UNIVERSITY - NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

UNOLS Annual Meeting

Summary Report

21 September 1999

National Science Foundation, Room 1235
4201 Wilson Boulevard
Arlington, VA

UNOLS ANNUAL MEETING
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Appendixes

Tuesday 21 September 1999

INTRODUCTION – The UNOLS Annual meeting was held in Room 1235 of the National Science Foundation on 21 September 1999. Items of the agenda, ***Appendix I***, were addressed in the order as reported below. Bob Knox, UNOLS Chair, called the meeting to order at 0830 and welcomed the gathering. The participants of the meeting are listed in ***Appendix II.***

ACCEPTING MINUTES – The minutes from the 18 September 1998 Annual meeting were accepted as written.

COMMITTEE REPORTS

Research Vessel Operator's Committee (RVOC) – Paul Ljunggren, RVOC Chair, provided the report and gave an update on a variety of RVOC activities. Defibrillators were bought and

supplied to the entire fleet. The Research Vessel Safety Standards (RVSS) have been updated and will soon be published. The RVOC Safety committee met at the University of Rhode Island to review the latest USCG and international regulations and how they might affect the UNOLS Fleet. RVOC was tasked by NSF to develop a van inventory. Joe Coburn is heading this activity. The annual 1999 RVOC meeting will be held on 2-4 November at HBOI. The agenda will include a presentation by Jamestown Marine Services on computerized maintenance systems, a discussion of the Academic Fleet Review and a presentation on the National Marine Fisheries Service's planned fishery research vessel.

DEep Submergence Science Committee (DESSC) – Patty Fryer, DESSC chair, provided the report. This year marked the first cruise which used both ROVs and the autonomous vehicle ABE. The Deep Submergence Group at WHOI is developing a next generation Jason which should be ready for service in 2001. It will be an upgrade to the current Jason. At the July DESSC meeting, plans were discussed for the DESCEND Workshop scheduled for 25-27 October. The first day of the workshop will be devoted to discussions on science directions. The second day will discuss technology and identify facility needs for the future. Patty hopes to have a rough draft of the report ready by the December DESSC meeting.

Fleet Improvement Committee (FIC) – The FIC report was presented by Larry Atkinson. The FIC met with ONR and Lockheed/Martin representatives to discuss the AGOR 26 design. FIC is providing the user community input on the design. Science Mission Requirements (SMRs) have been developed for a replacement of ALPHA HELIX. Plans for the East Coast SMRs are tabled for now. The FIC will work with operators on replacement plans for their respective vessels. A major focus of the FIC has been development of "Biennial Review of the Fleet" document. An outline of the document is provided in ***Appendix III.***

Ship Scheduling Committee (SSC) – Mike Prince, outgoing SSC Chair, presented the 2000 ship utilization totals (see ***Appendix IV***) and reviewed the Ship Scheduling procedures which were altered this year. Under the new procedures, the full meeting of the SSC was held in July when most funding decisions had been made. The review committee met again in September to finalize the schedules. In 2000, NSF will be supporting 59% of the fleet usage. This is up from past years. Much of the NSF work is on large ships. Other agency totals (ONR and NOAA) are down. The intermediate east coast vessels appear to have light schedules in 2000. The funding level for NAVO work is not clear at this time. If funding is less than in past years, the lower priority NAVO programs might not be scheduled. The UNOLS system is ready to accommodate either funding scenario. The number of funded ROV programs in 2000 is high and some of this work may be shifted to 2001. Mike reviewed the cruise scenarios for each of the large ships. Approximately 80% of the ship time requests are now being submitted electronically by the community. Use of the electronic filing is very helpful.

Research Vessel Technical Enhancement Committee (RVTEC) – John Freitag, RVTEC Chair, reported on the committee's 1998 meeting. It was unique in that it was combined with the INMARTECH '98 Symposium, a joint meeting with the international community. The INMARTECH program included a variety of technical sessions. Informative discussions resulted from this joint meeting. The 1999 RVTEC meeting will be hosted by the University of Texas in

Port Aransas, TX on 20-22 October. A discussion on the data storage format of NetCDF is planned. FIC formally requested that RVTEC apply a standard format and NetCDF was selected. The meeting will also include discussions on underway data processes, ARGO, and a SeaNet Update.

Other activities include updating the RVTEC homepage which has been handled by Tom Wilson. The RVTEC has also been involved in planning HEALY's science system testing. Many of the RVTEC members will be involved in development of the tests and participating in the test cruises.

Arctic Icebreaker Coordinating Committee (AICC) – Jim Swift, AICC Chair, provided the report. The AICC goal is to have HEALY's scheduling and operation modeled after UNOLS. HEALY has been launched and is expected to be delivered to the USCG in November. Warm water trials will be conducted in February 2000. The ship will be ready for full science operations in early 2001. A full report of the AICC activities is included as ***Appendix V***.

Jim reported on a RAND study that is investigating the costs associated in making a nuclear submarine available for use by the science community. MENDELL RIVERS is a submarine scheduled for decommissioning and has eight to nine years of reactor life remaining. The Navy is considering making this ship available for science.

FEDERAL AGENCY AND CORE REPORTS

Department of State (DOS) – Tom Cocke gave the DOS report. NSF, ONR and NOAA are providing support for a full time clearance specialist, Liz Maruschak. Liz has made a significant difference in assisting with the clearance process. However, about two-thirds of the requests that are submitted are received late. Requests are required to be at the DOS one month prior to the deadline for the request. As an example, in the case of a country which requires six months for clearance processing the request must be submitted seven months before cruise time. Late submissions place a strain on the DOS office. Post cruise obligations are the reports required by the coastal states that granted clearance. About one third of these reports are submitted to the DOS by PIs on time. This is actually an improvement from past years when only one fourth were submitted on time. Twenty-three reports remain outstanding for the past year.

Liz has devoted a lot of time on the DOS based ship tracking system. She has been redeveloping the system from FoxPro to ACCESS. This has greatly improved efficiency. Liz is looking for an ACCESS-2000 expert to look over her application. It is not clear whether or not the funding for Liz will continue into FY00.

There is no news concerning the ratification of the Law of the Sea Treaty.

Mineral Management System (MMS) – no report

Naval Oceanographic Office (NAVO) – Paul Taylor gave the report for NAVO. Viewgraphs from this presentation are included as ***Appendix VI***. The viewgraphs provide UNOLS and

NAVOCEANO accomplishments for 1997-1999. The NAVO program was organized by Gordon Wilkes and Jim Trees. Jim Trees has retired from the Navy. Gordon has also retired, but is back as a contractor for NAVO. Use of UNOLS ships has been very beneficial to NAVO. The Navy survey ships are all forward deployed and rarely return to the United States. As a result, NAVO's survey needs in U.S. waters could not be met prior to utilization of the UNOLS ships. Paul provided a viewgraph showing the institutions that have conducted NAVO work. The positive attitude of the UNOLS operations is excellent. During the three years of operations, 12 different ships were used for a total of 1255 ship days. In the past three years all of the funds available for UNOLS use was spent by NAVO on UNOLS ships or in processing data collected from UNOLS ships. Because the funding level for CY2000 is unclear there are scenarios for funding at both the $3M level and the $7.5M level. If full funding is received, lower priority projects will be scheduled. NAVO is very pleased with the processed data that UNOLS has provided.

National Oceanic and Atmospheric Administration (NOAA) – CDR Beth White provided the NOAA report. She began the report by noting that line officers from NOAA OAR, NOS and NMFS are present. Beth introduced Tashiro Shozo from JAMSTEC who is visiting NOAA. Also introduced was Louisa Koch, Deputy Assistant Administrator of OAR.

R/V BROWN will be arriving in Hawaii this month (September) and will then depart for Seattle with arrival scheduled on 23 October. This will complete an around-the-world cruise that started on 14 January. Beth gave an overview of the programs that BROWN conducted over the past year.

Oceanographer of the Navy (OON) – Pat Dennis gave the report for the Oceanographer of the Navy. RADM Richard West is now aboard as the new Oceanographer of the Navy and is enthusiastic about his new assignment. Rick Spinrad is also onboard as the new Technical Director for the OON. Rick brings significant experience and a full knowledge of the UNOLS system. The Navy's survey fleet modernization plan is nearing completion. TAGS 64, BRUCE HEEZEN, will be delivered this winter and may make a trip to Rhode Island to honor the school that gave the ship its name. TAGS 65 has yet to be named.

Naval Research Laboratory (NRL) – Joan Gardener provided the report for NRL. For 2000 NRL is planning approximately $1.3M of UNOLS ship time. Work is scheduled on REVELLE.

National Science Foundation (NSF) – The NSF report was given by Don Heinrichs. His viewgraphs are included as ***Appendix VII***. Several staff changes were announced. Don will be retiring at the end of December. Recruitment for an Associate Program Director is underway. CDR Beth White, on loan from NOAA, is assisting at NSF on a part-time basis. She has been a great help to NSF. Holly Smith has joined OCFS/ODP as a science assistant.

The Ocean Sciences budget request for 2000 is an increase of 2.6% over 1999. The major emphases in the 2000 budget are for Information Technology (IT^2) and Biocomplexity in the Environment (BE). Congress has not signed the budget at this time. The House mark is at FY99 level and the Senate mark is at the request level. The budget will need to go to conference and may go into a continuing resolution.

The Academic Fleet Review Report recommended the UNOLS system be retained. Technical support for share-use shipboard systems has been listed as a concern. The need for a long-range plan was recommended. Further discussion on this topic is planned later in the meeting.

Don reported on NSF program issues. The Government Performance and Results Act (GPRA) for facilities must be implemented. Annual performance goals must be developed for research facilities for FY99 and FY00. As a performance goal for operations, it is desired to keep facility operating time lost due to unscheduled downtime to less than 10%. Construction and upgrades should be kept within annual time schedules and expenditure plans, and not exceed 110% of estimates.

Facility templates for reporting GPRA are being developed for use starting early October. Each operator will provide information to the UNOLS Office who will compile statistics. The results will be merged at NSF. As an action, NSF and UNOLS operators need to agree on a single, consistent procedure to define and report "user units."

In other program issues, Don reported that proposal guidelines have been updated on the NSF website. On 15 October 1999, Fastlane will be a requirement for all proposals.

Don reported on NSF planning issues. They plan to articulate a broadly based vision for the future of ocean sciences and technology. They also plan to develop a robust plan for the modernization and composition of the academic research fleet that responds to realistic science and funding decisions.

Bob Knox made a presentation on behalf of UNOLS recognizing Don's many contributions and dedication to the academic fleet. Don was presented with a mariner's clock.

Office of Naval Research (ONR) – Sujata Millick provided the ONR report and began by presenting the ONR Organization Chart, see ***Appendix VIII***. RADM Gaffney is the Chief of Naval Research, Dr Saalfeld is Technical Director, and Vice Chief of Naval Research is BGEN Timothy Donovan. There are six departments within ONR. Sujata reported that in effort parallel to the NSF Futures workshops, ONR has four focus areas and 16 corporate thrusts. The four focus areas are Battlespace Environments, Undersea Warfare/Anti-Submarine Warfare, Undersea Warfare/Mine Warfare, and Maritime Intelligence, Surveillance, Reconnaissance & Space Exploitation. The Navy's support for fleet facilities was presented. Total funding for Research Facilities in CY1999 is $21,800 and is $13,164 for CY2000. The total Navy ship time supported in these years is $18,203 in CY1999 and $11,662. The ship time use totals were broken down further by types of Navy support (ONR, NRL, NAVO, NOPP and other).

The AGOR 26 construction contract is close to being signed. The Phase I design effort is nearing completion. The design was presented at the Council meeting. FIC will review the AGOR 26 design in detail at their November meeting. MOANA WAVE was removed from service in June of this year. Its final disposition is still unclear. ONR has significant work off Asia in the near term. The Navy's LWAD program will be carried out in the Mediterranean next year.

Bob Knox introduced Rear Admiral Evelyn Fields, Director of the NOAA Corps.

Consortium for Oceanographic Research and Education (CORE)– Bob Winokur, Vice President of CORE, gave the report and began by reviewing various budget issues. Funding for NAVO's use of UNOLS vessels has been included as part of the NOPP budget at the $7.5M level for the past several years. It appears that Congress has reduced this level to $3M for FY00. There is an effort to put some of the NOPP money into other agency budgets. It is important that the UNOLS community make their representatives aware of the importance of this NOPP funding. It is unclear at this time if additional money will be added to the budget. The Senate and House budgets for NOAA differ dramatically and it is still a question as to how this will be reconciled.

Bob Winokur presented viewgraphs showing current NOPP Plans, see ***Appendix IX***. For FY2000, agencies with NOPP budget submissions are ONR, NOAA and NASA. The total budget is approximately $18M. There are three themes for NOPP 2000: Processes and Prediction, Sensing and Systems, and Sustainable Coasts and Coastal Presence. Bob discussed the CORE ocean observations initiative. This began in 1998 with a request to NORLC from Congressmen Saxton and Weldon for a U.S. plan. In July of this year CORE completed a paper titled, "A National Initiative to Observe the Oceans: A CORE Perspective." A new report on this topic is to be completed by the end of 1999. They hope to engage the broader community concerning how best to proceed with an ocean observing plan. Some of the issues that need to be resolved include management, integration of present and future systems, integration between coastal and open ocean systems, relationship to international programs, and identifying objectives, requirements and priorities. Bob provided a list of the ocean observations task team members. Membership includes both federal agency representatives and academia. Various examples illustrating the needs for observatories include:

- Ocean-atmospheric interactions and climate,
- Deep ocean and solid earth science,
- Ocean chemistry and the carbon cycle,
- The coastal zone, and
- Biological dimensions.

A list of the current NOPP representatives was provided and includes 12 agencies. Also presented was the list of the NORLC members.

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NSF Academic Fleet Review – Don Heinrichs provided the report on the Academic Fleet Review. His viewgraphs are provided as ***Appendix X***. Don gave the history of the review and explained why it had been initiated. The National Science Board (NSB) requires that all facilities be reviewed periodically. A review of the fleet had not been conducted in some time, and as a result, NSB requested the review. Ron Tipper and Ellen Kappel provided the administrative support for the review report. Don presented a viewgraph showing the Committee membership and their charge from the Assistant Director of Geosciences. The Committee included

representation from industry, federal agencies, and the academic community. The members included Roland Schmitt, Chair; Earl Doyle, Steve Ramberg, Hugo Bezdek, Christopher D'Elia, Ellen Druffel, Larry Mayer, and Georges Weatherly. The Committee's charge was to:

- Review and evaluate the current Academic Research Fleet.
- Review and evaluate management structure, existing capabilities and services and possible changes.
- Recommend actions to improve the organization, management and cost effective operation of the fleet.

The Committee found that the UNOLS system should be retained with increased emphasis on science support and continuous quality improvement. Don showed figures from the fleet review report which provided the ship utilization totals for 1988 through 1999 for NSF as well as ship utilization for the entire fleet. The charts show a decline in the NSF use of the fleet in recent years. The review committee recommended that any extra facility funds available as a result of low utilization should be applied to fleet improvement.

Don reviewed the findings and recommendations of the fleet review:

Principal Findings:

- Current practices provide excellent access to the sea for U.S. researchers
- UNOLS services are meeting community needs and costs are comparable to other government and commercial operators.

Recommendations:

- The UNOLS system should be retained.

Programmatic findings:

- There is a potential for a near-term period of reduced use of UNOLS fleet by NSF grantees.
- There is need for a strong continuing program for technology introduction, improvement of existing capabilities, and a more systematic approach to maintenance and upgrades.
- There is a need to enhance quality control, training and safety procedures, and develop even higher standards for shared use facilities.

Recommendation:

- Launch a significant campaign to upgrade and strengthen the fleet to prepare for increasing technological sophistication and improve future productivity and quality of fleet operations.

Operational findings:

- Continue the practice of competing the management of the UNOLS Office.
- Needs for specialized capabilities are met in special circumstances from outside the UNOLS system.

Recommendations:

- Use a cooperative agreement for support of the UNOLS Office to ensure necessary management oversight.
- Consider a trial including some commercial ship operators as UNOLS non-member operators to provide unique fleet capabilities.

Planning findings:

- Ocean scientists must assess the future needs and opportunities of the field to establish priorities. A broad vision is essential to anticipate future fleet requirements.
- Federal agencies must improve long range planning for facilities with twenty to thirty year life spans, beyond the scope of NSF and UNOLS alone.

Recommendation:

- NSF must accelerate and expand efforts to articulate a broadly based vision for the future of ocean science and technology.
- Federal agencies sponsoring research in oceanography should develop a long range plan for modernization and composition of the oceanographic research fleet that reaches well into the 21st century.

A general discussion followed Don's presentation. The Council was concerned with the recommendation to charter commercial ships. Don explained that the recommendation did not include bare-boat charters for which there are often safety concerns as well as additional costs to provide a fully founded ship, bringing the total cost equal to or greater than UNOLS vessels. Chartering should be for special needs, those beyond the capability of the UNOLS Fleet. An example would be giant coring from the MARION DUFRESNE or a multi-channel seismic ship.

Don reviewed the initial and developing actions that NSF Ocean Sciences has taken in response to the Committee's recommendations. The initial actions include:

- Developing new cooperative agreements for ship operators, with increased emphasis on quality control and standards.
- Revising guidelines, reviews and management of shared-use instrumentation to improve technology (This was an area of considerable concern to the science community. Repeated comments related to shared-use equipment were received via the user survey.)
- Sponsoring workshops focused on emerging technology, specialized capabilities and improvements to basic systems. Don noted that plans were well underway for the DESCEND workshop in October as well as a Winch and Wire Symposium. Additionally, NSF has supported training proposals submitted by various operators and technician groups.
- Recompeting the UNOLS Office award as a cooperative agreement.

Developing actions include:

- Acceleration and expansion of science planning activities.
- Long-range planning for the modernization and composition of the fleet.
- Trial participation of commercial operators to provide unique capabilities.

NSF will be working with other federal agencies in developing a long-range strategic plan for fleet upgrades and replacement. Don presented a viewgraph showing the projected useful life of UNOLS ships. Long range planning will be an agenda item at the November FOFCC meeting.

Winch and Wire Symposium – Jack Bash reported that plans are underway for a Winch and Wire Symposium. The purpose of the symposium is to define future winch and wire requirements, assess the inventory in the fleet, and identify what is needed. A steering committee has met to plan the symposium. A questionnaire was developed and distributed to the community. Returns were about 10%. Six heroes have been identified to represent the four

primary science disciplines, plus an operator and an ocean engineer. They are compiling summaries of the questionnaire results to present at the symposium. The symposium is tentatively planned to be held at Tulane Medical Center, New Orleans in early December. Speakers will be invited to address the specific topics. A result will be an update of the winch and wire handbook. Jack encouraged participation from the science and engineering user community.

KEYNOTE ADDRESS
BY
DR. PETER BREWER

Dr. Peter Brewer, Senior Scientist at Monterey Bay Aquarium Research Institute (MBARI) provided the keynote address. His view graphs are included as ***Appendix XI***. Peter Co-chairs with Ted Moore (University of Michigan) the working group to integrate the findings of the four disciplinary NSF *Futures* workshops. NSF's OCE department selected the synthesis group which includes 24 members from 17 different academic institutions. Peter reviewed the charge; "The objective of this activity is to develop a clear and compelling description of the most important and promising opportunities for discovery and new understanding in the ocean sciences over the next decade." An e-mail survey was conducted which reached approximately 10,000 scientists. In response, 120 detailed responses were received. These were clustered into four areas: coastal processes, climate/ocean interactions, ecosystem research, crustal processes and flows.

