.00	.00	.00	24.00	.00	.00	3.00	.00	.00	.00	.00	27.00
Bureau of Land Management/Minerals Mgmt. Service	20.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	20.00
National Oceanic and Atmospheric Administration	31.50	.00	19.50	192.00	.00	.00	31.00	.00	.00	.00	.00	37.00	.00	8.00	319.00
Department of Energy (ERDA)	3.00	.00	2.00	5.00	.00	.00	7.00	.00	.00	.00	.00	.00	.00	.00	17.00
Other Federal	19.00	5.00	.00	.00	.00	.00	11.00	.00	.00	.00	.00	.00	.00	.00	35.00
State/Municipal	55.00	.00	.00	12.00	.00	5.50	18.50	.00	.00	29.00	.00	.00	.00	19.00	139.00
Other/Private	87.00	10.00	4.50	132.50	2.00	.00	135.50	22.00	9.00	5.50	15.00	.00	.00	5.00	428.00
TOTALS	1443.80	46.00	332.00	1430.00	2.00	5.50	1098.00	22.00	126.00	49.50	68.00	.00	.00	243.00	4865.80
PERCENT	29.67	.95	6.82	29.39	.04	.11	22.57	.45	2.59	1.02	1.40	.00	.00	4.99	100.00

INSTITUTION	PRELIMINARY										UNOLS OFFICE				
	UNOLS RESEARCH VESSELS FLEET OPERATIONS - 1995 -					CRUISE DAY PROFILES					DATE: 11/13/96				
	PHYS. OCEAN	ACOUS-TICS	CHEM. OCEAN	BIOL. OCEAN	ENVR. ECOL.	FISH. INVST	CLIM. METEO	GEOLO GEOPH	MAP CHRTG	OCEAN ENGIN	TRAIN-ING	TRANS. NONSCI	POLL. ASSESS	OTHER	TOTAL
University of Hawaii	105.00	.00	.00	.00	.00	.00	.00	43.00	.00	.00	.00	.00	.00	47.00	195.00
University of Alaska	77.00	.00	.00	28.00	.00	.00	.00	39.00	.00	.00	.00	.00	.00	.00	144.00
University of Washington	116.00	.00	34.00	220.00	.00	.00	.00	27.00	.00	11.00	.00	.00	.00	1.00	410.00
Oregon State University	75.00	16.00	.00	9.00	.00	.00	.00	42.00	.00	.00	.00	.00	.00	.00	145.00
Scripps Institution of Oceanography	168.00	10.00	53.00	198.00	.00	.00	.00	239.00	.00	3.00	.00	.00	.00	6.00	682.00
Texas A & M University	.00	.00	.00	2.00	.00	.00	.00	95.00	.00	.00	9.00	.00	.00	8.00	122.00
University of Texas	20.00	.00	.00	31.00	.00	.00	.00	.00	.00	13.00	.00	.00	.00	8.00	72.00
University of Miami, RSMAS	8.00	2.00	4.00	16.00	.00	.00	.00	7.00	.00	.00	4.00	.00	.00	3.00	47.00
University of Georgia, Skidaway	.00	.00	4.00	72.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.00	77.00
Duke University/University of North Carolina	28.00	8.00	44.00	49.00	.00	.00	.00	29.00	.00	11.00	7.00	.00	.00	.00	176.00
University of Delaware	26.00	.00	49.00	97.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	26.00	198.00
Lamont-Doherty Geological Observatory	7.00	.00	.00	.00	.00	.00	.00	275.00	.00	.00	.00	.00	.00	28.00	310.00
University of Rhode Island	89.00	.00	.00	139.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	228.00
Woods Hole Oceanographic Institution	492.00	.00	2.00	51.00	.00	.00	.00	217.00	.00	24.00	.00	.00	.00	71.00	857.00
University of Michigan	.00	.00	.00	26.00	.00	5.50	.00	55.50	.00	.00	3.50	.00	.00	.00	90.50
Moss Landing Marine Laboratory	10.00	.00	22.00	82.00	.00	.00	.00	15.00	.00	.00	.00	.00	.00	35.00	164.00
Louisiana Universities Marine Consortium	53.00	10.00	.00	78.00	2.00	.00	.00	.00	.00	.00	17.00	.00	.00	2.00	184.00
Harbor Branch Oceanographic Institution	128.80	.00	30.00	315.00	.00	.00	.00	14.50	.00	85.00	.00	31.00	.00	6.00	610.30
Bermuda Biological Station for Research	41.00	.00	90.00	17.00	.00	.00	.00	.00	.00	5.00	.00	.00	.00	1.00	154.00
TOTALS	1443.80	46.00	332.00	1430.00	2.00	5.50	0.00	1098.00	22.00	126.00	49.50	68.00	0.00	243.00	4865.80
PERCENT	29.67	0.95	6.82	29.39	0.04	0.11	0.00	22.57	0.45	2.59	1.02	1.40	0.00	4.99	100.00

VESSELS	PRELIMINARY										UNOLS RESEARCH VESSELS FLEET OPERATIONS - 1995 -				UNOLS OFFICE		PAGE 3
	CRUISE DAY PROFILES														DATE: 11/13/96		
