UNIVERSITY-NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

ADVISORY COUNCIL MEETING
February 6, 7, 1986
University of Texas Institute for Geophysics
University of Texas
Austin, Texas

Advisory Council members together with representatives from the National Science Foundation and the Office of Naval Research met at the University of Texas Institute of Geophysics, Austin, Texas. The meeting was called to order at 8:30 a.m., February 6 by Council Chairman Charles Miller. The meeting followed the agenda (Appendix I) except as noted.

Attendees

Advisory Council

Charles B. Miller, Chairman
Harris B. Stewart, Vice Chairman
Robertson P. Dinsmore
Thomas C. Malone
John Martin
Arthur Maxwell
Christopher N.K. Mooers
Robert W. Corell, *ex-officio*
Ferris Webster, *ex-officio*

UNOLS OFFICE

William D. Barbee

Observers

Don Heinrichs, NSF
Keith Kaulum, ONR

Art Maxwell welcomed the Council to the University of Texas Institute for Geophysics and Austin. He gave a brief status report on UTIG, including recent research and faculty additions, recent declining trends in funding (due largely to decreases in funds from industry) and the decision to lay up the FRED H. MOORE.

Associate Director John G. Sclater briefly discussed some recent research activities.

The minutes of the October 21, 1985 Advisory Council meeting were accepted.

ADVISORY COUNCIL STANDING ROLES

Ship Scheduling Process. Robertson Dinsmore, Harris Stewart, Jr., and John Martin reported on the October, 1985 scheduling meetings and response to Ship Scheduling Group recommendations.

At the October meetings, NSF program managers announced ship operations funding decisions that affected scheduling:

CAYUSE not funded for operation in 1986.

CAPE FLORIDA transferred to West Coast for operation by MLML in CENCAL early in 1986.

OSPREY not funded for operation in 1986.

These decisions together with science funding decisions allowed schedule consolidation and other cost saving measures:

Cost reductions due to reduction in days operated:

CAPE HENLOPEN	ISELIN
CONRAD	SPROUL
ENDEAVOR	WASHINGTON
GYRE	

Cost reductions due to partial or full-year lay-up:

CAYUSE (full-year)	OSPREY (full-year)
KNORR (partial)	WECOMA (full-year)

All of these recommendations had been acted on.

Although these various steps had brought costs for 1986 fleet operation to within reach of available funding, there still remained a problem.

Both agency officials and UNOLS members closely involved with ship scheduling stated the need for earlier identification of ships for lay-up and a more effective consolidation of schedules on the ships operating. The very late schedule resolution in 1985 (for 1986 schedules) did not allow adequate planning time for the ships laid up. Further, many large and intermediate ships will not have full schedules in 1986.

After discussion, the Advisory Council agreed (and NSF and ONR officials concurred) that UNOLS should reach a preliminary identification of ship lay ups at the May-June UNOLS and Ship Scheduling meetings. Ship scheduling meetings in March, 1986 should concentrate on identification of the science projects to be supported and on the scale and location of ship requirements to support funded science. NSF will emphasize the need to submit science proposals to meet February 1 and June 1 target dates. (See recent announcements in UNOLS NEWS, etc.)

After hearing reports from NSF and ONR together with further informal discussion, it was determined that the Chairman, Advisory Council, would notify UNOLS membership of the issue and need to reach firm schedule (and lay-up) recommendations by June.

The Chairman's letter to UNOLS membership:

- *Ship operations for 1987 will be at about the same level as in 1986.*

- *Two to four full-year lay-ups may be necessary and there may be additional part-year lay-ups.*

- *NSF will identify specific ships for lay-up in June, 1986; if UNOLS recommendations are to be considered they must be made by June.*

- *Individual investigators are urged to submit proposals preferably to meet the February 1 target date, certainly to meet the June 1 date.*

- *Individual institutions and UNOLS must accelerate their scheduling process, to achieve by June an effective UNOLS fleet schedule.*

The Chairman's letter (dated February 10, 1986) is Appendix II.

Expeditionary Planning There had been no activity since October meetings. No report was made.

ALVIN Review Committee. Robert Corell reported that overhaul of ALVIN should be completed in time for ATLANTIS II/ALVIN to take up scientific work in mid-April, 1986. The overhaul includes modifications designed to improve capability and reliability, and to extend the interval between major overhauls. The overhaul (to be reported on in UNOLS NEWS, Vol. 3, No. 1, and in Summary Reports of ALVIN Review Committee Workshops and Meetings, winter, 1985-86) will include a new propulsion system, more power, more payload, a better logging system and greater reliability.

Additional bunks for scientific personnel are being added on the ATLANTIS II, providing some relief for that problem.
Appendix III, *Exploring Our Ocean Frontier* is a brief history of ALVIN'S first 21 years, prepared by the Submersible Program, W.H.O.I.

In 1986, ALVIN/ATLANTIS II are scheduled for a series of geological and engineering investigations on the mid-Atlantic Ridge and in the Northwest Atlantic; geological, biological and geochemical investigations at the West Florida Escarpment cold seep sites, investigations in the Panama Basin and finally, the beginning of a series of biological studies off California.

At meetings in December, 1985 and January, 1986, the ARC recommended the addition of NSF/NOAA sponsored work on the mid-Atlantic Ridge and of microbiology and biology at the West Florida site.

For 1987, schedules will be recommended at the ARC meeting in May, 1986. Work is pending off California, vicinity of Hawaii and seamounts in the mid-Pacific, in the Mariana region of the western Pacific, Gorda-Juan de Fuca and off the Oregon coast, and on the EPR.

ALVIN continues to be a valuable facility for ocean science investigations. Operators at W.H.O.I. do an excellent job, both in the engineering and maintenance of a technologically advanced facility and in operational support to investigators.

The ARC held workshops for advanced planning in December, 1985 and January, 1986. Notices of Intent were received for work in:

North Atlantic (especially mid-Atlantic Ridge, West Florida),
South Atlantic,
Northeast Pacific (Gorda-Juan de Fuca, etc.), and
East Equatorial Pacific (EPR, S. American continental shelf, Galapagos and Guaymas).

The ARC also provided planning assistance for the Navy's SEA CLIFF program of support for academic scientists. A major science program is anticipated for 1988. The Navy intends to have a dedicated support ship.

The ALVIN Review Committee has coordinated for the three funding agencies (NOAA, NSF and ONR) a study of the ALVIN program. Dirk Frankenberg, University of North Carolina, chairs an Oversight Committee to:

- assess ALVIN planning and operations,
- recommend facility needs, and
- assess ARC and other planning functions.

The Committee's report will be available early in 1986.

Since the TITANIC was found in 1985, the potential for using ALVIN for further investigations there has become an intense issue. The Navy will sponsor ALVIN-supported engineering development there in 1986. There has also been interest expressed for independent sponsorship of ALVIN investigations at the TITANIC site. The ALVIN Review Committee has prepared a *Position Statement on Potential Use of the ALVIN/ATLANTIS II for Operations at the TITANIC site.* The statement reviews the context for ALVIN utilization, recites the chronology of events related to potential use at the TITANIC site, and outlines the ARC position on use of ALVIN.

Cruise Assessments. Advisory Council dissatisfaction with current procedures for Cruise Assessments continued. Discussion centered on the problems encountered when assessments of performance are submitted through the ship or operating institution (e.g., reluctance to submit critical reports, bias toward innocuous assessments, ship's force resentment). It was noted, however, that this system has the advantages of quick communication with marine operations, and provides a more effective system for producing returns.

The Advisory Council decided that they would not change current procedures for Cruise Assessments, wherein chief scientists usually fill out the forms and return them to the UNOLS Office through the operating institution. However, a statement will be added to Cruise Assessment Forms informing Chief Scientists that they may also communicate directly with the Advisory Council if shipboard conditions warrant.

Vessel Inspections - Robertson Dinsmore reported on vessel inspection programs now in force for the UNOLS Fleet. Since the NSF vessel inspection program has become established, distinct improvements are seen. The operating condition of ships in the fleet is improving, in part, in response to findings on earlier inspections. Also, as both the inspection team and operators gain experience with the program, individual inspections are becoming more effective. *Guidelines for NSF/MARAD Material Condition Review of Research Vessels are Appendix IV.*

The NSF program has been expanded to include some Associate Member operators (e.g., SUNCOASTER at Florida Institute for Oceanography, WEATHERBIRD at Bermuda Biological Station, the PELICAN at LUMCON).

The Navy's INSURV inspection program is being extended to include scientific equipment and operations. (This will be accomplished by means of a subcontract through UNOLS Office.)

General Findings from inspection programs are:

- o Cranes are only marginally adequate for their service; some are not marinized, some A/J frames are too light for modern operations.

- o Many ships require improved echo sounding capacity (new transducers, recorders, logging, etc.).

- o Many ships have operational SAIL systems and the systems are being used.

Inspection teams are beginning to look at shared-use and other equipment aboard vessels. The objective is to control inventories to equipment that is useful, available and well-maintained.

Both NSF and ONR offered to provide the Advisory Council more systematic information concerning inspections. The Advisory Council will be provided summary reports of inspections. (These summaries will be provided for information, not review, purposes.)

Shipboard Scientific Instrumentation - John Martin distributed partial results of his survey on costs for use and availability to investigators of selected instrumentation. (Appendix V covers CTD's, box corers and water sampling bottles.) The survey illustrates a broad range of charges, differing policies on availability and a complexity of conditions for use/cost.

Many problems exist concerning scientific equipment, marine technicians and costs. Costs can be significant; for some geophysical investigations, special equipment and technician rates can be more than 50% of ship cost rates. Individual investigators often can be surprised by and must change their plans to accommodate instrument and technician costs. Software and procedures developed at one institution are often not available at other institutions.

NSF is re-examining its approach to marine technicians and management of technician programs, especially concerning interaction with shipboard scientific equipment. The workshop on technicians and shared use equipment held in 1985 did not solve all problems. NSF might be willing to sponsor further studies or workshops, but only on the basis of a well-founded proposal providing a solid workshop/study outline.

John Martin will expand his survey of UNOLS institution procedures to include marine technical services.

Triennial Review of Fleet (Fleet Management). Charles Miller noted the changes in individual ship status (e.g., transfer of CAPE FLORIDA, lay-up or non-operation of CAYUSE, OSPREY, and WECOMA) that are significant fleet changes. He noted that these changes are parallel to recent Advisory Council or Ship Scheduling Group recommendation. He noted that one fleet question remained: disposition (re-assignment or other) of the CAYUSE. Earlier recommendations had been that UNOLS institutions be informed that they could propose to operate CAYUSE (perhaps as replacement for a currently-operated vessel). *Don Heinrichs noted that NSF is presently also considering options to assign CAYUSE to another Federal agency.*

If NSF considers options for CAYUSE not in concert with earlier Advisory Council recommendations, they will inform UNOLS and the Council prior to a decision.

Fleet Replacement Committee - Robertson Dinsmore reported on recent FRC activities, as they approach completion of their report. Submission of the FRC report would complete the Committee's response to their UNOLS charge.

Fleet Replacement Committee Goals:

- Recommend the numbers and types of new ships for the UNOLS fleet, with replacement dates,

- Prepare a set of science mission requirements for each of the various classes of ships, and

- Undertake representative conceptual designs.

The principal findings on which the report is based are:

1. *The average age of the UNOLS fleet is 19 years, and by the mid 1990's most of the seven large ships (over 200 ft.) will have exceeded a planned service life of 30 years. Many, if not most existing ships are already mission obsolete or only marginally capable of meeting the requirements of modern oceanography.*

2. *The number of future ships will not differ significantly from the existing fleet.*

3. *The mix of ships should be about evenly divided among the size classes, i.e., large, intermediate and small ships.*

4. *New ships should have improved seakeeping and station keeping, upgraded laboratories, better facility for overside handling and better scientific outfitting. Consequently, new ships will be larger than existing ones in the same class.*

5. *Selected ships should have, in addition to capabilities for multidisciplinary research, enhanced capability for a particular discipline, function, or area of operation, e.g., marine geology or geophysics, submersible support or polar research.*

6. *Up to one-third of the ships, mostly in the largest class are approaching obsolescence or are already mission obsolete. Replacement should start soon -- 1987-90.*

7. *The existing fleet should be completely replaced by 2015.*

8. *The Committee recommends a fleet of eight large ships (200-300 ft.), six intermediate ships (150-200 ft.), and six small ships (100-150 ft.).*

A more comprehensive report from the Fleet Replacement Committee will appear in *UNOLS NEWS, Vol. 3, No. 1, March, 1986.*

The Fleet Replacement Committee held a workshop in January, 1986 for a community-wide review of its preliminary report. The Summary Report of the FRC Workshop (Appendix VI) includes drawings of eleven conceptual designs and design comparisons of high endurance, medium endurance and SWATH ships among those concepts.

The FRC report is expected to be completed by about the end of March.

The Advisory Council endorsed the efforts of the Fleet Replacement Committee, and considered means whereby UNOLS could foster continued progress on planning and construction toward UNOLS fleet replacement. *The Advisory Council requests that the Fleet Replacement Committee recommend a sequence of new steps to promote progress in planning for fleet replacement. Those recommendations should address among other issues:*

- *Selection from among conceptual designs of candidates to pursue further, and*
- *Development of a time line for at least the early ship replacements.*

The Advisory Council discussed fleet replacement at length. A fleet replacement program as developed by the FRC is about a one-half billion dollar program over 30 years. Success in implementing a program of that scale will require broad, effective support from the ocean community as well as consistent agreed-to approaches from NSF and ONR.

Chairman Dinsmore noted that the FRC will continue planning and will pursue additional steps in the design spiral. Chairman Dinsmore will also consult with the A/C and others in UNOLS on reconstituting or otherwise continuing the Fleet Replacement Committee.

UNOLS Communications - Ferris Webster reported that John Knauss would call another meeting of the Committee Chairperson group (e.g., chairs of UNOLS, NAS Ocean Studies Board, Sea Grant Directors, NASULGC Marine Division, etc.) Ferris will introduce the issues of the one-half billion dollar fleet replacement program and of additional ONR support for ocean research.

The UNOLS Chairman discussed briefly with the Council potential speakers for the summer UNOLS Semiannual Meeting.

International Restrictions to Ocean Science Committee - Harris B. Stewart reported that he had polled IROSC members concerning a proposal for a *Center for International Cooperation in Ocean Sciences.* (A proposal from David Ross had been presented to UNOLS, been the subject of UNOLS and Advisory Council discussion over the past two years and had been a candidate for such a proposed center.) The consensus from IROSC members was that enthusiasm for such a center had flagged, that there was not currently a proposal for review and that the issue of a center should not be pursued by UNOLS.

UNOLS Chairman Ferris Webster had received a tentative proposal to establish an activity that would assist research vessel operators, operating institutions and principal investigators with requests for foreign clearances and monitoring foreign clearance problems. The proposal was to conduct the foreign clearance assistance and monitoring activity as a UNOLS function, operating at and with support from JOI, Inc. Comments on the concept from William Erb, State Department, and Warren Wooster, IROSC, were also noted.

The Advisory Council did not endorse the proposal to establish a UNOLS function to assist with foreign clearance requests to monitor clearance problems. The sense of the Council was that although there are problems with the process for foreign clearances, the Council was not convinced that the proposed function would be an appropriate solution. They suggested that before UNOLS action, specific problems should be defined through a survey of UNOLS institutions. Harris Stewart, with IROSC, will undertake such a survey.

Harris Stewart informed the Council that a preliminary program plan has been prepared by a working group under the Ocean Studies Board for the Caribbean Marine Science Regional Program fostered by Department of State (see UNOLS Semiannual Meeting, October 23, 1985). Implementation of the program would require a research vessel, perhaps from the UNOLS fleet.

UNOLS Nominations for June, 1986 - Chairman Webster discussed with the Council the formation of a Nominating Committee. Nominations are required for UNOLS Chairman and Vice Chairman, and for three Advisory Council members.

Acquisition and Management of Advanced Technical Facilities - Charles Miller noted that the ad hoc Special Facilities Committee, chaired by Brian Lewis, had met and reported to UNOLS (Appendix VII). The special committee considered three major facilities issues:

- Multichannel seismic systems,
- Satellite data and instrumentation, and
- Supercomputers.

They considered these facilities that are or may be of importance to oceanography and coordination or management roles that UNOLS might play.

Their conclusions:

- MCS systems are being considered by NORPO under JOI and NSF. No immediate action is required by UNOLS.
- Dissemination and use of satellite data is also being considered under JOI (and by Federal agencies). UNOLS should not duplicate any of these functions. UNOLS should, however, be kept actively advised of development.
- The oceanographic community is poorly represented for defining access, specifying needs and dissemination of information regarding supercomputers. UNOLS should address those three problems through a special committee and a full-time employee (at NCAR).

In response to the Special Committee report, the Advisory Council recommended that UNOLS establish an Oceanographic Supercomputing Committee (OSCC) charged as follows:

- *A thorough REVIEW of supercomputing in oceanography*

  - *Our requirements: hardware, software, data nets*

  - *Status of access: ease of access and actual usage data*

  - *Organizational structure: now (in place) and needed*

  From the review UNOLS (and NSF) would expect to report about early 1987.

- *Recommend an operational mode, including formulation of a specific and continuing role for OSCC. Should there be:*

  - *An office. The present UNOLS Executive Secretary's office probably cannot add this function as now set up.*

  - *Software exchange policy and exchange system. Present mode of multiple development of nearly identical programs is very wasteful.*

  - *Dedicated supercomputers.*

- *Establish and oversee operations. The AC tentatively agrees that OSCC should be analogous to the ALVIN Review Committee (ARC).*

- *Tentative candidates for an OSCC were discussed.*

Sponsoring Agency Information to the Advisory Council Don Heinrichs, Head, OCFS, discussed NSF budgets and budget submissions for 1986 and 1987 together with program and management activities.

Budget estimates for 1986 (in the table below) reflect cuts arising from Gramm-Rudman reductions.

