REPORT OF

MARINE TECHNICIANS MEETING

University of Rhode Island
22-23 January 1975

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1 May 1975

Report of MARINE TECHNICIANS MEETING January 22-23, 1975 University of Rhode Island, Narragansett, R.I.

BACKGROUND OF MEETING

Over the last five or ten years, the role of marine technicians has changed dramatically. This has been caused primarily by the increased sophistication in oceanographic instrumentation, such as STD systems and shipboard computers. As the instrumentation has become more complex, researchers have become more dependent upon the technicians who repair, maintain and operate the data collection and data processing systems. It is the rare scientist these days who is thoroughly familiar with all aspects of the suite of instrumentation on which his data is dependent. More important it is the rare program that supports sufficient technical staff to cover all instrumentation for a seagoing program.

As the instrumentation has become more sophisticated, it has also become more expensive. Only very large programs with an institution can justify the exclusive use or control of some of these instruments and the persons who maintain them. This has lead to a pooling of some kinds of instrumentation. The marine technician often provides the continuity necessary under a pooling arrangement. For some very expensive facilities (for example the Vector Averaging Current Meters) the pooling is sometimes on an inter-institutional basis.

Seagoing technicians have become specialists concentrating in some cases on the instrumentation of an oceanographic discipline such as geological or physical oceanography, or in other cases, concentrating on a single instrument such as an STD. The marine technician is no longer exclusively the water catcher, the winch operator

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or the electronics generalist who fixes everything from the ship's radio to the bathymetric recorder. He is apt to be a computer programmer-operator-maintenance man, and he may even build the interface between the computer and the STD system.

Because of these changes in the role of the marine technician, we are recruiting people with different qualifications than we were a few years back. Once we get good people, we are anxious to keep them. In short, seagoing marine technicians have become an important oceanographic facility. The effective utilization of this facility suggests that we should tak a look at the variety of institutional arrangements that exist for marine technicians.

At the first UNOLS meeting in November, 1971, marine technicians were identified as one of the specialized facilities requiring the early attention of UNOLS. The first annual report of UNOLS in July, 1972, accented the need for trained marine technicians funded separately, and the need for a clear definition of marine technicians. During this time, the Office of Facilities Support of NSF has designated marine technicians as a separate facility. The instructions for ship operations proposals commencing in 1972, specifically excludes marine technicians costs for the first time. Institutions were invited to submit separate proposals to NSF for marine technicians support. ONR has continued to fund marine technicians in proportion to support services provided to ONR researchers. Thus, marine technicians have been recognized by UNOLS, NSF and ONR as an oceanographic facility of some importance, yet no comprehensive definition or overview of marine technicians has been undertaken.

A recommendation of the 1974 UNOLS Meeting was that a special meeting of UNOLS be convened dealing with the subject of marine technicians or university research vessels. Accordingly, a meeting was called and charged with the following purposes:

- *To examine the various institutional structures for marine technicians, which will attempt to define "marine technicians" and to consider the funding alternatives for marine technicians.*

- *To develop a national overview of marine technicians' activities and problems in academic oceanography, and to produce a set of recommendations for the more rational management and utilization of this important oceanographic facility.*

PARTICIPATION

The Meeting was held at the Narragansett Bay Laboratory of the Graduate School of Oceanography of the University of Thode Island which acted as host. Mr. Robert B. Sexton of URI acted as Chairman and R. P. Dinsmore of UNOLS acted as secretary.

The meeting was attended by twenty two participants representing thirteen UNOLS Members and two Federal Agencies. A list of the participants is given in Appendix I.

Prior to the meeting each UNOLS member was invited to prepare and submit written statements of institutional marine technician structure present funding schemes and problems. Collected copies of those statements submitted are attached as Appendix II.

PROCEEDINGS OF THE MEETING

The first phase of the meeting was reports by participating members on their institutional practices. These are summarized as follows. More detailed information is contained in the statements in Appendix II.

Lamont-Doherty Geological Observatory - D.E. Hayes, UNOL Representative

Lamont operates VEMA and CONRAD full time, dedicated primarily to marine geology and geophysics, and to a lesser extent physical/chemical oceanography and marine biology. Each ship carries a complement of 10 full time shipboard technicians in addition to crew and the rotating scientists and technicians involved in special scientific research projects. These 10 resident technicians are involved almost entirely in the continuous acquisition of underway and station geological, geophysical, and oceanographic data. They may be divided in three catogories: (1) electronic technicians to monitor and maintain continuous underway geophysical equipment, (2) computer technicians for operation of the satellite navigation and computer equipment, and (3) instrument/winch technicians responsible for working with overside equipment while on station. (Winch operation is a crew function on THOMPSON; as crews are minimized, additional technician services are needed). In addition, Lamont consider that they require a minimum of two full time technicians ashore - a senior electronics supervisor/technician and a senior data supervisor/computer technician. These back up, recruit, train, and supervise the resident technicians and, ideally, should be supplemented by a shore side pool of technicians to provide for shore-side rotation and vacation.

Out of this minimal staffing of 22 shiprelated technicians, Lamont has been able to get NSF Marine Technician support for 4 shipboard technicians and 1 shore based technician. The remainder of the funding must come from research projects.

Texas A & M, - T.K. Treadwell

TAMU received support for ship operations and technician support from the following sources:

ONR - Project related ship and technician funding

NSF - (a) Project related ship funding
(b) Block (?) funding for technicians for less than half the amount required to support NSF research. (It is not my understanding that this is "block" funding in the same way as OFS equipment funding. If we are to seek equivalent support from other agencies, keyed either to ship days or research dollars, it is no different than the "project related" ship funds.
(c) Technician funding in specific research projects.

Texas A & M Institutional Funds
Block funding for both ship and technicians for student training and research and to support unfunded faculty research.