	PHYS. OCEAN	ACOUS-TICS	CHEM. OCEAN	BIOL. OCEAN	ENVIR. ECOL.	FISH. INVST	CLIM. METEO	GEOLO GEOPH	MAP CHRTG	OCEAN ENGIN	TRAIN-ING	TRANS. NONSCI	POLL. ASSESS	OTHER	TOTAL		
MELVILLE	32.00	0.00	47.00	21.00	0.00	0.00	197.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	297.00		
KNORR	340.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	350.00		
T. THOMPSON	114.00	0.00	33.00	161.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	333.00		
EWING	7.00	.00	.00	.00	.00	.00	275.00	.00	.00	.00	.00	.00	.00	28.00	310.00		
MOANA WAVE	105.00	.00	.00	.00	.00	.00	43.00	.00	.00	.00	.00	.00	.00	47.00	195.00		
ATLANTIS II	25.00	0.00	2.00	51.00	0.00	0.00	196.00	0.00	0.00	0.00	0.00	0.00	0.00	46.00	320.00		
WECOMA	75.00	16.00	0.00	9.00	0.00	0.00	42.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	145.00		
ENDEAVOR	89.00	0.00	0.00	139.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	228.00		
OCEANUS	127.00	0.00	0.00	0.00	0.00	0.00	21.00	0.00	24.00	0.00	0.00	0.00	0.00	15.00	187.00		
SEWARD JOHNSON	85.00	0.00	0.00	176.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	271.00		
GYRE	.00	.00	.00	2.00	.00	.00	95.00	.00	.00	8.00	9.00	.00	.00	8.00	122.00		
NEW HORIZON	96.00	5.00	6.00	95.00	0.00	0.00	36.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	240.00		
COLUMBUS ISELIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.00		
EDWIN LINK	30.80	0.00	27.00	62.00	0.00	0.00	14.50	0.00	3.00	0.00	21.00	0.00	0.00	0.00	158.30		
POINT SUR	10.00	0.00	22.00	82.00	0.00	0.00	15.00	0.00	0.00	0.00	0.00	0.00	0.00	35.00	164.00		
CAPE HATTERAS	28.00	8.00	44.00	49.00	0.00	0.00	29.00	0.00	0.00	11.00	7.00	0.00	0.00	0.00	176.00		
ALPHA HELIX	77.00	0.00	0.00	28.00	0.00	0.00	39.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	144.00		
ROBERT G. SPROUL	40.00	5.00	0.00	82.00	0.00	0.00	6.00	0.00	5.00	1.00	0.00	0.00	0.00	6.00	145.00		
CAPE HENLOPEN	26.00	0.00	49.00	97.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.00	198.00		
WEATHERBIRD II	41.00	.00	90.00	17.00	.00	.00	.00	.00	5.00	.00	.00	.00	.00	1.00	154.00		
SEA DIVER	13.00	.00	3.00	77.00	.00	.00	.00	.00	82.00	.00	.00	.00	.00	6.00	181.00		
PELICAN	53.00	10.00	.00	78.00	2.00	.00	.00	22.00	.00	.00	17.00	.00	.00	2.00	184.00		
LAURENTIAN	0.00	0.00	0.00	26.00	0.00	5.50	55.50	0.00	0.00	3.50	0.00	0.00	0.00	0.00	90.50		
LONGHORN	20.00	.00	.00	31.00	.00	.00	.00	.00	.00	13.00	.00	.00	.00	8.00	72.00		
BLUE FIN	.00	.00	4.00	72.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.00	77.00		
CLIFFORD A. BARNES	2.00	0.00	1.00	59.00	0.00	0.00	2.00	0.00	1.00	11.00	0.00	0.00	0.00	1.00	77.00		
CALANUS	8.00	2.00	4.00	16.00	0.00	0.00	7.00	0.00	3.00	0.00	4.00	0.00	0.00	3.00	47.00		
TOTALS	1443.80	46.00	332.00	1430.00	2.00	5.50	1098.00	22.00	126.00	49.50	68.00	.00	.00	243.00	4865.80		
PERCENT	29.67	.95	6.82	29.39	.04	.11	22.57	.45	2.59	1.02	1.40	.00	.00	4.99	100.00		

INSTITUTION	PRELIMINARY											TOTAL
	UNOLS RESEARCH VESSELS FLEET OPERATIONS - 1995 -					OPERATIONAL DAYS CHARGED BY SPONSOR					UNOLS OFFICE DATE: 11/13/96	
	NATL SCI. FNDTN	OFF. NAVAL RES.	U.S. GEOL. SURV.	MIN. MGMT. SERV.	NATL. OCEAN. ATM AD.	DEPT. OF ENERGY	OTHER FEDER. FUNDS	STATE OR MUNIC.	PRIV/ FORGN. FUNDS			
University of Hawaii	171.00	.00	.00	.00	5.00	.00	19.00	.00	.00	.00	.00	195.00
University of Alaska	89.00	19.00	.00	.00	.00	.00	.00	.00	1.00	.00	.00	144.00
University of Washington	276.00	114.00	.00	.00	.00	6.00	.00	14.00	.00	.00	.00	410.00
Oregon State University	70.00	75.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	145.00
Scripps Institution of Oceanography	528.00	74.00	.00	20.00	.00	.00	5.00	55.00	.00	.00	.00	682.00