Peter continued by giving an overview of the various FUTURES workshops and also provided general comments from all four reports. The four workshops were titled: APROPOS (physical), FOCUS (chemistry), OEUVRE (biology), and FUMAGES (MG&G) Approximately 40 people attended each workshop. The workshop reports are very different from each other. They have not been published in hardcopy, but are posted on the web: www.joss.ucar.edu/joss_psg/project/oce_workshop. Satellites were barely mentioned in the reports. Time domain was a very strong common theme. Large-scale surveys were barely mentioned. There was strong interest in perturbation experiments, non-equilibrium/non-steady state, and land-sea boundary. Monitoring /observatories were of passive interest. Computing power, the drill ship and submersible/ROV were all assumed. Once the four disciplinary workshops synthesized, implementation will begin.

In developing a synthesis report, the working group had to decide what a decadal report should look like. They decided to select existing reports that have been admired and effective to use as examples. They looked at two NAS Committee Reports, the 1982 "Field Report" - Astronomy and Astrophysics for the 1980's and the 1985 "Pimental Report" - Opportunities in Chemistry. The "Field Report" appears to be a close model in that their approach was similar. Peter reviewed an early suggestion for the report outline, but it was determined that this model would be difficult to follow.

The committee selected interdisciplinary themes and identified key people to address each theme. The themes included: the role of ocean in climate change, the ocean beneath the sea floor, coastal ocean perturbations and processes, turbulent mixing and bio-chemical physical interactions, non equilibrium system dynamics, dynamics of the ocean lithosphere, ocean prediction, and the ocean

carbon cycle. The committee has not been working in isolation; they have been calling on outside help.

Peter reviewed the draft report outline. It includes a preface, executive summary, introduction, new frontiers in ocean science, new approaches and cross cutting issues and resources and partnerships. The new frontiers section will address the working group themes. Peter gave examples of what would not be considered by the report: design and timing of NASA ocean missions, the fate of navy acoustic systems, extra-terrestrial oceans, future use of Navy operational submarines, and design and support of purely operational submarines. It was recognized that this is a NSF paper and although there are many other important issues, the report needs to focus on the NSF objectives.

DESCEND Workshop Plans – Patty Fryer provided a report on the status of the DESCEND workshop plans, see ***Appendix XII***. She reviewed the website and listed the steering committee members. The workshop is planned for October 25-27, 1999 at the National Science Foundation. People who are not able to attend are welcome to provide input by submitting an abstract. To date 90 people have registered for the meeting. Patty reviewed the meeting agenda. Day one is devoted to science discussions and Day two is devoted to technology discussions. The third day will be a wrap up session. Report writing will be conducted at the meeting and it is hoped that a draft report will be ready by the December DESSC meeting.

SeaNet Update – Ellen Kappel gave an update on SeaNet. A full report on the status of SeaNet was included in the last issue of "*UNOLS News.*" SeaNet use has been low. The SeaNet group is looking for funds to cost share the expense of its use with the users. To help introduce the system to the community, SeaNet plans to contact the PIs listed on upcoming ship schedules with SeaNet installations to see if they would be willing to try out the system. SeaNet will help pay for the communication costs during these projects. SeaNet plans to request a no-cost extension for their grant. They will try to have a system demonstration at the fall AGU meeting.

Charlie Flagg noted that this is an important issue and could have important applications for shipboard modeling. Recently there was a multi-ship program on Georges Bank where communications was difficult. The SeaNet system has the potential to provide an important communications capability.

UNOLS Membership Votes:

UNOLS Charter Revision – A revision to paragraphs 3.a. and 5.a. of the UNOLS Charter were proposed, see ***Appendix XIII***. The proposed revision would allow membership by both consortia and individual memberships, but voting will be by either the member institution or by consortia member, not both. A motion was made and passed to accept the proposed revisions to the UNOLS Charter.

Application for Membership: Southern California Marine Institute (SCMI) - An application for membership was submitted by SCMI, see ***Appendix XIV***. A motion was made and passed to approve SCMI for UNOLS membership.

Application for Membership: New Jersey Marine Sciences Consortium (NJMSC) - An application for membership was submitted by NJMSC, see ***Appendix XV***. A motion was made and passed to approve NJMSC for UNOLS membership.

United States Coast Guard Agency Report – Jon Berkson provided the USCG report which included a HEALY update, a POLAR Class update and the status of the USCG/NSF MOA. Sea trials on HEALY were conducted on 23-30 August in the Gulf of Mexico. Final deliver of the ship is expected in early November 1999. Planning for ice and science trials is on track with a four-phase schedule starting in mid-January 2000.

POLAR SEA is expected to be available for Science of Opportunity work in the mid-June to late July 2000 time frame. POALR STAR is in a shipyard undergoing major repairs to the centerline shaft. Shaft alignment problems forced the cancellation of a planned summer Science of Opportunity cruise in 1999.

In May, the Coast Guard and NSF signed a revised MOA for use of Coast Guard icebreakers for Arctic and Antarctic projects support by the NSF. The full details of the Coast Guard report are included as ***Appendix XVI***.

Issues before UNOLS - Bob Knox reported on the issues before UNOLS.

Future UNOLS Fleet Evolution – Bob indicated that this will be a major planning focus in upcoming years as many of the UNOLS intermediate and small vessels will approach the end of their useful life in the next ten years. Peter Brewer addressed a few of the research directions to be expected in the future. His report will be useful in identifying the needed capabilities of future platforms.

Revised Research Vessel Safety Standards (RVSS) – The RVSS have been updated and will be distributed. It is important to keep them up-to date with respect to ISM codes.

UNOLS Office Transfer – The UNOLS Office will transfer to Moss Landing Marine Lab on May 1, 2000. Mike Prince will be the new Executive Secretary.

Moorings as a Facility – A meeting is planned at the conclusion of the Annual Meeting to address the issue of moorings as a facility.

NOPP Status and Outlook - The NOPP outlook was provided earlier in the meeting during the CORE report.

NOAA Fisheries Needs – Bob Knox gave a brief background and status on the NOAA/NMFS AMLR program. This program is primarily for fisheries research in Antarctic. NOAA solicited the academic community for the AMLR ship support. WHOI and SIO submitted a joint proposal. Both KNORR and MELVILLE can be outfitted for fisheries work. NOAA indicated that the proposal was good, but the cost was too high. As a result, NOAA sent a request for proposals

out commercially. WHOI and SIO again responded, however, were disqualified because the commercial solicitation indicated that the proposal must include a liquidated damages clause. WHOI and federal agencies cannot legally comply with this requirement. The future status of AMLR with respect to UNOLS ships is unclear at this time.

UNOLS/NOAA-OAR MOU – The MOU is at NOAA awaiting signature.

UNOLS/NOAA-NMFS MOU – An MOU has been drafted and endorsed by UNOLS. It is now at NOAA for comment.

Integrated Ocean Observation Plan – Bob Knox reported that he will give a paper on the role of research vessels in the long-term ocean observing system for climate at the Oceanobs99 Conference, to be held in Saint Raphael, France October 18-22, 1999. Research ships will be needed to sustain certain kinds of global observations, such as, actual sampling at sea, deploying autonomous instruments, or maintaining moored stations. Support of global observations will need to be factored into fleet renewal plans.

BLUE FIN Replacement Plans – Plans for replacement of BLUE FIN have been stalled while financial matters are resolved. There is no new status at this time.

CALANUS Replacement Plans – Construction of the replacement for CALANUS are well underway. This ship is a catamaran design. It is scheduled to begin operations in early 2000.

Additions to the UNOLS Fleet – R/V BLUE HERON operated by Univ. of Minn., DULUTH was accepted into the UNOLS Fleet.

Retirements from the UNOLS Fleet – MOANA WAVE operated by the University of Hawaii was retired from the UNOLS Fleet in June.

Alaskan SMRs and Future Plans – In 1999, the Science Mission Requirements for an Alaskan vessel were endorsed by the UNOLS Council and forwarded to the University of Alaska. The Council encouraged U.Alaska to continue ALPHA HELIX replacement efforts. The question was raised of whether or not it would be feasible for U.Alaska and NOAA/NMFS to collaborate in an effort to acquire an Alaskan vessel. NMFS has indicated that they need at least one fisheries research vessel fully dedicated to fisheries work. As a result, NOAA's new FRV planned for the Alaska region would not be available for general oceanographic work by academia. However, if Alaska were to build a vessel with a fisheries capability, the NMFS would likely have a half-year of fisheries work for that vessel.

White Paper on Ship Scheduling – Jack Bash reported that the white paper providing instructions on the UNOLS ship scheduling procedures is in its final editing process and should be on the street within the month.

UNOLS Future Public Outreach Plans – In outreach activities, Jack reported that he chaired a session at MTS on SWATHS. MBARI and WHOI presented papers. Glosten provided input to

both of these papers. The UNOLS Office will have a booth at the fall AGU conference. Jack is the MTS book review editor and he welcomes volunteers willing to conduct a review.

UNOLS Brochure – Vicky Cullen of WHOI is working on an update to the UNOLS Brochure. She hopes to have the document finalized by the end of the year. It will be distributed to the UNOLS Members. It is a very popular publication.

SEA CLIFF Engineering Study Status – Dick Pittenger reported that as part of the SEA CLIFF engineering study visits have been made to Russia and France to examine their submersible technologies. A visit to JAMSTEC is also planned. WHOI has been investigating high strength metals. A report is planned for the fall DESSC meeting (after briefing the funding agencies).

UNOLS Website Upgrades – Updates to the UNOLS website continue. The ship time request form is working well. Work on the ship scheduling form continues. Plans for transferring the website to MLML are under consideration.

UNOLS Appointments to Committees: Bob Knox announced new appointments to the UNOLS Committees.

- Executive Committee – Bob Knox (Chair), Tom Royer, Patty Fryer, Paul Ljunggren
- DESSC – DESSC is in the nominating process to find replacement for expiring terms.
- FIC – Dave Hebert, Mark Brzezinski
- SSC – Joe Ustach (Chair), Dan Schwartz (Vice Chair)

UNOLS Council Farewells – Bob Knox extended his thanks on behalf of the UNOLS Community to Clare Reimers for her service on the UNOLS Council.

Council Election Results – The UNOLS Nominating Committee of Tom Shipley (Chair), Larry Atkinson and Barbara Prezelin assembled a slate of candidates for the UNOLS Council positions. The slate and CVs for each candidate are included as ***Appendix XVII***. The election was held in accordance with the UNOLS Charter as readopted February 1999. There were no nominations from the floor. Voting was conducted by ballot of the UNOLS member representatives present at the meeting. The election results were as follows:

At-Large Representative (3-year term): Denis Wiesenburg (Univ. of Southern Mississippi)
Operator Representative (3-year term - second term): Dennis Hansell (Bermuda Biological Station for Research)

UNOLS Membership Lists - ***Appendix XVIII*** includes lists of UNOLS Member Institutions, the Council and Committees, Operators, and Schedulers.

The Annual Meeting adjourned at 2:30 pm

Appendix I

UNIVERSITY-NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

ANNOUNCEMENT

UNOLS ANNUAL MEETING

Tuesday - September 21, 1999 - 8:30 a.m.
National Science Foundation, Room 1235
4201 Wilson Boulevard, Arlington, VA

This meeting is open to all investigators, users, operators and sponsors of university oceanographic facilities. It is a public forum for discussing the utilization and scheduling of research vessels and other facilities as well as their support and future planning.

Robert Knox, Chairman

John F. Bash, Executive Secretary

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University-National Oceanographic Laboratory System

The University-National Oceanographic Laboratory System is a planning mechanism for oceanographic facilities. It is a joint effort of the academic community and the Federal funding agencies, principally the NSF, ONR, NOAA, USCG, MMS, and USGS.

UNOLS provides for community-wide cooperation and review of the utilization of facilities and opportunities for access to those facilities. It assesses the match of programs to the needs of academic programs and makes recommendations of priorities for replacing or improving the numbers and mix of facilities.

UNOLS serves as a focus for new ideas and requirements for specialized facilities.

UNOLS does not replace direct contact between the investigator and institution's operating facilities. It does, however, serve as a backup and clearinghouse for information and coordination that might not otherwise be available to the researcher and his/her laboratory.

UNOLS is composed of institutions and laboratories which use and/or operate sea-going facilities and maintain an academic program in the marine sciences. It comprises several standing committees dealing with ship scheduling, marine operations, their regulations and logistics, technical support, Arctic icebreaker coordination, fleet improvement and replacement, and national facilities. Member institutions' representatives are individuals whose role is to provide oceanographic facility services or use those facilities. Membership does not ensure Federal funding.

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8/18/99

UNOLS ANNUAL MEETING

8:30 A.M., Tuesday, 21 September 1999
National Science Foundation, Room 1235
4201 Wilson Boulevard
Arlington, VA

Introduction and Welcome: Robert Knox, UNOLS Chair will call the meeting to order and report on 1998-1999 activities, current issues and issues continuing into 2000.

Accept Minutes of the 1998 Annual Meeting.

COMMITTEE REPORTS

Research Vessel Operators' Committee (RVOC) - Paul Ljunggren, Chair, will review the activities of RVOC for 1998-1999 and plans for the 2-4 November Annual RVOC meeting at HBOI.

DEep Submergence Science Committee (DESSC) – Patty Fryer, Chair, will report on the DESSC activities, 1998/99 ATLANTIS/ALVIN/ROV operations, and equipment/instrumentation upgrades and improvements for the National Deep Submergence Facility. She will report on deep submergence operations planned for 2000 and beyond.

Fleet Improvement Committee (FIC) - Larry Atkinson, Chair, will report on the FIC activities in 1998/99 and plans for the upcoming year including a status report on "The UNOLS Biennial Review of Sea Going Oceanographic Facilities."

Ship Scheduling Committee (SSC) – Mike Prince, Chair, will review the recommendations of the September Ship Scheduling Review meeting. He will summarize the UNOLS ship operation plans for 2000. He will also recap the outcome of the revised scheduling process that was tried in 1999.

Research Vessel Technical Enhancement Committee (RVTEC) - John Freitag, Chair, will report on RVTEC activities in 1998/1999 and plans for the RVTEC Annual Meeting scheduled for 20-22 October.

Arctic Icebreaker Coordinating Committee (AICC) - Jim Swift, Chair, will report on the activities of the AICC in 1998/99 including the status of science modifications and testing for USCG Icebreaker HEALY. He will also review Science of Opportunity operations planned for the future.

FEDERAL AGENCY and CORE REPORTS

Federal Agency Reports - Information from Federal Agencies (DOS, MMS, NAVO, NOAA, NOO, NRL, NSF, ONR, USCG and USGS) on 1999 activities and forecasts for 2000 and beyond.

Consortium for Oceanographic Research and Education – A report on CORE activities of interest to UNOLS will be provided.

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

KEYNOTE ADDRESS – DR. PETER BREWER

Dr. Peter Brewer, Senior Scientist at Monterey Bay Aquarium Research Institute, will discuss his activities as Co-Chair of the working group to integrate the findings of the four disciplinary Futures workshops. The product of their efforts will be a succinct and integrated description of research topics that have the most potential for significant impact on the understanding of the ocean system and which feasibly can be tackled during the next decade or so.

NSF Academic Research Fleet Review – Don Heinrichs of NSF will review the recommendations of the Academic Fleet Review Committee as well as future implications of the results.

Winch and Wire Symposium – Jack Bash will report on plans for the Winch and Wire Symposium presently scheduled for December.

DESCEND Workshop Plans – Patty Fryer will report on plans for the DEveloping Submergence SCiencE into the Next Decade, "DESCEND" workshop. The workshop is scheduled for October 25-27, 1999.

SeaNet Update – A report on the installation and use of SeaNet on selected UNOLS vessels will be provided.

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

- Future UNOLS Fleet Evolution
- Revised Research Vessel Safety Standards
- UNOLS Office Transfer
- Moorings as a Facility
- NOPP - Status and Outlook
- NOAA's Fishery Needs
- UNOLS/NOAA-OAR MOU – Two-year Review
- UNOLS/NOAA-NMFS MOU Draft Status
- An Integrated Ocean Observation Plan
- New Ship Construction - Replacement plans for BLUE FIN and CALANUS
- Fleet Additions/Retirements (BLUE HERON was added, MOANA WAVE retired)
- Alaskan SMRs and Future Plans
- White Paper on Ship Scheduling
- UNOLS Future Public Outreach Plans
- UNOLS Brochure
- SEA CLIFF Engineering Study Status
- UNOLS Website Upgrades
- UNOLS Dues Accounting

UNOLS Members may wish to raise additional issues.

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

- **UNOLS Charter Revision** - Clare Reimers will review proposed revisions to the UNOLS Charter. A membership vote is required for adoption of the proposed revisions. Enclosed is a copy of the proposed revised Charter ***(enclosure 1)***.
- **Application for UNOLS Membership** - Southern California Marine Institute has applied for membership as a UNOLS institution. A copy of the application is included in ***enclosure 2***.
- **Application for UNOLS Membership** - The New Jersey Marine Sciences Consortium has applied for membership as a UNOLS institution. A copy of the application is included in ***enclosure 3***.

UNOLS Elections: Elections for the following UNOLS Council positions will be held (the slate of nominees is attached as ***enclosure 4***):

- **UNOLS Council Member,** (3-year term) At-large, affiliated with any Member Institution.
- **UNOLS Council Member,** (3-year term) Operator representative, from among designated UNOLS Operator Institutions.

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

Calendar for UNOLS Meetings:

MEETING	LOCATION	DATES
Scheduling Review	Arlington, VA	9 September 1999
UNOLS Council	Arlington, VA	20 September 1999
UNOLS Annual	Arlington, VA	21 September 1999
RVTEC	Port Aransas, TX	20-22 October 1999
DESCEND Workshop	Arlington, VA	25-27 October 1999
RVOC	Fort Pierce, FL	2-4 November 1999
FIC	Moss Landing, CA	Fall, 1999
Winch & Wire Symposium	Arlington, VA	Tentatively 1-2 December 1999
DESSC	San Francisco, CA	12 December 1999
AICC	TBA	TBA

Adjournment

Appendix II

Annual Meeting - Sep. 21, 1999

NAME	AFFILIATION	TELEPHONE	FAX	EMAIL ADDRESS
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Appendix III

Fleet Improvement Committee
Report to UNOLS
September 1999

1. Addition of new members

FIC is adding two new members: Dr. David Hebert from URI is joining FIC representing physical oceanography. Dr. Mark Brzezinski's from UCSB representing geochemistry. Both fill appropriate regional and disciplinary niches. With those additions the membership stands at:

UNOLS Operators:
Bill Smethie, LDEO.
Tom Weingartner, U. Alaska.
Chris Measures, U.Hawaii
David Hebert, URI

Any Non-Op Institution:
Larry Atkinson, ODU.
Mark Brzezinski, UCSB.

Any UNOLS Inst:
Ex-Officio: Joe Coburn (WHOI)
John Freitag (URI)

2. Oversight of AGOR 26 – the "Hawaii Swath"

FIC has participated in several meetings over the past several years on issues related to AGOR-26. At the upcoming November FIC meeting we will again hear a report from NavSea and Lockheed-Martin regarding the progress. At that time, as in the past, we may assign a subgroup to address a specific problem that comes up.

3. The Alaska SMR

This SMR is now in the hands of the University of Alaska. FIC will provide support as necessary.

4. The East Coast SMR

This SMR is tabled for the time being until a clearer direction appears. The SMR is essentially complete at the level of detail agreed upon at the beginning of the effort.

5. Cape Henlopen replacement

I have had discussions with Mat Hawkins at U. Del regarding FIC involvement in the long range planning for the Henlopen replacement.

6. Biennial Review

The review is slowly taking up speed. We are at the point of getting commitments from authors. Following is the brief outline of the review.