Other Agencies - Project related ship and technicians funding

Texas A & M's total technician program is presently funded as follows:

a.	NSF block funding	19%
b.	Institutional block funding	10%
c.	Project related agency funding	23%
d.	University direct employment, not project related	18%
e.	Ship's operating budget	0%
f.	Shortfall	30%

The shortfall must be made up by putting additional technicians on the University budget, by specifying additional technician support in new proposals, and by transferring technicians or functions to the ship operation budget.

Woods Hole Oceanographic Institution - Melvin A. Rosenfeld
M.C. Stalcup

Woods Hole has no resident marine technicians; all such support comes from research projects as required by individual investigators or groups of investigations. A typical cruise will consist of 3 to 4 scientists and 15 to 20 supporting personnel. No routine data is taken, only that which is mission oriented. A scientist lacking his own technicians, as a biologist wanting physical oceanographic data, must piggy back on a related cruise engaged in such operations. Historically WHOI assesses each grant for reversing thermometer inventory and calibration.

WHOI has elected to base their NSF Marine Technician proposal on their Shipboard Computer Systems Group - 6 or 7 technicians, a clerk, and a staff engineer - which maintains and operates a central computer system on each of three major vessels and a parallel shore-based computer. They are also responsible for Nav Sat, LORAN, and OMEGA navigations systems; each cruise is manned by one technician to operate and maintain the computer and to provide software support.

WHOI recognize deficiences in their present operation:

a. Excessive sea duty for some specialists.
b. No provision for an investigator needing data for which he has neither equipment nor trained technician in his own group.
c. Limited exchange of technicians among groups and departments.
d. Lack of opportunity to pass on expertise unique to one individual.
e. Certain equipments for which there is no specific organizational responsibility.

There is some consideration being given to establishment of a technical services section.

Scripps Institution of Oceanography - George Shor
James L. Coatsworth

Scripps has many technicians directly employed by and supervised by research investigators. They also have three major technician pools:

Technical Support Division - complementing the Marine Facilities Division at Point Loma, under an Associate Director for Ship Operations and Technical Support

Resident Marine Techs - 5
Equally funded by ONR & NSF
Geophysical Techs - 5
Prorated among users
Shipboard Computer Group - 9
Originally funded as part of ship operational funds. Now proposed to NSF under Marine Technician funding - underfunded, deficiency made up by institutional funds
Underway Data Processing Group - 10
Major support from industrial gift funds

Alpha Helix Program Marine Technicians - 5

NSF funding as National Facility

Data Collection and Processing Group - 26

State supported - some support to other research groups on reimbursable basis. Part of NODC data processing costs included in proposal to NSF

Scripps was bailed out on one occasion by a State of California separate emergency grant of $200,000 to compensate for a shortfall in federal funding for ship operations, but it is unlikely this would be repeated.

Florida State University - George W. Flager

As of the first of the year, NSF withdrew support of the RV/TURSIOPS. Florida is cutting back state support as part of a general austerity program; continued operation is unlikely. Marine Technician requirements have usually been filled by part time employment of graduate students.

Oregon State University - Rod Mesecar

Principal investigators or related groups of investigators employ their own technicians on individual grants. Dr. Mesecar and his supporting engineers and technicians are separately funded by specified collaboration with other investigators in the general ONR proposal and, using this as a base, provide consulting and technical support on a selective basis to other groups. The University has one seagoing scientific technician and two alternating shipboard electronic technicians as part of the ship support program.

University of Hawaii - Richard L. Longfield

There are four groups of marine technicians at the Hawaiian Institute of Geophysics, U of H:

Marine Technicians - Technical Assistance Group - 5 electronic and instrument techs assigned to RV/KANA KEOKI and the same to R/V MOANA WAVE - funded jointly by NSF-OSF and non-NSF research contracts.

Specialists - related to specific systems or equipment - employed on various research contracts and grants.

Shore Support Group - machinist, welders, etc., funded by ship operations.

Instrument Design and Development Group - Responsible for design and construction of marine instrumentation - funded by contracts, grants, and State funds.

University of Washington - Walter C. Sands

University of Washington does not segregate any group as being primarily concerned with ship support, but operates a self-sustaining cost center organized into functional units, providing services on a reimbursible basis to grants, contracts, or ship support. Originally, ship board technical support was identified as the maintenance and operational assistance associated with scientific systems considered as part of the standard equipment of the vessel, including the monthly lease cost of the shipboard IBM 1130 computer. These costs were separately budgeted and maintained as part of the ship's operational budget, as were the salaries of the resident electronic technician (doubling as ships radio officer) and, as required, one or more resident marine technicians. In 1973 and 1974, the resident technician costs were proposed and charged to the NSF-OSF budget on the assumption that these funds were in support of all research agencies, as were the equipment funds. Maintenance of scientific equipments were included as before as part of ship operational funds. We were advised, however, that in 1975 all scientific systems maintenance costs, including computer lease charges, should be deleted from the vessel operational budget. These costs, totalling approximately $80,000, appeared a logical submission for NSF-OFS support; the salary of the resident electronic technician, devoting about 60% of his time to communications operations and maintenance, seemed a logical charge to shipboard operational funds. We were informed, however, that the marine technician OFS funds had to be based around salaries. We therefore resubmitted our proposal, tailoring it to funds available and specifying the full time salary of the resident technician, and allocating the remaining funds, as "other direct costs", to scientific systems maintenance and support. No state funds are available to make up the short fall; needed maintenance costs will have to be made up by charges to research grants and contracts using the vessel or by redefinition of what charges may properly be made to ship operational funds.

Winch operations are provided by crew members, and shipboard instrument maintenance will be provided by the resident electronic technician, but all other shipboard technical support - chemical analyses, computer operation and programming, CTD operators, etc. must be provided by the individual investigators, whether by direct employment or through Technical Services.

Chesapeake Bay Institute, John Hopkins - Harold Sheen

One technician is permanently assigned to RV/RIDGELY WARFIELD to assist scientific parties and maintain shipboard equipment. His costs are recovered as part of vessel use day costs. Shore support is provided by a full time

technician who fabricates supporting buoys, mooring gear, who provides low level instrument maintenance, and who provides small boat operating assistance. A second shore side technician provides data analysis services and data gathering assistance at a professional level. The last two recover their costs by time sheet based charges against research grants and contracts.