Texas A & M University	.00	24.00	.00	.00	.00	.00	.00	20.00	.00	.00	78.00	122.00
University of Texas	36.00	5.00	.00	.00	.00	.00	.00	30.00	.00	1.00	.00	72.00
University of Miami, RSMAS	21.00	6.00	.00	.00	10.00	7.00	.00	.00	.00	3.00	.00	47.00
University of Georgia, Skidaway	74.00	.00	.00	.00	.00	3.00	.00	.00	.00	.00	.00	77.00
Duke University/University of North Carolina	125.00	8.00	21.00	.00	.00	1.00	10.00	.00	.00	11.00	.00	176.00
University of Delaware	173.00	25.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	198.00
Lamont-Doherty Geological Observatory	250.00	.00	.00	.00	.00	.00	.00	.00	.00	60.00	.00	310.00
University of Rhode Island	191.00	37.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	228.00
Woods Hole Oceanographic Institution	771.00	61.00	.00	.00	20.00	.00	.00	.00	.00	5.00	.00	857.00
University of Michigan	79.00	.00	.00	.00	.00	.00	.00	9.00	.00	2.50	.00	90.50
Moss Landing Marine Laboratory	110.00	32.00	6.00	.00	.00	.00	1.00	9.00	.00	6.00	.00	164.00
Louisiana Universities Marine Consortium	.00	38.00	.00	.00	93.00	.00	.00	1.00	.00	52.00	.00	184.00
Harbor Branch Oceanographic Institution	133.80	114.00	.00	.00	191.00	.00	.00	.00	.00	171.50	.00	610.30
Bermuda Biological Station for Research	151.00	.00	.00	.00	.00	.00	.00	.00	.00	3.00	.00	154.00
TOTALS	3248.80	632.00	27.00	20.00	319.00	17.00	35.00	139.00	428.00	8.80	4865.80	
PERCENT	66.77	12.99	.55	.44	6.56	.35	.72	2.86	8.80	100.00		

	PRELIMINARY													PAGE 5	
	UNOLS RESEARCH VESSELS FLEET OPERATIONS - 1995 -													UNOLS OFFICE	
	OPERATIONAL DAYS CHARGED BY SPONSOR													DATE: 11/13/96	
VESSLS	LENGTH	NATL SCI. FNDTN	OFF. NAVAL RES.	U.S. GEOL. SURV.	MIN. MGMT. SERV.	NATL. OCEAN. ATM AD.	DEPT. OF ENERGY	OTHER FEDER. FUNDS	STATE OR MUNIC.	PRIV/ FORGN. FUNDS	TOTAL				
MELVILLE	279 FT	257.00	35.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	297.00				
KNORR	279 FT	350.00	.00	.00	.00	.00	.00	.00	.00	.00	350.00				
T. THOMPSON	274 FT	219.00	114.00	.00	.00	.00	.00	.00	.00	.00	333.00				
EWING	239 FT	250.00	.00	.00	.00	.00	.00	.00	.00	60.00	310.00				
MOANA WAVE	210 FT	171.00	.00	.00	.00	5.00	.00	19.00	.00	.00	195.00				
ATLANTIS II	210 FT	297.00	1.00	.00	.00	20.00	.00	.00	.00	2.00	320.00				
WECOMA	184 FT	70.00	75.00	.00	.00	.00	.00	.00	.00	.00	145.00				
ENDEAVOR	184 FT	191.00	37.00	.00	.00	.00	.00	.00	.00	.00	228.00				
GYRE	182 FT	.00	24.00	.00	.00	.00	.00	.00	20.00	78.00	122.00				
OCEANUS	177 FT	124.00	60.00	.00	.00	.00	.00	.00	.00	.00	187.00				
SEWARD JOHNSON	204 FT	81.00	36.00	.00	.00	66.00	.00	.00	.00	88.00	271.00				
NEW HORIZON	170 FT	193.00	8.00	.00	.00	.00	.00	5.00	34.00	.00	240.00				
COLUMBUS ISELIN	170 FT	.00	.00	.00	.00	.00	.00	.00	.00	.00	0.00				
EDWIN LINK	168 FT	21.80	.00	.00	.00	75.00	.00	.00	.00	61.50	158.30				
POINT SUR	135 FT	110.00	32.00	6.00	.00	.00	.00	1.00	9.00	6.00	164.00				
CAPE HATTERAS	135 FT	125.00	8.00	21.00	.00	.00	1.00	10.00	.00	11.00	176.00				
ALPHA HELIX	133 FT	89.00	19.00	.00	.00	.00	.00	.00	1.00	35.00	144.00				
ROBERT G. SPROUL	125 FT	78.00	31.00	.00	20.00	.00	.00	.00	16.00	.00	145.00				
CAPE HENLOPEN	120 FT	173.00	25.00	.00	.00	.00	.00	.00	.00	.00	198.00				
WEATHERBIRD II	115 FT	151.00	.00	.00	.00	.00	.00	.00	.00	3.00	154.00				
SEA DIVER	113 FT	31.00	78.00	.00	.00	50.00	.00	.00	.00	22.00	181.00				
LONGHORN	105 FT	36.00	5.00	.00	.00	.00	.00	.00	30.00	1.00	72.00				
PELICAN	105 FT	.00	38.00	.00	.00	93.00	.00	.00	1.00	52.00	184.00				
LAURENTIAN	80 FT	79.00	.00	.00	.00	.00	.00	.00	9.00	2.50	90.50				
BLUE FIN	72 FT	74.00	.00	.00	.00	.00	3.00	.00	.00	.00	77.00				