Topic	Author
The Future	
Future Research Requirements	Chairs of NSF Ocean Discipline review Comr
Future Observing Systems	
General Information on the UNOLS Fleet	
State of the Fleet and Trends in Fleet Use	Atkinson, DeSilva, Bash, and Prince
Historical Perspective of Fleet Replacement and Expansion	Dick Pittinger and others including past chairs
New Assets	Chris Measures (9/10/99)
Trends in support of research sponsorship	
Specific Topics - New types of vessels	
Icebreakers	Jim Swift
Seismic Vessels	Paul Ljunggren and John Diebold
Swath Vessels	Joe Coburn
ROV's and AUV's	Fred Grassle Bellingham
Ocean Observatories	Bob Molinari
Fisheries and Hydrographic Surveying	
Fisheries Surveys	Ned Cokelet
Hydrographic Surveys	Sam DeBow
Technical Issues	
New Regulations	Joe Coburn
Ship Supported Technology	

Larry Atkinson
Chair, FIC

Appendix IV

2000 UNOLS Ship Utilization

		Class	Updated	NSF	Navy	NAVO	NOA	Inst	Other	Total	Funded	% Funded
Atlantis	WHOI	1	09/02/1999	262			19		22	303	227	75%
Ewing	LDEO	1	08/29/1999	253					7	260	253	97%
Knorr	WHOI	1	09/02/1999	265	57					322	170	53%
Melville	SIO	1	09/06/1999	244			18	4		266	221	83%
Revelle	SIO	1	08/31/1999	206	107					313	304	97%
Thompson	UW	1	08/22/1999	81	20	50	10	66	28	255	169	66%
Endeavor	URI	3	08/30/1999	98	85	20	26			229	164	72%
Gyre	TAMU	3	09/02/1999	10	55			14	67	146	79	54%
Horizon	SIO	3	09/02/1999	54		30	23	38		145	92	63%
Johnson	HBOI	3	09/07/1999	168	4		86		1	259	172	66%
Link	HBOI	3	09/07/1999	53	72				45	170	124	73%
Oceanus	WHOI	3	09/06/1999	110	91		6		5	212	136	64%
Wecoma	OSU	3	09/12/1999	140	21		39			200	192	96%
Alpha Helix	U of Alaska	4	09/02/1999	95	0	0	21	1	29	146	78	53%
Hatteras	Duke	4	08/05/1999	103	17	30	31	10	9	200	83	42%
Henlopen	U of Del	4	08/26/1999	147	37				4	188	174	93%
Pt Sur	MLML	4	09/12/1999	42	56			15	54	167	90	54%
Sproul	SIO	4	08/30/1999	49	33			12	15	109	77	71%
Weatherbird	BBS	4	08/22/1999	130						130	130	100%
Barnes	UW	5	09/07/1999	36	5		10	13	10	74	32	43%
Blue Fin	Skidaway	5	09/07/1999	79	8		25		5	117	91	78%
Calanus	Miami	5	09/02/1999	45	26	35	61	6		173	136	79%
Laurentian	U. Mich	5	07/06/1999	232						232	232	100%
Longhorn	U of T	5	09/06/1999	20		30		28		78	78	100%
Pelican	LUMCON	5	09/02/1999	80	21	60	50	2	27	240	122	51%
Sea Diver	HBOI	5	09/07/1999	26	62					88	88	100%
Uracca	STRI	5	09/02/1999	15				105		120	15	13%
Totals				3043	777	255	425	314	328	5142	3729	73%
% of Total				59%	15%	5%	8%	6%	6%			

Appendix V

Report from the UNOLS Arctic Icebreaker Coordinating Committee to the UNOLS Annual Meeting - September 1999

The UNOLS Arctic Icebreaker Coordinating Committee (AICC) provides scientific oversight of Arctic marine science support on US vessels, with primary focus on USCGC Polar Star, USCGC Polar Sea, and the new USCGC HEALY. In the past year the AICC held meetings 18-20 November 1998 at NSF headquarters in Arlington, VA, and 24-25 March 1999 in New Orleans. Interim business has been handled via a lively email correspondence, and AICC representatives have attended other meetings related to AICC business.

Although the history of the AICC's interactions with the Coast Guard is not long, the principal accomplishment of the AICC is the much-improved dialogue with the Coast Guard regarding icebreaker construction and support of Arctic marine science. This close working relationship is immediately obvious to anyone attending an AICC/Coast Guard function. The Coast Guard deserves a large measure of credit, and the AICC has noted to the Coast Guard especially that the appointment and retention of excellent leaders such as Capt. Johnson (head of HEALY construction oversight), Capt. Garrett (first Commanding Officer of the HEALY), and Comdr. Dupree (Chief of Icebreaker operations) is exactly the type of move that has brought about this relationship. The AICC has urged the Coast Guard to continue placing such capable, "science friendly" officers in positions of responsibility at sea and ashore in the icebreaker program.

The AICC has asked the Coast Guard to model its relationships with user-scientists upon those carried out by UNOLS large ship operators. The AICC has been discussing with the Coast Guard various means to help ensure close ties with the UNOLS technical and scientific communities. Discussions continue in a positive atmosphere, though without a specific plan or proposal as yet. The AICC notes as a positive step that Coast Guard Marine Science Technicians now participate on short UNOLS cruises as part of their training.

HEALY delivery has been delayed until late 1999, mostly due to the complexity of the vessel, its "first of type" status, and a severe shortage of skilled shipyard labor in Louisiana. There have been no reports to the AICC of the sort of major problems that might bring construction or testing to a halt. The delays are, however, causing a rescheduling of the post delivery trials. Reports received from the HEALY construction team indicate that USCGC HEALY is now in the midst of builder's trials, including running in the Gulf of Mexico near the Mississippi delta. Both successes and problems have been noted in these reports, which have generally had a positive tone. An updated evaluation of status is expected by late October. The AICC has noted the potential for problems with the Healy's science winch systems, low overhead clearance in the main lab, blockages for moving large objects on the main deck to and from the science hoist, and need for additional science network connections and cable ports, among other items. The Coast Guard has begun work in making or scheduling most of the needed modifications, and is keeping an eye open to the potential problem areas.

The Coast Guard's warm water trials should take place ca. January/February 2000, after which the ship will likely make a public relations visit to Baltimore. The AICC plans to assist by providing posters for labs and persons to explain Arctic research projects. The ship will conduct ice trials in

the eastern Arctic in winter/spring 2000 and will not transit to its homeport (Seattle) until after completion of both ice and science trials. Present plans call for the Healy's availability for agency-funded Arctic marine science support - the vessel's primary mission - beginning spring 2001. HEALY crew training is well underway. Crew familiarization of the ship is receiving a high priority.

John Freitag (UNOLS RVTEC) continues to coordinate the oceanographic community's participation in the Healy's science systems testing and has kept the AICC up to date. The basic outline of this program includes: (a) Warm water Phase I testing of SeaBeam, ADCP, data network, CTD, Bathy 2000, coring and winch systems and hull and machinery acoustic noise tests; (b) Transit Phase II includes little or no science system testing; (c) Level Ice trial, Phase III is almost exclusively a programmed sequence of ice breaking, with little science systems testing per se except for bathymetry and the data network, though teachers and or wildlife observers might be appropriate for his phase; (d) Science Systems Testing, Phase IV consists of four, one week legs moving to progressively more intense and complex tests of all major science systems in a high arctic environment, and may also include teachers. AICC members will be at sea on the vessel during the test cruises. The AICC will develop a process by which test evaluation reports are developed and routed through the system and see to the release of public data after the science systems testing program.

The outlook is positive for NSF's Arctic marine science programs, including both that HEALY funding will not eat into traditional ocean science funding at NSF and that OPP Arctic science funding looks healthy. The deadline for OPP Arctic proposals will be the same as for other ocean science programs at NSF. NSF agrees that expeditionary planning will be important for developing cohesive programs. The Arctic Section is working on the question of how to handle equipment upgrades and new equipment needs and has hired an Arctic Research Support and Logistic Manager. It is possible that OPP may adopt practices similar to those in Ocean Sciences, where technical support is shifting over from the research budgets to the technician support budgets.

Regarding proposal submissions, NSF has confirmed that ship costs for use of HEALY need not be explicitly contained in NSF proposal budgets, so long as ship use requirements are clear in accompanying documentation, (for example the "831" form or NSF/OPP's coming logistical support form for Arctic research). A ship-time request form is available from http://gso.uri.edu/unols/unols.html.

The AICC is encouraged by recent Coast Guard attitudes about and conduct of its icebreaker Arctic marine science support. Considering (1) that the AICC's stated goal is that science users of the Coast Guard icebreakers be provided an overall cruise support experience similar to that provided by the large UNOLS operators, (2) that very high personnel turnover rates are normal to the Coast Guard [the Coast Guard is looking into this and taking some action in the icebreaker program], and (3) that a large measure of UNOLS' success rests upon the experience and expertise of the officers, crew, technicians, and support personnel, the clear challenge ahead for the AICC will be to bring together these elements successfully and with the continued enthusiasm and participation of all parties.

The AICC has been modeled after UNOLS DESSC ('the ALVIN committee') for expeditionary planning. The Committee's responsibility is to pull together a critical mass to give direction for scientists in writing proposals but in no way be meant to influence agency funding decisions. To advance expeditionary planning and to keep the community at large informed the AICC plans to continue its involvement with the UNOLS booth at AGU and will conduct a town meeting at the AGU Fall meetings. Participation in some form will also be necessary at ASLO in San Antonio and at the NSF OAII meeting in October. A primary goal of this process will be to prepare and update a 5-year "rolling" plan for Arctic marine science use of the Coast Guard icebreakers.

A community census in late 1998 uncovered strong interest from potential science users. With the first HEALY support for the Western Arctic Shelf-Basin Interactions project in 2002, the AICC has advised NSF, the Coast Guard, and the community that assessment of scientific interest in use of HEALY during 2001, based upon that census, indicates a likelihood of work in the eastern Arctic, for example including the Nansen-Gakkel Ridge, during mid-late summer 2001. Additional marine science programs in the western or eastern Arctic are also logistically feasible earlier that year.

The Coast Guard plans to continue alternating the polar class ships with six months of a year in the yard and a year operating. The Coast Guard's mission for breaking into Thule remains. Presently the Canadians have been picking up the mission but this may not always be possible.

The AICC completed its 1999 Science of Opportunity (SOO) review and reported to the Coast Guard and scientists. The cruise was cancelled, however, due to vessel availability issues. The 2000 SOO cruise announcement is due to be published in September 1999. The AICC is charged with assessing SOO proposals for logistic and overall compatibility with the SOO mission. No decisions are made by the AICC with regard to participation, and AICC comments are specifically not to be used to leverage agency support for any proposal. The AICC continues to caution the community that science support is not necessarily the chief mission of SOO cruises, and the AICC reminds all that the Coast Guard will continue to accept ship-time requests for funded Arctic science missions on the Polar-class vessels and the HEALY.

The AICC has been briefed by Dr. Bernie Coakley of Tulane University regarding his recent experience with Arctic bathymetric and sub-bottom surveys. In ice-covered waters it is most effective to use a submarine. With heavy emphasis on central Arctic marine geology and geophysics expected for future HEALY proposals, joint submarine/HEALY ventures could provide a substantial science benefit. NSF has funded a study to develop capital and operating costs for a SSN operating for science. A steering committee has met to provide the contractor, Rand Corporation, study direction. At least two AICC members are on this steering committee.

The next AICC meeting will probably be held in January 2000, most likely at NSF.

The AICC can be reached by writing to the Chair (jswift@ucsd.edu) or to the UNOLS Office (unols@gsosun1.gso.uri.edu).

Exploring Ocean Data with Java OceanAtlas

Java OceanAtlas plots include offset profiles, property-property plots, contour plots, station maps, and a comprehensive data window, most using color as an extra plotted variable to aid interpretation. Plots are linked and may be "browsed" by sample and/or by station.

Plots can be re-scaled, re-sized, or have their colored variable changed. Selected areas of most plots can be made into new plots. Standard levels, scales, contours, and colors can be changed via user interfaces similar to those used in commercial applications.

Java OceanAtlas provides data filtering and exporting, plus allows data import from spreadsheets and NODC-format data files. Custom sections can be created directly from station maps. Many different types of calculations can be performed.

Java OceanAtlas beta versions available now for Windows (95, 98, NT), Unix, and MacOS! (See http://odf.ucsd.edu/OceanAtlas)

Java OceanAtlas

Java OceanAtlas (JOA) is an improved version of Power OceanAtlas, an application which provides graphic exploration of oceanographic section data. [For JOA features plus user instructions see http://www.oceanatlas.com.]

JOA runs under Microsoft Windows (9X and NT), Mac OS, Linux, and most Unix operating systems. [JOA will run on any platform that supports a Java Virtual Machine (JVM) or Java Just In Time Compiler (JITC).]

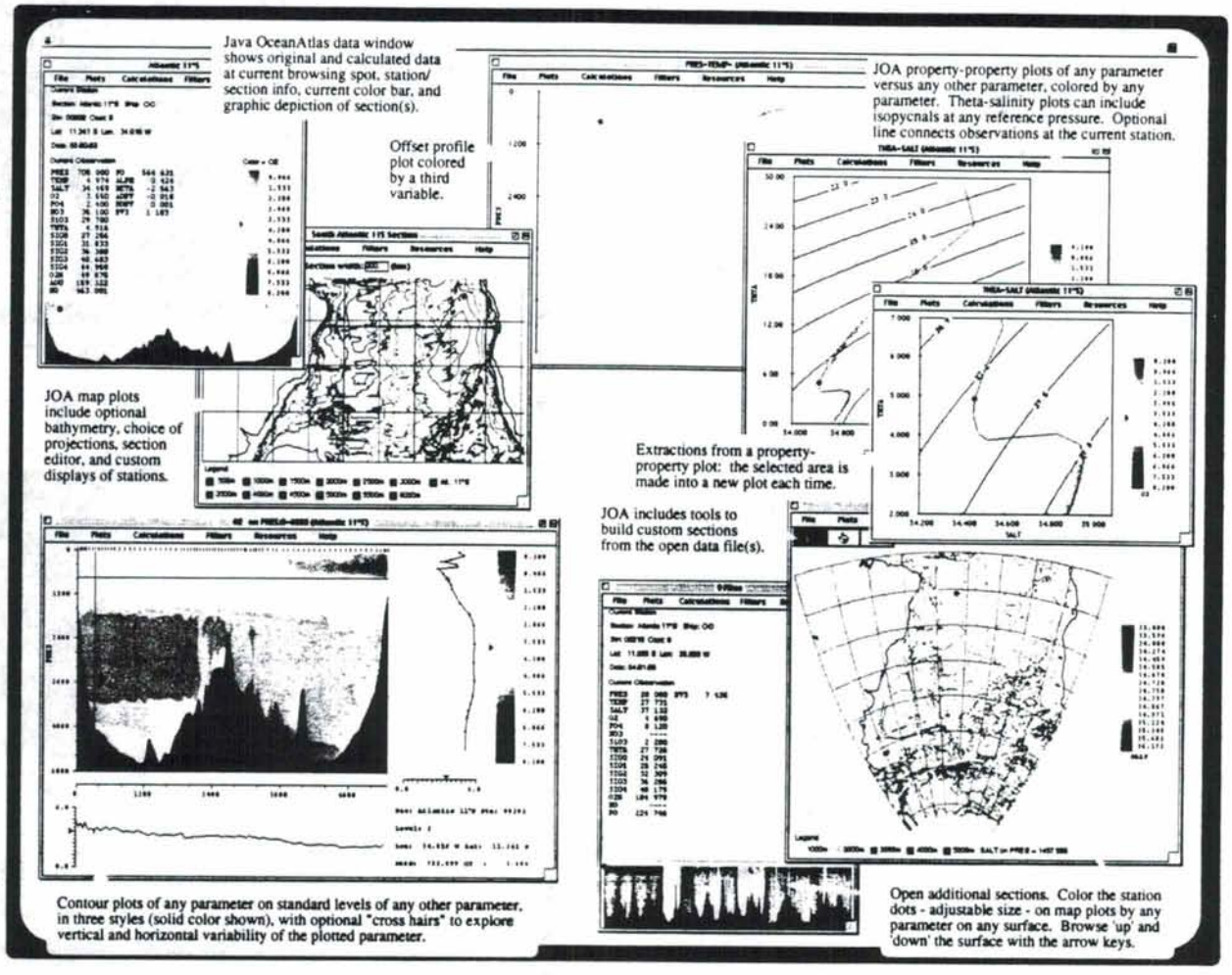
Beta versions of JOA now on http://odf.ucsd.edu/OceanAtlas are stable and fully functional. We are especially interested in hearing from users regarding installation and use on various operating systems.

Java OceanAtlas contacts:
Jim Swift (jswift@ucsd.edu)
John 'Oz' Osborne
(oz@oceanatlas.com)

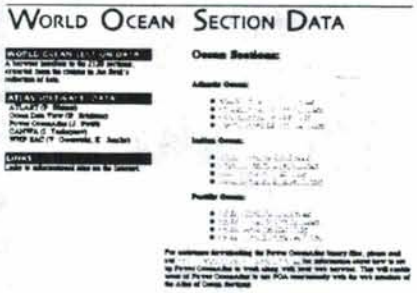
JOA distribution on CD-ROM (early 2000) will be via JPL:

http://podaac.jpl.nasa.gov/order/order_displaytools.html

Java OceanAtlas development is supported by a grant from the National Science Foundation.



Global compilation of sections now available!



Atlas of Ocean Sections

(multi-OS hybrid CD-ROM)

J.Swift, P. Rhines, and R. Schlitzer

2120 sections from the World Ocean, sorted geographically, corrected for standard seawater differences and known discrepancies, and with bad data removed. Assembled from Joe Reid's data collection. Data in NODC SD2 standard exchange format (can be read by all computers). Also in binary formats for Power OceanAtlas/ Java OceanAtlas, and Ocean Data View.

Also includes ATLAST (PC/MS-DOS), Ocean Data View (PC/Windows 9X & NT), and Power OceanAtlas (Mac OS). Mac OS files include public WOCE bottle data plus a library of Arctic Ocean data. Also includes a Northwest Atlantic atlas and a corrected World Ocean dataset.

Version 1 is complete. Version 2 (will include more data plus Java OceanAtlas) is expected spring 2000.