University of Rhode Island - Robert Sexton

There are technicians, data processors, computer programmers, and data archivists who are supported by individual research contracts and grants. In addition, there is an institutional pool of eight persons providing support to RV/TRIDENT users. Three specialize in current meter operations, the other five maintain, operate, and repair a pool of instrumentation that includes reversing thermometers, the STD system, the shipboard computer, the seismic profiling system, etc. Each of these have either a degree or other formal background in their field.

There are three sources of funding for this technician pool: NSF-OFS funds, charges to research grants, and - in dire emergency - institutional funds. It appears that shortfalls this year will not permit maintaining the current level of services.

PROCEEDINGS OF THE MEETING (Cont.)

The second phase of the meeting dealt with specific topics of mutual interest and concern. Each of these is summarized as follows:

Definition of "Marine Technician"

There was much agreement on the need for a definition of marine technicians but little concensus on what a specific definition should be.

The NSF instructions for the preparation of proposals requesting support for marine technicians imply a definition as:

> " ... *those technicians whose duties and responsibilities are primarily concerned with the maintenance or operation of the scientific gear and instrumentation necessary for collection, processing and reduction of oceanographic research data.*"

The NSF definition goes on to exclude from NSF Marine Technicians Support (but not necessarily from a definition)

> " *Members of the ship's company and shorebased personnel whose primary responsibilities involve the operation of a ship, rather than the operation or maintenance of scientific equipment aboard ship, should not be included in the 'marine technician' category, nor should technicians normally assigned on a full-time basis to specific research projects.*"

The definition given in (1) above is satisfactory for a broad interpretation and to allow the flexibility needed to apply to the wide variety of institutional practices. It is in fact so broad that under the expressions "processing and reduction of oceanographic data," almost every employee of a laboratory, could be so considered.

The purpose of this meeting is to deal with the NSF Marine Technician Support concept implied in (2) above and for that purpose the term "Marine Technician" used herein is limited to that concept.

> It should be noted, however, that "Marine Technicians" (and their support) are clearly recognized in other elements of marine research beyond the scope of this meeting and its report.

The diverse approaches of various labs to the use of marine technicians requires to some extent, a flexible approach. Areas of communality, which define Marine Technicians are as follows:

- Services of a pooled or shared use nature.
- Services of a seagoing activity or a direct adjunct thereto (such as shop technicians who work directly with seagoing instrumentation).
- Data reduction and processing only as an adjunct activity by technicians who also go to sea to gather data.

Applications of the above would continue to exclude technicians assigned on a full-time basis to specific research projects and narrow the definition by excluding unspecified broad categories of "data processors".

Subject to these interpretations, the definition of Marine Technicians set forth in (1) and (2) above is the most adequate description which can reflect present arrangements.

Current Support of Marine Technicians

Based on reports from members the support of marine technicians presently chiefly stems from the following sources:

(a) From NSF Grants for this Purpose
(b) From ONR Contract awards based on a pro rata ship time determination
(c) From NSF and other agency research grants based on services required and otherwise unfunded
(d) From direct institutional and/or state support or overhead

A profile of the current marine technicians requirements and proposed NSF (OFS) support is given in Table I. It can be seen that UNOLS Members under the NSF guidelines have identified 1975 Marine Technicians costs at about $3.2M of which $1.8M is attributable to NSF projects. It was noted that NSF (OFS) has available to support these requirements about $1.1M. The remaining NSF support must come either from NSF research projects, instituiton overhead or be unaccomplished. The total of $3.2M Marine Technicians Costs represents about 16% of the total ship operations costs of the same institutions ($19.6M for 1975).

The figures shown by Table I further represent the highly diverse practices of various institutions. (The particular abnormality of Scripps Institution is explained in the memo from its Associate Director contained in Appendix II). Nevertheless, it was agreed by all participants that these figures are realistic to be used and generally represent minimum levels.

Requirements for Increased Support

The increasing needs for technicians are described in the introductory section (Background). These were discussed in detail by the participants and included:

(a) Increasing sophistication of equipment being used and the technical services needed for its operation and maintenance.

(b) Multi-disclipinary programs (CUEA, GATE) as well as many newly developing environmental projects now require instrumentation and data needs usually beyond the purview of an individual investigator.

(c) Shared use concepts are often proving to be an effective and economical arrangement. However, the funding for shared use is often outside of individual research projects.

(d) Capital acquisition of expensive long life equipment often outlives the program for which it was procured and becomes a pool of equipment under shared use.

(e) Seagoing computers are proliferating along with shipboard operators.

(f) Visiting investigators on UNOLS ships often require technical services which are not usually included in their own projects.

(g) Data Responsibilities required by agency rules and by foreign clearance obligations, and incident to multi-disclipinary projects often fall to marine technicians shared by the project.

These factors as well as others represent the increasing costs of marine technicians to a fully found seagoing research effort.

Of special significance is Item (d) above which calls for planning in the capital acquisition of long lived equipment to provide for the enduring maintenance and operation of the equipment throughout its life.

Proposed Support for Marine Technicians

On the basis that Mrine Technicians are an adjunct service to research ship use, their support should be predicated on ship usage by the agency or activity sponsoring the ship time. This can be accomplished by a cost center system or a daily rate charge for the technician services or functional group so identified as appropriate for a particular ship.

Research proposals submitted by an investigator should contain a clear statement of marine technician needs. In the past many problems are attributable to the overlooking of this important part. However, many investigators are often not aware that the ship he intends to use may have certain established requirements and fixed charges for the ship he intends to use. This is a reasonable rationale for a fixed daily rate appropriate to the ship.