CLIFFORD A. BARNES	66 FT	57.00	.00	.00	.00	.00	6.00	.00	14.00	.00	77.00				
CALANUS	64 FT	21.00	6.00	.00	.00	10.00	7.00	.00	.00	3.00	47.00				
TOTALS		3248.80	632.00	27.00	20.00	319.00	17.00	35.00	139.00	428.00	4865.80				
PERCENT		66.77	12.99	.55	.41	6.56	.35	.72	2.86	8.80	100.00				

		PRELIMINARY										UNOLS RESEARCH VESSELS FLEET OPERATIONS - 1995 -		PAGE 6				
		PROJECT PERSON-DAYS AT SEA BY SPONSOR										UNOLS OFFICE		DATE: 11/13/96				
VESSELS	LENGTH	NATL		U.S.		MIN.		NATL.		DEPT.		OTHER		STATE		PRIV/		
		SCI.	FNDTN	NAVAL	GEOL.	MGMT.	MGMT.	OCEAN.	ATM AD.	OF	ENERGY	FEDER.	MUNIC.	OR	FORGN.	FUNDS	FUNDS	TOTAL
				RES.	SURV.	SERV.	SERV.	ATM AD.	ENERGY	FUNDS	MUNIC.	FUNDS	MUNIC.	FUNDS	FUNDS	FUNDS	FUNDS	TOTAL
MELVILLE	279 FT	5022.00		983.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	56.00	.00	.00	6,061.00
KNORR	279 FT	9829.00		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	9,829.00
T. THOMPSON	274 FT	6699.00		2621.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	9,320.00
EWING	239 FT	385.00		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	110.00	.00	495.00
MOANA WAVE	210 FT	2022.00		.00	.00	.00	.00	90.00	.00	.00	.00	183.00	.00	.00	.00	.00	.00	2,295.00
ATLANTIS II	210 FT	5876.00		23.00	.00	.00	.00	350.00	.00	.00	.00	.00	.00	.00	.00	44.00	.00	6,293.00
WECOMA	184 FT	874.00		1102.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1,976.00
ENDEAVOR	184 FT	2699.00		285.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	2,984.00
GYRE	182 FT	.00		185.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	422.00	1038.00	.00	1,645.00
OCEANUS	177 FT	859.00		684.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	42.00	1,585.00
SEWARD JOHNSON	176 FT	1537.00		497.00	.00	.00	.00	1119.00	.00	.00	.00	.00	.00	.00	.00	990.00	.00	4,143.00
NEW HORIZON	170 FT	2196.00		88.00	.00	.00	.00	.00	.00	.00	.00	45.00	.00	581.00	14.00	.00	.00	2,924.00
ISELIN	170 FT	.00		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	0.00
EDWIN LINK	168 FT	213.50		.00	.00	.00	.00	798.00	.00	.00	.00	.00	.00	.00	.00	475.00	.00	1,486.50
POINT SUR	135 FT	1186.00		309.00	78.00	.00	.00	.00	.00	.00	.00	13.00	.00	256.00	.00	45.00	.00	1,887.00
CAPE HATTERAS	135 FT	1284.00		88.00	183.00	.00	.00	.00	3.00	100.00	.00	.00	.00	.00	.00	11.00	.00	1,669.00
ALPHA HELIX	133 FT	1021.00		222.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	18.00	.00	335.00	.00	1,596.00
ROBERT G. SPROUL	125 FT	680.00		218.00	.00	248.00	.00	.00	.00	.00	.00	.00	.00	165.00	.00	9.00	.00	1,320.00
CAPE HENLOPEN	120 FT	611.00		50.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	661.00
WEATHERBIRD II	115 FT	743.00		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	9.00	.00	752.00
SEA DIVER	113 FT	213.00		312.00	.00	.00	.00	339.00	.00	.00	.00	.00	.00	.00	.00	173.00	.00	1,037.00
LONGHORN	106 FT	281.00		6.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	180.00	.00	40.00	.00	507.00
PELICAN	106 FT	.00		502.00	.00	.00	.00	798.00	.00	.00	.00	.00	.00	10.00	.00	115.00	.00	1,425.00
LAURENTIAN	80 FT	631.50		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	76.00	.00	34.50	.00	742.00
BLUE FIN	72 FT	647.00		.00	.00	.00	.00	.00	11.00	.00	.00	.00	.00	.00	.00	.00	.00	658.00
CLIFFORD A. BARNES	66 FT	230.00		.00	.00	.00	.00	.00	38.00	.00	.00	.00	.00	164.00	.00	.00	.00	432.00
CALANUS	64 FT	73.00		40.00	.00	.00	.00	54.00	35.00	.00	.00	.00	.00	.00	.00	41.00	.00	243.00
TOTALS		45,812.00		8,215.00	261.00	248.00	248.00	3,548.00	87.00	341.00	1,928.00	341.00	53.14	1,928.00	3,525.50	5.51	63,965.50	
PERCENT		71.62		12.84	.41	.39	.55	5.55	.14	.53	3.01	.53	.14	3.01	5.51	5.51	100.00	