BUDGET ESTIMATES
FY 1986-87
(IN $M)

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	1985 Actual	1986 Request	1986* Estimate	1987** Request
OCEAN SCIENCE DIVISION				
Ocean Science Research	58.2	59.9	57.4	66.4
Oceanographic Facilities	34.9	36.8	33.7	37.2
Ocean Drilling	27.6	28.9	27.6	30.1
	120.7	125.6	118.7	133.7
OSF Breakout				
Operations				
Ship Ops	23.8		25.6	
Other Ops & Misc.	2.9			
Marine Techs	2.4		2.5	
Subtotal	29.1	29.5	28.1	30.5
Acquisitions and Development				
Shipboard Equipment	1.7		1.5	
Instrumentation	1.8		1.8	
Technology Development	1.6		1.8	
Ship & Shore Construc./Conv.	.7		.5	
	5.8	7.3	5.6	7.2
TOTAL	$34.9	$36.8	$33.7	$37.2

* February 5, 1986 current plan. Includes Gramm-Rudman reductions.
** Administration Budget Request to Congress on February 5, 1986.

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For 1986 there is a real loss in OCFS of about $1.2M below 1985.

The Ocean Science Division request (a part of the Administration Budget Request to Congress, February 5, 1986) is about 12 1/2% increase over 1986. Ocean support and facilities would increase about 13% over 1986 (but only about 6 1/2% over 1985).

The thrust of Ocean Sciences Division planning for 1987 highlights the Directorate emphasis on global science processes: WOCE, TOGA, Global Ocean Flux, Ridge Crest Studies.

Within OCFS, ODP's fiscal level of effort would be maintained (i.e., 4.2% inflationary increase). Ship operations support would be maintained. Most of the increase in Acquisition and Development would be in Technology Development, focused on new technology for global ocean processes.

It was noted that under P.L. 99-177 (Gramm-Rudman-Hollings) the Congressional budget schedule has changed and several new steps become possible (See Appendix VIII).

NSF continues to pursue U.S. - U.K. cooperative ship operations. In 1986 the R/V DARWIN will conduct two legs in support of physical oceanographic investigations in the western Indian Ocean. In 1987 NSF will provide one leg.

The NSF believes that it is extremely important to achieve early identification of ships that will not operate in 1987. UNOLS recommendations are expected at the end of June scheduling meetings. UNOLS needs to look at the best fleet schedule, not the best individual ship/institution schedules.

Keith Kaulum reported that ONR is scheduled for a 10% across-the-board cut in 1986. This translates to a reduction of about $5M for ocean sciences. Distribution of the reduction had not yet been decided.

Prospects for 1987 are for as much as a 20% reduction below planned 1987 levels.

The new research vessel for academic oceanography (AGOR-23) remains in the 1987 budget, but at $33M, not at $35M. ONR is working closely with the Fleet Replacement Committee in an effort to assure that the FRC's science mission requirements priorities (e.g., seakeeping, etc.) survive through the NAVSEA ship design process. NAVSEA is working on about ten point designs (i.e., individual ship-type designs) including both SWATH and monohull ships. There is a good spirit of cooperation among ONR, the FRC and NAVSEA.

One objective of examining point designs is to assure that the design selected can be built for the money budgeted. At the present stage it appears that an adequate SWATH ship might not be within budget. The process for competitive selection of a design and preparation of the RFP continues on the schedule announced earlier. Critical decisions are expected from a CNO Executive Board meeting in late March.

ONR will continue to need a liaison group in UNOLS to fill the functions that are being served by Bob Dinsmore and the FRC.

Other Business - The Council discussed the overall status of oceanographic support in Federal agencies (in addition to budget reports for NSF and ONR already reported.)

NOAA's budget in the Administration's 1987 request to Congress is down 36%, from $1.3 billion to $.84 billion.

NSF overall is up about 8% above the 1986 estimate prior to Gramm-Rudman cuts. NASA'S ocean sciences support also shows an increase.

Congressional hearings to review the health of ocean sciences are likely to be held during 1986. An opportunity for a UNOLS witness would be desirable, especially to emphasize the fleet replacement effort and to support prospective program initiatives in ocean sciences.
A presentation to the Ocean Principals on the fleet replacement effort would also be helpful in maintaining visibility for that activity.

UNIVERSITY - NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

Agenda
Advisory Council Meeting
University of Texas
February 6, 7, 1986
8:30 a.m.

Accept minutes of October 21, 1985 Advisory Council Meeting-- These minutes will be available for review.

Advisory Council Standing Roles. Status and Reports

Effective Management of UNOLS fleet.

Scheduling Process-Stewart and Martin. 1986 fleet schedules. Initiation of 1987 scheduling process. Submission of science proposals to NSF (those requiring ship time).
Expeditionary Planning-Corell (Little recent action).
ALVIN Review Committee-Corell. Report on December, January workshops. Status of ALVIN program. Navy submersibles SEA CLIFF, TURTLE.

User assessment forms-Carl Lorenzen will not be at the meeting.
Vessel inspection process-Dinsmore
Triennial Review-Miller. 1986 fleet status (Transfers, lay ups, potential reassignments of ships, e.g. CAYUSE.)

Fleet replacement committee-Dinsmore. Status of FRC efforts and Fleet Replacement Plan. Report on January 6, 1986 National UNOLS Fleet Replacement Workshop.

Shipboard Scientific instrumentation, technician programs and user manuals-Martin.

Communication and Liaison

UNOLS News-Malone. Volume 2, Number 4, was distributed in January (under a November date line.) Volume 3, Number 1 target date?

UNOLS communications-Miller, Webster. Reports on new issues that have arisen through contact between A/C, Executive Committee etc., and Federal agencies.

International Restrictions to Ocean Science Committee-Stewart, Corell. IROSC review of proposal for a Center for International Cooperation in Ocean Sciences. IROSC recommendations.
A/C examination of a tentative proposal to establish a UNOLS function to assist with clearance requests and monitor clearance problems (from Lee Stevens).

Acquisition and management of advanced technical facilities-Miller, Mooers. The UNOLS Special Facilities Committee met and reported to the Chairman Advisory Council. A/C Consideration on the report and recommendations. Further actions?

Forecast of Scientific and government trends, federal agency contact-Mooers, Maxwell, Webster. Reports as pertinent. Advisory Committee to Ocean Sciences Division. R. Corell, Chairman will report to A/C as appropriate.

Sponsoring Agency Information to Advisory Council.

Don Heinrich, Grant Gross and others-NSF
Keith Kaulum-ONR
John Albright-NOAA
Hawley Thomas-MMS
William Erb-DOS

Nomination for June 1986-Webster. Both Chairman and Vice Chairman are up for re-elections. Ferris Webster is not eligible for re-election. There is some ambiguity as to whether or not Bob Corell is eligible to stand again. (He's finishing second one-year term.) Three A/C member-elections are due, for positions held by Miller, Dinsmore and Stewart. The first two are from Member Institutions, Stewart from an Associate. Chairman Webster will discuss nominations and the nominating committee with the A/C.

Other business-None that I know of.

UNIVERSITY-NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

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

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10 February 1986

Dear Colleagues:

Federal agency reports at the Advisory Council meeting of 6-7 February raised matters of immediate concern to all of you. It is certain that budget shortfalls for UNOLS fleet operations in FY '87 will be at least as serious as those of FY '86. There will be 2 to 4 ship lay-ups of full year duration and additional part-year lay-ups. The most optimistic view is that NSF and all other agencies can support as much field work in 1987 as in 1986. NSF has taken responsibility for directing lay-ups and intends to identify specific ships for 1987 lay-up about June 1986. NSF believes this is necessary to help institutions and crews plan more adequately for lay-ups and to achieve the greatest savings.

NSF expects and will consider UNOLS recommendations on lay-ups. To be useful on the NSF schedule, recommendations must be ready at the close of the June scheduling meeting. Thus, the early March and the June UNOLS scheduling meetings must bring schedules to a stage only reached previously in October. At both March and June meetings UNOLS must seek the most effective schedules to support funded science, not the best ship or institution schedules. Start planning NOW to bring a serious work schedule to the March meeting. Evaluation of project chances for funding will again, I'm sorry to tell you, come ahead of final science planning and proposal submission, and many nearly final designations of ships for lay-up will come before final decisions on proposals.

To anticipate this acceleration you should advise PI's to:

1) get ship requests submitted immediately;

2) provide preliminary outlines of proposed work using shiptime in 1987 to program directors by April at the latest (preferably this month);

3) discuss with you the chances for success of their proposals.

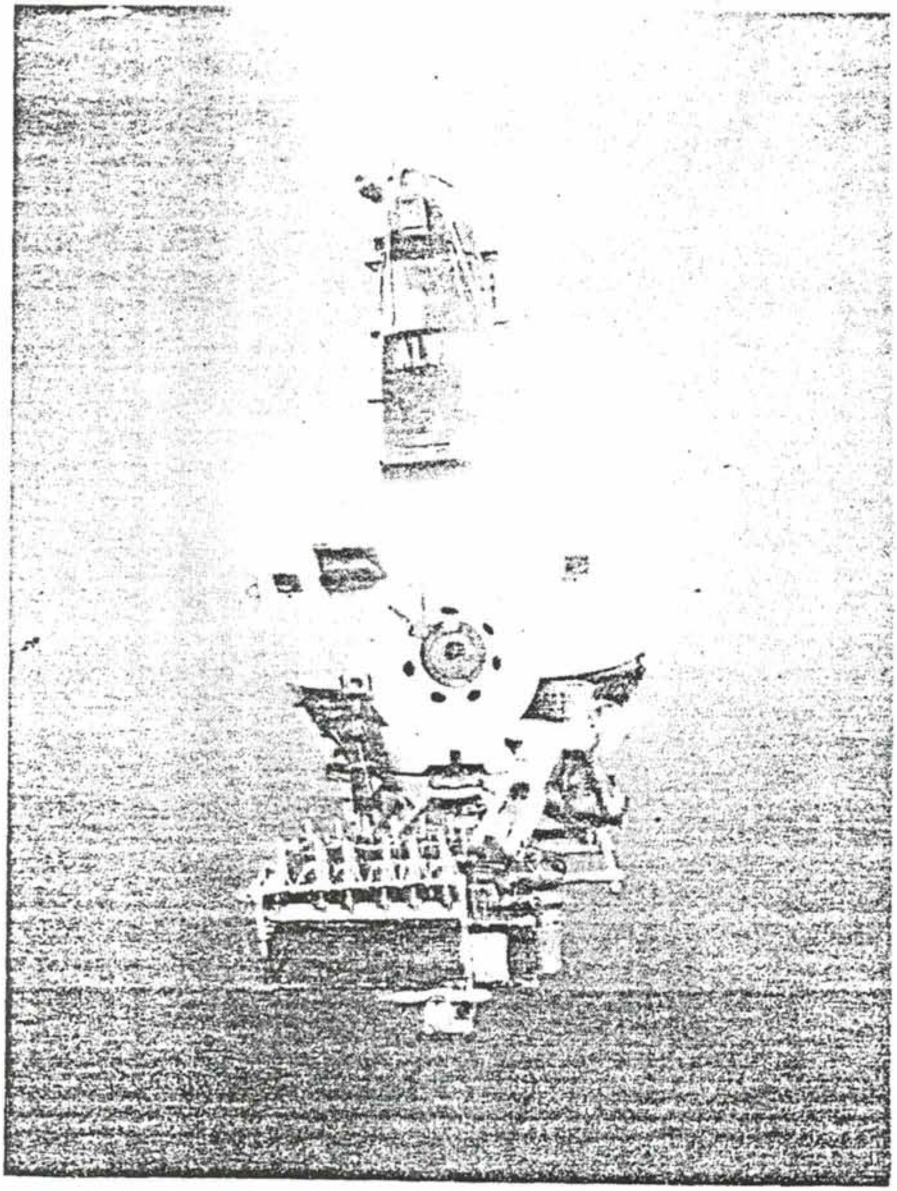
It would be good to reiterate to PI's the finality of the 1 June deadline for NSF proposals requesting shiptime. Dr. Heinrich, program director for oceanographic facilities, is adamant that no exceptions will be allowed.

Accelerated ship operations planning and communications with your staff should receive your immediate attention. These points will be reiterated in the invitation to the early March scheduling meeting.

Sincerely,

for Charles B. Miller
Chair, UNOLS Advisory Council

Exploring Our Ocean Frontier:



Deep Submergence Vehicle ALVIN
and the Woods Hole Oceanographic Institution
1964 — 1985
21 years of deep sea discoveries

21 YEARS OF EXPLORING THE OCEANS' DEPTHS

ALVIN's 21 years have been exciting ones -- it has made scientific discoveries that have astounded the scientific community and aroused the interest of the public. Changing in appearance over the years (from a rounded to a more angular look with a variety of new features -- arms, cameras, etc.), ALVIN has (in the words of the Star Trek introduction) "boldly gone where no man has gone before."

In its explorations, ALVIN has explored the Mid-Atlantic Ridge, part of the earth's vast underwater mountain range, glided past other-worldly black smokers at the East Pacific Rise, and taken samples of water and strange life forms at the vent communities at the Galapagos Islands, East Pacific Rise, Florida escarpment (near Tampa) and at the newly discovered Juan de Fuca Ridge vents.

ALVIN's history parallels the space program. Built by the U.S. Navy in 1964 and given to the Woods Hole Oceanographic Institution to operate, ALVIN became oceanography's "spacecraft" into hostile and unexplored environments. In the early years ALVIN's primary mission was one of pilot training and search and recovery. Science played only a modest role. But just as space flights have become routine with shuttles ferrying astronauts and scientists into space, similarly, ALVIN has made ocean diving a well-used and valuable research tool. With 1,663 dives to its credit, ALVIN is the workhorse of the scientific diving fleet.

According to Barrie Walden, WHOI's manager of submersible engineering and operations, "ALVIN has an unlimited useful life since it is constantly undergoing modifications, allowing it to remain abreast of technology. Although originally constructed in 1964, there is little of the submersible which is 21 years old. In recent years, we have concentrated on data gathering capabilities by adding and improving the sensor suites, incorporating a data logging system and expanding the imaging capability. This winter, we will replace the propulsion and hydraulic systems which should increase our reliability and improve our power budget."

The mission that first showed ALVIN's usefulness was the infamous case of the missing hydrogen bomb. Dropped in the Mediterranean off of Spain in a 1966 plane collision, the bomb defied all methods of detection. ALVIN located the device and then relocated it when it slipped during the recovery process.

The project that put ALVIN on a valid scientific footing was FAMOUS in 1974. The French-American Mid-Ocean Undersea Study looked at the Mid-Atlantic Ridge, collecting first-ever photos and samples of this major spreading center.

The following highlights from ALVIN's illustrious career have been provided by Ed Bland, research associate in the ALVIN group and a former pilot with over 200 dives to his credit, including the shortest dive on record (4 minutes with an ALVIN associate) and until recently the northernmost dive in the Gulf of Maine by the Bay of Fundy. (The recent Juan de Fuca dives were a bit further north.)

Paul Fye, WHOI's fourth director, presided at the ALVIN commissioning on June 5, 1964. Over 500 people attended the event.

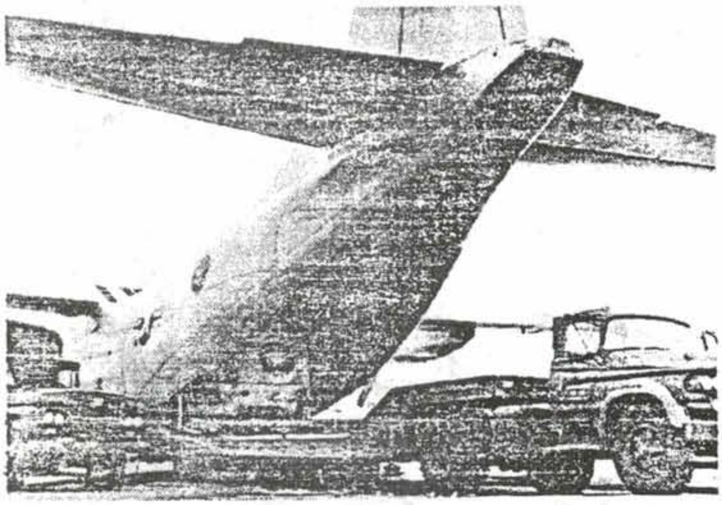
Allyn Vine, a WHOI ocean engineer, was one of ALVIN's chief advocates. Mrs. Allyn Vine christens the sub named for her husband.

HIGHLIGHTS OF ALVIN'S 21 YEARS

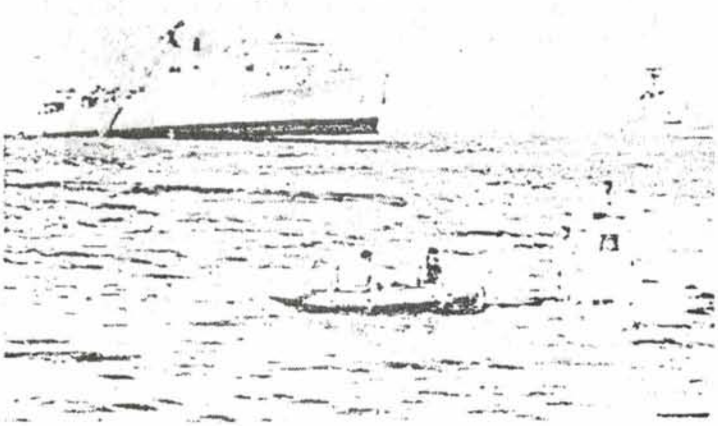
1964 ALVIN commissioned at Woods Hole on June 5. A series of test dives in Woods Hole Harbor, Buzzards Bay, and Vineyard Sound go progressively deeper from 12 to 65 feet.

1965 R/V LULU constructed from two Navy surplus pontoons. LULU, with ALVIN aboard, towed to Port Canaveral, Florida, for deep trials (unmanned, 7500 ft.; manned, 6000 ft.).