In the case of NSF which makes block grants for ship costs and marine technicians, the marine technicians grant should reflect the entire support needs determined in this manner. Other agencies which usually include ship time costs as a part of the research contract should include the marine technicians costs as a succinct part.

Determination of the marine technicians daily rate or the cost center rates as should of course be subject to review, negotiation and audit much the same as ship time daily rate cost. Once established it should be applicable in a uniform manner.

In order to achieve the levels of required funding, the National Science Foundation Office for Oceanographic Facilities and Support would require - as indicated in Table I - an additional $0.7M in new funds to be available. A figure of $1.0M is probably more realistic. Assuming that a portion of this already exists within research grants it can be accomplished by internal reallocations within NSF. Past experience, however, has shown that marine technicians are often cut back when during negotiations in research projects - or are altogether forgotten. Consequently, new funds probably are required.

Interim Support Arrangements

Recognizing that the foregoing arrangements cannot be accomplished in a short space of time, positive interim arrangements should be implemented. These include:

(a) A clear statement of requirements for and the costs of marine technicians should be included on all research proposals submitted by institutions.

(b) Funding agencies should recognize that requirements for marine technicians represent a very nearly fixed cost.

(c) Research Grants and Contracts should include marine technicians funding as a specified item so that these amounts can properly be applied to the respective cost centers and functional groups.

(d) Within NSF and until the Oceanographic Facilities Budget can support the full apportionment of NSF related costs, Marine Technicians should be supported by both research project grants and facilities grants on an equitable arrangement developed between the various program managers. Proposals for marine technicians support to NSF should reflect total marine technician needs and the Oceanographic Facilities Support Office should take the lead in coordinating support response.

Institutional Procedures

Based on the reports of the various participants, each institution has devised organizational and administrative methods to match their own particular requirements, facilities and talent available. In some respects this diversity has contributed to the overall problem. There appeared no special advantages, however, in recommending large scale pools of technicians where none now exist or eliminating them where they do exist. In several institutions small functional groups have achieved excellence and should not be disregarded. It is advantageous to exchange views and reflect on other techniques - but there is no obvious one best way.

Continuing interchange among administrative personnel involved in technical support activities and - separately - among the engineers and technicians is desirable. The extent and mechanism of this interchange should be the subject of continuing correspondence.

(b)

(c)

(d)

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MAILING LIST DEVELOPED FROM BROCK MARINE TECHNOLOGY MEETING

Jan. 29, 1975

Dr.

Dr.

Institutional Marine Technician Structure

at the

Scripps Institution of Oceanography

A Statement for the

UNOLS Marine Technician Meeting

22 January 1975

University of Rhode Island

Prepared by

James L. Coatsworth

20 January 1975

SIGNED James L. Coatsworth

As indicated in the URI background statement, the increasing complexity of instruments and the consequent requirement for technicians competent in a number of specialized areas leads to a necessity for a stable technician force and hence stable funding. This stability must bridge gaps in cruise activity, ship activity, and most important of all, investigator activity. It is this latter gap which most strongly argues for a centralized technician pool.

The 1st section following, a statement on the management structure and sources of funding for Marine Technicians, is modified from a proposal for Marine Technician support prepared at Scripps Institution of Oceanography for presentation to The National Science Foundation in July, 1974. A second section addresses current problems for technicians at Scripps. Appendices I) outlines the Scripps management structure for Marine Technicians and II) presents a breakdown of tasks performed by Resident Technicians while in home port, foreign ports and at sea.

A. The Scripps Institution of Oceanography employs a considerable number of technicians to assist its scientific staff in their research and field operations. Many of these are supervised directly by the staff members whose research they aid, and whose grants or contracts provide their salaries, as is the case in the usual university department. A significant proportion, however, work in task groups that provide a particular service or suite of related services to an institution-wide assemblage of users. They are presently organized into two major administrative groupings.

These groups either calibrate and prepare equipment for work at sea, carry out work at sea, or handle marine data, or (more usually) do all three. They include the following:

1) Resident Marine Technicians
2) Geophysical Equipment Technicians
3) Shipboard Computer Group
4) Underway Data Processing Group (navigation; underway geophysical data) of the Geological Data Center
5) Alpha Helix Program Marine Technicians
6) Data Collection and Processing Group (physical and chemical oceanography) of the Marine Life Research Program

The first four groups recently have been merged (along with several other specialized support operations) into a Technical Support Division. This assemblage complements the Marine Facilities Division based at Point Loma that operates the ships; both report to an Associate Director for Ship Operations and Technical Support. Because of the need to rotate personnel between shore and shipboard assignments on a regular basis, each of the six groups normally has both shore based and sea-going duties. Appendix I is a flow chart for all groups including Marine Technicians at Scripps except for individuals who work for specific staff members and who therefore are distributed throughout the institution.

The Resident Marine Technicians, each spend about half of each year at sea on the two major vessels (Melville and Thomas Washington). In addition to standing underway scientific watches as required, they take care of the laboratory equipment that is permanently installed on the ships and instruct oncoming scientists in its use; carry out continuing or

"ancillary programs" that are not of primary interest to the group using the ship at any given time; maintain and issue stocks of small tools and supplies; encode results for computer analysis ashore, and prepare the multitude of cruise reports currently required. Ashore they assist in preparing for cruises, advise on the selection and ordering of sampling equipment, prepare loading plans and supervise installation of scientific gear aboard ship. They maintain the staging area at Marine Facilities (Point Loma) and the surplus equipment warehouse at Scripps, and overhaul geological sampling gear. Finally, they compile, maintain, and distribute the Sample Data Index and collect and report ROSCOP data to NODC. Costs for their support are requested equally from ONR and from NSF.