VESSELS	PRELIMINARY											UNOLS OFFICE DATE: 11/13/96
	UNOLS RESEARCH VESSELS FLEET OPERATIONS - 1995 -											
	UNOLS CRUISE PARTICIPANTS AND AFFILIATIONS											
SCI	TECH	GRAD	STU/ OBS	TOTAL	NON-OPER UNOLS	NON- UNOLS	FED	FRGN	TOTAL			
MELVILLE	85.00	68.00	72.00	39.00	264.00	21.00	27.00	2.00	30.00	0.00	80.00	
KNORR	93.00	220.00	37.00	34.00	384.00	11.00	30.00	18.00	46.00	105.00		
T. THOMPSON	104.00	183.00	46.00	8.00	341.00	60.00	24.00	10.00	6.00	100.00		
EWING	119.00	96.00	20.00	22.00	257.00	11.00	21.00	5.00	55.00	92.00		
MOANA WAVE	74.00	116.00	62.00	5.00	257.00	7.00	17.00	6.00	13.00	43.00		
ATLANTIS II	133.00	208.00	69.00	15.00	425.00	25.00	57.00	19.00	38.00	139.00		
WECOMA	47.00	66.00	29.00	22.00	164.00	10.00	40.00	31.00	.00	81.00		
ENDEAVOR	119.00	102.00	36.00	13.00	270.00	13.00	18.00	48.00	8.00	87.00		
OCEANUS	39.00	78.00	10.00	7.00	134.00	4.00	20.00	5.00	2.00	31.00		
SEWARD JOHNSON	279.00	131.00	74.00	30.00	514.00	92.00	110.00	60.00	50.00	312.00		
GYRE	64.00	120.00	38.00	33.00	255.00	19.00	13.00	7.00	21.00	60.00		
NEW HORIZON	108.00	111.00	58.00	77.00	354.00	27.00	38.00	17.00	1.00	83.00		
ISELIN	.00	.00	.00	.00	0.00	.00	.00	.00	.00	0.00		
EDWIN LINK	138.00	40.00	55.00	29.00	262.00	33.00	104.00	12.00	16.00	165.00		
POINT SUR	135.00	87.00	213.00	145.00	580.00	201.00	156.00	25.00	3.00	385.00		
CAPE HATTERAS	87.00	66.00	70.00	51.00	274.00	87.00	53.00	35.00	3.00	178.00		
ALPHA HELIX	76.00	37.00	31.00	11.00	155.00	5.00	42.00	1.00	40.00	88.00		
ROBERT G. SPROUL	133.00	142.00	81.00	75.00	431.00	15.00	59.00	23.00	7.00	104.00		
CAPE HENLOPEN	357.00	63.00	21.00	22.00	463.00	256.00	64.00	6.00	12.00	338.00		
WEATHERBIRD II	437.00	93.00	251.00	37.00	818.00	38.00	35.00	3.00	16.00	92.00		
SEA DIVER	56	21.00	9.00	55.00	141.00	31.00	58.00	31.00	2.00	122.00		
PELICAN	75.00	35.00	19.00	.00	129.00	16.00	87.00	24.00	.00	127.00		
LAURENTIAN	42.00	32.00	28.00	73.00	175.00	29.00	26.00	6.00	7.00	68.00		
LONGHORN	45.00	26.00	54.00	89.00	214.00	.00	52.00	3.00	.00	55.00		
BLUE FIN	70.00	42.00	41.00	36.00	189.00	6.00	58.00	1.00	.00	65.00		
CLIFFORD A. BARNES	49.00	62.00	55.00	110.00	276.00	.00	12.00	.00	.00	12.00		
CALANUS	25.00	21.00	26.00	37.00	109.00	1.00	.00	4.00	14.00	19.00		
TOTALS	2989.00	2266.00	1505.00	1075.00	7835.00	1018.00	1221.00	402.00	390.00	3031.00		
PERCENT	38.15	28.92	19.21	13.72	100.00	33.59	40.28	13.26	12.87	100.00		

AGENCY	PRELIMINARY										UNOLS RESEARCH VESSELS FLEET OPERATIONS - 1995 -			UNOLS OFFICE			PAGE 1
	PHYS. OCEAN	ACOUS-TICS	CHEM. OCEAN	BIOL. OCEAN	SEA DAY PROFILES			GEOLO GEOPH	MAP CHRTG	OCEAN ENGIN	TRAIN-ING	TRANS. NONSCI	POLL. ASSESS	OTHER	TOTAL		
					ENVIR. ECOL.	FISH. INVST	CLIM. METEO									DATE: 11/13/96	
National Science Foundation	850.30	2.00	252.00	1039.50	0.00	0.00	720.00	0.00	10.00	12.00	15.00	0.00	166.00	3066.80			
Office of Naval Research	282.00	29.00	39.00	14.00	0.00	0.00	83.00	0.00	84.00	0.00	0.00	0.00	35.00	566.00			
U.S. Geological Survey	0.00	0.00	0.00	0.00	0.00	0.00	21.00	0.00	0.00	3.00	0.00	0.00	0.00	24.00			
Bureau of Land Management/Minerals Mgmt. Service	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00			
National Oceanic and Atmospheric Administration	31.50	0.00	26.50	168.00	0.00	0.00	31.00	0.00	0.00	0.00	37.00	0.00	7.00	301.00			
Department of Energy (ERDA)	3.00	0.00	2.00	5.00	0.00	0.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	17.00			
Other Federal	19.00	5.00	0.00	0.00	0.00	0.00	11.00	0.00	0.00	0.00	0.00	0.00	0.00	35.00			
State/Municipal	55.00	0.00	0.00	12.00	0.00	5.50	18.50	0.00	0.00	29.00	0.00	0.00	19.00	139.00			