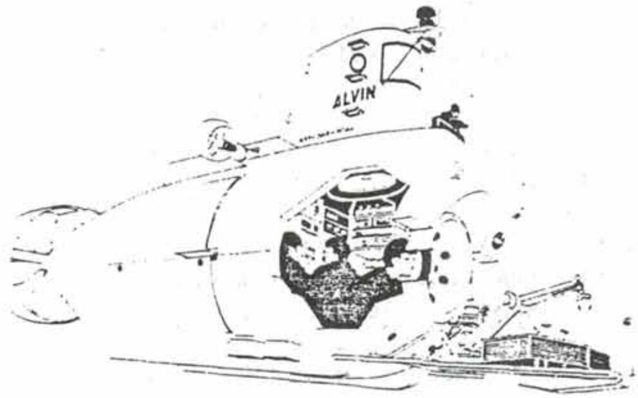
1966 An Air Force B-52 and tanker collided over Spain, dropping an H-bomb in the Mediterranean off Cartagena, Spain, in January. ALVIN was called. In



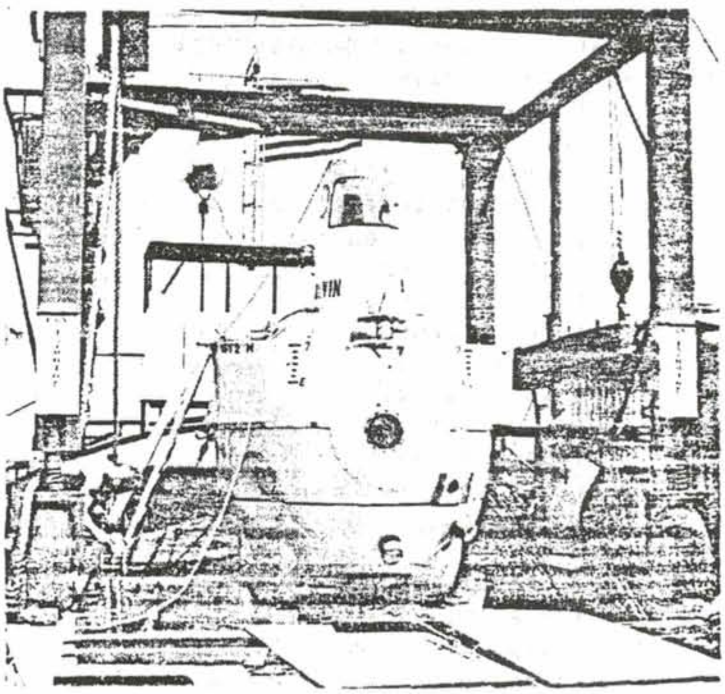
ALVIN is loaded into an Air Force plane at Otis Air Force Base (Cape Cod) for shipment to Spain where she assisted in the search for a missing H-bomb in 1966.



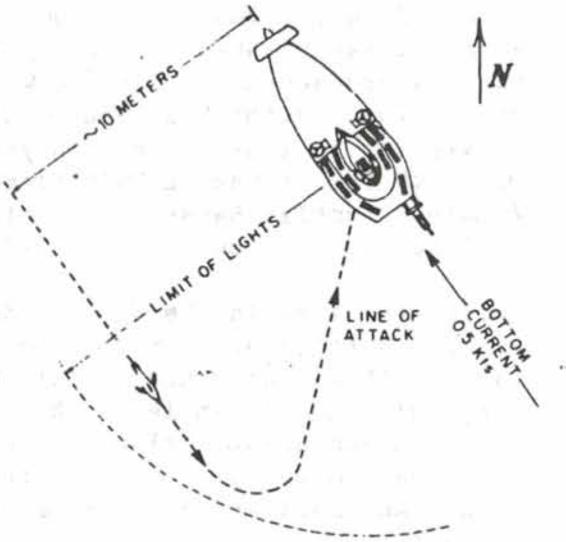
ALVIN joins naval ships assigned to the search.

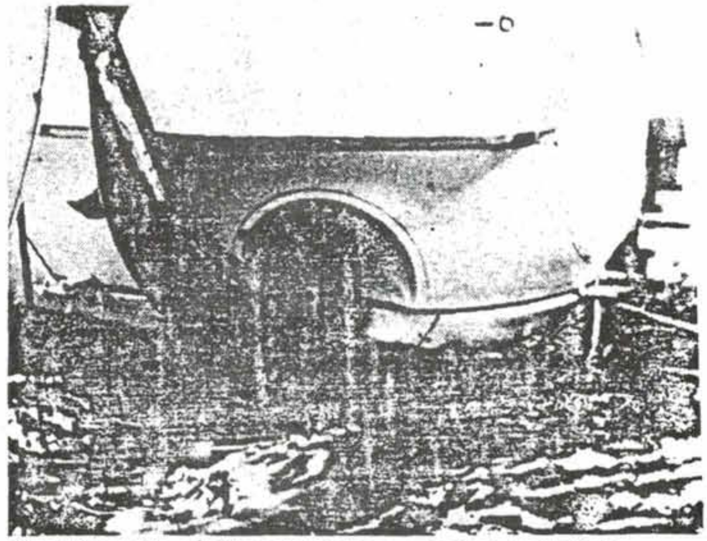


February 1966 ALVIN and her support vans were loaded into an Air Force cargo aircraft at Otis and flown to Rota, Spain. During the next two months ALVIN searched the ocean floor off of Cartagena for the lost H-bomb, operating from a Navy LSD. Bomb was located for the first time on March 15 but subsequently lost during attempt to attach lift lines. Bomb slid down-slope to deeper water; the search continued. Bomb relocated on April 2 by ALVIN and finally recovered on April 7. ALVIN returned to Woods Hole in LSD for overhaul.



In the early days of ALVIN/LULU operations, ALVIN was lowered with support cables from a launching cradle. ALVIN fell into the ocean when one of the cables failed due to corrosion.





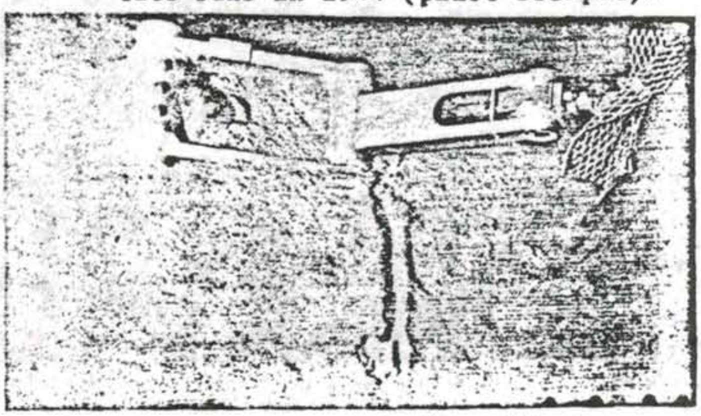
ALVIN survived a swordfish attack during 1967, bringing the fish back up as a trophy; it was served for dinner that evening. Later research projects tested the strength of the plexiglass windows and their ability to withstand direct swordfish strikes. The windows survived all tests.

1967 **Return to Bahamas for Navy dives. Subsequent transit north for biology/ geology dives on the Blake Plateau and off of Cape Charles. During dive #202 on July 6, ALVIN was attacked by a swordfish on the bottom at about 2000 ft. The fish became trapped in ALVIN's skin and was brought back to the surface intact.**

ALVIN completed a long series of dives south of New England in the Canyons and along the continental slope for geology, biology, thermal studies and sound measurements. On dive #209, in the Hydrographer Canyon area, a Navy F6F aircraft was found, photographed, and surveyed. It was later identified as being lost overboard from a carrier during practice runs in 1944 (pilot escaped).

On dive #224, September 24, the mechanical arm was lost during a rough recovery. The arm was subsequently found and recovered on dive #236 on October 15, reconditioned and reinstalled.

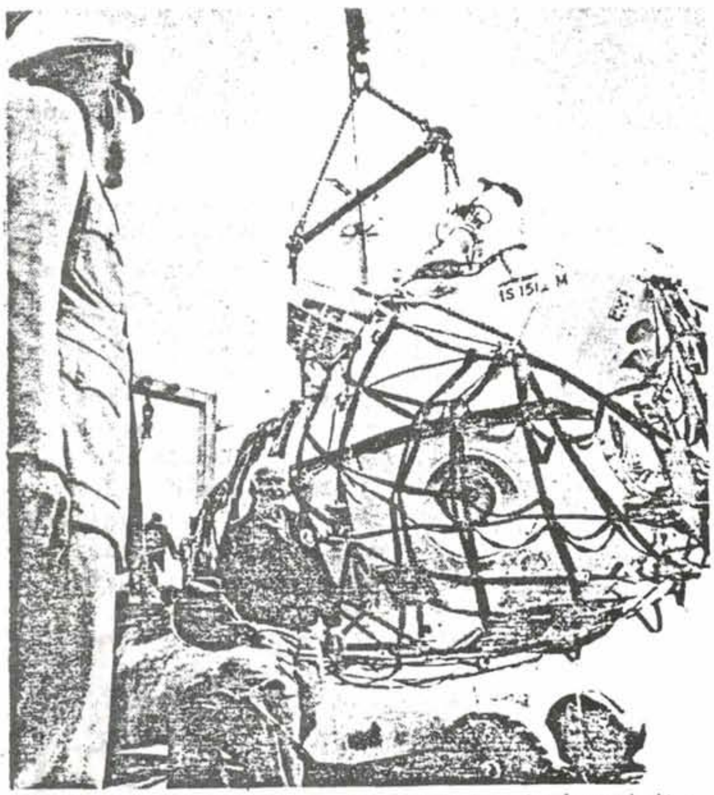
1968 Series of dives to observe submerged whales, Navy dives to survey tops of sea mounts for new range, geology and biology studies. During launch for dive #308 on October 16, ALVIN's cradle support cables failed and ALVIN slid into the water and sank to the bottom in 1535 meters of water. Ed Bland, pilot, received some bruises and a sprained ankle. Uneaten lunches sank too. Poor weather conditions and insufficient recovery equipment prevented recovery during the rest of the year.



ALVIN lost her mechanical arm on Dive #224 when a handling line became fouled on the catamaran.

ALVIN sits on the floor of the continental shelf near Hydrographer Canyon in 1,535 meters of water.

1969 ALVIN remained on the bottom until Labor Day. The DSV ALUMINAUT (a submersible from the Reynolds Aluminum Company) and the R/V MIZAR assisted in the recovery, which required placement of a toggle-bar into the hatch (ALUMINAUT had to break the sail in order to accomplish this). MIZAR then raised ALVIN to 50 ft., where divers then wrapped her with lines and nets to prevent loss of any pieces. ALVIN towed to the Vineyard, where a crane mounted on a barge pulled her out of the water. Overall, very little structural damage to the submersible (except for sail). Lunch on board, soggy but edible. Close to freezing temperatures and lack of decay at depths led to new areas of biological and chemical research at the Institution.



ALVIN's sail had to be broken in order to insert the toggle bar for lifting. Divers wrapped harnesses around the sub when it reached 50 feet to prevent any loss of parts during the tow back to Martha's Vineyard.

1970 ALVIN undergoes overhaul after her ten-month dunking.

1971 ALVIN's first post-loss dive is #309 on May 17.

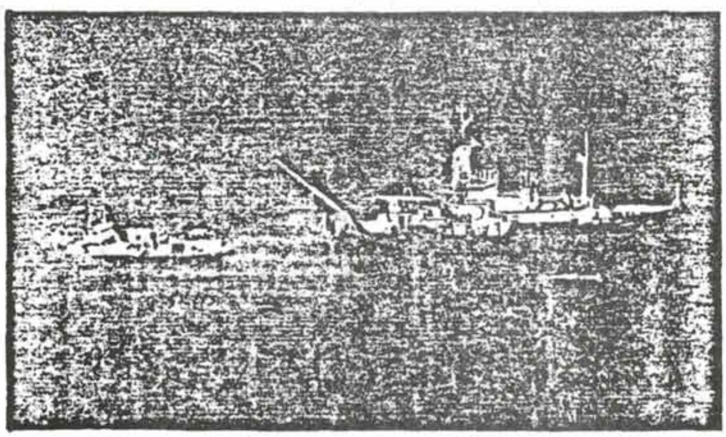
In mid-June a permanent bottom station was established on the continental slope south of Martha's Vineyard. The station has been regularly re-visited at least once each year. Dr. Ruth Turner was ALVIN's first female scientist-passenger on dive #345 to the station on August 13.

Series of dives in the Gulf of Maine and the Straits of Florida. On dive #364 ALVIN was attacked and hit by a large blue marlin while on the bottom off of Grand Bahama Island. The fish did some damage to the underwater lights and sail and much damage to himself.

1972 Series of dives at Martha's Vineyard station (biology), Hudson Canyon (geology and biology), Gulf of Maine (geology), navigational and rock drill experiments.

1973 During the spring, a new titanium pressure hull and variable ballast system were installed. After a series of test dives, ALVIN was officially certified to 12,000 ft.

1974 Project FAMOUS (French-American Mid-Ocean Undersea Study) provided first look at the Mid-Atlantic Ridge along with French submersibles CYANA and ARCHIMEDE. National Geographic ran articles on the Project in the May 1975 issue, one by Bob Ballard and the other by Jim Heirtzler.



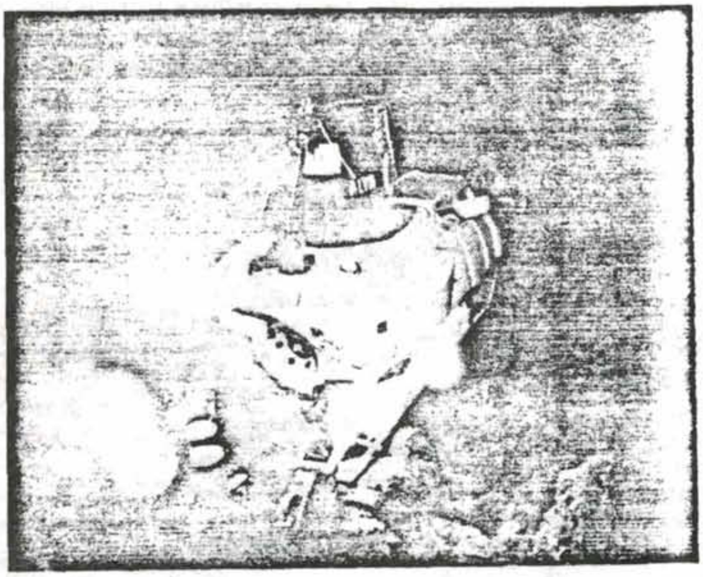
R/V KNORR, with ALVIN aboard and LULU in tow, departs for the Azores and Project FAMOUS. There the sub was transferred to LULU for the trip to the dive site some 200 miles southwest.

1975 Series of dives at Bahamas (biology), Grand Bahama Island (geology), Blake Plateau (biology), NOAA radioactive waste dump survey. Establishment of a new deep (12,000 ft.) station south of Cape Cod.

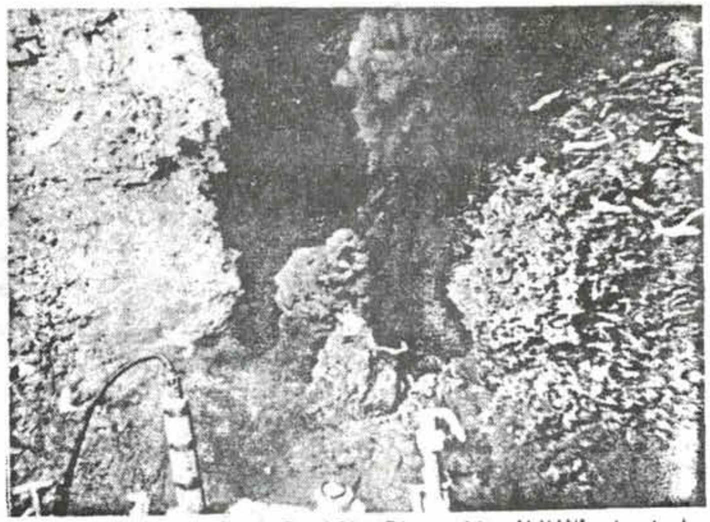
1976 ALVIN certified for 4,000 meters (13,000 ft.). Navy dives near St. Croix and Tongue of the Ocean, biology on the shelf, slope, and canyons south of Cape Cod, recovery of waste drum from radioactive waste site (RADWASTE) off of New Jersey.

1977 Transit to Panama and Canal passage (for the first time) and geology work in the Galapagos Rift during February and March. A major discovery was the abundance of warm water animal life on and in the immediate proximity of the warm water vents. Since no light can penetrate through the deep waters, scientists concluded the animal chemistry is based on chemosynthesis.

Return through the Canal for dives in the Cayman Trough in April (a continuation of geology investigations). During this series the Nicaraguan earthquake occured and was plainly felt by ALVIN while submerged.



This portrait of ALVIN at the Galapagos Rift was taken with a remote-controlled 16 mm motion-picture camera. ALVIN placed the equipment on a stable surface, backed up, and then made a grand entrance for the camera. Photo by Emery Kristoff and Alvin Chandler, © National Geographic Society.



Black smoker at East Pacific Rise with ALVIN's basket in foreground. Photo by Dudley Foster.

1978 New titanium frame installed. Continuation of RADWASTE and biology studies off East Coast. Second trip to the Mid-Atlantic Ridge (plate tectonic geology on the plate spreading centers.

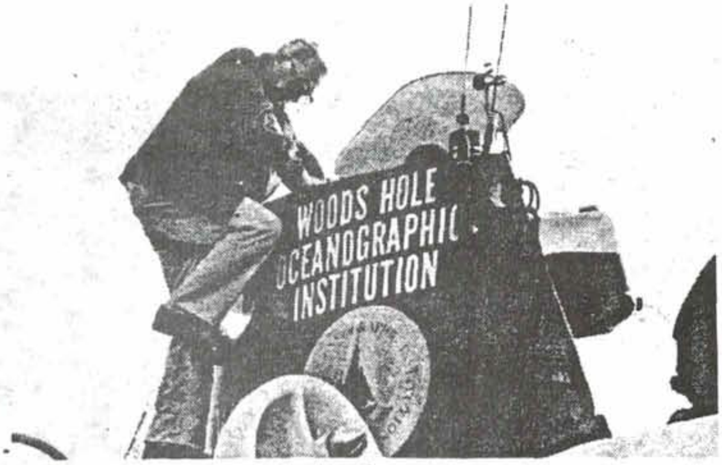
1979 Transit to Panama followed by biology and geology cruises to the Galapagos in January and February. National Geographic bought a dive and filmed the highly acclaimed special "Dive to the Edge of Creation."

In April and May ALVIN made her first trip to the East Pacific Rise at 21 Degrees North. These geology dives revealed hot water vents or "black smokers" spewing forth superheated water at 350^{o}C (650^{o}F). Many of the same animals found at the Galapagos vents are found at this location off of Mexico.

Further dives near San Diego, Tamayo Fracture Zone, East Pacific Rise, and Galapagos from June through December.

1980 ALVIN completes 1,000th dive at the Galapagos Rift in January.

ALVIN returns to the Mid-Atlantic Ridge and Kane and Oceanographer Fracture Zones during June and July for geology studies. Additional dives along East Coast, Bahamas, St. Croix. BBC films special.



Walter Cronkite enters ALVIN on Dive #1211 which was filmed for his Universe television series.