The Geophysical Equipment Technicians build, maintain, and operate the seismic relfection profiler systems routinely used on R/V Thomas Washington and R/V Melville. The profiler systems are used by all of the marine geologists and most of the geophysicists at SIO when they go to sea; these technicians also maintain the seismic refraction systems used on specialized cruises. Each technician customarily spends about four months per year at sea, operating and maintaining the equipment; the remainder of the time he overhauls, repairs, and builds new equipment ashore. Special or major items of new equipment normally are requested either by principal investigators in individual research grant proposals, or in the institution's ship improvement proposal to NSF, or they may be funded by the University from gift funds. The Office of Naval Research provides support for some cruises in the contracts for work by individual staff members as listed in the Institution's ocean studies contract. The costs of operation and maintenance are prorated between ONR, NSF, and UC-funded research, according to the number of days at sea and the complexity of the geophysical system requested.

The Shipboard Computer Group operates and maintains three IBM 1800 computer installations: one each on Melville and Thomas Washington and a third, ashore, that is used for developing and de-bugging programs for the ship-borne units and for some reduction of data acquired at sea. This group also does programming, on a reimbursable basis, for individual staff projects. Costs of this seagoing computer group originally were charged against ship operating funds. However, starting with fiscal year 1974, and at the request of NSF, the group's budget was separated from ship funding, and charges for the computer use were made on a daily-rate basis, based on the number of days at sea of the ship on which the seagoing computers are installed. UC and ONR research programs pay their own computer use charges. During the present year the University is also covering some of the charges for computer use on NSF-support cruises, because the funding provided for the shipboard computer from the CY 1974 technician grant was inadequate to cover all of the charges.

The Geological Data Center, which includes the Underway Data Processing Group, consists of a group of technicians who receive, process, archive, and distribute the navigational, echo-sounding, magnetic, gravity, and seismic reflection data from our ships. They handle the computer processing of the institutional sample index compiled and maintained by the Resident Technicians. They also transmit data to the National Geophysical and Solar-Terrestrial Data Center of NOAA. During the present year, on a one-time basis, a small part of the funds necessary to transmit accumulated data to NGSDC was obtained from that agency. In addition, the center prepares regional and ocean-wide charts and occasionally provide staff to assist the sea-going technician groups. Major financial support for the Geological Data Center overall comes from gift funds through the Scripps Industrial Associates program. Support of the costs of preparation of the SIO sample index are requested jointly from ONR and NSF.

The Alpha Helix laboratory technicians (administratively housed in the Physiological Research Laboratory) perform duties for the Alpha Helix Program similar to those of the Resident Technicians for the Melville and Thomas Washington described earlier. Their duties place somewhat more emphasis on the operation and maintenance of that vessel's specialized and sophisticated laboratory equipment, and the logistic problems of receiving and trans-shipping delicate equipment and biological samples from or destined for a number of other institutions or agencies. Dr. Walter Garey currently coordinates the Alpha Helix Advisory Committee to develop future programs of work for the ship, a national facility carrying out work almost entirely funded by NSF.

The Data Collection and Processing Group of the Marine Life Research Program was the first-established technician pool at Scripps; it now is concerned primarily with physical, chemical and biological oceanographic work at sea. The principal mission of DCPG is to process the voluminous data of the state-supported CalCOFI program, but in order to even out the work load of the CalCOFI cruises (which are heaviest every three years), DCPG supplies technicians to other research groups throughout the institution, with funding from the beneficiaries. It services water-sampling gear, STD's, reversing thermometers, current meters, nets and similar equipment. DCPG technicians reduce physical oceanographic observations, maintain the institutional archives of such data, and forward copies to NODC. For CY 75, funding for part of the costs of the maintenance and calibration facilities, archiving and data transmittal were requested from NSF.

The total personnel in the above groups number 59, including some administrative staff, plus fractional F.T.E.'s, broken down as follows:

Resident Marine Technicians - 5.
Geophysical Technicians - 5.

Computer Group - 9.
Geological Data Center - 10.
Alpha Helix Program - 5.
D.C.P.G. - 26.

B. A breakdown of tasks performed by Resident Marine Technicians at Scripps is presented in Appendix II. The items listed as tasks performed at sea may serve to emphasize a number of problems which exist at Scripps with reference to "task group" technicians.

Tasks at Sea, 1 through 9, are those for which the Resident has full responsibility. They are not difficult, but they consume time and some are of considerable importance, in particular the various aspects of liaison under task 6.

Tasks listed under item 10 are often difficult and require technician skills. A typical core or dredge station, in deep water, may consume 5 or more hours. Some may extend to 10-12 hours, during all of which an experienced scientist or technician must be in close contact with the ship's force.

A 28 day leg contains 224 working hours, assuming the extended 56-hour week. Subtracting the fixed-time hours estimated for tasks 1-10, 43 hours remain in which to perform the ship-time, station-keeping operations which are primary tasks for the expedition. There is thus, a requirement for overtime beyond the "extended work week", which is the expected norm at sea.

It has already been brought to our attention, in the background paper from URI, that the increased complexity of equipment and techniques employed in research at sea has greatly increased the dependence of researchers on technicians familiar with these complexities.