Other/Private	81.00	10.00	4.50	129.50	2.00	0.00	125.50	20.00	9.00	5.50	15.00	0.00	14.00	416.00			
TOTALS	1341.80	46.00	324.00	1368.00	2.00	5.50	1017.00	20.00	103.00	49.50	67.00	0.00	241.00	4584.80			
PERCENT	29.3	1.0	7.1	29.8	0.0	0.1	22.2	0.4	2.2	1.1	1.5	0.0	5.3	100.0			

INSTITUTION	PRELIMINARY										UNOLS RESEARCH VESSELS FLEET OPERATIONS - 1995 -		UNOLS OFFICE		PAGE 2
	SEA DAY PROFILES										DATE: 11/13/96		OTHER	TOTAL	
	PHYS. OCEAN	ACOUS-TICS	CHEM. OCEAN	BIOL. OCEAN	ENVR. ECOL.	FISH. INVST	CLIM. METEO	GEOLO. GEOPH	MAP. CHRTG	OCEAN ENGIN	TRAIN-ING	TRANS. NONSCI			
University of Hawaii	101.00	.00	.00	.00	.00	.00	.00	37.00	.00	.00	.00	.00	.00	47.00	185.00
University of Alaska	74.00	.00	.00	27.00	.00	.00	.00	39.00	.00	.00	.00	.00	.00	.00	140.00
University of Washington	96.00	.00	31.00	201.00	.00	.00	.00	23.00	.00	11.00	.00	.00	.00	1.00	364.00
Oregon State University	72.00	18.00	.00	9.00	.00	.00	.00	42.00	.00	3.00	.00	.00	.00	.00	142.00
Scripps Institution of Oceanography	165.00	10.00	45.00	197.00	.00	.00	.00	227.00	.00	5.00	.00	.00	.00	8.00	658.00
Texas A & M University	.00	.00	.00	2.00	.00	.00	.00	90.00	.00	.00	8.00	.00	.00	8.00	117.00
University of Texas	20.00	.00	.00	31.00	.00	.00	.00	.00	.00	13.00	.00	.00	.00	8.00	72.00
University of Miami, RSMAS	8.00	2.00	4.00	16.00	.00	.00	.00	7.00	.00	3.00	.00	.00	.00	3.00	47.00
University of Georgia, Skidaway	.00	.00	4.00	72.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.00	77.00
Duke University/University of North Carolina	28.00	8.00	39.00	48.00	.00	.00	.00	26.00	.00	.00	11.00	.00	.00	.00	166.00
University of Delaware	26.00	.00	49.00	97.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	26.00	198.00
Lamont-Doherty Geological Observatory	6.00	.00	.00	.00	.00	.00	.00	246.00	.00	.00	.00	.00	.00	27.00	279.00
University of Rhode Island	81.00	.00	.00	137.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	218.00
Woods Hole Oceanographic Institution	445.00	.00	2.00	48.00	.00	.00	.00	192.00	.00	23.00	.00	.00	.00	62.00	772.00
University of Michigan	.00	.00	.00	26.00	.00	5.50	.00	55.50	.00	.00	3.50	.00	.00	.00	90.50
Mass Landing Marine Laboratory	10.00	.00	22.00	81.00	.00	.00	.00	15.00	.00	.00	.00	.00	.00	35.00	163.00
Louisiana Universities Marine Consortium	51.00	10.00	.00	68.00	2.00	.00	.00	.00	.00	20.00	.00	.00	.00	2.00	170.00
Harbor Branch Oceanographic Institution	117.80	.00	39.00	291.00	.00	.00	.00	17.50	.00	63.00	.00	.00	.00	14.00	573.30
Bermuda Biological Station for Research	41.00	.00	89.00	17.00	.00	.00	.00	.00	.00	5.00	.00	.00	.00	1.00	153.00
TOTALS	1341.80	46.00	324.00	1368.00	2.00	5.50	0.00	1017.00	20.00	103.00	49.50	67.00	0.00	241.00	4584.80
PERCENT	29.27	1.00	7.07	29.84	.04	.12	.00	22.18	.44	2.25	1.08	1.46	.00	5.26	100.00

VESSELS	UNOLS RESEARCH VESSELS FLEET OPERATIONS - 1995 -										PRELIMINARY				UNOLS OFFICE		PAGE 3	
	PHYS. OCEAN	ACOUS-TICS	CHEM. OCEAN	BIOL. OCEAN	SEA DAY PROFILES				MAP CHRTG	OCEAN ENGIN	TRAIN-ING	TRANS. NONSCI	POLL. ASSESS	OTHER	TOTAL	DATE: 11/13/96		
					ENVIR. ECOL.	FISH. INVST	CLIM. METEO	GEOL. GEOPH								UNOLS OFFICE	DATE: 11/13/96	
MELVILLE	29.00	.00	39.00	20.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
KNORR	303.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	10.00	313.00	
T. THOMPSON	94.00	.00	30.00	144.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	289.00	
EWING	6.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	279.00	
MOANA WAVE	101.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	185.00	