The Atlas of Ocean Sections CD-ROM is available free, only from the order form found on the JPL PODAAC web site:

http://podaac.jpl.nasa.gov/order/order_displaytools.html

UNOLS Arctic Icebreaker Coordinating Committee

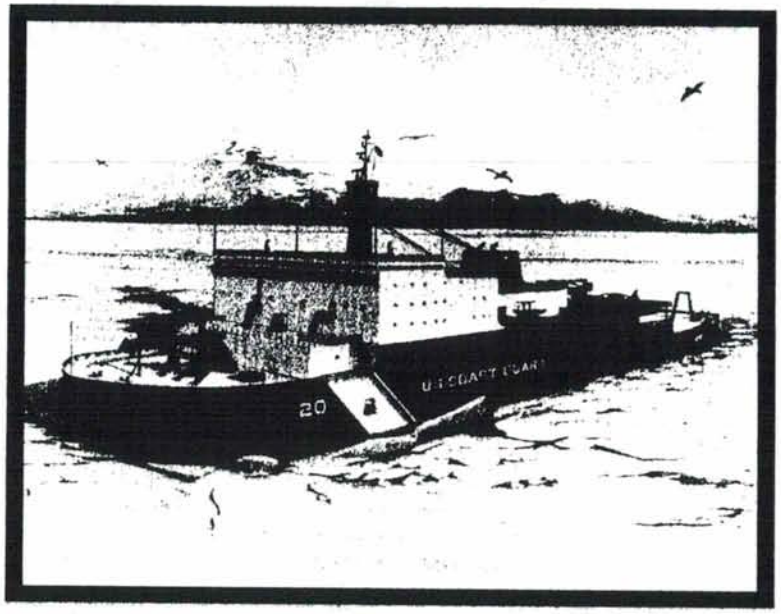
ARCTIC ICEBREAKER OPERATIONS

Scientific oversight of Arctic polar science support on US vessels
Supported by NSF and US Coast Guard
Ties to agencies supporting Arctic research from vessels
Ties to science organizations concerned with Arctic research from vessels

AICC members
Jim Swift, SIO, Chair (jswift@ucsd.edu)
Lisa Clough, East Carolina University
Joe Coburn, WHOI
Glenn Cota, Old Dominion University
Kelly Falkner, Oregon State University
Larry Lawver, University of Texas at Austin
Dan Lubin, SIO
Terry Whitledge, University of Alaska, Fairbanks
Jack Bash, UNOLS executive secretary
Bob Knox, UNOLS Chair

AICC Business
Ship scheduling via UNOLS Ship Time Request Form
Publicize science-of-opportunity cruises & assess logistics
Chief Scientist pamphlet review
Technical support assessment (equipment & expertise)
Coordinate icebreaker logistics for science missions & new initiatives

Science-of-Opportunity
Cruise opportunities announced by USCG
No USCG funding for science
Not to interfere; science not first priority
AICC will assess logistics criteria only
Coast Guard has final say
Investigators to apply via form available from UNOLS web site
(http://gso.uri.edu/unols/unols.html)



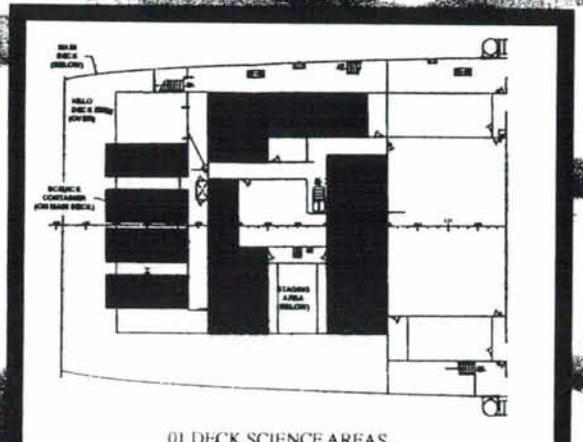
USCGC HEALY

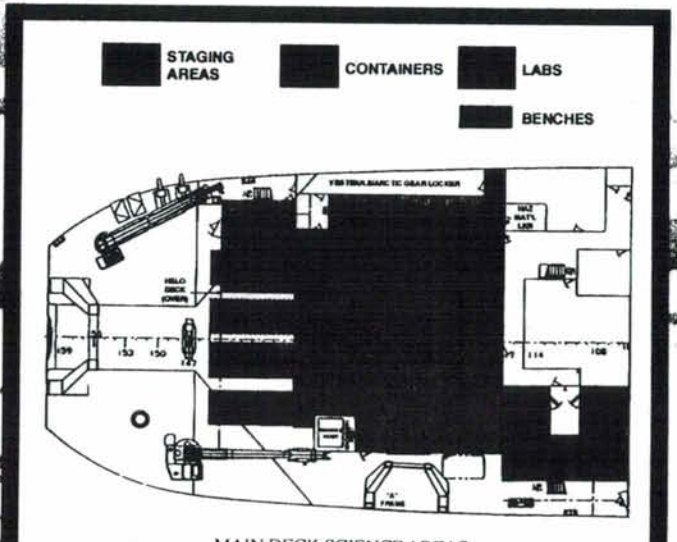
A modern polar research vessel designed to be operated by the US Coast Guard for the US polar science community
420' length / 82' beam / 28' draft
15,332 tons
30,000 HP
twin screw
classic bow
4.5 ice @ 3 knots
crew of 75 (includes 14 in helo group)
35 science berths normal; 50 surge
full 4-season vessel

Available ca. 200- days each year for funded science missions, beginning Spring 2001.

Labs totalling ca. 4000 sq. ft.
- 2 large staging bays
- main lab
- wet lab and dry assembly area
- bio/chem lab
- electronics lab
- aft con / science control station
- climate control chambers
- science refrigerators and freezers (walk-in)
- Arctic gear vestibule
- hoist from cargo holds to lab deck

Up to 8 science vans
- 2 "double" positions will hold 40' vans
- provision for side-by-side vans
- full ship services to 6 van positions
- 2 vans with "airlocks" to labs


01 DECK SCIENCE AREAS



MAIN DECK SCIENCE AREAS

Using USCGC HEALY

Proposals can be submitted any time. Suggested deadline of February of the year preceding use of the ship.
Submit UNOLS ship time request form with each request. (http://gso.uri.edu/unols/unols.html)
In NSF proposals indicate the number of ship days, without explicit ship-use dollars. Logistics form must be included.
For other agencies contact program managers.

Long-term planning

The AICC will host an annual community planning workshop for US Arctic vessel support in San Francisco one day before the beginning of the AGU Fall meetings. A rolling 5-year science use plan will be prepared in order to provide a temporal and regional palette of science missions, options, and requirements from which investigators, the Coast Guard, and agencies can draw science and funding scenarios. Announcements of these open meetings will be widely circulated. The UNOLS web site will include a long-term planning table. Planning ideas are accepted via email at any time.

Appendix VI

UNOLS AND NAVOCEANO Accomplishments 1997 - 1999

Paul Taylor

Gordon Wilkes

Naval Oceanographic Office

INSTITUTIONS

- Duke Marine Laboratory
- Lamont-Doherty Earth Observatory
- Louisiana Consortium
- Moss Landing/NPGS
- Oregon State University
- Scripps Institute of Oceanography
- Texas A&M
- University of Delaware
- University of Washington
- Woods Hole Oceanographic Institution

Three Years of UNOLS

- **Total UNOLS Ship Days - 1255**
- **Navy ship year equivalent - approx. 5 ship years**
- **Ships Used - 12**
- **Accomplishments:**
  - **Gravity - All Navy Requirements Outside EEZ's Met**
  - **Physical Oceanography**
    - **Core/grabs - *297/163***
    - **CTD - *5832***
    - **XBT - *2149***
  - **Side Scan Sonar**
  - **High Resolution Bathymetry**

Range Support

- **SOCAL**
- **AUTEC**
- **ECSWTR Onslow Bay**

Other

- **HITS**
- **ODISTA**

UTILIZATION

1997	1998	1999
Ship Days 373	Ship Days 431	Ship Days 451
Funds 7.5M - Ships 6.4 -Other 1.1	Funds 7.3M -Ships 6.6M -Other 0.7M	Funds 7.4M -Ships 6.1M -Other 1.3M
Institutions 8	Institutions 6	Institutions 6
Ships 9	Ships 8	Ships 8

Operational Tempo '97 - '99

1997 UNOLS SHIPS SCHEDULES - NAVOCEANO

9/5/1999

SHIPS	1997 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EWING - Lamont/Doherty Slope Stability Studies												
MELVILLE - Scripps Gravity												
KNORR - WHOI Onslow Bay												
REVELLE - Scripps SOCAL Range Bathy												
SPROUL - Scripps SOCAL Range Sampling												
NEW HORIZON - Scripps SOCAL Range Side Scan												
NEW HORIZON - Scripps SW Coast PhysO												
CAPE HATTERAS - Duke SE Coast PhysO												
PELICAN - LUMCON Gulf Coast PhysO												
CAPE HENLOPEN - UDel NE Coast PhysO												
POINT SUR - NPGS Central WC PhysO												
THOMPSON - UWash ODISTA												

1998 UNOLS SHIP SCHEDULES - NAVOCEANO

9/5/1999

SHIPS	1998 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CAPE HATTERAS - Duke SE US Physical Oceanography												
WECOMA - Oregon State NW US Physical Oceanography												
REVELLE - Scripps Gravity Surveys - PAC												
PELICAN - LUMCON GMEX - Physical Oceanography												
CAPE HENLOPEN - UDelaware MidLant US - Physical Oceanog.												
THOMPSON - UWash Gravity Surveys - PAC/Phys. O.												
NEW HORIZON - Scripps SW US - Physical Oceanog.												
KNORR - WHOI AUTEC Range												

NAVOCEANO 1999 UNOLS SHIP SCHEDULE

9/5/1999

SHIPS	1999 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CAPE HATTERAS												
CAPE HENLOPEN												
PELICAN												
NEW HORIZON												
PT SUR												
THOMPSON												
MELVILLE HITS Survey												
REVELLE Gravity												

CY2000 PROJECTIONS

AT 3.0 MILLION

	Funding	$=(000K)
Process	200	
Acoustics	175	
Services	175	
Equip Lease	120	
NAVO	150	
	820	

PRIORITIZED	Ship Days	
So. FLA Range	20	
GOMEX	60	
ONSLOW	30	
SOCAL RANGE	30	
MW WGOMEX	30	
NARRAG	10	
	180	2160

Ship Time Request Submitted

2980

AT 7.5 MILLION

	Funding	$=(000K)
Process	300	
Acoustics	175	
Services	300	
Equip Lease	120	
NAVO	300	
	1195	

PRIORITIZED	Ship Days	
So. FLA Range	20	
GOMEX	60	
ONSLOW	30	
SOCAL RANGE	30	
MW WGOMEX	30	
NARRAG	15	
		2220
CAPE COD	15	
CENCAL	15	
MIDLANT	20	
SoCal	15	
PacNW	15	
KEY WEST	20	
HAWAIIAN ISLANDS	60	
PUERTO RICO	30	
GOMEX Monitoring	60	
	435	4050

7465

Appendix VII

Staff

- Dr. Donald Heinrichs, Head, Oceanographic Centers & Facilities (retiring 12/31/99)
- Recruitment for Associate Program Director, Ship Operations underway
- CDR Beth White, NOAA, assisting at NSF on part-time basis.
- Ms. Holly Smith joined OCFS/ODP as Science Assistant

Management issues

- FY 2000 budget...???
- Academic Fleet Review findings and recommendations

Program issues

- Government Performance and Results Act (GPRS) facilities reports
- Recompetition of award for Ship Inspection Program
- Updated/electronic submission guidelines for FY 2001 and beyond proposals

Planning issues

- Articulate broadly-based vision for future of ocean science and technology
- [illegible] and composition of academic research fleet

OCEAN SCIENCES	FY 1998	FY 1999	FY 2000	Increase	Percent
Ocean Sciences Research Support	$112.2M	121.7M	125.0M	3.3M	2.70%
Oceanographic Centers and Facilities	46.1M	47.3M	48.5M	1.2M	2.50%
Ocean Drilling Program	40.7M	45.6M	46.8M	1.2M	2.60%
	$199.1M	$214.6M	$220.3M	$5.7M	2.60%

NOTES:

- Major emphases in NSF budget request:
  - Information Technology (IT^2) - $146 million increment
  - Biocomplexity in the Environment (BE) - $70 million increment
- "Disciplinary" programs proposed for cost-of-living increases
- No budget yet!
  - House budget markup keeps NSF at FY 1999 level
  - Senate budget markup [illegible]

GPRA

Research Facilities

Operations	- Keep operating time lost due to unscheduled downtime to less than 10% of the total scheduled possible operating time, on average
Construction and upgrades	- Keep construction and upgrades within annual expenditure plan, not to exceed 110% of estimates - Keep construction and upgrades within annual schedule, total time required for major components of the project not to exceed 110% of estimates - For construction and upgrade projects initiated after 1996, keep total cost within 110% of estimates made at initiation of construction

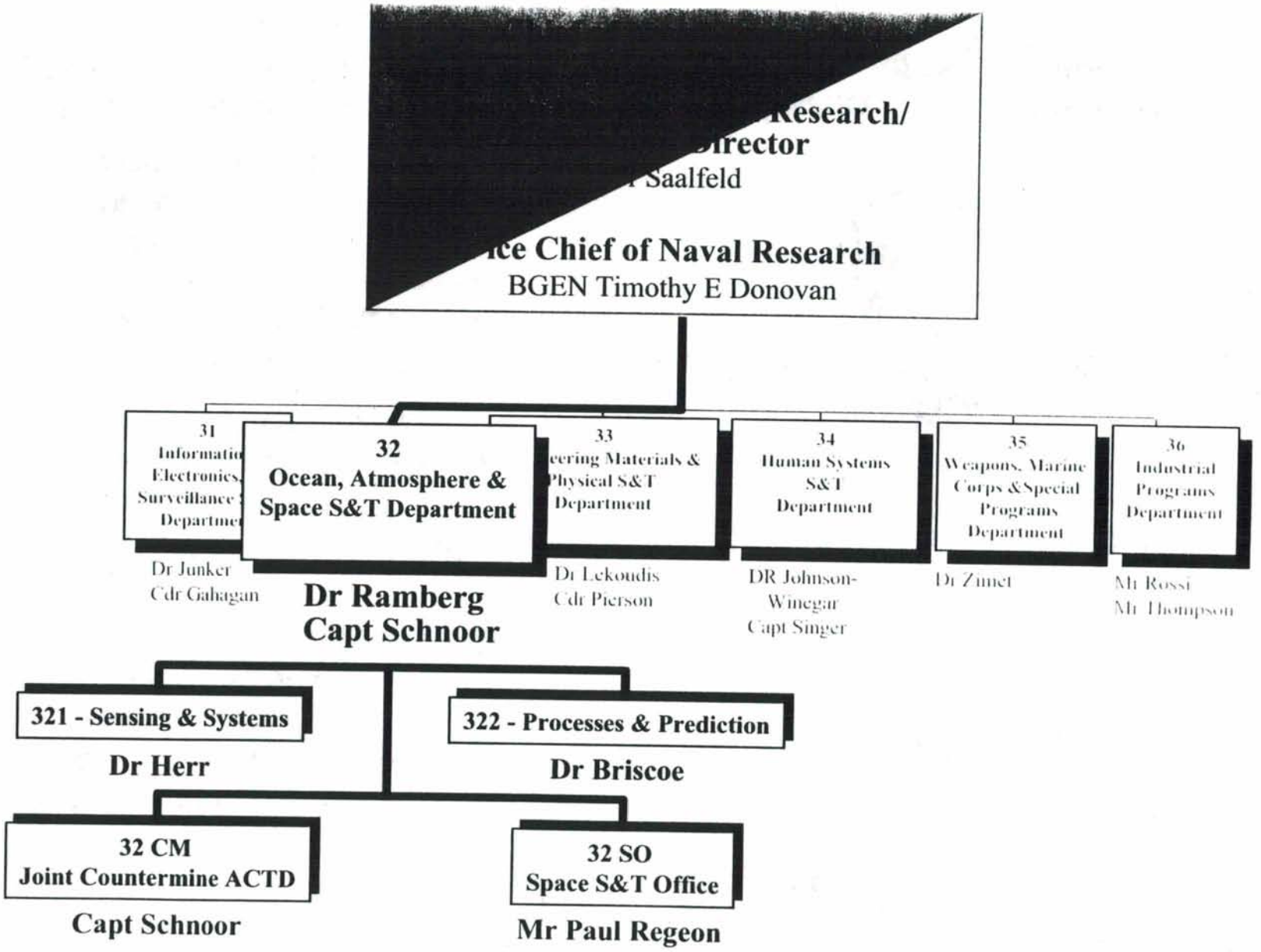
- Basic approach for operations is same as pilot experiment of a year ago - user units.
- Fiscal year basis with project directors, managers, or their designers to enter performance data through the FastLane Project Reporting System

Status:

- [illegible] starting early October

Appendix VIII

ONR Organization



Code 32 Overview - Focus Areas (4) & Corporate Thrusts (16)

- Battlespace Environments (BSE)
  - **Environmental Processes**
  - **Sensors and Data**
  - **Model Development**
  - **Data Assimilation and Information Exploitation**
  - **Validation Studies**

Mel Briscoe
(703) 696-4120
briscom@onr.navy.mil

- Undersea Warfare/Anti-Submarine Warfare (USW/ASW)
  - **Cooperative ASW**
  - **Wide Area ASW Surveillance**
  - **Battlegroup ASW Defense**

Frank Herr (acting)
(703) 696-4125
herrf@onr.navy.mil

- Undersea Warfare/Mine Warfare (USW/MIW)
  - **Organic Minehunting (Sensing/Processing)**
  - **Mine/Obstacle Neutralization**
  - **Sweeping/Jamming**
  - **Mining**
  - **Advanced Force Operations**

Doug Todoroff
(703) 696-2485
todorod@onr.navy.mil

- Maritime Intelligence, Surveillance, Reconnaissance & Space Exploitation (ISR/SpaE)
  - **Remote/Space Sensing Processes**
  - **Space/Airborne Sensor Development**
  - **Sensor Exploitation & Demonstration**

Frank Herr
(703) 696-4125
herrf@onr.navy.mil

* FY99$ distribution

Research Facilities

	CY 1999		2000	
	Days	Funds ($K)	Days	Funds ($K)
• Shiptime	1301	$18,203	1067	$11,662
• FLIP	47	$623	78	$702
• Upgrades/Eqpt.		$1,658		$500+
• Deep Submergence		$ 500		$300
• Layups		$816		-
Total	1348	$21,800	1118	$13,164

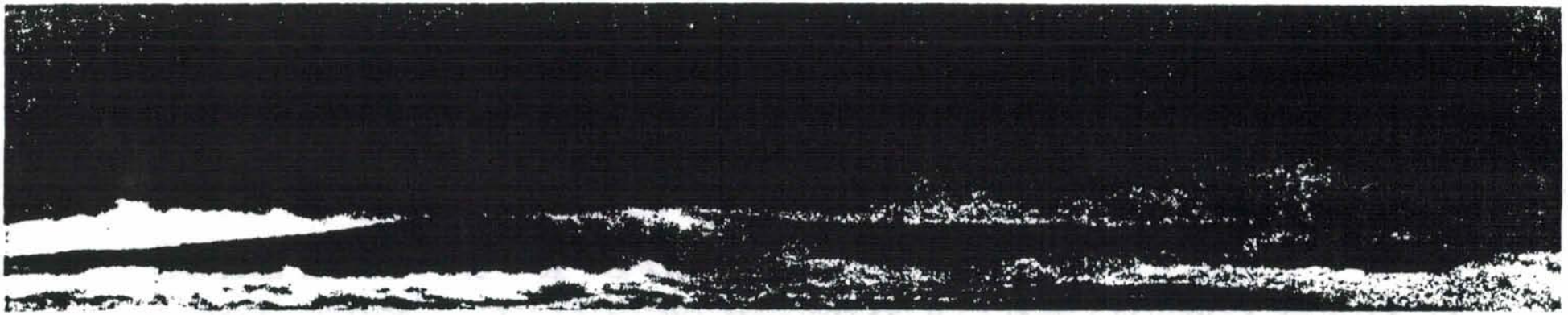
9/21/99

Navy Use of UNOLS

	CY 99	CY 00
ONR	$9,175	$8,646
NRL	$775	$1,003
NAVO	$7,260	$2,404
NOPP	$962	$105
Other	$200	$206
Total	$18,372	$12,364