1981 Extensive work in St. Croix area. Return to Galapagos and East Pacific Rise. Dives in the Panama Basin.

1982 Dives at East Pacific Rise and Guaymas Basin. Walter Cronkite made dive #1211 to the hot vents. Dives at the Panama Basin followed by long transit to the Mid-Atlantic Ridge. Returned to Woods Hole in August and completed local studies for biology, geology, and corrosion. Dives in the Florida Straits and the Providence Channels.

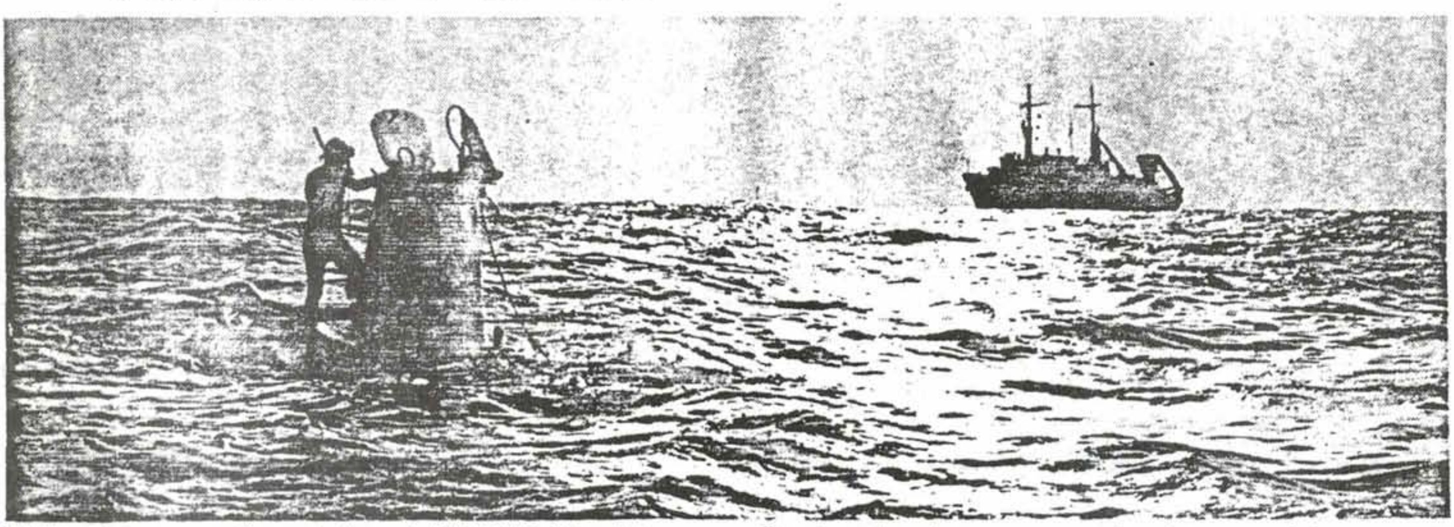
1983 A major ALVIN overhaul took place at Woods Hole including design of a new frame to allow for a single-point lift system. During the same time, work on R/V ATLANTIS II continued, preparing her for her new role as mother ship and tender for ALVIN. These extensive modifications were conducted during A-II's regular mid-life refit. A large A-frame was added to the stern for ALVIN launch and recovery.

1984 ALVIN and ATLANTIS II departed Woods Hole in January for Charleston, S.C. Final preparations and harbor tests include first actual ALVIN launch and recovery using A-frame, followed by geology cruise to the Blake Plateau. Several rough water recoveries were made at sea, proving the A-frame system could work under less than ideal conditions.

March geology/biology cruise out of Tampa on the West Florida Escarpment in the Gulf of Mexico discovered a series of bottom cold water vent communities containing animals very similar in appearance to those in the Pacific.

Transit to the Pacific for further dives in the Panama Basin and the East Pacific Rise. In mid-April ANGUS discovered a new vent field to the south of the dive area which A-II and ALVIN visited.

Dives at the Juan de Fuca and Gorda Ridges off of Oregon/Washington in July reveal black smokers in this northern spreading center.



ALVIN surfaces as Support Vessel ATLANTIS II, with newly installed A-frame, approaches for recovery.

The launch and recovery system has proved to be gentle to passengers yet capable of operating in rather rough sea conditions. Photo by Rod Catanach.

1985 - Much of ALVIN's work during 1985 focused around the vent communities at the Guaymas Basin in the Gulf of California, the East Pacific Rise off of Mexico, and near the Galapagos Islands. Successful tests were made of new deep ocean sampling and photography equipment designed to be controlled from within ALVIN. Since 1964, the vehicle has traveled vertically (up and down) a total of 3,535 miles. The final months of 1985 will be dedicated to maintenance and upgrade of the vehicle in Woods Hole.

ALVIN DIVE STATISTICS FOR 1985

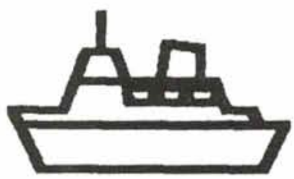
TOTAL DIVES	161
Total depth	390,746 meters 1,269,925 feet
Average depth per dive	2,426.99 meters 7,887.72 feet
Total time submerged	1,190.51 hours
Average time submerged per dive	7.39 hours
Total passengers	296
Dives for geology	88
Dives for biology	59
Dives for chemistry	7
Dives for engineering tests	5
Dives for equipment recovery	1
Dives for photography	1

ALVIN DIVE STATISTICS FOR 1964 - 1985

TOTAL DIVES	1,663
Total depth	2,871,676 meters 9,332,947 feet
Average depth per dive	1,726.80 meters 5,612.11 feet
Total time submerged	10,097.51 hours
Average time submerged per dive	6.07 hours
Total passengers	2,754
Dives for geology	564
Dives for biology	490
Dives for test & training	176
Dives for inspection, survey, recovery	120
Dives for VIP & scientist orientation	68
Dives for engineering & equipment tests	32
Dives for chemistry & geochemistry	75
Dives for geophysics & vent dynamics	29
Dives for U.S. Navy tests & survey	14
Dives for miscellaneous oceanography	73
Dives for dump site survey & recovery	13
Dives for public relations purposes	9

DRAFT

Guidelines for NSF / MARAD Material Condition Review of Research Vessels



These Guidelines have been prepared by the NSF / MARAD Review Team to inform ship operators of what to expect during the review and how to prepare the ship and marine staff for the Material Condition Review

January 1986

NSF/MARAD
MATERIAL CONDITION REVIEW

TYPICAL SCHEDULE

Review Team:	Normally consists of two (2) reviewers for ships up to 90 ft. in length; three (3) reviewers for ships over 90 ft. in length, plus one (1) representative from MARAD and one (1) representative from NSF.
Day zero:	Review Team arrives motel. Pre-review materials* at motel registration desk at check in time.
Day one:	0830 hrs. Review Team arrives ship. Pre-review orientation meeting w/marine staff and crew. Dockside review by reviewers with each reviewer accompanied by knowledgeable crew member or marine staff person.
Day two:	0830 hrs. Ship departs for sea trials of ship's maneuvering and science equipment. 1400 hrs. Debriefing session held on board for marine staff and crew. 1500 hrs. Review Team departs.

Following the Review, a written report will be forwarded through appropriate channels to the institution. The Report will be accompanied by a request for a response outlining corrective measures to be carried out by the institution.

*see Section II B.1.

NSF/MARAD MATERIAL CONDITION REVIEW

I. General

The purpose of the NSF/MARAD Material Condition Review is to assure that the seaworthiness and safety of research vessels supported by NSF meet or exceed the standards set forth by the UNOLS Safety Standards, and applicable requirements of the American Bureau of Standards and the U.S. Coast Guard. In addition the Review examines the scientific capabilities of research vessels in accordance with accepted community standards, and expectations.

Material Condition Reviews are presently conducted on a two year cycle. The Review examines the ship's hull, tanks, decks, propulsion machinery, auxillary electrical systems, auxillary machinery, navigation and communication equipment, habitability, pollution control, damage control and safety. The Review includes a dockside and an at-sea component to exercise all ship systems and scientific capabilities.

At present drills such as fire drills, and man overboard drills, are not included in the Review. However, crew training procedures are reviewed.

II. Preparation

A. General

All ship machinery and systems should be up and operational. All Tanks scheduled for inspection (see III B.11.) should be open and ventilated. It is important that as complete a complement of scientific instrumentation and shipboard equipment available to scientists be on board and operational.

The NSF coordinator should be advised beforehand if any equipment will not be functioning. Any non-functioning ship's equipment or scientific equipment should be noted on Part 1 Material Condition Review and any changes should be reported to the Review Team upon arrival at the vessel.

B. Documents

1. The following information or documents should be distributed to each member of the Review Team (normally five persons) upon their arrival at the motel the day before the Review:

   a. Part 1 Material Condition Review
   b. UNOLS Ship Characteristics Form
   c. Copy of Cruise Manual or Chief Scientist Handbook
   d. Reports of corrective actions resulting from last inspection by the Review Team and other improvements or changes in ship's condition

e. List of names and titles of institutional personnel participating in the Review.

2. The following documents should be available at the initial meeting (prebrief) of the Review Team and ship/institution personnel.

   a. Stability booklet or information
   b. Letter from Coast Guard designating the ship an "Oceanographic Research Ship"
   c. Owners certificate
   d. Booklet of General Plans
   e. Life raft inspection documents

3. The following documents should be available on board for use by the science equipment reviewer.

   a. Manual of specifications, prints, and operational instructions for winches and cranes and other science equipment as available.

   b. Wire history records and shipboard wire logs (see Handbook of Oceanographic Winch, Wire, and Cable Technology).

   c. Copy of most recent NSF Ship Operations proposal, Technician proposal, Shipboard Scientific Support Equipment and Oceanographic Instrumentation proposals. Planning list of proposed equipment for next ensuing proposals.

   d. Lists of cooperative or shared use equipment and procedures.

   e. Diving Manual

C. Science Equipment and Instrumentation

1. In order to simulate operating research conditions, as complete a complement of scientific instrumentation and equipment generally available to scientist should be on board and operational.

2. For underway tests, the following equipment, if available, are suggested for use with the:

   a) Trawling winch: bottom trawl or dredge
   b) Hydrographic winch: bottom grab or sampler
   c) CTD winch: CTD or STD with Rosette Sampler or other hard wire instrument to test continuity of slip rings and cable and to demonstrate data collection and on board analyses capabilities.

D. Space and Materials

1) Space should be set aside for reviewers to stow gear, change clothes and wash up.

2) Flashlights, wiping rags, a tape measure, soap and toweling materials should be available.

III. Review of Hull and Machinery

A. General. This phase of the Review will begin with an inspection of tanks, followed by machinery and other spaces. The reviewer conducting this facet of the review is accompanied by a knowledgeable crew member (normally the chief engineer).

B. Hull. In general, the following will be examined as applicable.

1. Sluice valves, doors in watertight bulkheads, closing appliances in enclosed superstructure bulkheads and for air and sounding pipes.

2. All accessible parts of the steering arrangements, including the steering machinery, quadrants, tillers, blocks, rods, cables, telemotor or other control transmission gear and brakes.

3. Coamings and closing arrangements of ventilators to spaces below the freeboard deck and into enclosed superstructures, hatchway coamings, hatch covers, and all their supports.

4. All accessible parts subject to rapid deterioration.

5. Exposed machinery casings, guard rails and all means of protection provided for openings and for access to crew's quarters.

6. Freeing ports in bulwarks.

7. Decks and deck compositions.

8. Engine room bilges.

9. On vessels about twelve (12) years or older, the plating and framing below a representative number of portlights will be examined. This may require suitable inspection openings to be cut in sheathing.

10. Any alterations in structural arrangements, fittings and appliances upon which load lines are conditional.

11. Fore peak tanks, ballast tanks, voids and cofferdams will be examined internally every four (4) years from date of build. On vessels with several ballast tanks consideration should be given to examine about half of these spaces every two years. Tanks should be open and throughly ventilated in advance of the review. To avoid dupliation of inspection on classed vessels the internal inspections may be modified.

C. Machinery, Piping and Electrical

1. Operation of main and auxiliary machinery during sea trial will be observed. Operation of overspeed trips, audible and visual alarms for failure of lube oil on main and auxiliary diesel engines will be demonstrated either before or after sea trial.

2. Piping systems together with valves and manifolds will be generally examined for leakage, labeling of valves, supports etc. Operation of fuel oil valves arranged for operation outside of the compartment in which the valve is located will be demonstrated.

3. Wireways will be sighted where visible, switchboard given a general examination. Generators will be observed in operation under load either separately or in parallel.

4. Remote shutdown of fuel oil service and transfer pumps will be demonstrated.

IV. Review of Superstructure, Deck Machinery, Ship Control, Habitability and Safety

A. General

The purpose of this facet of the review is to determine the material condition of the superstructure, deck machinery, ship control equipment, status of habitability and general compliance with safety standards. The inspection generally takes two days. The first day comprises an alongside inspection and the second day is an underway sea trial designed to operate all shipboard equipment.

B. Dockside Review

1. The reviewer conducting this facet of the review is áccompanied by a knowledgeable crew member (normally the Master or First Mate). The crew member should have on his person keys to all locked spaces so that entry can be made on a timely basis.

2. The reviewer normally starts at the bridge level and proceeds downward and fore and aft covering all decks, spaces and storerooms. All equipment that can be properly tested in port will be activated (including safety equipment and alarms). In preparation for this, power should be available at the equipment (ship's generators do not have to be on the line, however). Equipment that can not be properly tested in port will be tested during the Sea Trial. Logs, navigation instruments and publications, medical supplies and documentation should be readily available.

3. Dry store rooms, freezers/refrigerators used for food storage, galley and the messing area will be inspected in company with the cook. This will be scheduled so as not to interfere with food preparation/serving/clean up.

4. Near the end of this phase emergency pumps and fire hoses will be tested (this is sometimes deferred to the second day).

5. Depending on the size of the ship and other factors, this phase of the inspection will consume most of the first working day.

B. At Sea Review

1. On the second day a sea trial is undertaken. The purpose of the trial is to test all ship control equipment. The tests attempt to determine if the equipment can operate at its designed limits. While the Review Team does not desire to cause material casualities, such casualitites are possible. If ship's personnel do not wish to operate certain equipment to the designed limits, they should, without hesitation, so state and the reasons therefore. Of course, safety is always of paramount importance and an overriding factor.

2. In preparation for the sea trial the following pertains:

   a. Arrangements should be made for radio terminations with a shoreside or other station. Transmissions will be made while at sea.

   b. All electronic equipment should be lighted off or on standby. Electronic navigation equipment should be set up pierside and track throughout the sea trial.

c. The gyro should be operating, repeaters aligned and radar gyro inputs set up prior to leaving the pier. An attempt will be made to determine the the gyro error, if any.

d. Once underway and sea room is gained, a full power run will be commenced. This will last about 30-40 minutes.

e. Upon completion of the full power phase, the ship will be crash stopped, sternway obtained and rudder tested and timed going astern.

f. All modes of steering, engine control, remote stations, auto pilot, etc. will be tested. The rudder will be timed going ahead. Emergency steering, if any, will be tested.

g. The bow thruster will be tested at full power.

h. Anchors will be dropped on the brake and the windlass tested. (It is not desired to be in shallow water for this test.)

i. Other deck machinery, life/work boats may be tested at this time.

V. Review of Scientific Equipment and Capabilities

A. General

The purpose of the science phase is to review the material condition and the operating procedures for the installed scientific equipment and instruments, and for the shared use equipment available to support shipboard investigators. The review usually comprises two days: the first day is dockside for the inspection of all shipboard instrumentation and associated records including shore facility, technical services, and storage. The second day is an underway test cruise for the operation of all shipboard systems.

B. Dockside Review

1. The senior Marine Technician or other person assigned in charge of shipboard science equipment should be prepared to assist the science reviewer during dockside inspection.

2. Areas of shipboard examination will include: winches, cranes, hydro frames, trawl frames, laboratories, science storerooms, transducer wells, echo sounders, meteorological equipment, navigation equipment, freezers, boats, and other installed scientific equipment. The inspection also will include scientists' staterooms and living quarters, and safety procedures for science personnel.

3. Shared scientific equipment, especially the inventory listed in the Cruise Manual or other prospective shipboard investigators listings will be examined for condition and status of availability.

4. Spare wires and cables and associated records should be available for inspection.

5. Technical services available at the laboratory for shipboard applications will be reviewed along with procedures, costs, and overall capability.

6. Shore facilities, shops, storage, and other support services will be toured.

7. The institution diving program and especially its interaction with shipboard procedures will be reviewed.

C. At Sea Review

1. All installed scientific equipment and instruments will be exercised under simulated operating conditions.

2. Several lowerings of each winch will be accomplished as per ii c.2. above in as deep water as practicable. Winch brakes, both auto and manual will be tested under load with simulated hydraulic and electrical failure.

3. Crane is to be exercised to maximum extension and stewed through all operating points.

4. Science echo sounders, 12 khz, 3.5 khz, and others are to be operated throughout test. A sample trace is to be annotated and delivered to science reviewer.

5. SAIL system (if installed) is to be operated throughout test. SAIL readout tape is to be delivered to science reviewer.

6. Stationkeeping tests will be made for the purpose of checking maneuverability and the effectiveness of the bow thruster (if installed).

7. Ordinarily, towed seismics arrays, cameras, piston coring, mocness nets, deep tow, and other heavy equipment will not be tested at sea but will be inspected ashore if such equipment is included as a part of ships shared use equipment.