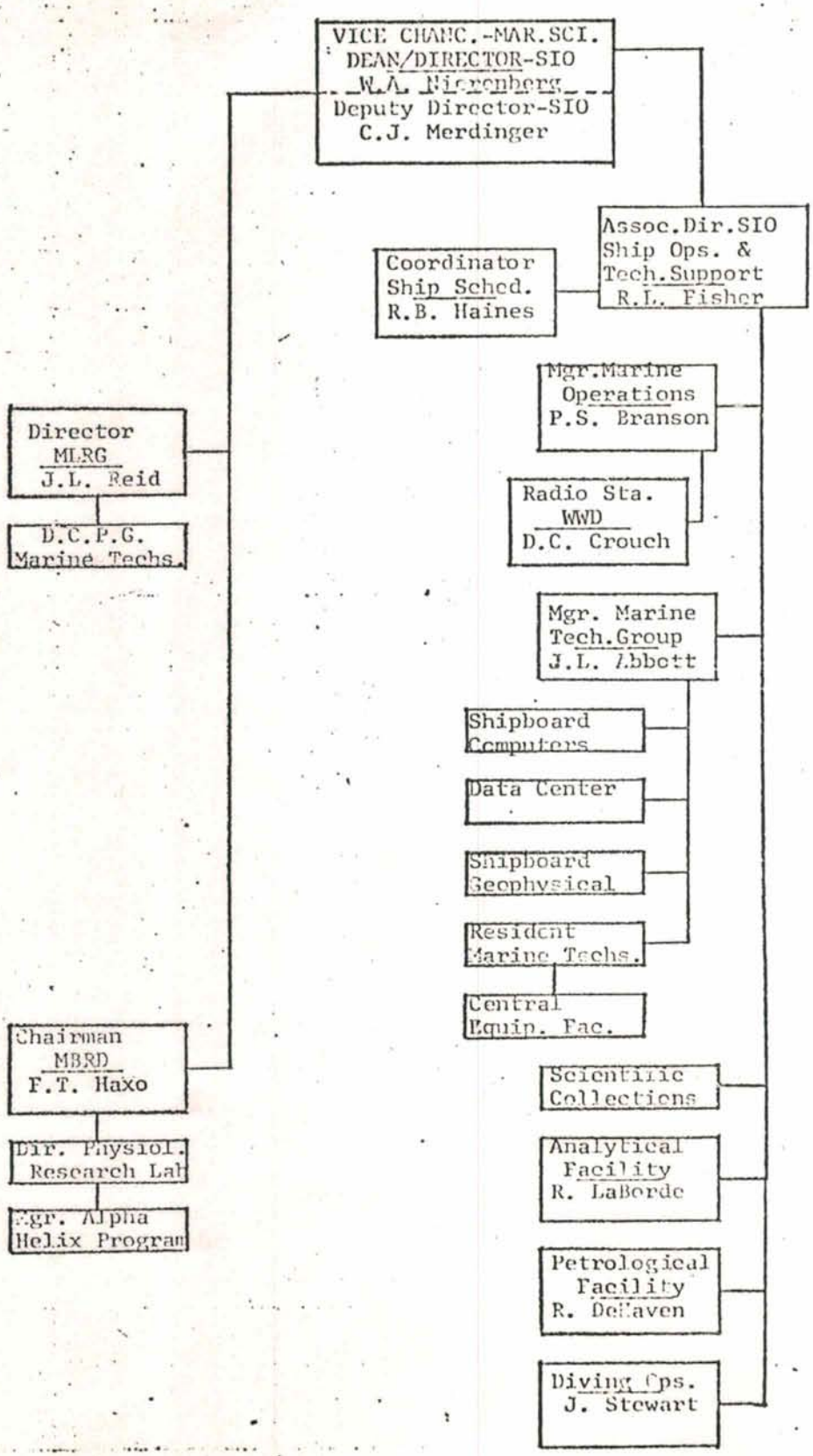
The great expense involved in obtaining "shelf" equipment from commercial sources encourages the Scripps staff to design and fabricate our own hardware - particularly bottom-contact gear, which is most subject to loss and damage. The only place, thus, to become familiar with this equipment is Scripps - which tends to compound the difficulties of recruiting qualified people - one of the two major problems described at URI.

Existing training programs, at schools in California which might provide candidates for technician positions, generally seem to be greatly deficient in most of the skills and background which we have found to be the most necessary at Scripps.

We agree fully with URI that a second major problem is funding arrangements for technicians: 1) to provide an adequate level of staffing to cope with the constantly increasing demands on service and capabilities, and 2) to provide a stable level of funding to allow for maintaining this staff during possible periods of decreased ship activity. It is counter-productive to follow a policy of alternate hiring and firing to provide the desired technical support.

APPENDIX I

SCRIPPS MANAGEMENT STRUCTURE FOR MARINE TECHNICIANS



APPENDIX II

TASKS PERFORMED BY RESIDENT MARINE TECHNICIANS
(in support of a scientific party of (typically) 20-25 and crew of 20-23).

In Port (Foreign):

TASK	% TIME
1. Personnel movements:	
a. Assist debarking scientific party in departure procedures.	25%
b. Receive arriving scientists, assign berths	
c. Receive guests, visitors, press, gov't officials, agents, etc.	
2. Ship preparation for upcoming research operations:	55%
a. Load arriving equipment.	
b. Make lab assignments and allocate space.	
c. Locate equipment and supplies for new arrivals.	
d. Unpack, install, test new equipment.	
e. Assist crew in loading stores.	
3. Interact with ship's agent:	20%
a. Purc hase of new and replacement scientific supplies.	
b. Pack, clear, and ship equipment, data, and samples.	
c. Work closely with locally-recruited fabricators for urgent equipment replacements not available by routine purchase.	

In Home Port: % Time for each task variable depending upon ship operational scheduling.

1. Interact with Expedition Co-ordinator and individual chief scientists involved in multi-disciplinary expeditions.
2. Prepare loading and unloading plans. Direct and facilitate these plans.
3. Prepare, maintain, and test equipment for expedition use.
4. Edit, process, distribute and archive Sample Data Index.
5. Assist Institution staff members in equipment preparation, operation, planning, and execution of local, short-term shipboard programs.

Appendix II, continued.

At Sea: Estimated hours per leg, assuming average 28 day duration.