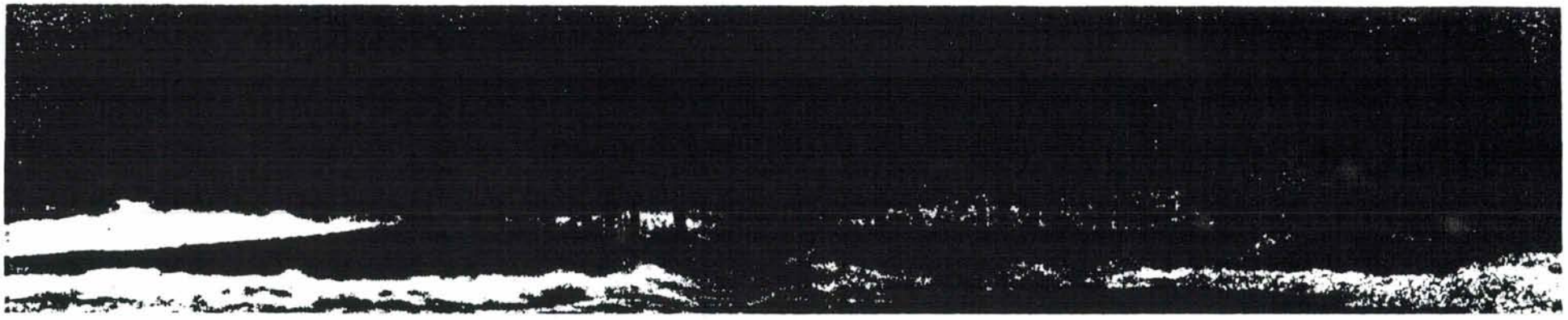
9/21/99

Appendix IX

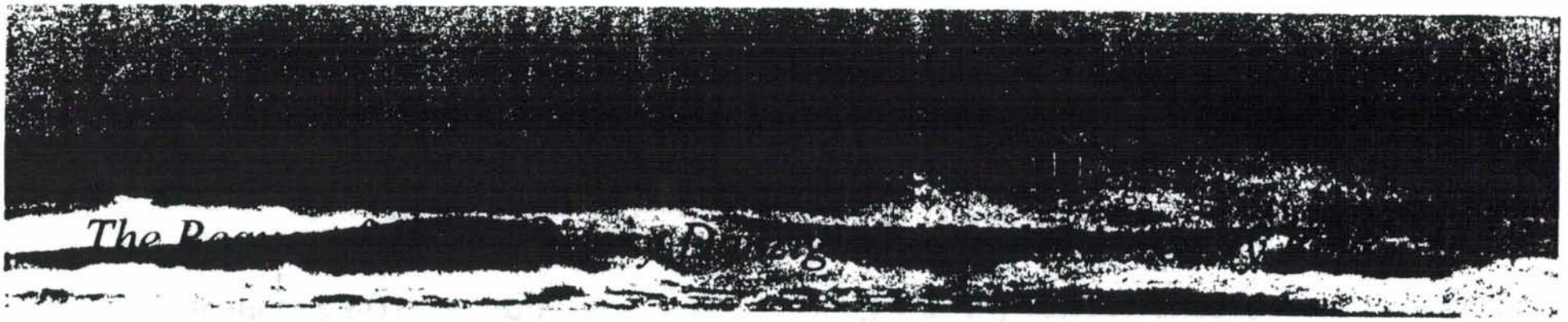


FY 2000

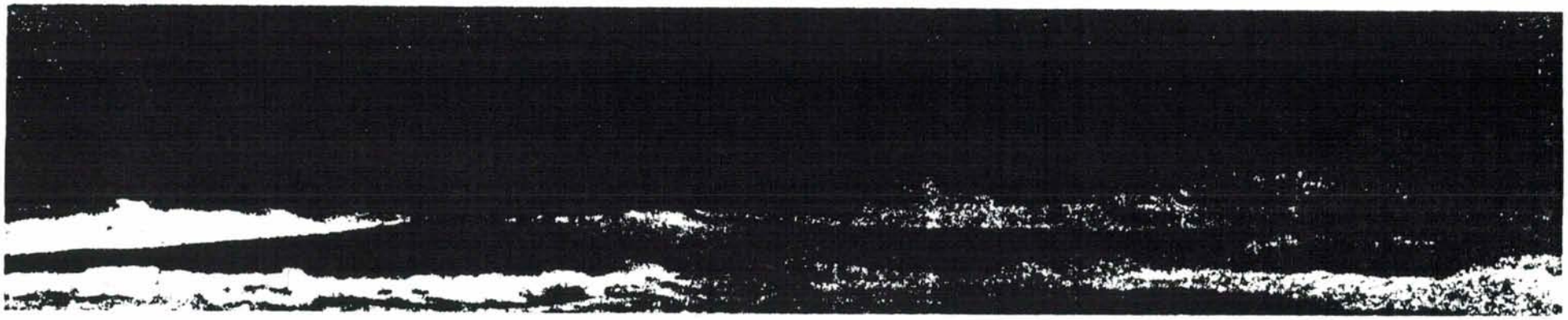
- Agencies with NOPP budget submissions: ONR, NOAA, NASA
  - Total budget submitted is approx. $18M (most of which would be committed to ongoing or specific projects)
- Other agencies have expressed interest (at highest levels) in supporting the Partnership Program in the outyears
- Three themes (NOPP 2000):
  - Processes & Prediction
  - Sensing & Systems
  - Sustainable Coasts & Coastal Presence



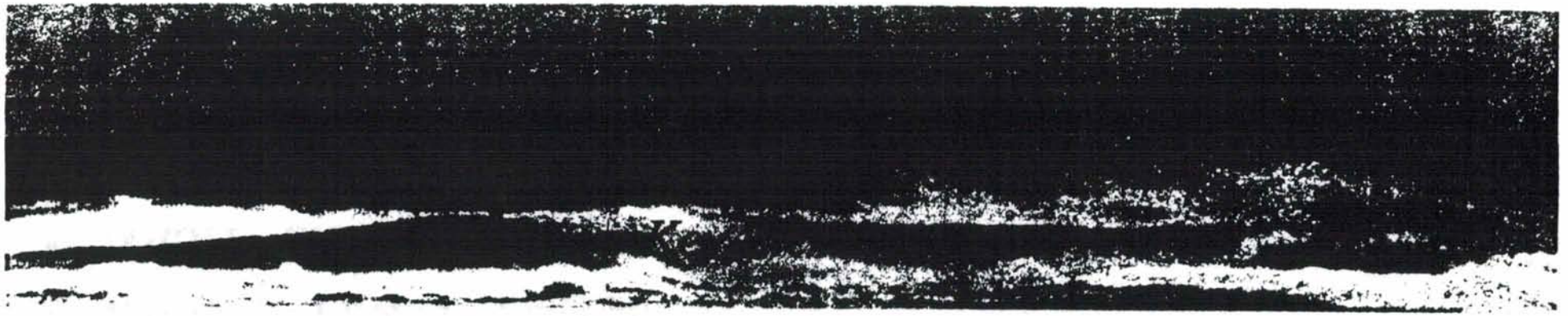
- Request to NORLC from Congressmen Saxton and Weldon - 8/98
- NORLC Report, "Toward a U.S. Plan for an Integrated, Sustained Ocean Observing System" (Nowlin/ Malone) - 4/99
- SecNav Danzig and UnderSec Baker letter requesting the next version from the ORAP - 5/99
- ORAP Task Team on Ocean Observations formed - 7/99
- CORE paper, "A National Initiative to Observe the Oceans: A CORE Perspective" - 7/99
- ONR and NOPPO support to ORAP Subcommittee
- New Report to be completed - 12/99



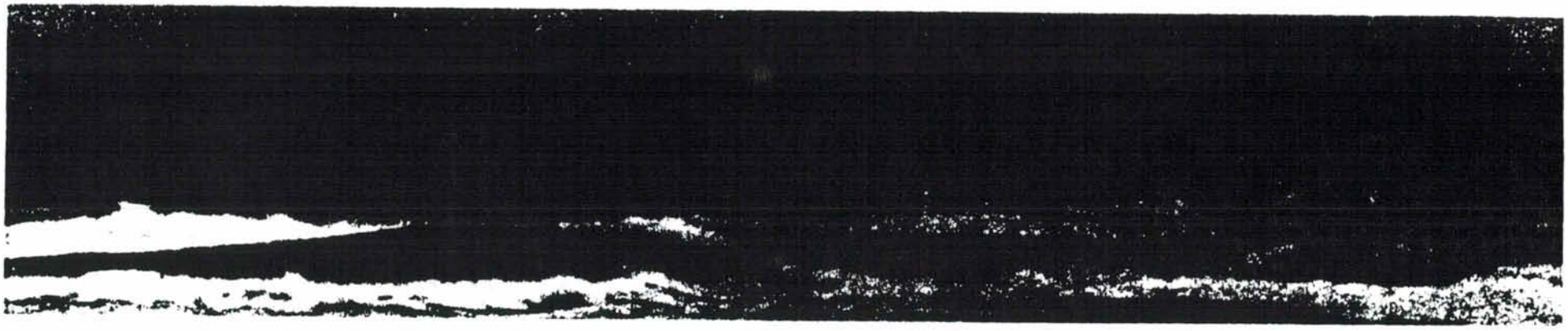
- Initial NORLC Report is a useful first step
- Engage Broader Community concerning how best to proceed
- Issues to resolve
  - Management
  - Integration of present and future systems
  - Integration between coastal and open ocean systems
  - Relationship to international programs
  - Identify objectives, requirements and priorities
- ORAP accept responsibility for next step in developing a comprehensive plan
- Complete by end of the year (1999)



- Robert Frosch, Harvard (Chair)
- Richard Anthes, UCAR
- Melbourne Briscoe, ONR
- Otis Brown, U. Miami
- Peter Cornillon, URI
- Frederick Grassle, Rutgers
- Molly Lutcavage, New England Aquarium
- Robert Knox, Scripps
- Eric Lindstrom, NASA
- Thomas Malone, UM HPL
- Robert Molinari, NOAA AOML
- John Orcutt, Scripps
- James Ray, Equilon Enterprises
- Michael Reeve, NSF
- Evan Richert, State of Maine
- Robert Weller, WHOI

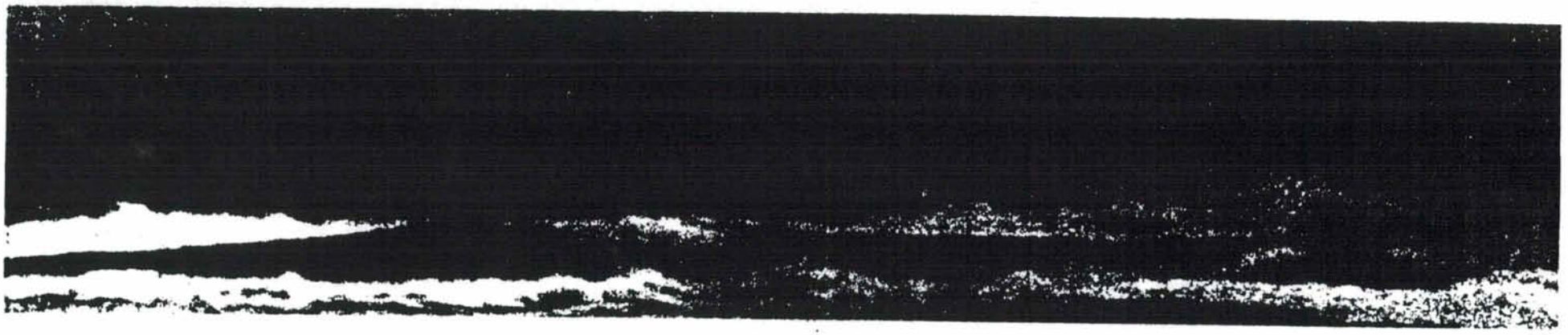


- Need for an Integrated Ocean Observing Strategy
- Examples illustrating the Needs:
  - Ocean-atmosphere interactions and climate
  - Deep ocean and solid earth science
  - Ocean chemistry and the carbon cycle
  - The coastal zone
  - Biological dimensions



IWG

- NAVY (Chair) - Steven Ramberg
- NOAA (Vice-Chair) - Stan Wilson
- EPA - Robert Menzer
- NSF - Michael Reeve
- DARPA - Edward Sheehan
- NASA - Eric Lindstrom
- USGS - S. Jeffress Williams
- OSTP - Donald Pryor
- OMB - Kim Newman
- USCG -Jonathan Berkson
- DoE -Michael Riches
- MMS - Kenneth Turgeon



NORLC

- NAVY (Chair) - Richard Danzig
- NOAA (Vice-Chair) - D. James Baker
- EPA - Carol Browner
- NSF - Rita Colwell
- DARPA - Fernando Fernandez
- NASA - Daniel Goldin
- USGS - Charles Groat
- OSTP - Neal Lane
- OMB - Jacob Lew
- USCG - James Loy
- DoE - Ernest Moniz
- MMS - Tom Kitsos

Appendix X

The Academic Research Fleet Review: Committee Membership

Roland Schmitt, Chair

Earl Doyle, Steven Ramberg, Hugo Bezdek, Christopher D'Elia, Ellen Druffel, Larry Mayer, Georges Weatherly

Charge from Assistant Director, Geosciences

- **Review and evaluate the current Academic Research Fleet**
- **Review and evaluate management structure, existing capabilities and services and possible future changes**
- **Recommend actions to improve the organization, management and cost effective operation of the fleet**

Academic Fleet Review Report

"The goal of any research facility should be to find the optimum path to satisfy the needs of the research enterprise."

Major themes

- → UNOLS system should be retained with increased emphasis on science support and continuous quality improvement
- → technology and facilities support requirements for science programs continue to evolve and modify patterns of use of research vessels, including need for special capabilities from non-UNOLS institution ships
- → capability, reliability, and technical support for shared-use shipboard systems are major user concerns
- → quality-based systems for ship operations, instrumentation support, and technical services should be adopted fleet-wide, along with rigorous evaluations of performance
- → entire UNOLS and operator system needs to be infused with an orientation toward continuous improvement and formal quality control programs
- ◆ ***UNOLS appears to be a well-suited vehicle to institute and evaluate such efforts in conjunction with the federal agencies.***

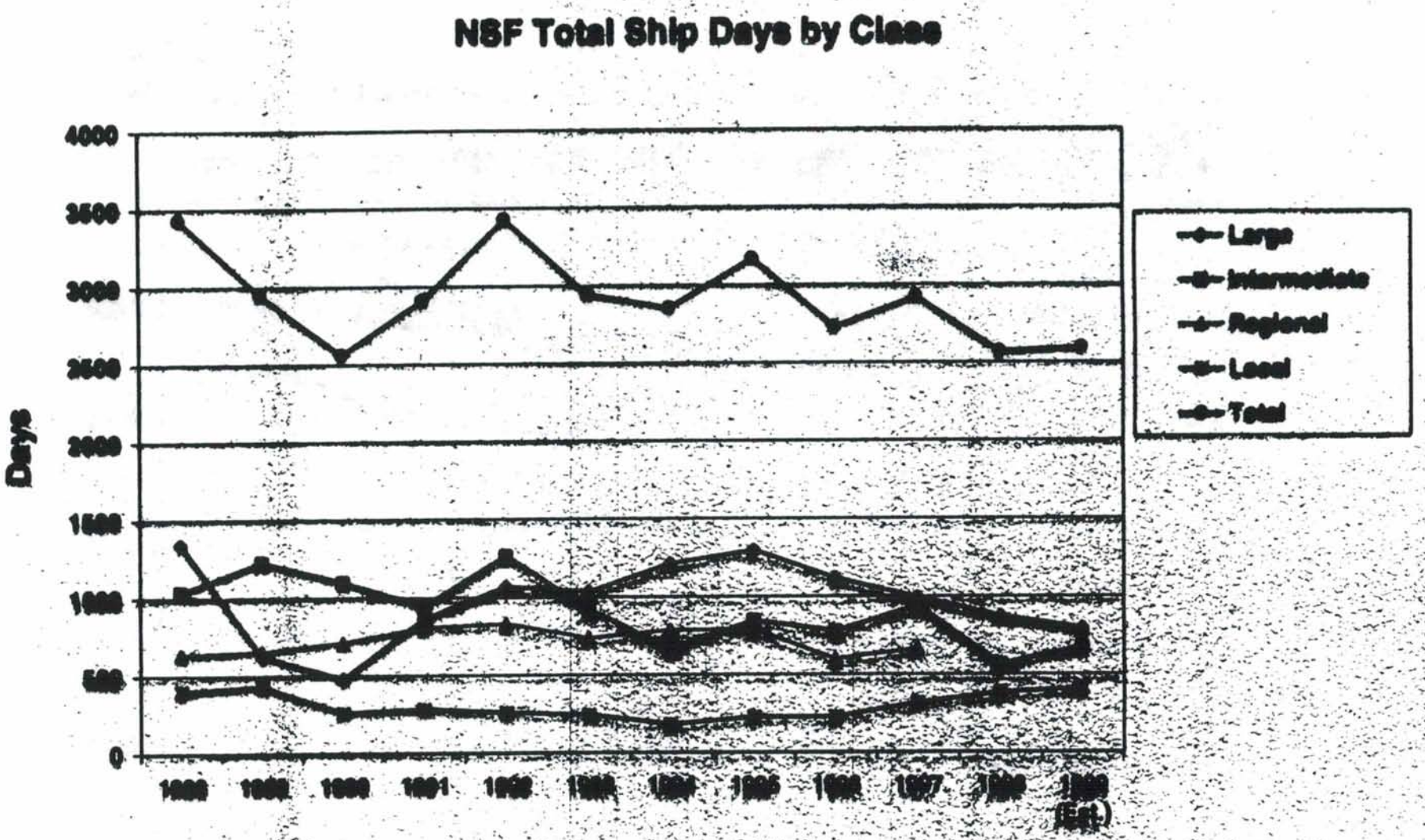


Figure 8. UNOLS annual operating days by ship class to support sea-going projects sponsored by NSF

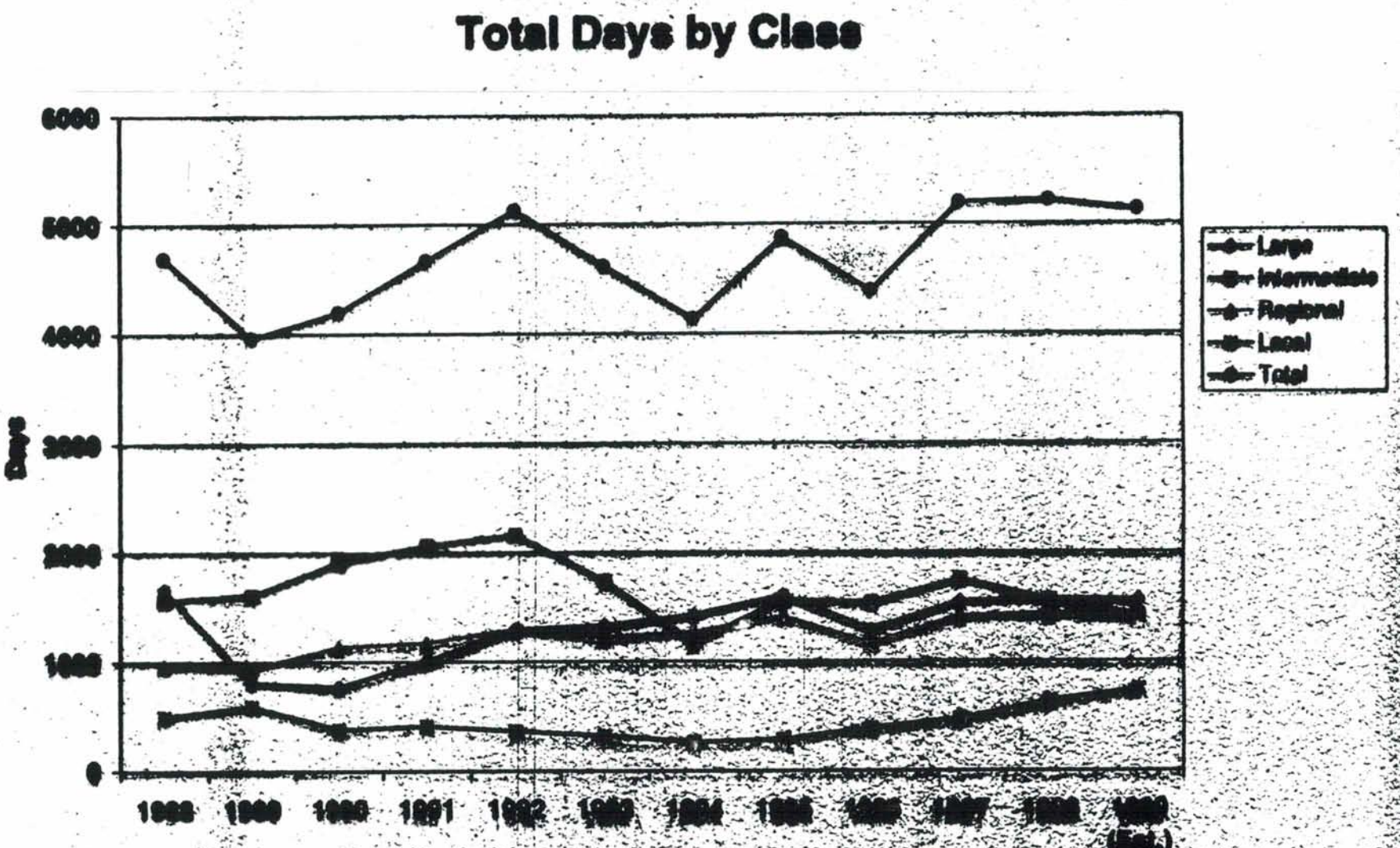


Fig. 7 UNOLS annual operating days by ship class to support sea-going projects by all research sponsors