Institution	Equipment Description	Charge
CTD's:		
Great Lakes & Marine Water Centers	Not listed	
MLML	No description provided	No charge listed
OSU	Neil-Brown (incl. fish w/ P.T.C. digitizer & oxygen interfaces, Tektronix 4052 computer, Kennedy 9-track tape drive, Revox audio tape drive, system clock, Anadex printer, H-P digital plotter, deck unit	$400/cruise + $10/cast $30/cast > 1000m
SIO	Not listed	
Texas A&M	Neil-Brown Mark III 6000m Grundy 9042 3000m	$63/day $32/day
UA	Neil-Brown Mark IIIB, w/ O_2 probe; u/water units (2) (0-3000dB and 0-6000 dB units)	Free to NSF users (req'd repair & maint. charges); private & profit organizations charged 10% of replacement value
UH	Not listed	
URI	Neil-Brown Digital CTD/O_2 w/ (2) 6500m fish; CTD deck unit (2); 5-liter 12-bottle rosette sampler (2 u/water units, 1 deck); 5-liter 24-bottle rosette sampler (deck-unit and u/water unit); analog cassette recorder (2); slip rings (3); HP-2112B "M" series acquisition computer w/32K memory (2); 7970B 9-track tape drives, 45 IPS @ 800 BPI (2); GE Terminet, 110/300 baud printing terminal; Epson MX80 printers (2); 565 Calcomp 10" drum plotters (2); Ann Arbor CRT terminals	$631/day

Institution	Equipment Description	Charge
CTD's: (cont.)		
USC	Not listed	
UW	Neil-Brown - pressure to 6500m, accuracy to +6.5 dB; temperature range -32°-+32°C w/ accuracy to 0.005°C; conductivity range 1-65 mohm w/ accuracy to 0.005mohm; (2) additonal sensors can be added to measure variables; interfaced to a HP-85 and/or TI Professional computer to provide realtime access;HP-85 data cartridges not provided	$40/day
WHOI	Not listed	

Institution	Equipment Description	Charge
BOX CORERS:		
Great Lakes & Marine Water Centers	Not listed	
MLML	No description provided	No charge listed
OSU	Soutar (removable core boxes, weights)	$200/cruise
SIO		$300/station
Texas A&M	Small = 12"x12"x24" w/ 300 lbs. removable weights Large = 18"x18"x32" w/1000 lbs. " " Small = 25cm x25cm x 50 cm w/ 300 lbs. " "	$16/day $25/day $16/day
UA	Soutar - (3) stainless steel sampling boxes	Free to NSF users (req'd repair & maint. charges); private & profit organizations charged 10% of replacement value
UH	Not listed	
URI	Not listed	
USC	Modified N.E.L.	$10 set-up; Day 1-7=$30 Day 8-30=$22
UW	Not listed	
WHOI	Ocean Instruments MKIII	$200/cruise

Institution	Equipment Description	Charge
WATER SAMPLING - 30-LITER NISKIN BOTTLES:		
Great Lakes & Marine Water Centers	Size not designated	
MLML	No description provided	No charge listed
OSU	(10); compatible w/ rosettes	$5 ea./cruise +$1 ea./day Max. $10 ea./cruise
SIO	Not listed	
Texas A&M	Not listed	
UA	(17)	Free to NSF users (req'd repair & maint. charges); private & profit organizations charged 10% of replacement value
UH	Not listed	
URI	(12)	$141/day (hydrographic equipment)
USC	Set of (6) w/ messengers	$5/set set-up; Day 1-7= $10 ea Day 8-30=$7
UW		$2.50/day
WHOI		no chg. listed

Institutions NOT providing equipment information:

The University of Texas (Port Aransas Marine Lab)

University of Miami

Skidaway Institute of Oceanography

Duke University Marine Lab

The Johns Hopkins University (Chesapeake Bay Institute)

University of Delaware (College of Marine Studies)

Columbia University (Lamont-Doherty)

Appendix VI

R. P. Dinsmore
15 January 1986

SUMMARY REPORT OF FRC WORKSHOP

6-7 January 1986

The purpose of the Workshop was to review the Draft Report of the UNOLS Fleet Replacement Committee principally dealing with the needs for new, replacement ships, the numbers and mix of new ships, and a time schedule for replacement. In addition, the Workshop had the task of reviewing the Science Mission Requirements for new ships and the several concept designs which depicted those requirements.

Altogether, fifty persons were present: 30 UNOLS member delegates and invitees, 9 Navy, 1 NSF, and 10 naval architects. Preliminary results of the Workshop are outlined below:

1. The numbers of ships needed and time frames are about right. The Plan, however, should be flexible enough for continual updating and able to withstand the ravages of severe budget constraints and still continue as an effective report to deal with ship replacement.

2. SWATH ships received moderate to strong support for an early acquisition; in part because of what they promise but also because of the potential impact on subsequent planning.

3. Large High Endurance Ships received more support than most anticipated largely due to needs such as WOCE, TOPEX, and high latitude work.

4. The G & G option was supported but with caution that the multi-discipline capabiity must be well preserved. This probably will result in a larger size ship.

5. Each (or most) of the "Classes" should have at least one ice worthy ship. This then might -- and it should be examined further -- call for an ice worthy "option" which could eliminate the Polar Research Vessel from our plan.

6. The mix of large ships for early planning appeared to be one SWATH and one High Endurance Ship (probably with a G & G option) and the remainder of the large ships probably as Medium Endurance Ships.

7. Seakeeping continued to be the most overriding of requirements but means must be developed to properly describe our seakeeping requirements.

8. It should be emphasized that the major needs for replacement ships is in terms of new technology and work at sea which cannot now be done and most certainly will not be done in the future without new ships. Mission obsolescence, not platform obsolescence, is the dominant factor now.

Table 4

Profile of Replacement
UNOLS Fleet

	Existing Fleet	Plan For Replacement Fleet
Large Ships (over 200 ft)		
General Purpose	5	5
MG&G Option	1	2
Sub. Handling Option	1	1
Polar Research Option	0	1*
Intermediate Ships (150-200 ft)		
General Purpose	6	6
MG&G Ship	1	0
Small Ships (100-150 ft)		
General Purpose	7	6
TOTAL	21	21

Table 5

Ship Replacement Plan shown by 5-year Increments

Time Frame	LARGE (Over 200 ft.) (200-275 ft.) Classes I & II	INTERMEDIATE (150-199 ft.) Class III	SMALL (100-149 ft.) Class IV
1985-1989	1 new GP 1 new MG&G modernize two	---	---
1990-1994	1 new GP 1 new MG&G 1 Polar R/V	---	1 new
1995-1999	1 Sub. Handling	2 new	1 new
2000-2004	1 new GP	1 new	2 new
2005-2009	---	3 new	---
2010-2014	2 new GP	---	2 new
Total	9	6	6

REVISED

Table 4 (Rev.)

Profile of Replacement UNOLS Fleet

	Existing Fleet	Plan For Replacement Fleet
<u>Large Ships (over 200 ft)</u>		
General Purpose	5	4
MG&G Option	1	2
Sub. Handling Option	1	1
High Latitude Option	0	1
<u>Intermediate Ships (150-200 ft)</u>		
General Purpose	6	5
High Latitude Option	0	1
MG&G Option	1	0
<u>Small Ships (100-150 ft)</u>		
General Purpose	7	5
High Latitude Option	0	1
TOTAL	21	20

Table 5 (Rev.)

Ship Replacement Plan shown by 5-year Increments

Time Frame	LARGE (Over 200 ft.) (200-275 ft.) Classes I & II	INTERMEDIATE (150-199 ft.) Class III	SMALL (100-149 ft.) Class IV
1985-1989	1 new GP 1 new MG&G modernize two	---	---
1990-1994	1 new GP 1 new MG&G	---	1 new
1995-1999	1 Sub. Handling	2 new	1 new
2000-2004	1 new GP	1 new	2 new
2005-2009	---	3 new	---
2010-2014	2 new GP	---	2 new
Total	8	6	6

SCIENTIFIC MISSION REQUIREMENTS

Ship Class

Large Ships: Class I & II (over 200 feet LOA)

- High Endurance General Purpose Research Vessel - Size Range 250-300 Feet
- M G & G Option for a High Endurance Research Vessel
- Medium Endurance, General Purpose Research Vessel - Size Range 200-250 Feet
- M G & G Option for a Medium Endurance Research Vessel
- Large SWATH Type General Purpose Research Vessel
- Submersible Handling Option for a Large General Purpose Research Vesssel; (To be developed)
- Polar Research Capability for Large General Purpose Research Vessel; (To be developed)

Intermediate Size Ships: Class III (150-199 Feet LOA)

- Intermediate Size General Purpose Research Vessel

Small Size Ships: Class IV (100-149 Feet LOA)

- Small Size SWATH Type General Purpose Research Vessel
- Small Size Monohull General Purpose Research Vessel; (To be developed)

SUMMARY CONCEPTUAL DESIGNS

Large SWATH Research Vessels

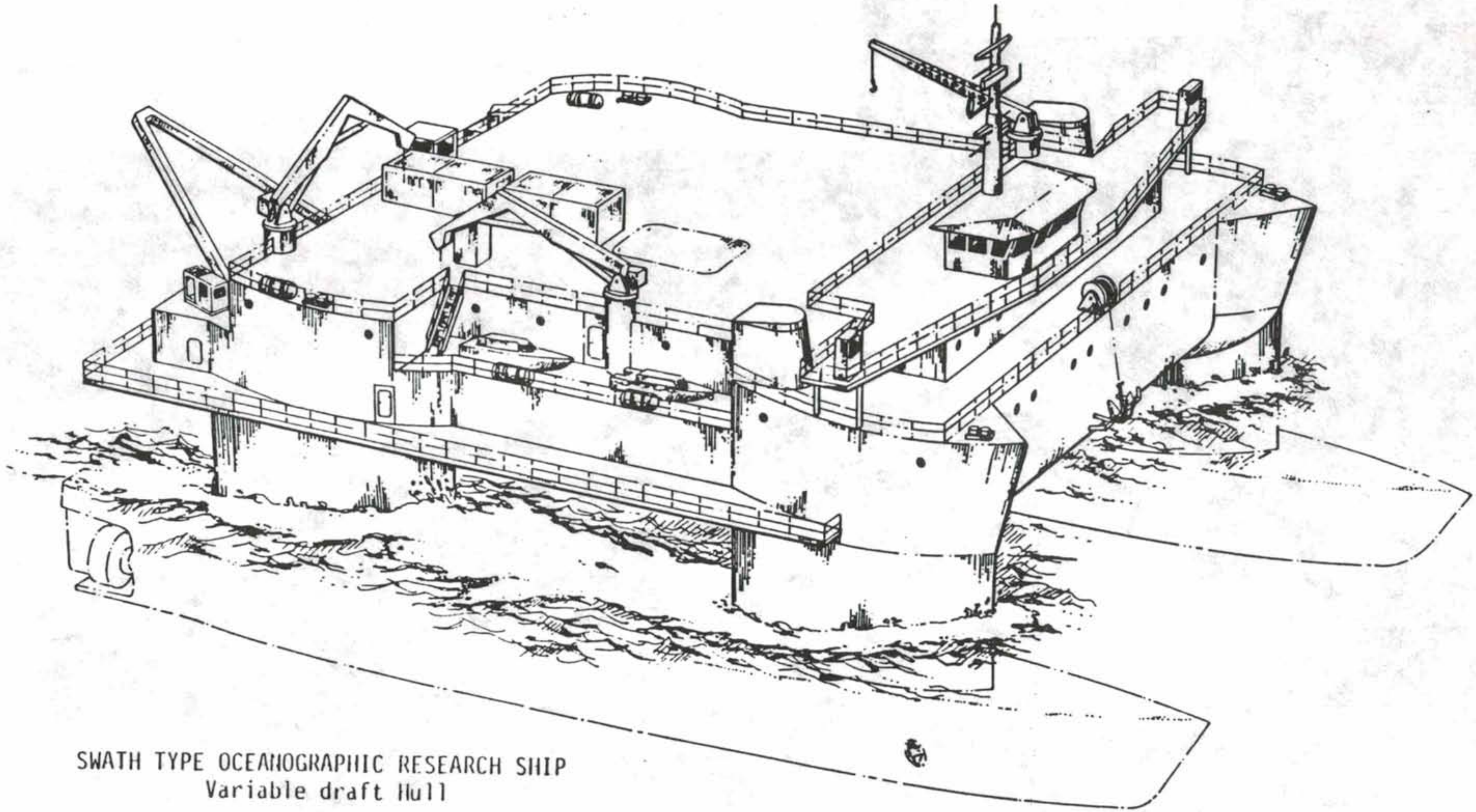
- 2500-Ton SWATH Oceanographic Research Ship; SSS Corp.; February, 1985
- Semi-submerged Oceanographic Research Ship; Blue Sea McClure; April, 1985
- Large Oceanographic Research Ship; SWATH AG(X); Naval Sea Systems Command, Preliminary Design Div.; August, 1985

High Endurance Research Vessels

- Large Oceanographic Research Ship: MONOHULL AG(X); Naval Sea Systems Command, Preliminary Design Div.; August, 1985
- High Endurance Oceanographic Research Ship; J.Leiby, Woods Hole Oceanographic Institution; December, 1985
- Large Oceanographic Research Vessel; Rodney E. Lay & Associates; October, 1985
- General Purpose Oceanographic Research Ship with Enhanced Marine Geology and Geophysics Capability; John W. Gilbert Associates; October, 1985

Medium Endurance Research Vessels

- "MG&G Friendly" Oceanographic Research Ship; Marinette MarineCorp.; May, 1985
- Large Oceanographic Research Ship; M. Rosenblatt & Son, Inc.; October, 1985
- Medium Endurance General Purpose Oceanographic Research Ship; Glosten Associates; November, 1985

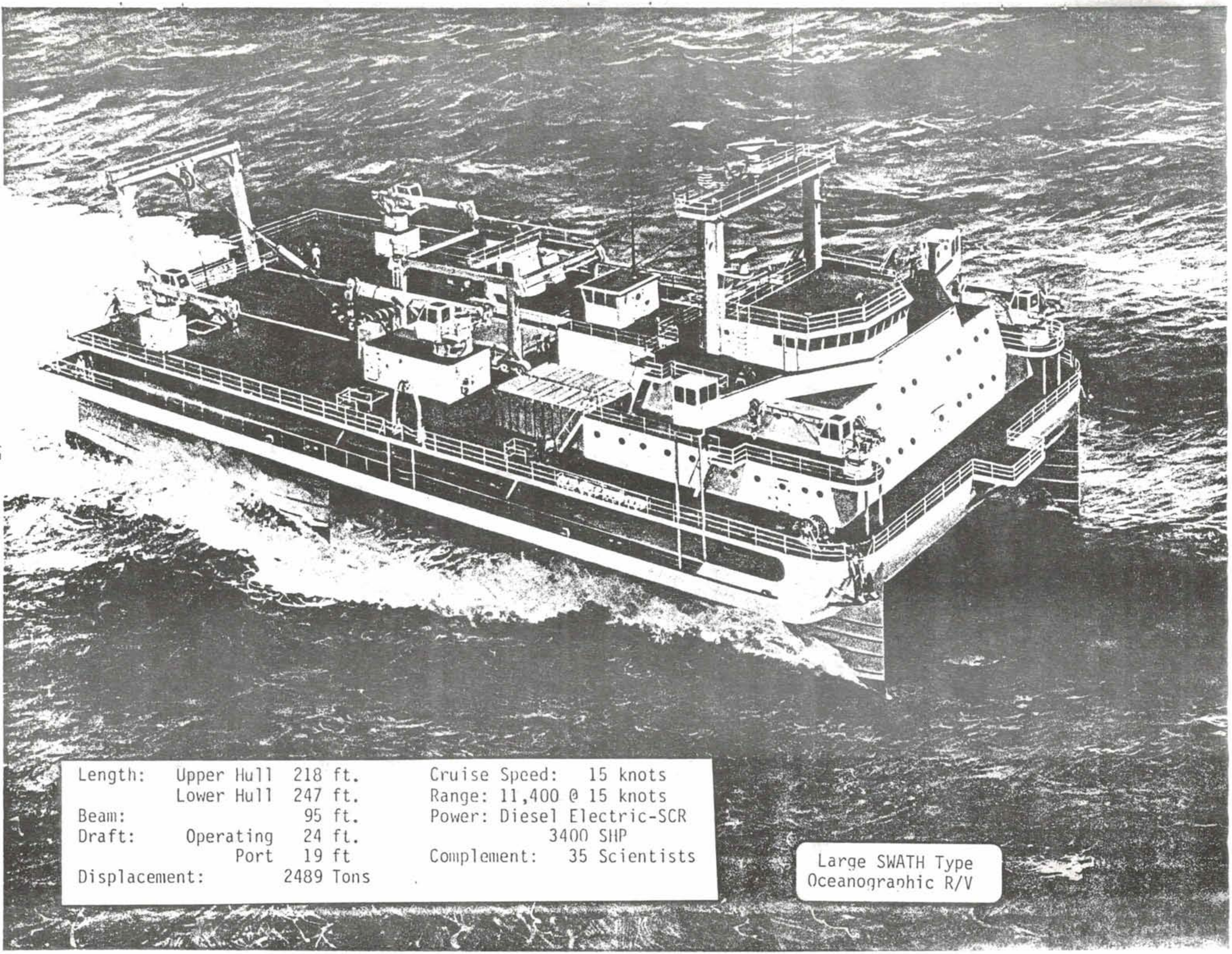


SWATH TYPE OCEANOGRAPHIC RESEARCH SHIP
Variable draft Hull

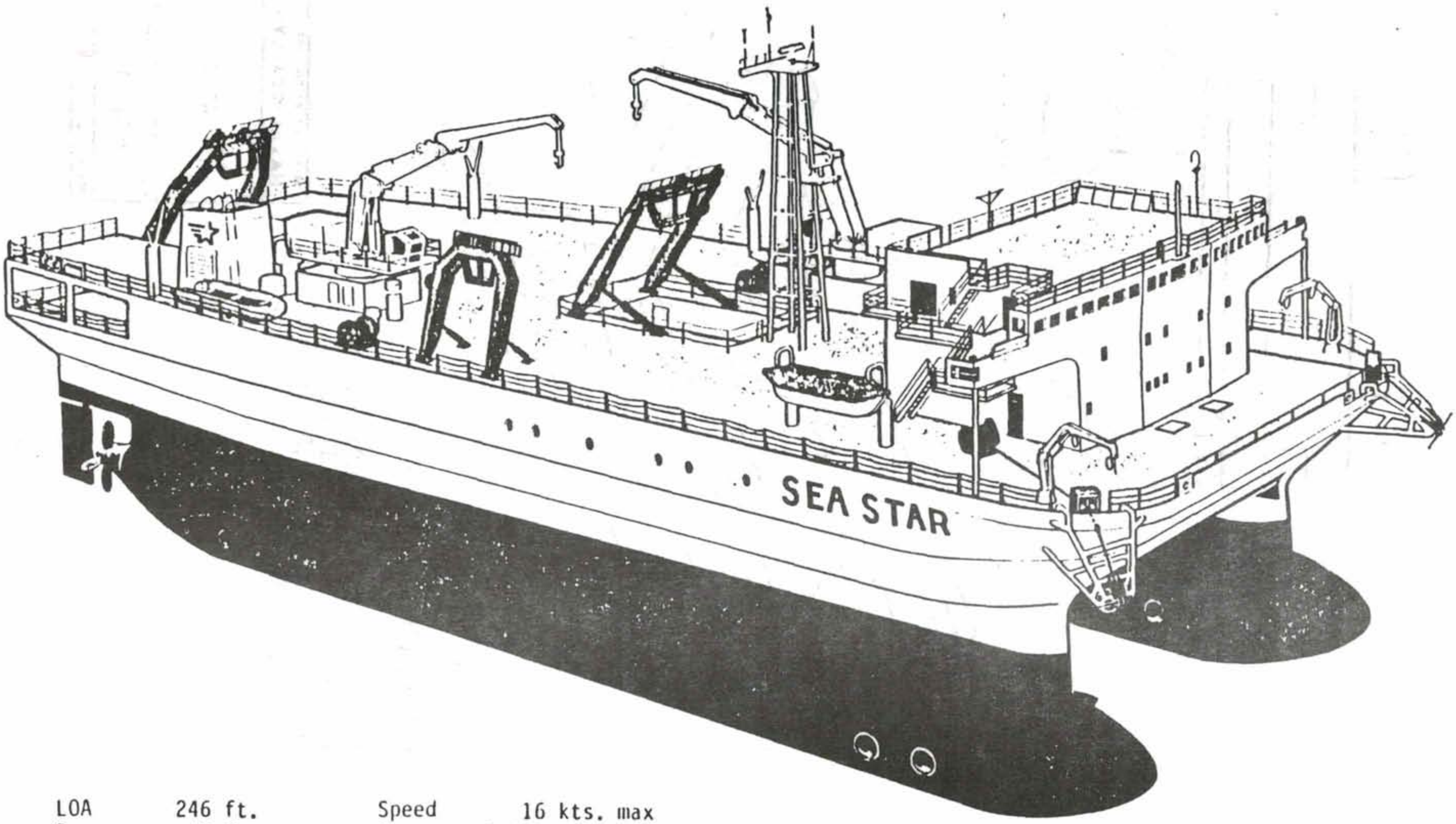
Length:	Upper Hull	147 ft	
	Lower Hull	202 ft	
Beam:		104 ft.	
Draft:	Operating	26 ft.	
	Transit	15 ft.	
Displacement:		3220 L.Tons	