ATLANTIS II	22.00	.00	2.00	48.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	280.00	
WECOMA	72.00	16.00	.00	9.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	142.00	
ENDEAVOR	81.00	.00	.00	137.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	218.00	
OCEANUS	120.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	179.00	
SEWARD JOHNSON	73.00	.00	.00	156.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	239.00	
GYRE	.00	.00	.00	2.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	117.00	
NEW HORIZON	96.00	5.00	6.00	95.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	240.00	
COLUMBUS ISELIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
EDWIN LINK	33.80	.00	36.00	64.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	175.30	
POINT SUR	10.00	.00	22.00	81.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	163.00	
CAPE HATTERAS	28.00	8.00	39.00	48.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	166.00	
ALPHA HELIX	74.00	.00	.00	27.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	140.00	
ROBERT G. SPROUL	40.00	5.00	.00	82.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	145.00	
CAPE HENLOPEN	26.00	.00	49.00	97.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	198.00	
WEATHERBIRD II	41.00	.00	89.00	17.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	153.00	
SEA DIVER	11.00	.00	3.00	71.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	159.00	
PELICAN	51.00	10.00	.00	68.00	2.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	170.00	
LAURENTIAN	.00	.00	.00	26.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	90.50	
LONGHORN	20.00	.00	.00	31.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	72.00	
BLUE FIN	.00	.00	4.00	72.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	77.00	
CLIFFORD A. BARNES	2.00	.00	1.00	57.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	75.00	
CALANUS	8.00	2.00	4.00	16.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	47.00	
TOTALS	1341.80	46.00	324.00	1368.00	2.00	5.50	.00	1017.00	20.00	103.00	49.50	67.00	.00	241.00	4584.80			
PERCENT	29.27	1.00	7.07	29.84	.04	.12	.00	22.18	.44	2.25	1.08	1.46	.00	5.26	100.00			

INSTITUTION	UNOLS RESEARCH VESSELS FLEET OPERATIONS - 1995 -										TOTAL	UNOLS OFFICE DATE: 11/13/96	PAGE 4			
	PRELIMINARY															
	SEA DAYS CHARGED BY SPONSOR															
NATL SCI. FNDTN	OFF. NAVAL RES.	U.S. GEOLOG. SURV.	MIN. MGMT. SERV.	NATL. OCEAN. ATM AD.	DEPT. OF ENERGY	OTHER FEDER. FUNDS	STATE OR MUNIC.	PRIV/ FORGN. FUNDS								
University of Hawaii	161.00	.00	.00	.00	5.00	.00	19.00	.00	.00	.00	.00	.00	.00	185.00		
University of Alaska	87.00	19.00	.00	.00	.00	.00	.00	.00	.00	1.00	.00	.00	33.00	140.00		
University of Washington	250.00	94.00	.00	.00	.00	6.00	.00	.00	.00	14.00	.00	.00	.00	364.00		
Oregon State University	69.00	73.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	142.00		
Scripps Institution of Oceanography	508.00	70.00	.00	20.00	.00	.00	5.00	.00	.00	55.00	.00	.00	.00	658.00		
Texas A & M University	.00	22.00	.00	.00	.00	.00	.00	.00	.00	20.00	.00	.00	75.00	117.00		
University of Texas	36.00	5.00	.00	.00	.00	.00	.00	.00	.00	30.00	.00	.00	1.00	72.00		
University of Miami, RSMAS	21.00	6.00	.00	.00	10.00	7.00	.00	.00	.00	.00	.00	.00	3.00	47.00		
University of Georgia, Skidaway	74.00	.00	.00	.00	.00	3.00	.00	.00	.00	.00	.00	.00	.00	77.00		
Duke University/University of North Carolina	118.00	8.00	18.00	.00	.00	1.00	10.00	.00	.00	.00	.00	.00	11.00	166.00		
University of Delaware	173.00	25.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	198.00		