Ship Utilization Rates

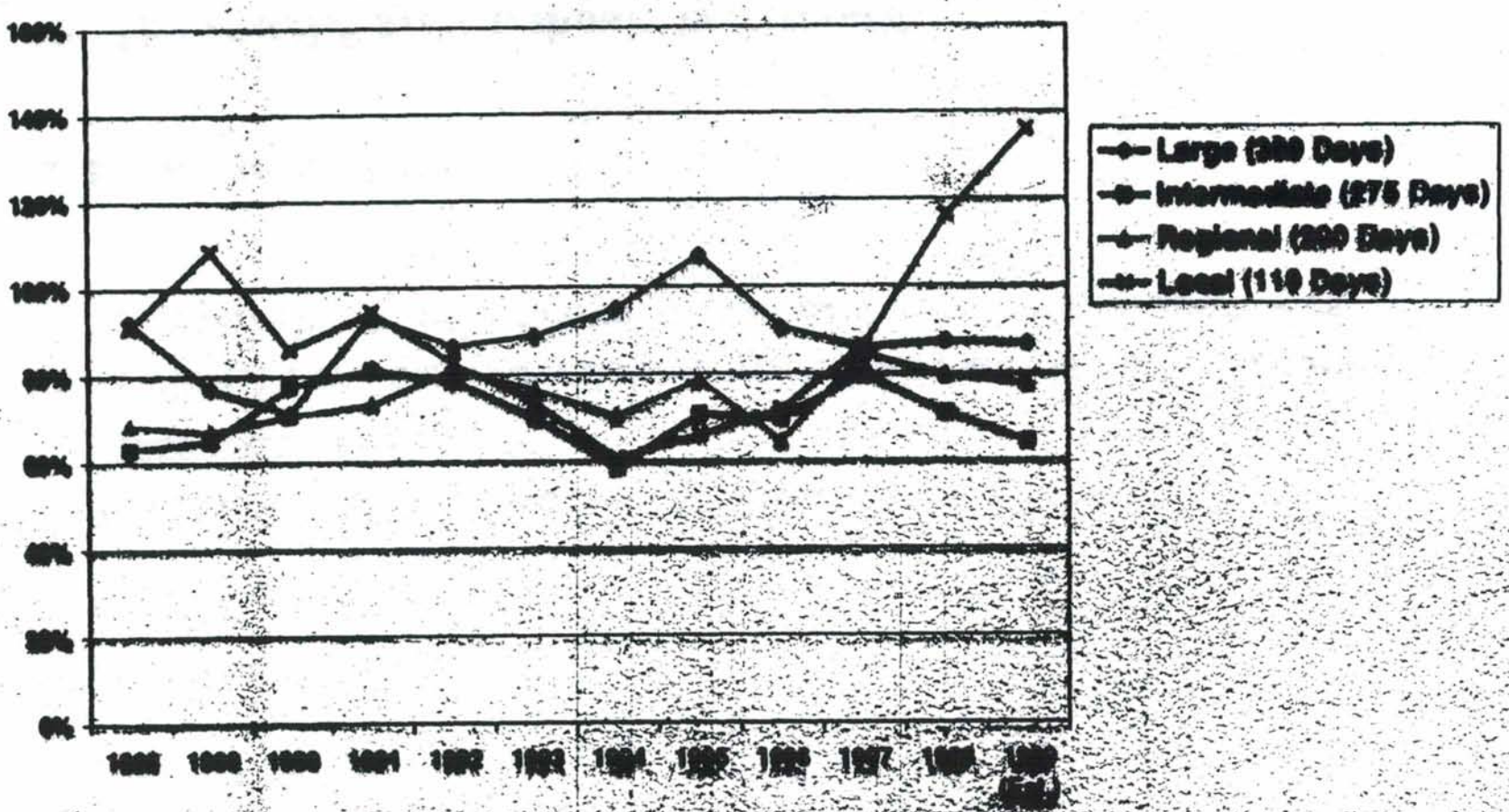


Figure 8. Academic Fleet Utilization as percentage of NSF-recommended standard operating year

Academic Fleet Review

Principal Findings:

- **Current practices provide excellent access to the sea for U.S. researchers**
- **UNOLS services are meeting community needs and costs are comparable to other government and commercial operators.**

Recommendation:

- **The UNOLS system should be retained.**

Academic Fleet Review

Programmatic findings:

- **Potential for near-term period of reduced use of UNOLS fleet by NSF grantees**
- **Need for strong continuing program of new technology introduction, improvement of existing capabilities, and more systematic approach to maintenance and upgrades**
- **Need to enhance quality control, training and safety procedures, and develop even higher standards for shared use facilities.**

Recommendation:

- **Launch a significant campaign to upgrade and strengthen the fleet to prepare for increasing technological sophistication and improve future productivity and quality of fleet operations.**

Academic Fleet Review

Operational findings:

- **Continue practice of competing the management of the UNOLS Office**
- **Need for specialized capabilities are met in special circumstances from outside the UNOLS system**

Recommendations:

- **Use a cooperative agreement for support of the UNOLS Office to ensure necessary management oversight.**
- **Consider a trial including some commercial ship operators as UNOLS non-member operators to provide unique fleet capabilities.**

Academic Fleet Review

Planning Findings:

- **Ocean scientists must assess the future needs and opportunities of the field to establish priorities. A broad vision is essential to anticipate future fleet requirements.**
- **Federal agencies must improve long range planning for facilities with twenty to thirty year life spans, beyond the scope of NSF and UNOLS alone.**

Recommendations:

- **NSF must accelerate and expand efforts to articulate a broadly-based vision for the future of ocean science and technology**
- **Federal agencies sponsoring research in oceanography should develop a long range plan for modernization and composition of the oceanographic research fleet that reaches well into the 21st century.**

Agree implementing Committee recommendations will enhance operations of the academic research fleet.

Initial actions

- **Developing new cooperative agreements for ship operators, with increased emphasis on quality control and standards.**
- **Revising guidelines, reviews and management of shared-use instrumentation to improve technology.**
- **Sponsoring workshops focused on emerging technology, specialized capabilities and improvements to basic systems.**
- **Recompeting UNOLS Office award as a cooperative agreement.**

Developing actions

- **Acceleration and expansion of science planning activities**
- **Long range planning for the modernization and composition of the fleet**
- **Trial participation of commercial operators to provide unique capabilities**

Appendix XI

NSF OCE
Decadal Planning Committee

Charge: ***"The objective of this activity is to develop a clear and compelling description of the most important and promising opportunities for discovery and new understanding in the ocean sciences over the next decade. ……".***
"The foundation of the report will be the four disciplinary science reports, plus, as appropriate, other recent planning documents …"

Motivation: ***"It is essential that all our plans be based upon a sound intellectual foundation. ……"***

Context: ***"Based on this document a long-range implementation plan for the Division will be constructed."***

OCEAN SCIENCES DIVISION
Disciplinary Science Workshops

- **APROPOS: Advances and Primary Research Opportunities in Physical Oceanography Studies**

Workshop: December 15th - 17th., Monterey, Ca.
Chaired by Bill Young

- **FOCUS: Future of Ocean Chemistry in the U.S.**

Workshop: January 6th -7th., Seabrook Is., S.C.
Chaired by Larry Mayer and Ellen Druffel

- **OEUVRE: Ocean Ecology: Understanding and Vision for Research**

Workshop: March 2nd - 3rd., Keystone, Co.
Chaired by Peter Jumars and Mark Hay

- **FUMAGES: Future of Marine Geology and Geophysics**

Workshop: December 4th - 6th., Ashland, Ore.
Chaired by Marcia McNutt and Paul Baker

www.joss.ucar.edu/joss/psg/project/oce_workshop

NSF OCE Decadal Committees

- First disciplinary meeting: FUMAGES (12/96). 4 disciplinary meetings held.
- Synthesis Committee first meeting 12/98
- Membership = 24
- Messages sent out via e-mail to about 10,000 scientists, national and international.
- About 120 detailed responses received. These clustered into 4 areas: Coastal processes, Climate/Ocean interactions, Ecosystem research, Crustal processes and flows.
- 7-8 working groups established

Committee Membership

Co-Chairs: Peter Brewer (MBARI) Ted Moore (U. Mich.)

Bob Beardsley (WHOI)
Ken Bruland (UCSC)
Jody Deming (UW)
Stan Hart (WHOI)
Peter Jumars (Bigelow)
Cindy Lee (SUNY)
Donal Manahan (USC)
Marcia McNutt (MBARI)
Mark Ohman (SIO)
Eli Silver (UCSC)
Karl Turekian (Yale)

Rainer Bleck (LANL)
Russ Davis (SIO)
Bob Detrick (WHOI)
Mark Hay (Georgia Tech.)
Dave Karl (U. Hawaii)
Susan Lozier (Duke)
Larry Mayer (U. Maine)
Frank Millero (RSMAS)
Peter Rhines (UW)
Sharon Smith (RSMAS)
Francisco Werner (UNC)

FUMAGES

- **8 "State of Art" science papers**

Mid-Ocean Ridges
Formation/Aging of ocean plates
Convergent Margins
Shelf & Sediment Transport
Water in the Lithosphere
Paleoceanography
Passive Margins
Near Shore Marine geology

- **4 Workshop Themes**

Solid Earth
Sediments
Paleoceanography
Fluids

- **Promising new Areas**

The time domain on all scales
Characterizing & Modeling Complex Systems
Role of Biological Activity on Geological Processes
Longer Term Variability of Geolological Processes

- **Enabling Technologies**

OEUVRE

- **Recent Progress:**
  Pelagic Microbial Food Web
  Fe Limitation
  Alternating Semi-stable Population States
- **Reasons for Recent Progress:**
  Technology on all scales, including Biotech.
  Computing power
  Explicit theories and models
  Interdisciplinary insights
- **Future Directions:**
  Role of organisms in geochemical transformations
  Form, function and behavior of individuals
  Processes structuring the assembly of oganisms
  Human impacts on climate, fisheries, and habitats

General Comments from all four reports

- **Satellites** – *barely mentioned*
- **Time domain** – *very strong common theme*
- **Large Scale Surveys** – *barely mentioned*
- **Perturbation experiments** – *strong interest*
- **Monitoring/Observatories** – *passive interest*
- **Non-Equilibrium/Non-Steady State** –*strong interest*
- **Computing power** – *Assumed*
- **Drill ship** – *assumed*
- **Submersible/ROV** – *assumed*
- **Land-Sea Boundary** – *strong interest*

Question: What does a Decadal report look like?

Answer: Pick two examples that have been admired and been effective, and learn.

Examples:

- *The "Field Report". Astronomy and Astrophysics for the 1980's. 1982.*

- *The "Pimentel Report". Opportunities in Chemistry. 1985.*

Both are NAS Committee Reports

Example: The "Field Report"

- *Decadal report of the Astronomy Survey Committee*
- **1978.** *– 223 scientists contacted. Committee of 7 selected; grew to 21*
- **Dec. 1980.** *Final meeting.*
- *Established 7 working groups: 4 on core science themes, 1 on related science, 2 on specialized technical fields.*
- *Open letter sent to 3,700 members of Society. Responses to working groups for evaluation*
- *Looked primarily at large technology NASA/NSF initiatives.*

Early suggestion of report outline

- **Cover Letter.** *The early days, Stratton Commission, period of discovery, formation of the committee and manner of operation.*
- **Introduction.** *The ocean and the earth. Evolution of exploration and understanding. Established infrastructure. The present opportunity.*
- **Recommendations of the Committee.** *TBD.*
- **Reports of the Working Groups.** *TBD.*
- **Established and Approved Programs.** *e.g. ODP, RIDGE, etc.*
- **Criteria for new Research Initiatives.** *Technical feasibilty. Status of theory and data analysis. Laboratory skills. Computational support. Value to society.*
- **New Programs.** *Large Scale (e.g. CLIVAR), Medium Scale (e.g. IRONEX, Time Series), Small Scale (e.g. Instruments, systems and methods).*

Early suggestion of report outline (continued)

- **Training and Education of new scientists**
- **Programs in need of development.** ***Important concepts now lacking in some criteria for establishment as a new research initiative. Links to other areas (e.g. Polar).***
- **Appendices.** *e.g. Relation to mission agencies. Organization, education and training. Membership. Sources.*

Interdisciplinary Themes Selected

- ***Role of the Ocean in Climate Change (Turekian)***
- ***The Ocean Beneath the Sea Floor – Fluids, Chemistry and Life in the Ocean Crust (Deming)***
- ***Coastal Ocean Perturbations and Processes (Mayer)***
- ***Turbulent Mixing and Bio-Chem Physical Interactions (Davis)***
- ***Non-Equilibrium System Dynamics (Werner)***
- ***Dynamics of the Ocean Lithosphere (Silver)***
- ***Ocean Prediction (Bleck)***
- **TBD - *Ocean Carbon Cycle (?)***

Draft Report Outline

- ***Preface:*** *Background, Disciplinary Reports, Charge etc.*
- ***Executive Summary***
- ***Introduction:*** *History, Exploration, National Defense, etc.*
- ***New Frontiers in Ocean Science:*** *Working Group themes*

Climate & Oceans *Turbulent Mixing Interactions*
Ocean Prediction *Non-Equilibrium Ecosytem Dynamics*
Coastal Ocean Perturbations and Processes
Fluids, Chemistry and Life in the Ocean Crust
Dynamics of the Ocean Lithosphere

- ***New Approaches and Cross Cutting Issues:*** *The time domain*
- ***Resources and Partnerships:*** *Facilities and technologies. Manpower*

Examples of what we will not consider

- ***Design and Timing of NASA Ocean Missions.*** *e.g. EOS AM1, TPFO etc.*
- ***Fate of Navy Acoustic Systems.***
- ***Extra-terrestrial oceans.***
- ***Future use of Navy operational submarines.***
- ***Design and support of purely operational systems.*** *e. g. GOOS*

But note that the development of sensors and techniques for enhancement of these systems has been a critical partnership role for NSF that should continue.

OCE SCIENCE SYNTHESIS
DRAFT CHARGE

⊕ **How?**

This activity will be led by a community-based steering committee with well-balanced membership - balanced by discipline, gender, participation in the disciplinary workshops, research approach, etc., etc.

All appropriate recent planning documentation will be provided to the group which will determine the process by which it will achieve it's goals. For example, it is not clear that a major workshop is an essential part of this process - but maybe.....

If gaps are identified, this group will propose ways to fill them.

At the appropriate time, the committee must take steps to establish community buy-in of the results (workshop, meetings, web sites etc. - whatever is deemed appropriate.)

⊕ **Context**

Based on this document a long-range <u>implementation</u> plan for the Division will be constructed. This plan will be developed internally to the Division and will be followed by an opportunity for community comment and a thorough Advisory Committee review. A description of the Division's Education priorities will be integrated into this plan.

The science synthesis document will also be used as the basis for a series of public outreach documents.

OCE SCIENCE SYNTHESIS
DRAFT CHARGE

⊕ **Motivation:**

It is essential that all our plans be built upon a sound intellectual foundation. In making budgetary arguments/justifications both inside and outside NSF we need a high quality source for the science justification - this document is it!

The Division's future implementation plans and priorities will be based upon this document. We need an authoritative overview to help us, internally, to see the full picture of opportunities in the Ocean Sciences, and therefore understand the implications of prioritization that occurs (during later development of implementation plans).

It could be argued that the primary benefit is the process not the product - that the most important contribution is the insight that everyone gains from participating in the difficult process of identifying the most exciting opportunities for the future.

OCE SCIENCE SYNTHESIS
DRAFT CHARGE

⊕ **Objectives:**

The objective of this activity is to develope a clear and compelling description of the most important and promising opportunities for discovery and new understanding in the ocean sciences over the next decade. The product will be a succinct (~100-150pp) report written for community and agency readership.

The most challenging task is integration - we need an original vision of the future of the ocean sciences over the next decade presented (as far as possible) as an integrated whole.

The foundation of the report will be the four disciplinary science reports, plus, as appropriate, other recent planning documents from special focus programs.

Efforts will be made to identify gaps or omissions.

Boundaries with other disciplines will be explored, multidisciplinary efforts will be identified and fully developed.

The report will be a description of the research topics - the science problems.

While avoiding specific implementation issues, a section of the report will be devoted to the identification of technology and facilities requirements.

APPENDIX XII

DESCEND

- ❖ Meeting Announcement
- ❖ Agenda
- ❖ Steering Committee
- ❖ Application Form
- ❖ Travel Request Form
- ❖ Hotel Information
- ❖ Participant List
- ❖ Related Links

WHAT'S NEW

Comments & Questions?
Please contact the UNOLS Office with any questions regarding the DESCEND Workshop
unols@gso.uri.edu

~ WORKSHOP ANNOUNCEMENT ~

DESCEND

DEveloping Submergence SCiencE in the Next Decade: Scientific Challenges, Technology Developments, and Investigative Strategy

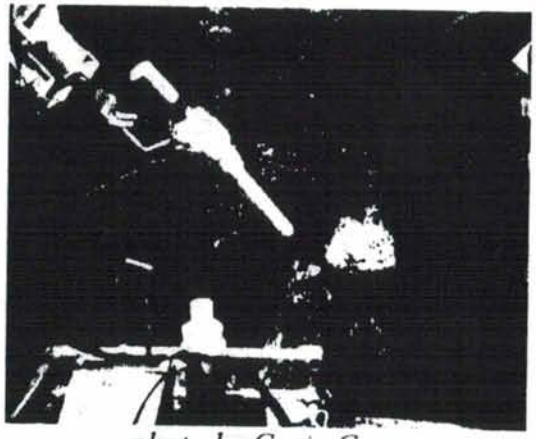


photo by Craig Cary

October 25-27, 1999
National Science Foundation
Arlington, VA

Please revisit this site often for updates on the workshop agenda and related topics.

Tentative Meeting Agenda

DEveloping Submergence SCiencE for the Next Decade: "DESCEND"
Scientific Challenges, Technology Developments, and Management Strategy

Monday, October 25th,
Day 1: Science Discussions:

8:30 a.m. **Open Meeting**

- UNOLS Welcome/Introduction
- Overview DESCEND – Patty Fryer
- Overview of FUTURES
- Overview of Submersible Science – Dan Fornari
- Observatory Science Overview – Keir Becker
- Charge to Participants/Workshop Groundrules – Patty Fryer

10:15 a.m. **Breakout Sessions: Science Breakout Sessions:**

- Ridge Processes – Tim Shank/Karen Von Damm
- The Abyss/Open Ocean – Art Yayanos/Andy Fisher
- Margins (passive & convergent) – Chuck Fisher
- Shelf & Coastal – Gary Taghon
- Polar – Jim Barry/

12:00 **Lunch**

1:00 p.m. **Reconvene Break-Out Sessions**

3:45 p.m. **Break**

4:00 p.m. **Plenary Session** – Each session leader will provide a 10-minute summary of their respective session. At the conclusion of all summaries there will be an open discussion.