Cruise Speed:	Transit	-	15 knots
	Operating	-	10 knots
Power: Diesel Electric			6000 SHP
Complement:	30 Scientists		

Blue Sea McClure
Houston, Texas

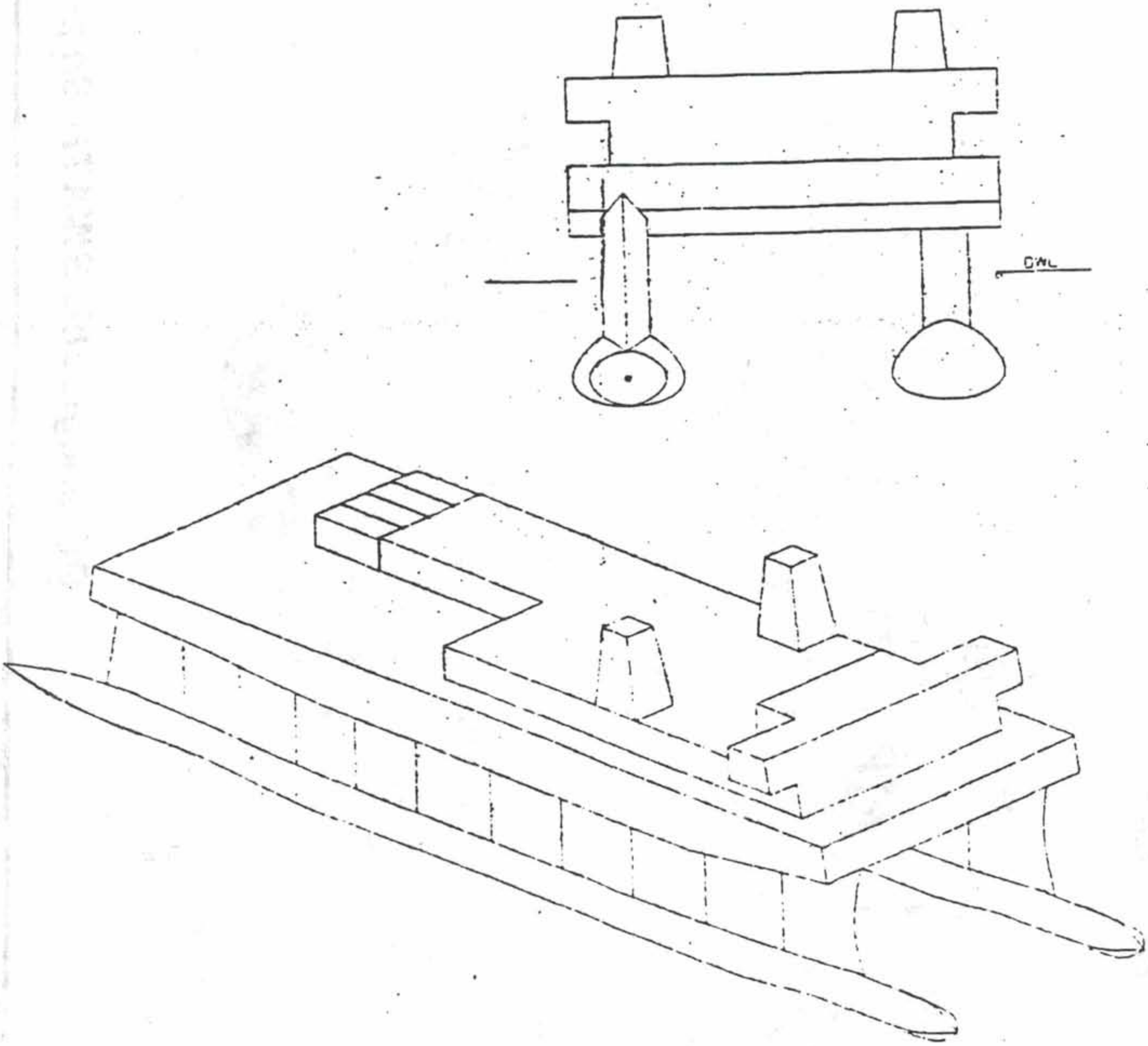

Length: Upper Hull 218 ft.
Lower Hull 247 ft.
Beam: 95 ft.
Draft: Operating 24 ft.
Port 19 ft
Displacement: 2489 Tons
Cruise Speed: 15 knots
Range: 11,400 @ 15 knots
Power: Diesel Electric-SCR
3400 SHP
Complement: 35 Scientists
Large SWATH Type
Oceanographic R/V

Lockheed Marine Systems Group



LOA	246 ft.	Speed	16 kts. max
Beam	92 ft.	Range	8,000 mi.@ 12 kts
Draft	21 ft.	Power	DE; 5,600 SHP
Displ.	3,300 L.Tons	Complement	35 Scientists

Oceanographic SWATH Ship



LARGE GENERAL PURPOSE RESEARCH SHIP

LOA	333 ft.	Displ.	5,038 L.Tons
LWL	246 ft.	Speed	17 knots
Beam	82 ft.	Range	12,000 mi.@ 15 kts.
Draft	23 ft.	Power	12,000 HP

DEPARTMENT OF THE NAVY WASHINGTON, D.C.

NAVAL SEA SYSTEMS COMMAND

AG(X) SWATH

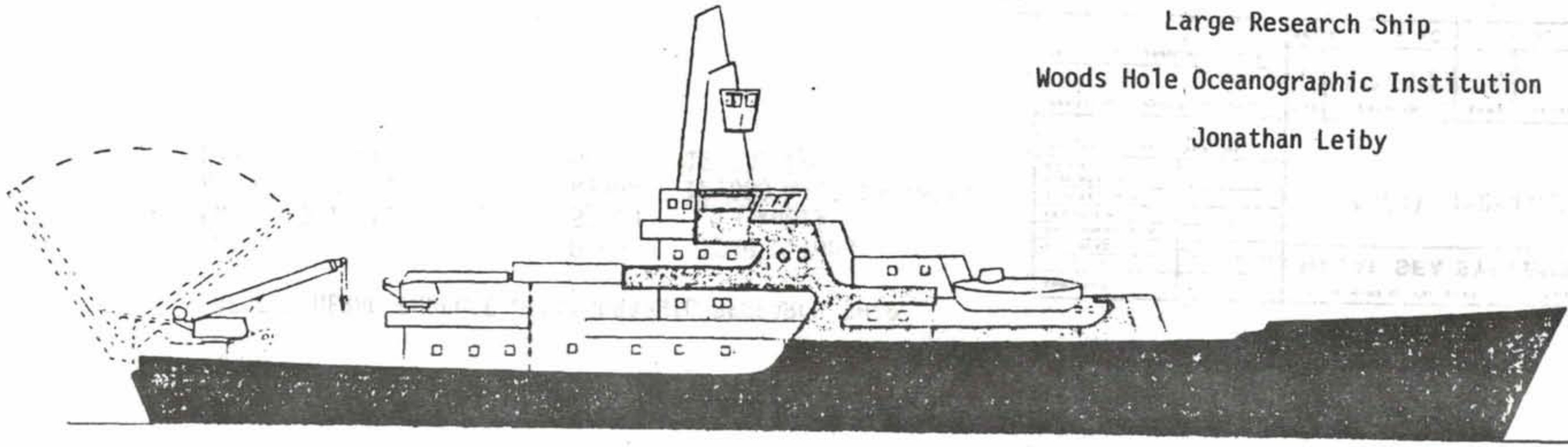
SIZE	FSCM NO.	DWG	NAVSEA DRAWING NO	REV
-	53711			

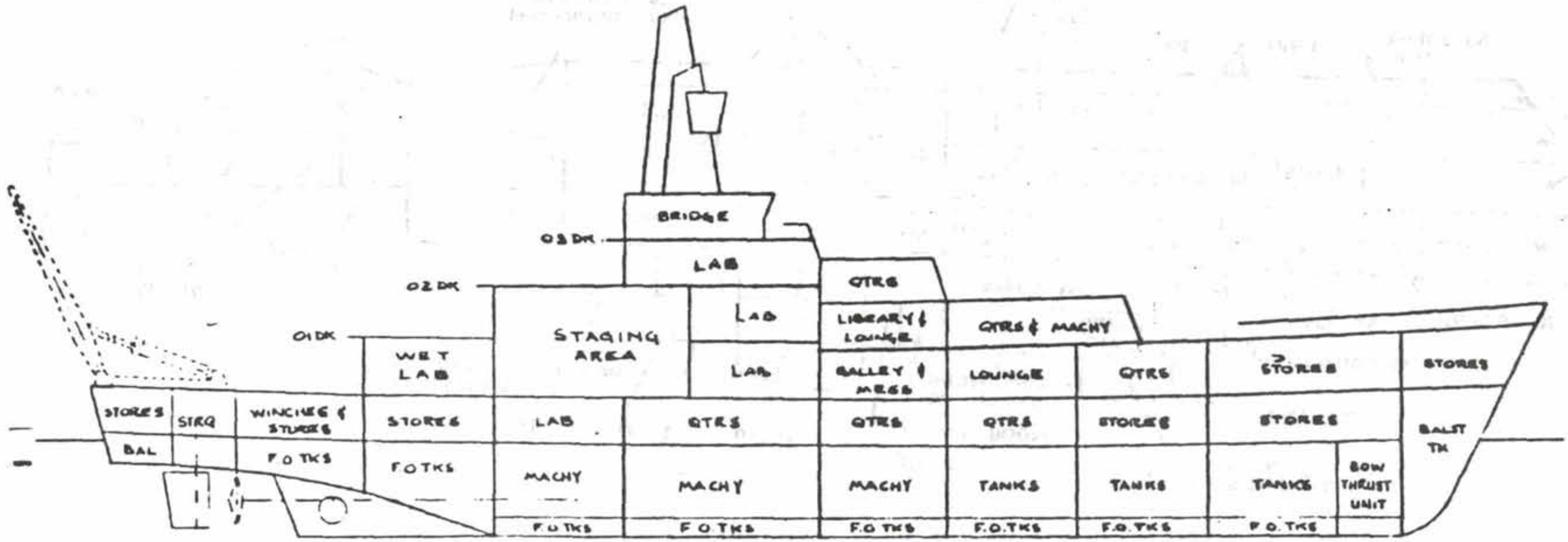
SCALE SH. OF

Large Research Ship

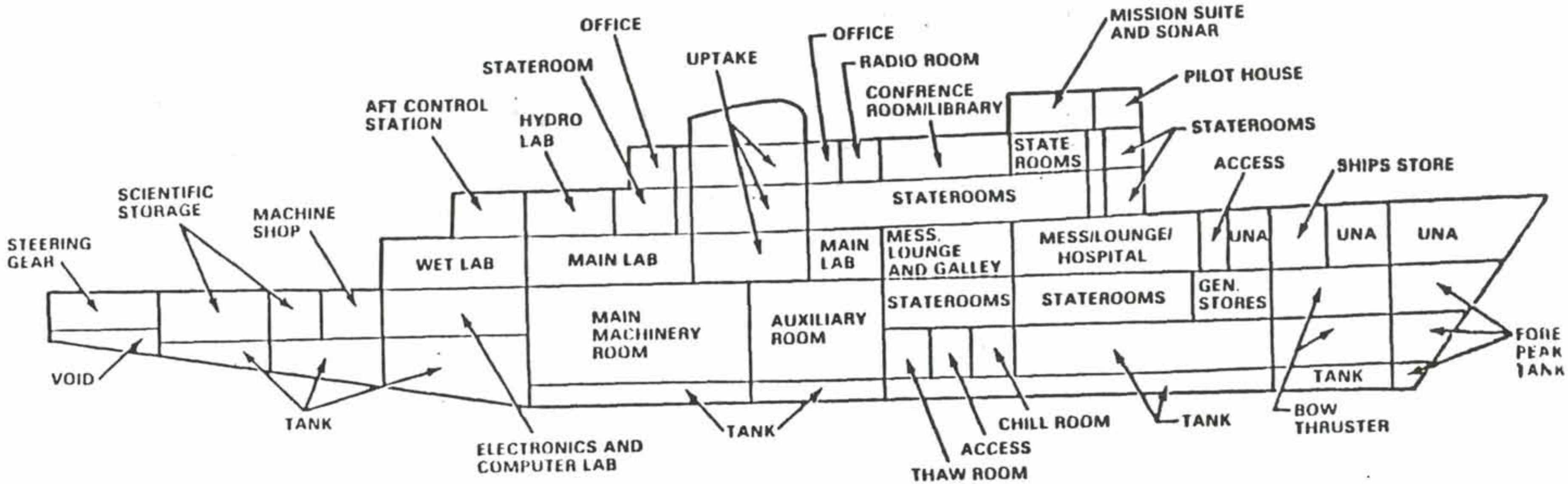
Woods Hole Oceanographic Institution

Jonathan Leiby





Length	275 L.B.P.	310 L.O.A.
Beam		68 Feet
Draft		21 Feet
Displacement		3,668 L Tons
Cruising Speed		16 Knots
Range	12,000 mi. @	15 Knots
Power (Diesel Elec. SCR)		6,800 S.H.P.
Complement		35 Scientific



LARGE GENERAL PURPOSE OCEANOGRAPHIC RESEARCH SHIP

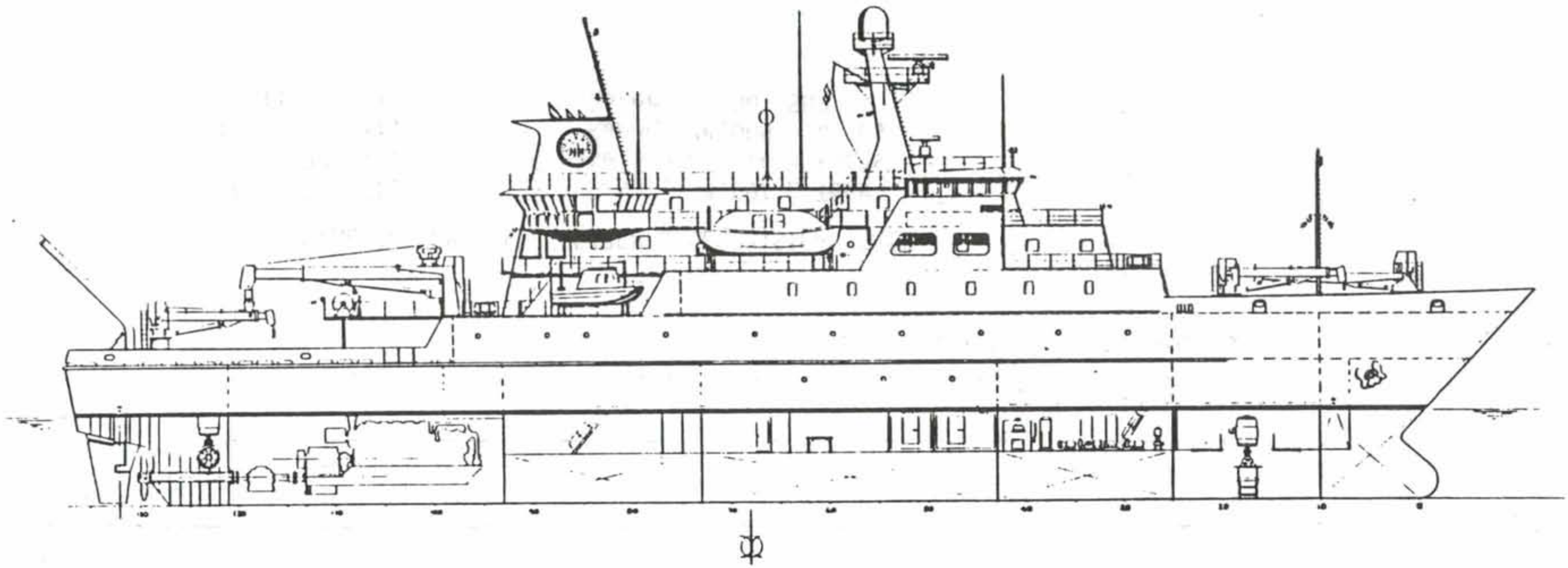
LOA		Disp.	3930 L.Tons
LWL	311 ft.	Speed	19 knots
Beam	52 ft.	Range	12,000 mi.@ 15 knots
Draft	13 ft	Power	12,000 HP

DEPARTMENT OF THE NAVY WASHINGTON D.C.