TASK	HRS./LEG
1. Computer processing u/w data.	30
2. Respond to requests for supplies, equipment, and information.	28
3. Collect, encode, and maintain XBT data.	28
4. Supervise u/w program. a. Train watchstanders in routine programs b. Adjust and calibrate recorders and effect minor repairs to equipment in cooperation with ships' Electronic Technician.	26
5. Deploy u/w gear.	25
6. Liaison between scientific party and ships' force. a. Explain shipboard procedures to new research staff. b. Assist in repair of ship related equipment. c. Fire and boat drill roll call and assignments for scientific party. d. Collect and distribute ships' forms, passports, etc. e. Interact with crew members to provide maximum support to scientific programs.	24
7. Prepare u/w data and scientific samples for return to SIO.	12
8. Process salinity data (ancillary program).	5-10
9. Interact with chief scientist a. Explain his program to others in party not directly involved in this. b. Assist as required.	variable
10. On-deck operations: No estimate of hours. These operations constitute the principal work undertaken during a leg, as opposed to the routine operations listed 1-10 on the preceding page. a. Assist in deployment of all over-side gear. b. Assist senior scientists in dredging, coring, and camera operations. Direct these operations in routine situations. c. Direct or execute trawls, net tows, water sampling, chemical sampling, when these are ancillary programs. d. Assist in hydrographic programs, (rig bottles, read thermometers, computer process data).	

e. Repair sonar pingers and other equipment, (usually, a direct function of rate of use during leg).

f. Assist in explosives handling routines in seismic refraction programs, as back-up "shooter".

g. Assist in preparation, labeling, preservation and storage of sample materials (cores, rocks, water, etc.)

SCRIPPS INSTITUTION OF OCEANOGRAPHY

TO : R. P. Dinsmore, UNOLS Office DATE: January 24, 1975

FROM : George Shor, Associate Director

SUBJECT: Additional comments on Marine Technicians, definition, funding, etc.

As you know, Scripps initiated the first requests for "block funding" certain marine technicians. When we first put our computer centers aboard the major ships, we adopted the simple expedient of listing the computer operators in the ship's crew, and charging for the computer operation through our ship daily rate charges. Subsequently, about the time that we acquired the R/V Washington with a fairly extensive set of permanently installed scientific equipment that belonged with the ship rather than to any separate research group, we put aboard the ship a "Resident Marine Technician" whose duties were to take care of the installed equipment, to take certain routine underway observations that we felt were a moral obligation on the institution in return for the loan of this extensively equipped ship, and to help the chief scientist in any way that he could. When we received the Alpha Helix as a national facility, we had to establish a management group for it, and subsequently found that the very completely outfitted biological laboratory aboard had to have an assigned technician who was familiar with the equipment in order to maintain the gear, aid the visiting investigators in its use, and keep up the laboratory.

I give these historical notes because they have considerable bearing on our proposal for technician support, and the problems that have been created by the present mode of technician funding. The proposal submitted last year by SIO was by far the largest in amount of funding requested of any institution; in fact it requests what turned out to be 1/2 of the total funding available for all institutions. Even so, it was drastically trimmed from the requests that were submitted internally, all of which were easily justifiable under the combination of specific instructions from Mary Johrde (i.e., that the computer and the radio station must be transferred from ship Operations to Technician proposals, and that the Alpha Helix management must be included rather than submitted as a separate proposal as in the past), and of the general definition of a Marine Technician given in the instructions for the proposal.

January 24, 1975

We did not know until this meeting that the amount allocated for each institution under the Marine Tech grant was a flat 7% of the amount allocated for ship support. If we had known that this was to be the case, we would have prepared the proposal very differently, and would have objected to having to include WWD and Alpha Helix management.

Radio station WWD provides essential communications services to the ships of the SIO fleet: in this mode of operation it is no different from the costs incurred by other institutions for commercial radio services, which are generally charged to ship operations. The scientific data traffic handled is almost entirely for the NMFS and Drilling programs, which reimburse us for their share of the costs; the "scientific" traffic for the regular SIO ships is primarily operational in nature, rather than transmission of data. Inclusion of these costs in the Technician budget rather than the ship's operational budget results in a net reduction of the funding available for those purposes for which the Technician grant was established.

The Alpha Helix program, as a national facility, requires administrative costs that are not related to any Scripps research, and as such have properly been funded by a special NSF grant in the past. National Facilities are, by their very nature, more expensive to run than institutional facilities because they require more formal "coordination". The costs of the total Alpha Helix share of the requested Technician grant is about 16% of the cost of operating the ship itself; of this the cost of the actual shipboard technicians comes closer to the across-the-board 7% granted. If we continue support of the Alpha Helix administrative and coordinating work by Garey and his secretary, we are essentially taking money either from the Technician grant to SIO or from SIO in-house funds to support the administration of a national facility. The advantages of having a "National Facility" are few enough already, and if NSF wishes to have such facilities (on the grounds that they save money), some of the money "saved" should be allocated to their support.

The general definition of a Marine Technician given in the call for proposals and as discussed and approved by the group yesterday is far too broad. The trap lies in the inclusion of "data processing" in any way other than as a minor adjunct activity by persons who also go to sea to gather data. This category, even excluding those persons who process data only for a single project, covers nearly all

January 24, 1975

employees of an oceanographic institution, and thereby dissipates the effect of the block funding of marine technicians who are basically supported in order to make the ship operations more effective, not in order to subsidize the individual research activities of scientists who happen to be employed at a ship-operating institution.

George Shor

George Shor

THE FLORIDA STATE UNIVERSITY MARINE LABORATORY

507 PS/A Building
Florida State University

Tallahassee, Fla 32306
904-599-3144

January 14, 1975

MEMORANDUM

TO: UNOLS Members

FROM: George W. Flager, Acting Director

SUBJECT: Marine Technicians

Florida State University is currently operating the R/V TURSIOPS for research and instructional programs of this and other universities within the State system. As of December 31, 1974, NSF withdrew financial support for the operation of the vessel. It is now being funded to a very limited degree by the University with funding beyond June 30, 1975, highly questionable.

The State of Florida is faced with a $128 M shortfall in anticipated revenue which must be pared from the current budget. FSU's portion of this "savings program" is $1 M. This is hardly the most opportune time to pose new programs to the Administration. Therefore, we are attempting to continue operation of the vessel but on a very austere basis.

It has been the practice in the past to employ a Graduate Student on a part time basis to perform functions of Marine Tech. This is usually one who has had previous mechanical and electrical experience and provide him technical training in certain areas, usually by the manufacturer of various equipment.