6:00 p.m. **Adjourn**

Tuesday, October 26th
Day 2: Technology & Instrumentation:

8:30 a.m. **Commence Day 2**

- Overview of untethered systems – AUVs: Jim Bellingham
- Manned and Unmanned Vehicles: Mapping
- Data Systems – Case studies within and outside of MG&G:

10:15 a.m. **Technological Breakout Sessions:**

- Event Response – Dana Yoerger/Bill Ryan
- Time Series – Long – Fred Duennebier/Ross Heath
- Time Series – Short – George Luther
- Expeditionary – Jim Cowen/Hugh Milburn
- Global – Fred Spiess

12:00 **Lunch**

1:00 p.m. **Reconvene Break-Out Sessions**

3:45 p.m. **Break**

4:00 p.m. **Plenary Session** – Each session leader will provide a brief (one bulleted overhead) summary of their respective session. At the conclusion of all summaries there will be an open discussion.

6:00 p.m. **Adjourn**

Wednesday, October 27th
Day 3: Wrap-Up:

8:30 a.m. **Commence Day 3**

Morning: **Overview of Technology Costs and Realities** – Jim Bellingham

A Discussion period would follow.

Afternoon: The afternoon would be set aside to allow the Steering Committee to complete writing assignments.

APPENDIX XIII

PROPOSED UNOLS CHARTER REVISIONS

3. MEMBERSHIP

a. Membership in UNOLS is open to those institutions which use, or operate and use, sea-going facilities and maintain an academic program in marine science. ~~Membership shall be by institution~~. It is intended that UNOLS institutions make substantial contributions to the national oceanographic program. Both individual institutions and consortia of such institutions may be members of UNOLS for purposes of attending UNOLS meetings, receiving UNOLS information, and other non-voting UNOLS activities. However, on any matter requiring a vote of the UNOLS membership either the member consortium may cast a ballot or individual member institution(s) within the consortium may cast ballot(s), but not both. In the event that any consortium and one or more of its constituent institutions disagree as to the voting option to be exercised in any matter, only the ballots of individual institutions within that consortium will be accepted on that matter. The choice of individual or consortium voting may be exercised independently on each voting matter and by each consortium and its constituent institutions. In the remainder of this charter the word "institution" means "individual member institution or member consortium" except where otherwise noted.

---

5. PROCEDURES

a. Voting. Election of UNOLS Officers and UNOLS Council members will be on the basis of one vote for each UNOLS institution represented. On issues coming before the membership for vote, each UNOLS institution will also exercise one vote. Except as otherwise specified (e.g., for involuntary termination of membership), matters voted on will be decided by a simple majority of UNOLS institutions casting votes in person or by proxy. Voting by the membership will ordinarily take place at UNOLS meetings. Two-thirds of the UNOLS operator institutions must be represented to establish a quorum. Because of the option for consortia or their member institutions to vote as in section 3a., the number that constitutes a quorum may be different for different votes. In extraordinary circumstances, matters may be submitted for vote by the membership at times other than UNOLS meetings. These matters will be submitted by mail or electronic mail, and will be governed by the same rules for decision and quorum as apply at meetings.

Appendix XIV

UNIVERSITY-NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

An association of institutions for the coordination and support of university oceanographic facilities

APPLICATION FOR MEMBERSHIP

Revised 4/97

Pursuant to the UNOLS Charter the below named organization hereby submits application for membership in the University-National Oceanographic Laboratory System. In doing so the applicant understands and agrees to work for the objectives set forth in the UNOLS Charter (Attached)

Name of Institution: Southern California Marine Institute

Name of person delegated to act as representative to UNOLS

Name: Donald L. Newman

Title: Associate Director

Address: 820 South Seaside Ave.

Terminal Island, CA 90731

Telephone Number: (310) 519-3172

Fax Number: (310) 519-1054

E-mail: SCMI@csulb.edu

General information on oceanographic, Sea Grant and other marine science programs

No. Professional Personnel 16 No Graduate Students 8

Approximate Annual Budget $ 1.5 million

List of research vessel(s) owned or operated

NAME	SIZE
R/V Yellowfin	76' x 28'
R/V SeaWatch	65' x 26'
R/V Vantuna	85' x 28'

NOTE: Please attach a brief list of the names and addresses of key individuals to whom the following information sent out by UNOLS would apply. (Note: The UNOLS Institution Representative receives all information.)

Ship user information - research ship schedules, ship availabilities, etc. (intended for scientists and ship users)

Research ship operations and maintenance - for Marine Superintendents and Port Captains

UNOLS Rep. only

SUBMITTED

Signature Donald L. Newman

Name Donald L. Newman
Title Associate Director
Date 5/2/97

RECEIVED
MAY 6 199
UNOLS OFFICE

Send to

P O Box 392
Saunderstown, RI 02874

Phone (401) 874-68

Scientists and Ship Users

Dr. Larry Allen
Biological Sciences
(818) 885-3340/3356
FAX: (818) 885-2034
E-mail: lallen@huey.csun.edu

Dr. Keith Arnold
Biological Sciences
(909) 869-4049/4038
FAX: 869-4078
E-mail: kearnold@csupomona.edu

Dr. Richard Bray
Program Director
Biological Sciences
(760) 750-4000
FAX: (760) 750-4111
E-mail: rbray_@csusm.edu

Dr. Ivan Colburn
Geological Sciences
(213) 343-2413/2400
FAX: (213) 343-2435
E-mail: None

Mr. George Engelke
Mechanical Engineering
(909) 869-2576/2575
FAX: 869-4341
E-mail: sjchan@csupomona.edu.

Dr. Vicky Fabry
College of Arts & Sciences
(760) 750-4110
FAX: (760) 750-4030

Dr. Allan Miller
Biological Sciences
(310) 985-8503
FAX: (310) 985-8878
E-mail: amiller@csulb.edu

Dr. Robert (Dan) Francis
Geological Sciences
(310) 985-4929
FAX: (310) 985-8638
E-mail: rfrancis@csulb.edu.

Dr. Steve Murray
Biological Sciences
(714) 449-7291
FAX: (714) 773-3426
E-mail: smurray@fullerton.edu

Dr. Carlos Robles
Biological Sciences
(213) 343-2067/2050
FAX: (213) 343-6451
E-mail: crobles@hitide.calstatela.edu

Dr. Roger Seapy
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FAX: (714) 773-3426
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Dr. David Sigurdson, Chair
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FAX: (310) 516-4268
E-mail: dsigurdson@dhvx

Dr. Jon Sloan
Geological Sciences
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FAX: (818) 885-2820
E-mail : jsloan@huey.csun.edu

Dr. Susan Williams
Biological Sciences
(619) 594-2738
FAX: (619) 594-5676
E-mail: swilliams@sunstroke.sdsu.edu


SCMI
Southern California
MARINE INSTITUTE

Effective August 1993 the Ocean Studies Institute, representing eight California State University campuses, the University of Souther California, and Occidental College merged to form the largest consolidated marine institute in California. While each campus will con tinue to maintain their respective marine science programs, this newly consolidated center will provide additional laboratory space, well as convenient seaside access to their fleet of research vessels. The research center is known as the Southern California Marin Institute (SCMI). SCMI is dedicated to providing field and laboratory support for Marine Biology, Oceanography and other ocean-rela ed studies.

The strategic alliance of these marine groups maximizes the resources of participating entities, while utilizing the collective knowledge these universities. SCMI establishes a synergistic relationship among the members, minimizes overall operating costs through consolida tion of resources, nurtures a positive relationship between governmental agencies and academia, allows greater visibility of member pro grams, creates a large marine database accessible to other educational and private entities, and raises the potential for external fundin through grants and contracts.

SCMI is dedicated to serving not only its member campuses, but also to provide educational and research opportunities to all public an private entities. Inquiries regarding SCMI and the services that can be provided should be sent to the following address:

Southern California Marine Institute
820 South Seaside Avenue
Terminal Island, Ca 90731
or Telephone (310) 519-3172
or Fax (310) 519-1054

USC • CSUF • CSUN • CSUDH • CSULA • CSULB • CSPUP • SDSU • CSUSM • Occidental College

The ocean offers major resources for Southern Californians from both biological and economical standpoints. Yet the Probability of environmental impact is great, as the ports of Los Angeles and Long Beach are among the busiest in the world. The high population density of the Los Angeles basin further exacerbates the potential for environmental disaster along the coast and in the harbors. The biological resources of our local marine habitats must be preserved for present and future generations. To achieve this goal, educational programs focusing on marine environments must be maintained. Future environmental disasters can only be averted by understanding the intricacies of the sea. SCMI is dedicated to providing field and laboratory support for Marine Biology, Oceanography and other ocean-related studies.

ORGANIZATION & PHILOSOPHY

A strategic alliance of marine groups maximizes the resources of participating entities, while utilizing the collective knowledge of the group. The new Southern California Marine Institute provides modern facilities including laboratories, storage, machine shop and technical support.

The Southern California Marine Institute:

- established a synergistic relationship among the members
- minimizes the operating cost through consolidation of resources
- nurtures a positive relationship between governmental agencies and academia
- allows greater visibility of members' programs
- creates a large marine data base accessible to other educational and private entities
- provides a land base to enhance educational programs or as a center for distance learning
- demonstrates fiscal responsibility to the legislature and general public
- raises the potential for external funding through grants and contracts

SCMI increases research and education capabilities as a result of better facilities.

ADVANTAGES

Through SCMI, the combined assets of highly skilled personnel and well-equipped vessels have the capability of meeting a variety of educational and research needs in both coastal and offshore waters. SCMI, intercampus faculty and graduate students combine to create a large reservoir of diverse expertise that can be coordinated into multidisciplined projects, including the areas of marine biology, oceanography, microbiology, chemistry, geology, economics, geography, archeology and engineering.

The Fish Harbor facility contains more than 13,000 square ft. of usable space, including offices, classrooms, fully-equipped laboratories and a machine shop. The wet labs are appointed with saltwater circulation systems to maintain living marine specimens.

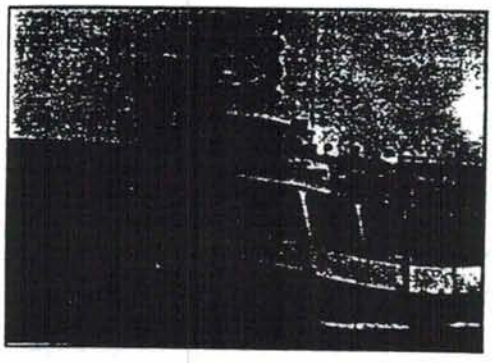
SCMI also has 10,000 square ft. of deep harbor space able to accommodate five research vessels at one time.

FACILITIES and CAPABILITIES

SCMI maintains a fleet of four coastal research vessels exclusively used to support marine science and educational programs for member institutions as well as for all regional users.

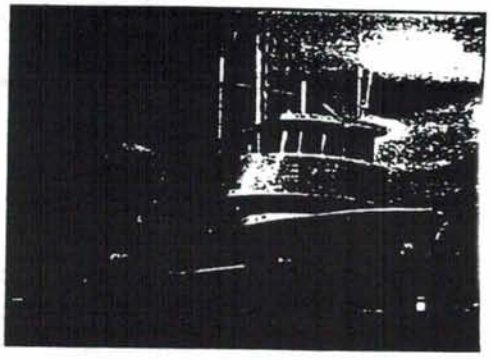
SCMI Vessels

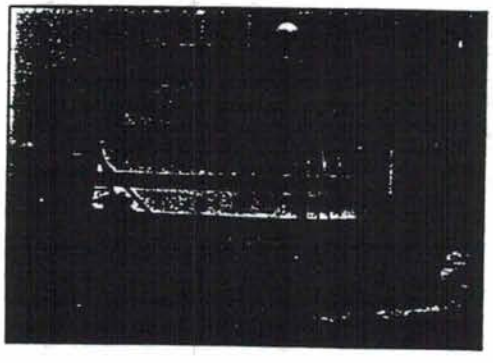
	VANTUNA	YELLOWFIN	SEA WATCH	GOLDEN WEST
Length	85 feet	76 feet	65 feet	41 feet
Beam	23 feet	24 feet	24 feet	12 feet
Draft	9 feet	8.6 feet	5 feet	3.5 feet
Cruising Speed	10 knots	9.5 knots	10.5 knots	10 knots
Normal Range	2000 NM	2000 NM	500 NM	100 NM
Fuel Capacity	2700 gallons	4000 gallons	1800 gallons	300 gallons
Endurance	5 days	10 days	5 days	24 hours
Compliment	3 crew	5 crew	3 crew	1 crew
Student/Scientist	38 day/12 night	40 day/6 night	40 day/16 night	17 scientists
Engines	twin 460HP Cats	twin 350HP Detroits	twin 465HP Detroits	one 275HP Detroit



Vantuna

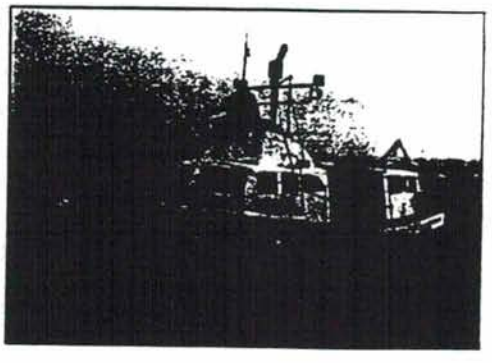
Yellowfin





Sea Watch

Golden West



For expanded vessel or scientific equipment specifications, please call (310) 519-3172

VESSELS

Appendix XV

UNIVERSITY-NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

An association of institutions for the coordination and support of university oceanographic facilities.

APPLICATION FOR MEMBERSHIP

Revised 4/97

Pursuant to the UNOLS Charter the below named organization hereby submits application for membership in the University-National Oceanographic Laboratory System. In doing so the applicant understands and agrees to work for the objectives set forth in the UNOLS Charter (Attached)

Name of Institution: New Jersey Marine Sciences Consortium

Name of person delegated to act as representative to UNOLS:

Name: William Corso

Title: Director of Research & Education

Address: Building 22, Fort Hancock

Highlands, NJ 07732

Telephone Number: (732) 872-1300 ext. 26

Fax Number: (732) 291-4483

E-mail: billcorso@aol.com

General information on oceanographic, Sea Grant and other marine science programs:

No. Professional Personnel 8 No. Graduate Students 0

Approximate Annual Budget $2,000,000.00

List of research vessel(s) owned or operated:

NAME	SIZE
Walford (NOAA owned)	55 feet
Victoria (NJMSC owned)	28 feet

NOTE: Please attach a brief list of the names and addresses of key individuals to whom the following information sent out by UNOLS would apply. (Note: The UNOLS Institution Representative receives all information.)

Ship user information - research ship schedules, ship availabilities, etc. (intended for scientists and ship users);

Research ship operations and maintenance - for Marine Superintendents and Port Captains.

SUBMITTED:

Signature

Name: William Corso

Title: Director of Research & Education

Date: 11 September 1997

Send to:

P.O. Box 392
Saunderstown, RI 02874

Phone: (401) 874-6825
Fax: (401) 874-6167
E-mail: unols@gsosun1.gso.uri.edu

Ship user information:

- Dr. Michael P. Weinstein
  NJMSC President and Director, New Jersey Sea Grant
- Mr. Steven Litvin
  Assistant Director, New Jersey Sea Grant

Research ship operations and maintenance:

- Capt. James Hughes
  Manager of NJMSC Marine Operations

All are at:

New Jersey Marine Sciences Consortium
Building 22, Fort Hancock
Highlands, NJ 07732

NJMSC MEMBER INSTITUTIONS

Atlantic Community College
Brookdale Community College
Burlington County College
City University of New York
County College of Morris
Cumberland County College
Fairleigh Dickinson University
Georgian Court
Jersey City State College
Kean College of New Jersey
Lehigh University*
Marine Academy of Science and Technology
Middlesex County College
Monmouth College
Montclair State University
New Jersey Institute of Technology*
Princeton University
Ramapo College
Richard Stockton State College
Rider University
Rowan College of New Jersey
Rutgers University*
Saint John's University
Saint Peter's College
Seton Hall University
Stevens Institute of Technology
Trenton State College
Union County College
University of Medicine and Dentistry of New Jersey*

*** Indicates institutions participating in New Jersey Sea Grant research projects listed in this directory.**

INTRODUCTION

The National Sea Grant College Program created by Congress in 1966, is operated by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA). Sea Grant is unique partnership with public and private sectors combining research, education and technology transfe for public service. This national network of universities meets changing environmental and economic needs o people in our coastal, ocean and Great Lakes regions.

Since 1975, New Jersey Sea Grant has been manage by the New Jersey Marine Sciences Consortium, an alliance of 30 colleges and universities, private organi zations and individuals interested in marine affairs. Having met the high standards and program balance set by the National Sea Grant Program, New Jersey Sea Grant became the 26th program in the nation to earn the status of "Sea Grant College", in 1989.

The value of Sea Grant to New Jersey has grown steadily by addressing the ever-changing challenges and opportunities presented by the state's extensive and invaluable marine and coastal resources. Empha sis on critical coastal problems that focus on fisheries shoreline processes, water quality, and marine biotechology continue to be at the forefront of current New Jersey Sea Grant research activities.

Scientifically sophisticated, these activities are also relevant to the state's economy. Despite its small size New Jersey is bounded by more than 1,700 miles of coastline. Tourism is the second largest industry accounting for over five billion dollars annually, most of that generated by marine recreational activities. New Jersey consistently ranks among the top ten in the nation in commercial fishing landings, and along with recreational fishing generates more than one billion dollars income annually.

From Sandy Hook to Cape May, and into the shallows of Delaware Bay, New Jerseyans are becoming increasingly aware of the importance of preserving the state's marine resources. They have also come to recognize the leadership of the New Jersey Marine Sciences Consortium and the New Jersey Sea Grant College Program in these efforts.

Appendix XVI

UNOLS ANNUAL MEETING
Coast Guard Agency Report
21 September 19999

USCGC HEALY Update

Avondale Industries conducted builder's sea trials on HEALY 23-30 August in the Gulf of Mexico. Results were overall satisfactory. The Coast Guard will start acceptance trials the week of 11 October, with final delivery coming in late October or early November. Planning for ice and science trials is on track for a four-phase schedule starting in mid-January 2000 and continuing until June. The members of the AICC and RVTEC committees have been heavily involved in the planning process and the Coast Guard is highly appreciative of their efforts. Cold weather trials will likely occur off of Baffin Island in the eastern Arctic. Following the completion of science trials, HEALY will transit the Northwest Pass to arrive in Seattle in August. A formal commissioning date has not been set but will occur in September 2000. HEALY is scheduled to sail on its first unrestricted science cruise in the early spring of 2001. Actual dates for deployment will be driven by the requirements of the initial science objectives.

POLAR Class Update

Since the last annual meeting, POLAR SEA has completed a deployment to the Antarctic for Operation Deep Freeze, and a follow-on Arctic deployment in support of a funded science mission in the area of the St. Lawrence Island polynya. POLAR SEA is currently undergoing a "Reliability Improvement Project" yard availability. The ship will complete this work in April 2000 and will be available for Science of Opportunity in the mid-June to late July time frame.

POLAR STAR is currently in Todd Shipyard undergoing major repairs to the centerline shaft. Shaft alignment problems forced the cancellation of a planned summer Science of Opportunity cruise. The ship will deploy for the Deep Freeze mission in early November and return to Seattle in April 2000. Following an in-port period for voyage repairs, POLAR STAR will sail on a three month Arctic mission from early July to late September. The Coast Guard is seeking interest for dedicated science support for this deployment.