Lamont-Doherty Geological Observatory	226.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	53.00	279.00		
University of Rhode Island	188.00	30.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	218.00		
Woods Hole Oceanographic Institution	691.00	60.00	.00	.00	17.00	.00	.00	.00	.00	.00	.00	.00	4.00	772.00		
University of Michigan	79.00	.00	.00	.00	.00	.00	.00	.00	.00	9.00	.00	.00	2.50	90.50		
Moss Landing Marine Laboratory	109.00	32.00	6.00	.00	.00	.00	1.00	.00	.00	9.00	.00	.00	6.00	163.00		
Louisiana Universities Marine Consortium	.00	36.00	.00	.00	.00	83.00	.00	.00	.00	1.00	.00	.00	50.00	170.00		
Harbor Branch Oceanographic Institution	126.80	86.00	.00	.00	186.00	.00	.00	.00	.00	.00	.00	.00	174.50	573.30		
Bermuda Biological Station for Research	150.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	3.00	153.00		
TOTALS	3066.80	566.00	24.00	20.00	301.00	17.00	35.00	139.00	416.00	4584.80						

		PRELIMINARY										PAGE 5	
		UNOLS RESEARCH VESSELS FLEET OPERATIONS - 1995 -										UNOLS OFFICE	
		SEA DAYS CHARGED BY SPONSOR										DATE: 11/13/96	
VESSELS	LENGTH	NATL SCI. FNDTN	OFF. NAVAL RES.	U.S. GEOL. SURV.	MIN. MGMT. SERV.	NATL. OCEAN. ATM AD.	DEPT. OF ENERGY	OTHER FEDER. FUNDS	STATE OR MUNIC.	PRIV. FORGN. FUNDS	TOTAL	TOTAL	
												TOTAL	TOTAL
MELVILLE	279 FT	237.00	31.00	.00	.00	.00	.00	.00	5.00	.00	.00	.00	273.00
KNORR	279 FT	313.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	313.00
T. THOMPSON	274 FT	195.00	94.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	289.00
EWING	239 FT	226.00	.00	.00	.00	.00	.00	.00	.00	53.00	.00	.00	279.00
MOANA WAVE	210 FT	161.00	.00	.00	.00	5.00	.00	19.00	.00	.00	.00	.00	185.00
ATLANTIS II	210 FT	261.00	1.00	.00	.00	17.00	.00	.00	.00	.00	.00	1.00	280.00
ENDEVOUR	184 FT	188.00	30.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	218.00
WECOMA	184 FT	69.00	73.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	142.00
GYRE	182 FT	.00	22.00	.00	.00	.00	.00	.00	20.00	.00	.00	75.00	117.00
OCEANUS	177 FT	117.00	59.00	.00	.00	.00	.00	.00	.00	.00	.00	3.00	179.00
SEWARD JOHNSON	204 FT	74.00	30.00	.00	.00	51.00	.00	.00	.00	.00	.00	84.00	239.00
NEW HORIZON	170 FT	193.00	8.00	.00	.00	.00	.00	5.00	34.00	.00	.00	.00	240.00
COLUMBUS ISELIN	170 FT	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
EDWIN LINK	168 FT	24.80	.00	.00	.00	89.00	.00	.00	.00	.00	.00	61.50	175.30
POINT SUR	135 FT	109.00	32.00	.00	.00	.00	.00	.00	9.00	.00	.00	6.00	163.00
CAPE HATTERAS	135 FT	118.00	8.00	18.00	.00	.00	1.00	10.00	.00	.00	.00	11.00	166.00
ALPHA HELIX	133 FT	87.00	19.00	.00	.00	.00	.00	.00	1.00	.00	.00	33.00	140.00
ROBERT G. SPROUL	125 FT	78.00	31.00	.00	20.00	.00	.00	.00	16.00	.00	.00	.00	145.00
CAPE HENLOPEN	120 FT	173.00	25.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	198.00
WEATHERBIRD II	115 FT	150.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	3.00	153.00
SEA DIVER	113 FT	28.00	56.00	.00	.00	46.00	.00	.00	.00	.00	.00	29.00	159.00
LONGHORN	105 FT	36.00	5.00	.00	.00	.00	.00	.00	30.00	.00	.00	1.00	72.00
PELICAN	105 FT	.00	36.00	.00	.00	83.00	.00	.00	1.00	.00	.00	50.00	170.00
LAURENTIAN	80 FT	79.00	.00	.00	.00	.00	.00	.00	9.00	.00	.00	2.50	90.50
BLUE FIN	72 FT	74.00	.00	.00	.00	.00	3.00	.00	.00	.00	.00	.00	77.00
CLIFFORD A. BARNES	66 FT	55.00	.00	.00	.00	.00	6.00	.00	14.00	.00	.00	.00	75.00
CALANUS	64 FT	21.00	6.00	.00	.00	10.00	7.00	.00	.00	.00	.00	3.00	47.00
TOTALS		3066.80	566.00	24.00	20.00	301.00	17.00	35.00	139.00	416.00	3.00	3.00	4584.80
PERCENT		66.89	12.35	.52	.44	6.57	.37	.76	3.03	9.07			100.00

100

100