NAVAL SEA SYSTEMS COMMAND

AG(X) MONOHULL

SIZE H FSCM NO. 53711

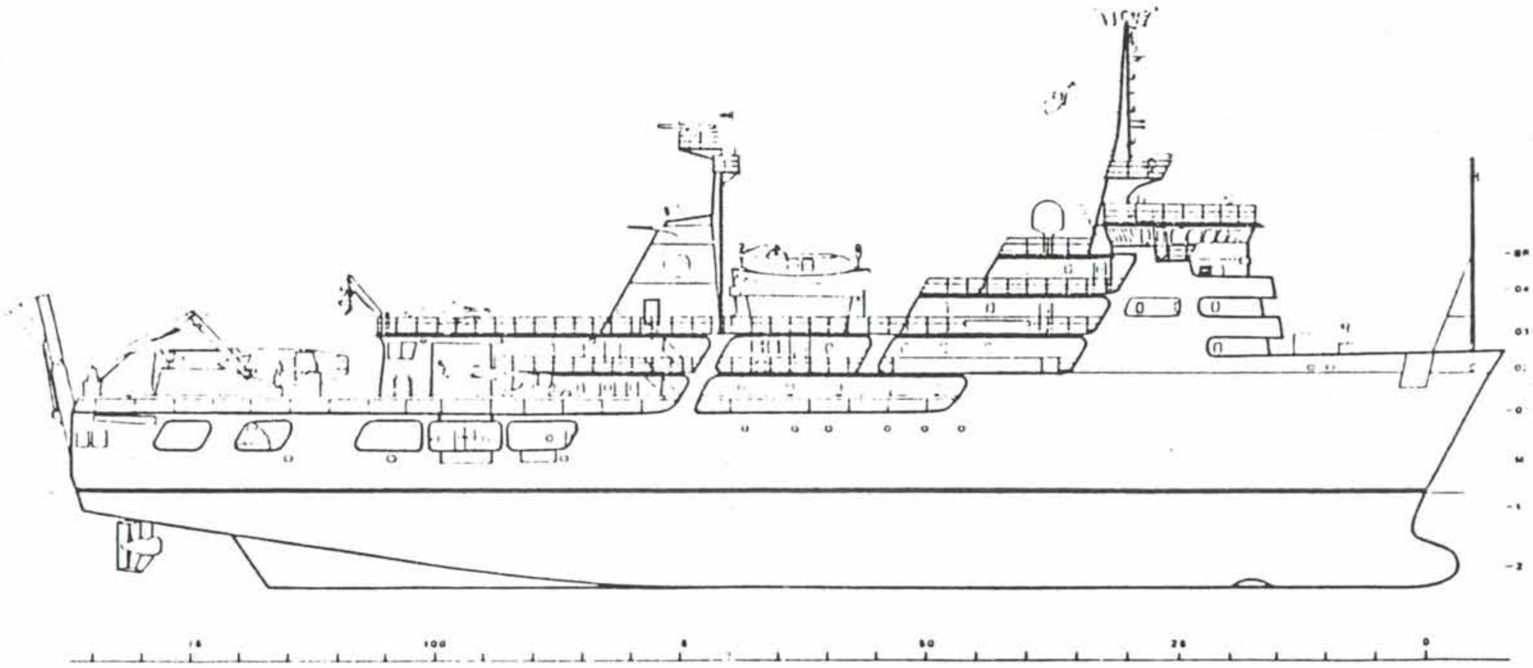


LARGE GENERAL PURPOSE OCEANOGRAPHIC RESEARCH SHIP

Length	273 LBP	300 LOA	Cruise Speed	14 knots
Beam		54 Ft.	Range	10,000 nm
Draft		18 Ft.	Power	4,000 SHP
Displ.		LT	Complement	33 Science

RODNEY E. LAY & ASSOCIATES
NAVAL ARCHITECTS

OUTBOARD PROFILE
300'-0" x 54'-0" x 28'-0"
RESEARCH VESSEL



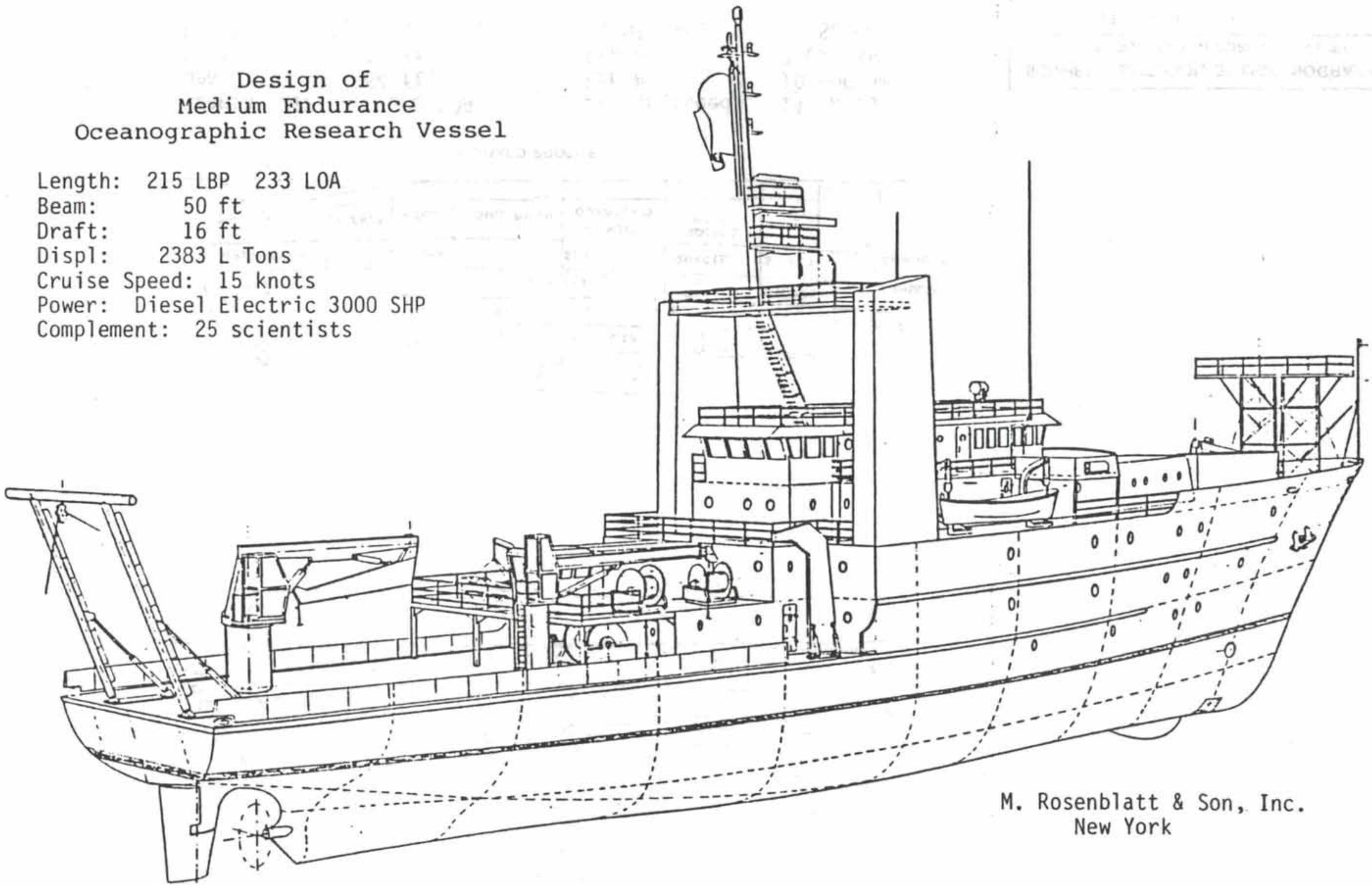
John Gilbert Associates

LARGE GENERAL PURPOSE RESEARCH & GEOPHYSICAL SHIP

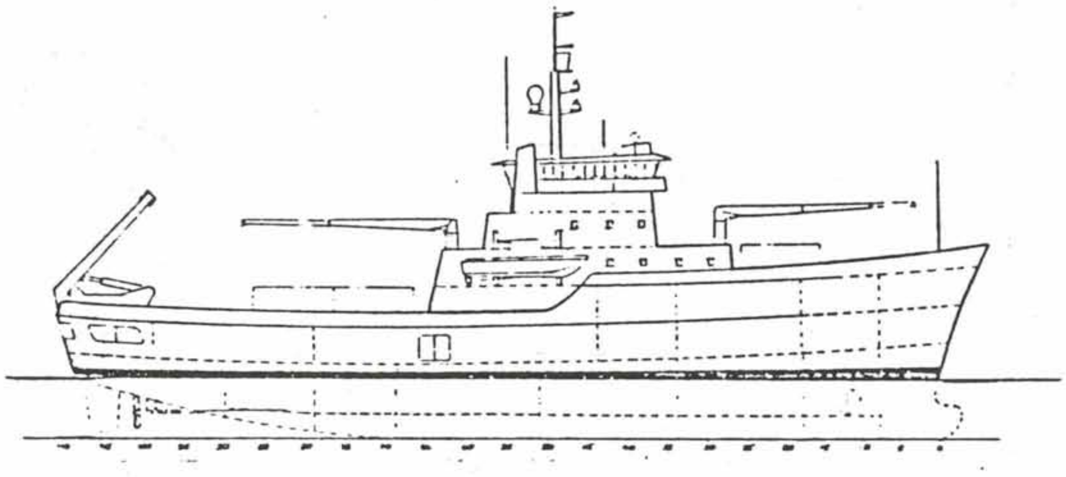
LOA	291 ft.	Disp.	4,997 L Tons
LBP	275 ft.	Cruise.Speed	14.5 knots
Beam	58 ft.	Range	24,000 n.miles
Draft	19 ft.	Power	5,000 SHP

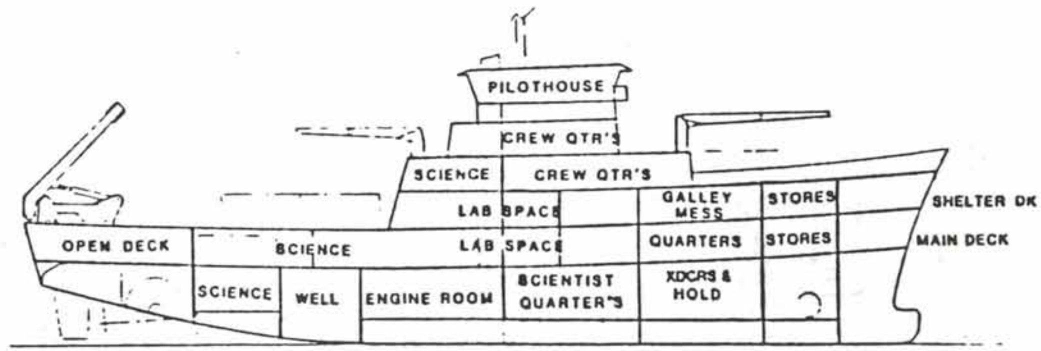
Design of
Medium Endurance
Oceanographic Research Vessel

Length: 215 LBP 233 LOA
Beam: 50 ft
Draft: 16 ft
Displ: 2383 L Tons
Cruise Speed: 15 knots
Power: Diesel Electric 3000 SHP
Complement: 25 scientists



M. Rosenblatt & Son, Inc.
New York





INBOARD PROFILE

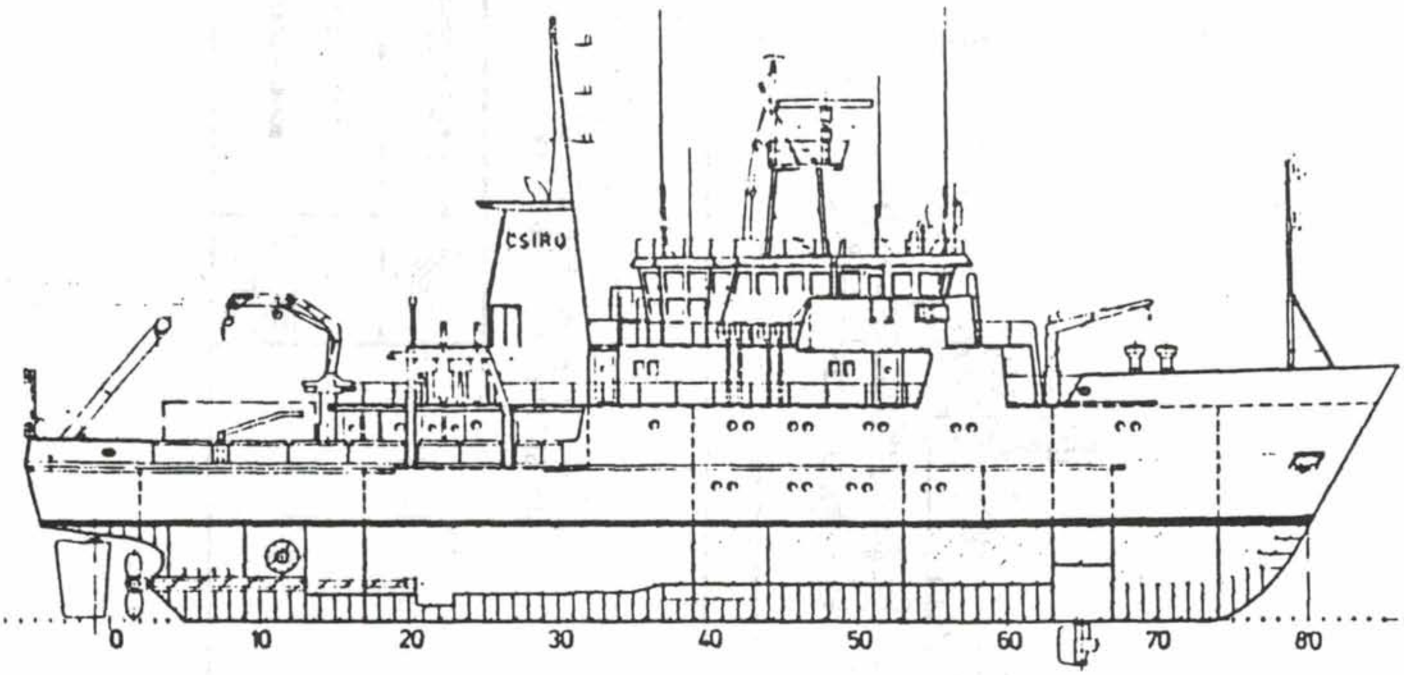
Length	212 LWL 228 LOA	Cruise Speed	14 knots
Beam	64 ft.	Range	10,500 nm
Draft	15 ft.	Power	3,000 SHP
Displ.	2,468 LT	Complement	25 Scientific

SCRIPPS INSTITUTION OF OCEANOGRAPHY
UNIVERSITIY OF CALIFORNIA, SAN DIEGO

212' LWL RESEACH VESSEL
DESIGN CONCEPT- ARRANGEMENTS

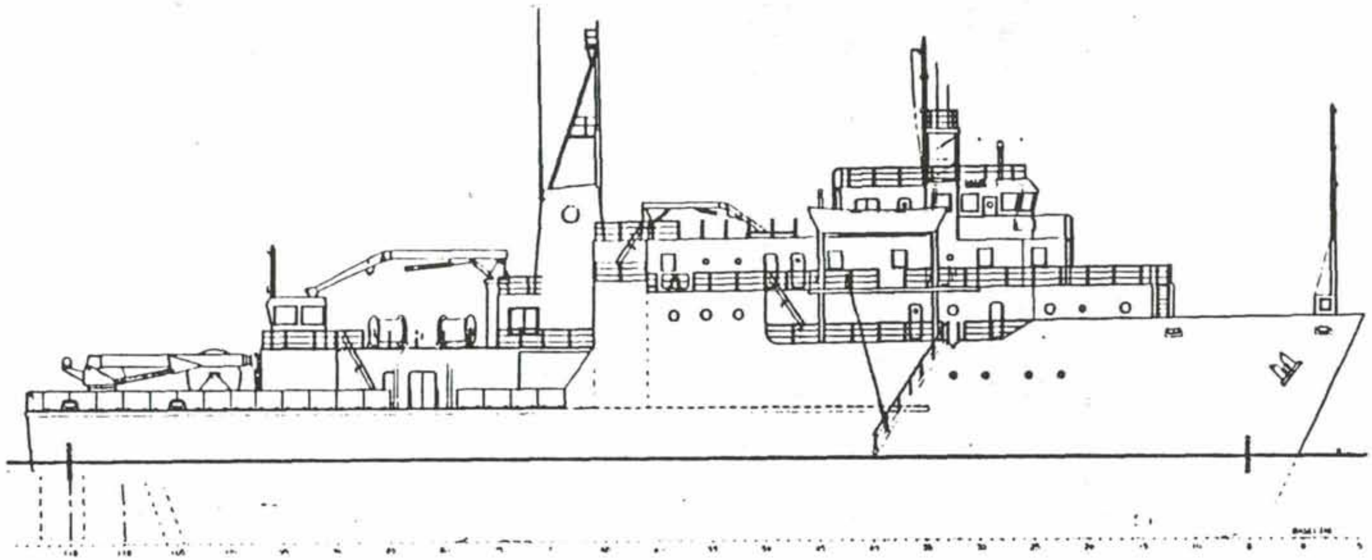
THE GLOSTEN ASSOCIATES, inc.