USCG – NSF Memorandum of Agreement

In May, the Coast Guard and National Science Foundation signed a revised MOA for use of Coast Guard icebreakers for Arctic and Antarctic projects support by the NSF. The document is a vast improvement over the outdated version it replaced and formalized a variety of responsibilities and practices that had evolved over the years. A key point was that the incremental reimbursement agreement was maintained essentially unchanged. It calls for NSF to pay all fuel costs and a surcharge for helicopter and ship maintenance costs.

APPENDIX XVII

UNOLS COUNCIL ELECTIONS

September 21, 1999

The UNOLS Nominating Committee has assembled the following slate of candidates for the UNOLS Council positions to be filled at the 1999 Annual Meeting. This election will be held in accordance with the UNOLS Charter as readopted February 1999. The current membership of the Council and a UNOLS Directory are attached.

Nominations may be made from the floor during the Annual Meeting. Such nominations may be made only by designated representatives of UNOLS institutions, and must be accompanied by the nominee's concurrence and qualifications. The nominee must meet the requirements of the UNOLS Council position he/she is nominated to fill.

UNOLS COUNCIL SLATE

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

Dr. James Bauer	Virginia Institute of Marine Science
Dr. David Naar	University of South Florida
Dr. Denis Wiesenburg	University of Southern Mississippi

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

Dr. Dennis Hansell	Bermuda Biological Station for Research
Dr. Will Sager	Texas A&M
Dr. Marsh Youngbluth	Harbor Branch Oceanographic Institution

VITAE

James Bauer (College of William and Mary, Virginia Institute) Biogeochemist

Ph.D., 1989, University of Maryland, Marine Biogeochemistry

James Bauer has participated in more than 20 seagoing programs on seven different UNOLS vessels since 1987. He studies natural carbon isotope geochemistry of marine organic matter and carbon cycling.

Dennis Hansell (Bermuda Biological Station for Research) Biogeochem

Ph.D., 1989, Oceanography/Biogeochemistry, Univ. Alaska

Dennis Hansell's research program investigates the carbon and nitrogen cycles in the global ocean. He has extensive experience with UNOLS, NOAA and other ships dating from 1985. Presently serving first term on UNOLS Council.

David Naar (Univ. South Florida) Marine Geologist

Ph.D., Scripps Institution of Oceanography, 1990

Has experience at sea on six different UNOLS vessels since 1979, plus other smaller vessels, and French and Asian research ships. David is familiar with ship scheduling, staff retention issues and facilities funding. He can provide a viewpoint from MGG research off the coastal waters of the California Channel Islands, Chile Trench, East Pacific Rise, and the Florida Carbonate Platform.

Will Sager (Texas A&M) Marine Geologist/Geophysicist

Ph.D., 1983, Geology and Geophysics, University of Hawaii.

His research interests include plate tectonics, paleomagnetism, and high-resolution seafloor mapping. He has sailed on 31 research cruises in 22 years. Current projects include a high-resolution side-scan sonar study of carbonate mounds on the Mississippi-Alabama outer shelf, a high-resolution side-scan sonar study of oil seeps on the Louisiana slope, a multi-disciplinary geological/geophysical study of Shatsky Rise oceanic plateau, and a paleomagnetism of seamounts in the Gilbert and Tokelau Islands.

Denis Wiesenburg (Univ. Southern Mississippi) Geochemist

Ph.D. Oceanography, Texas A&M University, 1980

Denis Wiesenburg has participated in over 40 research cruises in the north and south Atlantic Ocean, north Pacific Ocean, Gulf of Mexico, Mediterranean Sea and Norwegian Sea, including 512 days at sea include a DSV ALVIN dive and five days in the Navy research submersible NR-1. His current research interests include understanding the interaction of physical, chemical and biological processes in the ocean. As the USM UNOLS representative since 1994, he has attended the last five UNOLS Annual meetings.

Marsh Youngbluth (Harbor Branch) Biologist

Ph.D. (Biology, 1972) Stanford University.

He has been chief scientist on numerous cruises with UNOLS vessels. In addition, he has many years of manned/unmanned submersible experience with HBOI, MBARI, HURL, and IFREMER. Recent work within the department includes collaborations with scientists from the Monterey Bay Aquarium Research Institute studying population dynamics and predator-prey relationships of siphonophores.

APPENDIX XVIII

UNOLS DIRECTORY (with designated representatives)

Operator Institutions in **BOLD**

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ALABAMA MARINE ENVIRONMENTAL SCIENCES CONSORTIUM
Dr. George F. Crozier

UNIVERSITY OF ALASKA Dr. Thomas Weingartner

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

BIGELOW LABORATORY FOR OCEAN SCIENCES Dr. Lewis Incze

BROOKHAVEN NATIONAL LABORATORY Dr.Charles Flagg

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

UNIVERSITY OF CALIFORNIA, SANTA BARBARA
Dr. Steven Gaines

UNIVERSITY OF CALIFORNIA, SANTA CRUZ Dr. Ken Bruland

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 Gerlick

FLORIDA STATE UNIVERSITY Dr. William C. Burnett

HARBOR BRANCH OCEANOGRAPHIC INSTITUTION
Dr. 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. Stephen L. Root

LEHIGH UNIVERSITY Dr. Bobb Carson

LOUISIANA UNIVERSITIES MARINE CONSORTIUM
Dr. Michael Dagg

UNIVERSITY OF MAINE Dr. David Townsend

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. Russell A. Moll

UNIVERSITY OF MINNESOTA, DULUTH Dr. Thomas Johnson

MONTEREY BAY AQUARIUM RESEARCH INSTITUTE
Dr. Bruce Robison

MOSS LANDING MARINE LABORATORIES
Dr. Kenneth Coale

NAVAL POSTGRADUATE SCHOOL Dr. Roland W. Garwood

UNIVERSITY OF NEW HAMPSHIRE Dr. Wendell Brown

NEW JERSEY MARINE SCIENCES CONSORTIUM Dr. William Corso

STATE UNIVERSITY OF NEW YORK AT STONY BROOK
Dr. Roger Flood

UNIVERSITY OF NORTH CAROLINA AT WILMINGTON
Dr. Steven Miller

NOVA UNIVERSITY Dr. Richard E. Dodge

OCCIDENTAL COLLEGE Dr. Gary Martin

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

SOUTHERN CALIFORNIA MARINE INSTITUTE Dr. Donald Newman

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. Wayne Gardner

(over)

UNOLS DIRECTORY (with designated representatives)
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TEXAS A&M UNIVERSITY Dr. Ed Shaar, Jr.

VIRGINIA INSTITUTE OF MARINE SCIENCE Dr. L. Donelson Wright

UNIVERSITY OF WASHINGTON Dr. Bruce W. Frost

UNIVERSITY OF WISCONSIN AT MADISON Dr. Anders W. Andren

UNIVERSITY OF WISCONSIN AT MILWAUKEE Dr. Jack Orchard

UNIVERSITY OF WISCONSIN AT SUPERIOR Dr. Mary Balcer

WOODS HOLE OCEANOGRAPHIC INSTITUTION
RADM Richard Pittenger

UNOLS COUNCIL/COMMITTEES

UNOLS COUNCIL (UC)

(858) 534-4729	Robert Knox, SIO, (Chair)	10/94-10/00
(757) 683-5547	Thomas Royer, ODU, (V-Chair)	10/93-10/00
(541) 737-3966	Tim Cowles, OSU	09/98-09/01
(631) 344-3128	Charles Flagg, Brookhaven	09/98-09/01
(441) 297-1880 x210	Dennis Hansell, BBSR	09/96-09/02
(305) 361-4046	Tom Lee, U Miami	09/98-09/01
(805) 893-4319	Barbara Prezelin, UCA, SB	09/97-09/00
(228) 688-3177	Denis Wiesenberg, U SoMS	09/99-09/02
(512) 471-0430	Tom Shipley, U Texas	09/97-09/00
(401) 874-6579	John Freitag, URI, (Chair, RVTEC)	11/96-11/0X
(808) 956-6314	Patricia Fryer, U Hawaii (Chair, DESSC)	08/98-08/0X
(757) 683-4926	Larry Atkinson, ODU, (Chair, FIC)	10/97-10/0X
(252) 504-7579	Joe Ustach, Duke, (Chair, SSC)	09/99-09/01
(914) 365-8845	Paul Ljunggren, L-DEO, (Chair, RVOC)	10/96-10/0X
(858) 534-3387	J. Swift, SIO, (Chair, AICC)	09/96-09/0X

DEEP SUBMERGENCE SCIENCE COMMITTEE (DESSC)

(808) 956-6314	Patricia Fryer, U Hawaii, (Chair)	08/98-08/01
(617) 253-0221	David Mindell, MIT	09/99-09/02
(858) 534-4257	Joris Gieskes, SIO	09/99-09/02
(541) 867-0275	Robert Embley, NOAA	10/98-10/01
(206) 543-0859	Marvin Lilley, U Washington	06/96-06/99
(831) 459-3280	Dan Orange, U CA, Santa Cruz	07/93-06/99
(503) 725-3864	Anna-Louise Reysenbach, Portland State U	10/98-10/01
(914) 359-2900	William Ryan, LDEO	10/98-10/01
(757) 221-2229	Cindy Van Dover, College of William & Mary	06/95-06/01
(508) 289-2597	Richard Pittenger, WHOI, (ex-officio)	06/91-XXXX
(508) 289-2857	Daniel Fornari, WHOI, (ex-officio)	07/92-XXXX

RESEARCH VESSEL OPERATORS' COMMITTEE (RVOC)

(914) 365-8845	Paul Ljunggren, L-DEO, (Chair)	10/96-10/00
(504)-851-2808	Steve Rabalais, LUMCON, (V-Chair)	10/96-10/00

FLEET IMPROVEMENT COMMITTEE (FIC)

(757) 683-4926	Larry Atkinson, ODU, (Chair)	07/95-10/00
(808) 956-5924	Chris Measures, U Hawaii	09/98-09/01
(914) 365-8566	Bill Smethie, LDEO	10/96-10/99
(907) 474-7993	Tom Weingartner, U Alaska	09/95-09/01
(805) 893-8605	Mark Brzezinski, UCA, SB	09/99-09/02
(401) 874-6610	Dave Hebert, URI	09/99-09/02
(508) 289-2624	Joseph Coburn, WHOI, (ex-officio)	10/92-10/0X

RESEARCH VESSEL TECHNICAL ENHANCEMENT COMMITTEE (RVTEC)

(401) 874-6579	John Freitag, URI, (Chair)	10/96-10/00
(361) 749-6720	Anthony Amos, U Texas, (V-Chair)	11/97-11/01

(over)

UNOLS COUNCIL/COMMITTEES

SHIP SCHEDULING COMMITTEE (SSC)

(252) 504-7579	Joe Ustach, Duke, (Chair)	09/99-09/01
(206) 543-5062	Dan Schwartz, UWA (Vice-Chair)	09/99-09/01

ARCTIC ICEBREAKER COORDINATING COMMITTEE (AICC)

(858) 534-3387	Jim Swift, SIO, (Chair)
(252) 328-1834	Lisa Clough, East Carolina U
(508) 289-2624	Joe Coburn, WHOI
(757) 683-5835	Glenn Cota, ODU
(541) 737-3625	Kelly Falkner, OSU
(512) 471-0433	Larry Lawver, U Texas
(858) 534-6369	Dan Lubin, SIO
(907) 474-7229	Terry Whitledge, U Alaska

1/00

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

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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/						Capt. Stan Winslow Ship Scheduler PHONE: (808) 847-2661 FAX: (808) 848-5451 INTERNET: snug@poha.soest.hawaii.edu
University of Alaska Institute of Marine Science PO Box 757220 Fairbanks, AK 99775 Homepage: http://www.ims.alaska.edu:8000/helix.html	ALPHA HELIX	133/41	1966	15	NSF	Dr. Thomas Weingartner PHONE: (907) 474-7993 FAX: (907) 474-7204 INTERNET: weingart@ims.alaska.edu
University of Washington Box 357940 School of Oceanography Seattle, WA 98195-7940 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	Capt. Daniel Schwartz Marine Superintendent PHONE: (206) 543-5062 FAX: (206) 543-6073 INTERNET: schwartz@ocean.washington.edu
Oregon State University College of Oceanography PO Box 429 South Beach, OR 97366-0429 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 7700 Sandholdt Road Building D Moss Landing, CA 95039 Homepage: http://color.mlml.calstate.edu/www/	POINT SUR	135/41	1981	12	NSF	Mr. Michael Prince Marine Superintendent PHONE: (831) 633-3534 FAX: (831) 633-4580 INTERNET: prince@mlml.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 1978/1996 1981/1985	38 37 19 12	NAVY NAVY U.C U.C.	Ms. Rose M. Dufour/ Elizabeth Rios Brenner Ship Scheduler(s) Code A-0210 PHONE: (858) 534-2841 FAX: (858) 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: (734) 763-5393 FAX: (734) 647-2748 INTERNET: linda.m.goad@umich.edu
University of Minnesota Large Lakes Observatory Duluth, MN 55812 Homepage: http://www.d.umn.edu/llo	BLUE HERON	86/26	1985/1997-98	5	U.MN.	Dr. Doug Ricketts Marine Operations PHONE: (218) 726-7826 FAX: (218) 726-6979 INTERNET: ricketts@d.umn.edu

OPERATOR	NAME	LOA (FT/M)	BUILT/ CONVERTED	NO. of SCIENTISTS	OWNER	SHIP SCHED. CONTACT
Texas A&M University Mail Stop 3146 College Station, TX 77543 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
University of Texas Marine Science Institute 750 Channelview Drive Port Aransas, TX 78373 Homepage: http://www.utmsi.zo.utexas.edu/hornspec.htm	LONGHORN	105/32	1971/1986	12	U.T.	Mr. Robert Martin Assoc. Director, Admin. PHONE: (361) 749-6760 FAX: (361) 749-6777 INTERNET: martin@utmsi.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@lumcon.edu
Harbor Branch Oceanographic Institution 5600 US 1 N Ft. Pierce, FL 34948 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	CALANUS	64/20	1971	6	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 31411 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 135 Duke Marine Lab Road Duke University Marine Laboratory Beaufort, NC 28516 Homepage: http://www.env.duke.edu/marinelab/vessels.html	CAPE HATTERAS	135/41	1981	12	NSF	Dr. Joe Ustach Marine Operations PHONE: (252) 504-7579 FAX: (252) 504-7648 INTERNET: joeu@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.	Capt. Matt Hawkins Director, Marine Operations PHONE: (302) 645-4342 FAX: (302) 645-4006 INTERNET: hawkins@udel.edu
Lamont-Doherty Earth Observatory Columbia University Palisades, NY 10964-8000 Homepage: http://www.ldeo.columbia.edu/Ewing/home.html	MAURICE EWING	239/73	1983/1990	32	NSF	Mr. John Diebold Marine Sci. Coordinator PHONE: (914) 365-8524 FAX: (914) 359-6817 INTERNET: johnd@ldeo.columbia.edu

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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@ gso.uri.edu
Woods Hole Oceanographic Institution Woods Hole, MA 02543 Homepage: http://www.whoi.edu/marine-ops/	KNORR ATLANTIS OCEANUS DSRV ALVIN	279/85 274/84 177/54 25.8	1970/1989 1997 1976/1994 1964	34 35* 18	NAVY NAVY NSF NAVY	Mr. Jonathan Alberts Marine Ops. Coordinator. PHONE: (508) 289-2277 FAX: (508) 457-2185 INTERNET: jalberts@ 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. Jose Fuentes Acting Marine Superintendent PHONE: 011-507-227-5211 FAX: 011-507-232-6197 INTERNET:

*Includes: 22 Crew
11 DSG
2 Technicians

MARINE OPERATIONS CONTACT

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

UNOLS Hompepage: http://www.gso.uri.edu/unols/unols.html

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University of Hawaii Marine Center #1 Sand Island Road Honolulu, HI 96819 Homepage: http://www.soest.hawaii.edu/umc/							Capt. J.W. Coste Marine Superintendent PHONE: (808) 847-2661 FAX: (808) 848-5451 INTERNET: bcoste@poha.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.uaf.edu
University of Washington Box 357940 School of Oceanography Seattle, WA 98195-7940 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	Capt. Daniel Schwartz Marine Superintendent PHONE: (206) 543-5062 FAX: (206) 543-6073 INTERNET: schwartz@ocean.washington.edu
Oregon State University College of Oceanography PO Box 429 South Beach, OR 97366-0429 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 7700 Sandholdt Road Building D 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: (831) 633-3534 FAX: (831) 633-4580 INTERNET: prince@mlml.calstate.edu
University of California, San Diego Scripps Institution of Oceanography Nimitz Marine Facility 297 Rosecrans Street San Diego, CA 92106 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 1978/1996 1981/1985	23 22 12 5	38 37 19 12	NAVY NAVY U.C U.C.	Capt. Thomas S. Althouse Marine Facilities Code P-0705 PHONE: (858) 534-1643 FAX: (858) 534-1635 INTERNET: capt@mpl.ucsd.ed
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: (734) 763-5393 FAX: (734) 647-2748 INTERNET: linda.m.goad@umich.edu
University of Minnesota Large Lakes Observatory Duluth, MN Homepage: http://www.d.umn.edu/llo	BLUE HERON	86/26	1985/1997-8	4	5	U. MN.	Dr. Doug Ricketts Marine Operations PHONE: (218) 726-7826 FAX: (218) 276-6979 INTERNET: ricketts@d.umn.edu

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OPERATOR	NAME	LOA (FT/M)	BUILT/ CONVERTED	CREW	NO. of SCI.	OWNER	MARINE OPS. CONTACT
Texas A&M University Mail Stop 3146 College Station, TX 77543 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
University of Texas Marine Science Institute 750 Channelview Drive Port Aransas, TX 78373 Homepage: http://www.utmsi.zo.utexas.edu/hornspec.htm	LONGHORN	105/32	1971/1986	4	12	U.T.	Mr. Robert Martin Assoc. Director, Admin. PHONE: (361) 749-6760 FAX: (361) 749-6777 INTERNET: martin@utmsi.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	5	15	LUMCON	Mr. Steve Rabalais Marine Ops. Supervisor PHONE: (504) 851-2808 FAX: (504) 851-2874 INTERNET: srabalais@lumcon.edu
Harbor Branch Oceanographic Institution 5600 US 1 N Ft. Pierce, FL 34948 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	CALANUS	64/20	1971	2	6	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 31411 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 Oceangraphic Consortium 135 Duke Marine Lab Road 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: (252) 504-7580 FAX: (252) 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	7	12	U.D.	Capt. Mattt Hawkins Director, Marine Operations PHONE: (302) 645-4342 FAX: (302) 645-4006 INTERNET: hawkins@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: pwl@ldeo.columbia.edu

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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) 874-6554 FAX: (401) 874-6574 INTERNET: b_hahn@ gso.uri.edu
Woods Hole Oceanographic Institution Woods Hole, MA 02543 Homepage: http://www.whoi.edu/marine-ops/	KNORR ATLANTIS OCEANUS DSRV ALVIN	279/85 274/84 177/54 25.8	1970/1989 1997 1976/1994 1964	25 35* 12	34 24 18	NAVY NAVY NSF NAVY	Capt. Joe Coburn Manager, Marine Ops. PHONE:(508) 289-2624 FAX: (508) 540-8675 INTERNET: jcoburn@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: lblack@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. Jose Fuentes Acting Marine Superintendent PHONE: 011-207-227-5211 FAX: 011-027-232-6197 INTERNET:

* Includes 22 Crrew
11 DSG
2 Technicians