CA/BLH	NO SCALE	OCT 1985	8534-2 (1 of 2



R/V FRANKLIN (CSIRO, Australia)

Length:	LOA 181 ft.; LBP 159 ft.
Beam:	39 ft.
Draft:	12.5 ft.
Disp.:	
Speed:	13 knots
Power:	Single Screw CP: Diesel 2,100 HP
Complement:	13 Crew; 12 Science

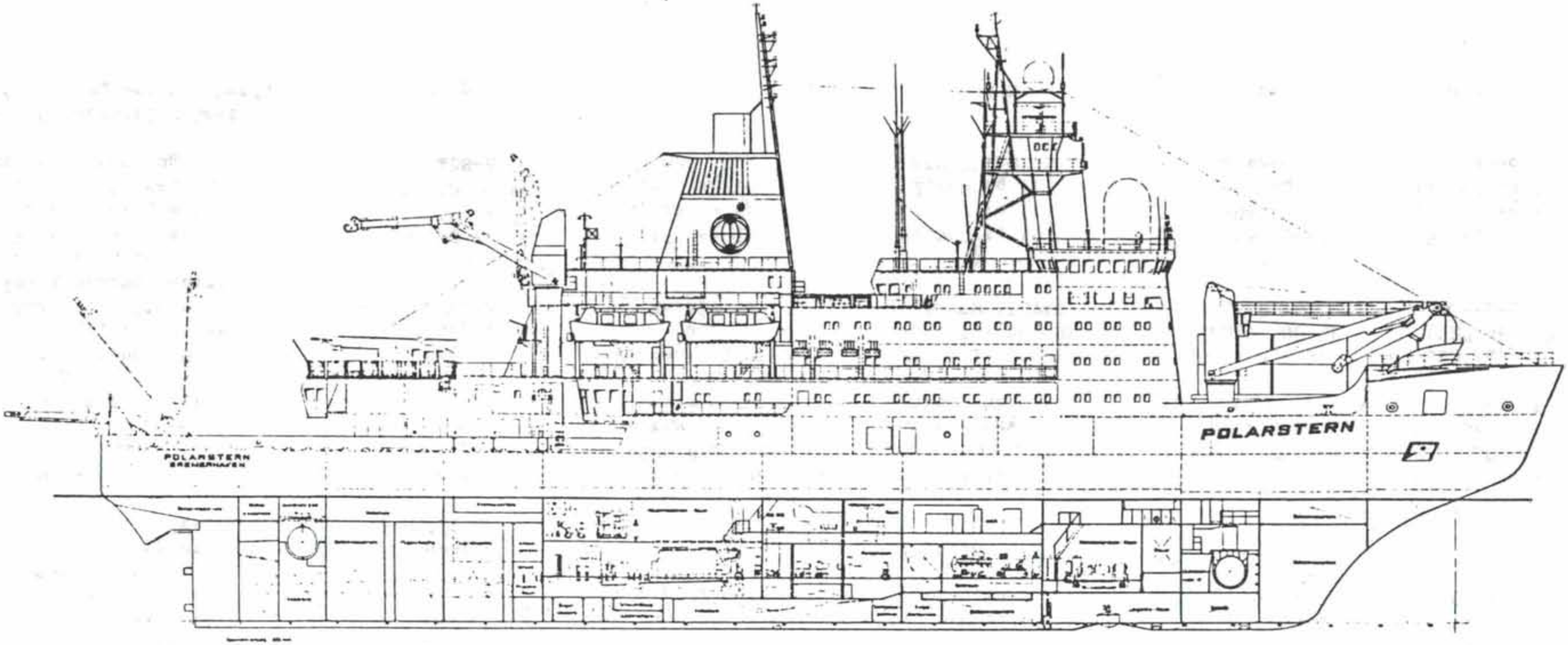


Length: 238 LBP 250 LOA
Beam: 52 ft
Draft: 15 ft.
Displ: 2790 LT
Cruise Speed: 14 knots
Power: Diesel Elec. 3000 SHP
Complement: 28 Scientists
Range: 1500 nm @ Cruise

GENERAL PURPOSE RESEARCH SHIP
with GEOPHYSICS CAPABILITY

MARINETTE MARINE CORPORATION

OUTBOARD PROFILE



R/V POLARSTERN

Length:	LOA 337 ft; LBP 335 ft.
Beam:	82 ft.
Draft:	34.4 ft.
Disp:	approx. 11,000 tons
Speed:	15.5 kts.max. ; 11 kts. econ.
Power:	Twin screw CP; Diesel 4x5000 hp.
Complement:	41 crew; 40 science; 25 passengers

12/20/85

DESIGN COMPARISONS FOR HIGH ENDURANCE SHIPS

	SCIENCE MISSION REQUIREMENTS	NAVSEA AG(X)	J. LEIBY/WHOI	R. LAY ASSOC.	J. GILBERT ASSOC. G&G OPTION
Dimensions:					
Length Overall	n/a	327 ft	310 ft	300 ft	291 ft
Length B.P.	n/a	311 ft	275 ft	273 ft	275 ft
Beam, Max.	n/a	52 ft	68 ft	54 ft	58 ft
Draft, Full Load	n/a	17.7 ft	21 ft	18 ft	19 ft
Freeboard of Work Deck	7-10 ft	7 ft	9′-0"	9.5 ft	6/15 ft
Freeboard of Stern	7-10 ft	7 ft	12′-0"	9.5 ft	6/15 ft
Weights:					
Light Ship Displacement	n/a	2,911 L Tons	3,930 L Tons	1,900 L Tons	unspec
Full Load Displacement	n/a	3,930 L Tons	5,840 L Tons	3,000 L Tons	4,997 L Tons
Fuel & Lube	n/a	779 L Tons	1,040 L Tons	unspec	1,176 L Tons
Science Mission Payload	n/a	454 L Tons	700 L Tons	unspec	unspec
Design Margin	n/a	312 L Tons	720 L Tons	unspec	unspec
Performance:					
Max Speed	unspec	19.3 Knots	18 Knots	unspec	16 Knots
Cruising Speed	15 Knots	15 Knots	15 Knots	14 Knots	14.5 Knots
Range of Cruising	12,000 miles	12,000 miles	12,000 miles	10,000 miles	24,000 miles
Endurance Days	60 days	53 days	60 days	60 days	70 days
Accommodations:					
Crew Size/Staterooms	unspec	25/14	26/26	22/16	
Science Size/Staterooms	30-35/2 per rm	35/20	36/23	33/20	52/32
Machinery:					
Propulsion	unspec	Geared Diesel; 2x 6000 HP; twin screw	Diesel Elec; SCR Drive; twin screw	Geared Diesel; one 4,000 up; single screw	Diesel elec; SCR 2 x 2500 HP "Z" Drive
Shaft Horsepower	unspec	9,500 SHP	6080 SHP	4,000 SHP	5,000 SHP
Thrusters					
Bow, Type & HP	unspec	tunnel; 600 HP	360°; 1,000 HP	360° /800 HP	360°/unspec
Stern, Type & HP	unspec	none	tunnel;1,000 HP	tunnel/800 HP	("Z" Drive)
Aux Elec. Power	unspec	3x1135 KW	1,500KW 600VAC	3x850 KW	unspec
Science Arrangements:					
Number of Labs	5	5	5	7	5
Total Lab Area	4,000 sq ft	4,162 sq ft	7,500 sq ft	5,593 sq ft	5,188 sq ft
Deck Working Area	3,000 sq ft	4,024 sq ft	7,500 sq ft	4,104 sq ft	11,677 sq ft
Science Storage Area	20,000 cu ft	1,979 sq ft	2,200 sq ft	3,876 sq ft	19,700 cu ft
Ice Strengthening:	ABS-B	ABS 1C	ABS Class 1B	unspec	unspec
Est. Construction Cost Excluding Science Outfit:	unspec	unspec	$32.8 M	unspec	unspec

12/ 20/ 85

DESIGN COMPARISONS FOR MEDIUM ENDURANCE SHIPS

	SCIENCE MISSION REQUIREMENTS	(AGOR-3)	L. ROSENBLATT	GLOSTEN ASSOC.	MARINETTE MARINE G&G OPTION
Dimensions:					
Length Overall	n/a	208 Ft	233 Ft	228 Ft	250 Ft
Length B. P.	n/a	196 Ft	215 Ft	212 Ft	238 Ft
Beam	n/a	37 Ft	50 Ft	64 Ft	52 Ft
Draft, Full Load	n/a	14 Ft 3 In	16 Ft	15.2 Ft	15 Ft
Freeboard at Work Deck	6-8 Ft	7 Ft 3 In	8 Ft	12/4 Ft	9 Ft+
at Stern	6-8 Ft	9 Ft	8 Ft	15/6 Ft	9 Ft
Weights:					
Light Ship Displacement	n/a	975 L Tons	1,440 L Tons	1,750 L Tons	1,902 L Tons
Full Load Displacement	n/a	1,350 L Tons	2,383 L Tons	2,469 L Tons	2,790 L Tons
Fuel & Lube	n/a	300 L Tons	527 L Tons	455 L Tons	654 L Tons
Science Mission Payload	n/a	unspec	unspec	242 L Tons	260 L Tons
Design Margin	n/a	None	113 L Tons	292 L Tons	204 L Tons
Performance:					
Max Speed	unspec	1.5 Knots	15.2 Knots	14.6 Knots	15 Knots
Cruising Speed	14 Knots	10 Knots	unspec	14 Knots	14 Knots
Range at Cruising	12,000 Miles	9,000 Miles	unspec	10,540 Miles	13,725 Miles
Endurance Days	50 Days	45 Days	unspec	48 Days	50 Days
Accommodations:					
Crew Size/Staterooms	unspec	21/15	14/8	23/unspec	16/10
Science Size/Staterooms	20-25/2 per room	20/11	25/13	25/unspec	28/15
Machinery:					
Propulsion	unspec	Diesel electric; single screw	Diesel-electric; SCR 3x1050 KW; single screw	Diesel electric; SCR 6x650 HP; twin screw	Diesel-electric; SCR 2x1500 KW
Shaft Horsepower	unspec	1,000 SHP	3,000 SHP	3,000 SHP	2,955 SHP
Thrusters					
Bow, Type & HP	unspec	360° ; 150 HP	360° ; 750 HP	360° ; 720 HP	OMNI; 600 HP
Stern, Type & HP	unspec	None	Tunnel; unspec HP	360° ; 720 HP	None
Aux Elec. Power	unspec	500 KW	600 KW	350 KW	500 KW
Science Arrangements:					
Number of Labs	5	2	4	6	5
Total Lab Area	3,000 Sq Ft	1,170 Sq Ft	2,843 Sq Ft	4,056 Sq Ft	2,700 Sq Ft
Deck Working Area	2,000 Sq Ft	2,005 Sq Ft	3,548 Sq Ft	6,706 Sq Ft	2,960 Sq Ft
Science Storage Area	15,000 Cu Ft	520 Sq Ft	2,613 Sq Ft	2,830 Sq Ft	1,060 Sq Ft
Ice Strengthening:	ABS Class C	No	ABS Class C	unspec	ABS Class C
Est. Construction Cost excluding Science Outfit:	n/a	$4.3 M (1963)	$16-25 M	$17-21 M	$30 M

DESIGN COMPARISONS FOR LARGE SWATH SHIPS

	SCIENCE MISSION REQUIREMENTS	SSS CORP.	BLUE SEA McCLURE	NAVSEA AC(X)	LOCKHEED SEA STAR	R/V KAIYO
Dimensions:						
Length Overall	n/a	247 ft	202 ft	333 ft	246 ft	197 ft
Length Waterline	n/a	218 ft	141 ft/202* ft	246 ft	223 ft	174 ft
Box Length (upper hull)	n/a	218 ft	147 ft	unspec.	246 ft	197 ft
Lower Hull Length	n/a	247 ft	202 ft	333 ft	240.6 ft	197 ft
Beam, Max.	n/a	95 ft	104 ft	82 ft	92 ft	92 ft
Draft, Full Load	n/a	24 ft	26 ft/15 ft*	23 ft	20.7 ft	20.6 ft
Draft, 50% fuel	n/a	19.3 ft	unspec.	unspec.	unspec.	16.4 ft
Hull Spacing, C/L	n/a	77 ft	76.5 ft	66 ft	63 ft	63 ft
Elevations Above DWL:						
Air Gap	n/a	16 ft	15 ft/26 ft*	10 ft	12.5 ft	12.5 ft
Working Deck	n/a	28 ft	15.5 ft/26 ft*	24 ft	25 ft	25 ft
Centerwell Deck	n/a	18 ft	15.5 ft/26 ft*	none	25 ft/15.5 ft	25 ft
Deck Aft	n/a	18 ft	15.5 ft/26 ft*	24 ft	15.5 ft	15.5 ft
Weights:						
Light Ship Displacement	n/a	1,911 L Tons	1,705 L Tons	3,552 L Tons	unspec.	unspec.
Full Load Displacement	n/a	2,489 L Tons	3,220/2,645* L Tons	5,038 L Tons	3,800 L Tons	3,500 L Tons
Fuel & Lube	n/a	485 L Tons	680 L Tons	1,283 L Tons	unspec.	unspec.
Potable Water	n/a	60 L Tons	50 L Tons	unspec.	unspec.	unspec.
Sea Water Ballast	n/a	892 L Tons	1,240 L Tons	none	unspec.	unspec.
Stores/Provisons/Effects	n/a	33.3 L Tons	30 L Tons	42 L Tons	unspec.	unspec.
Science Mission Payload	n/a	336 L Tons	285 L Tons	448 L Tons	409 L Tons	443 L Tons
Growth Margin	unspec.	100 L Tons	90 L Tons	463 L Tons	unspec	unspec.
Performance:						
Max Speed	unspec	16.5 Knots	16* Knots	17.7 Knots	16 Knots	14 Knots
Cruising Speed	15 Knots	15.0 Knots	10/15* Knots	15.0 Knots	12 Knots	12 Knots
Range of Cruising	10,000 miles	11,400 miles	10,000* miles	11,300 miles	8,000 miles	4,600 miles
Endurance Days	45 days	40 days	60 days	53 days	unspec.	unspec.
Accommodations:						
Crew Size/Staterooms	unspec.	25/16	23/15	25/13	23/unspec.	29/unspec.
Science Size/Staterooms	30-35/2 per rm.	35/20	30/16	35/20	35/unspec.	40/unspec.
Machinery:						
Propulsion	unspec.	Diesel-elec; 4-925KW;SCR drive; twin screw	Diesel-elec; 4x 1100KW;SCR drive; twin screw	Geared Diesel 2x 6000 HP; twin screw	Diesel-elec; 4x 1170KW; AC twin screw CPP	Diesel-elec; 4x 860KW; AC twin screw CPP
Shaft Horsepower	n/a	5,027 SHP	6,000 SHP	9,500 SHP	5,628	4,075
Thrusters						
Bow, Type & HP	n/a	360° jet 2x-469 HP	tunnel 1x500 HP	none	tunnel 4x	tunnel 4x unspec.
Stern Type & HP	n/a	none	none	none	tunnel 4x	tunnel 4x unspec.
Aux Elec. Power	n/a	400 KW	unspec.	3 x 1100 KW	unspec.	unspec
Science Arrangements:						
Number of Labs	5	7	8	5	6	n/a
Total Lab Area	4,000 sq ft	4,313 sq ft	4,454 sq ft	3,936 sq ft	4,700 sq ft	n/a
Deck Working Area	4,000 sq ft	12,000 sq ft	5,420 sq ft	5,840 sq ft	10,500 sq ft	n/a
Science Storage Area	20,000 cu ft	2,400 sq ft	2,556 sq ft	2,555 sq ft	903 sq ft	n/a
Centerwell	15x30 ft	15x30 ft	16x30 ft	none	17.5x35 ft	16x16 ft
Ice Strengthening:	none	none	none	unspec.	unspec.	unspec.
Est. Construction Cost Excluding Science:	unspec.	$16,840,000	$17,700,000	unspec.	$31M	$27M

* *Transit mode at 15-ft. Draft*

December 6, 1985

UNOLS SPECIAL FACILITIES COMMITTEE
Report of Meeting of December 5, 1985 at the UCAR Walter Orr Boardroom

Present at the meeting were:

Alan Robinson
Ferris Webster
Curt Collins
Dale Haidvogel
Brian Lewis, Chairman

The committee considered non-traditional facilities that are, or will be, of significant importance to oceanography, and the role UNOLS might play in their situation, management or coordination.

Three major facilities issues were addressed:

1. Multichannel seismic systems,
2. Satellite data and instrumentation, and
3. Supercomputers.

The following conclusions were reached:

1. Multichannel seismic systems are being considered by NORPO under the auspices of JOI and NSF. UNOLS will play a role in the scheduling of UNOLS ships involved in this work, but no immediate action is required by UNOLS.

2. The dissemination and use of satellite data by the oceanographic community is being considered by the Satellite ocean data system working group (SODS WOG) chaired by Dr. Jim Baker under the auspices of JOI, Inc. This group has broad membership and it is not necessary for UNOLS to duplicate its function. However, it is important that UNOLS be kept actively advised of SODS WOG activities, preferably by regular briefings.

   It is felt that the oceanographic community also has adequate participation in the specification of instrumentation to go in satellites: UNOLS would help by lobbying for particular missions.

3. Supercomputing: The committee felt that the oceanographic community is presently poorly represented in terms of defining access to supercomputers, specification of needs, and dissemination of information. It is urgent that something be done and UNOLS could play an important role to alleviate these three deficiencies. The committee recommends that a special UNOLS committee on Oceanographic Access to Supercomputers be established. The mandate of this committee should be to: coordinate and disseminate information to the

oceanographic community on supercomputers, define communication links between oceanographic institutions and supercomputer sites that will meet the needs of oceanographic scientists, identify hardware/software that will allow these needs to be met. To facilitate its work, the committee should have a full-time scientist/employee (preferably located at NCAR) who will execute the recommendations of the committee. If requested, we can suggest members of this committee and the scientist/employee.

CONGRESSIONAL BUDGET SCHEDULE

Action	Prior Law	PL99-177
President submits budget..................	End of Jan.	Early Jan.
CBO rept to Budget Cmtes on fiscal policy and economic priorities..................	April 1	Feb. 15
Committees submit reports and estimates to Budget Committees....................	March 15	Feb. 25
Senate Budget Committee reports budget resolution to floor.....................	April 15	April 1
Congress completes action on budget resolution..............................	May 15	April 15
House Appropriations Committee reports last regular appropriation bill.........	------	June 10
Congress completes action on reconciliation bill..............................	Sept 25	June 15
House completes action on regular appropriation bills..........................	Week after Labor Day	June 30
"Snapshot" of economic indicators, laws affecting spending and revenues, and projected deficit taken by CBO & OMB....	------	Aug 15
CBO and OMB report to GAO on deficit and content of sequester order making automatic spending cuts to meet deficit target................................	------	Aug 20
GAO forwards report to President.........	------	Aug 25
President issues sequester order.........	------	Sept 1
Fiscal year begins.......................	Oct 1	Oct 1
CBO and OMB issue revised reports reflecting additional Congressional action..................................	------	Oct 5
GAO issues revised report to President....	------	Oct 10
Final sequester order becomes effective...	------	Oct 15
GAO issues compliance report on sequester order.................................	------	Nov 15