Occasionally an M. S. Graduate will take the position full time, particularly when he has been advised against continuing to the PhD level. However, the salary of the position is dictated by the State Personnel regulations and is not commensurate with the education, experience, training and personal opinion of the individual concerned. The end result is that after one year on the job, a transfer is affected to another State agency to a position four grades higher in salary, from minimum salary of $8500 to min of $10,400.

The most influencing problems are the physical location of the Marine Lab and low pay scale. The Lab is located in an isolated area 50 mi SW of Tallahassee, no suitable living accommodation exist and negative social life. Young, viable stud type feels he can do better in any other area in a comparable position. It is impossible to increase the pay scale of an individual under the State system unless you increase the scale of all individuals who have a similar classification. Therefore, it is impossible to offer monitary compensation for the unattractive aspects of the position.

Several years ago, we attempted to solve the problem in cooperation with State Rehabilitation officials. In South Florida there is a marine environment oriented school that takes underprivileged but intelligent potential or already deliquent boys of high school age, usually from broken homes, and attempts to retrain them.

Through the efforts of a graduate of FSU Oceanography Dept. affiliated with the school, we agreed to employ one boy whom they considered above average and who had a high degree of potential for further education and training. One of the requirements of the State Rehabilitation Officials is that the boy, if released to a work-study program, must have a suitable home atmosphere in which to reside. The area in proximity to the Marine Lab is more red neck in social standards than South Georgia. Correctional authorities approved home and family we had located who were willing to accept the boy, but he wasn't willing to accept them. After he had moved in, the first guidance he received from foster parents was: 1. Get a haircut (that meant about 10 inches off the sides and back). 2. Enroll in the local high school and 3. No car of your own until you finish high school. Next day the boy packed up and drove back to the correctional school. That put the fini on that program.

UNIVERSITY OF WASHINGTON
SEATTLE, WASHINGTON 98195

Department of Oceanography
Cable Address: UNWADO

MARINE TECHNICIANS MEETING

From our viewpoint at the University of Washington, the problem is seen not as that of obtaining funding for marine technicians, but that of providing instrumentation support as part of our fleet operations.

As shown in the attached summary of our Technical Services operation, commonly used (and therefore unsophisticated) instrumentation is charged to individual research users on a cost recovery basis. Support services of various types are made available on a use charge basis to the various research budgets as requested.

Our fleet operations are conducted in essentially the same manner, although the reality is cloaked by various budgetary approaches peculiar to the individual funding agency. Instrumentation, as part of fleet operations, has been somewhat of an exception to this cost recovery approach. The original suite of instrumentation for RV THOMPSON was provided from outfitting funds received from the Navy. Subsequently, fleet scientific instrumentation has been augmented by grants from NSF. The acquisition costs of this equipment has not been considered a part of the recoverable cost, but rather a unconditional grant from the funding agency.

Originally, the cost of maintaining the fleet instrumentation, as obtained and defined above, by resident (shipboard) technicians, by Technical Services shops, and by outside groups, was considered part of the operational cost of the fleet and recovered from users on a use day recharge. The number of resident technicians varied according to the requirements of the current investigator from a minimum of one to a maximum of three. When NSF originally set up the separate Marine Technician budget, it was our understanding that this became a grant in the same sense as the equipment grant - an NSF contribution to the national oceanographic program.

During this time we began planning and accounting for our fleet instrumentation maintenance cost-including computer lease-by definable categories, as shown on the sample financial status report. In 1975, it had been our understanding that these "Marine Technician" or instrument maintenance costs were expected to be shared by all vessel users, even though separately identified and funded.

We believe the problem is too narrowly defined and unduly restricted by being considered as a matter of supporting individual technicians - the problem is one of supplying and maintaining facilities available to all users, as the vessels themselves.

Section 1

The Department does not have a marine technician group as such. The requirement for technical support of the vessels and their scientific systems is not sufficient to support a group having this function as their basic concern. The basic support functions for the Department, its vessels, their systems, and the individual research projects have been established in a self-supporting cost center--Oceanography Technical Services. This organization is composed of functional units, each individually self-supporting, as follows:

Applied Math -- Programmers and mathematicians

Computer Lab -- A shore based IBM 1130 and ancillary equipment

Cartography and Publications -- Illustrations, slides, photographs

Data Analysis -- Assistance with reduction of field data

Engineering -- Mechanical and electronic engineering services

Electronic Shop -- Repair, maintenance and assembly

Instruments and Equipment -- Maintenance and issue of centrally pooled equipment on a use charge basis

Small Vessels -- KESTREL, TENAS and a Boston Whaler--used by investigators on a use charge basis

Machine Shop -- Fabrication and repair.

Oceanographers -- Professional staff working for a number of investigators

Outside Shop -- HOH/ONAR, small boat, and waterfront maintenance cruise staging

Routine Chem Lab -- Routine analysis of field samples

There is no requirement that these services be used; investigators having need of significant amounts of support may hire their own staff and may contract for specific services elsewhere on or off campus. The staffing level of these units varies, therefore, with the level of services required and satisfactorily performed. The rates charged for their services are set to recover costs, and are monitored to insure that they are no higher than would be the case were they paid directly by a research budget and subject to University overhead.

RV THOMPSON FINANCIAL STATUS

CODE	CATEGORY	BUDGETED AMT	EXPENDED
111	BASE PAY	188,000.00	105,931.11
112	SECURITY WATCH	5,000.00	2,375.00
113	TEMPORARY HELPERS	2,000.00	870.56
110	SUBTOTAL - BASE PAY	195,000.00	109,176.67
121	SEA PREMIUM PAY	22,100.00	12,221.47
122	SEA WEOT & PREMIUM	109,000.00	55,849.37
123	SEA XOT & PREMIUM	32,000.00	20,416.40
124	BASE WEOT	500.00	
125	BASE XOT	500.00	189.32
120	SUBTOTAL - OT & PREMIUM	164,100.00	88,676.56
130	FRINGE BENEFITS	39,510.00	21,464.54
100	SUBTOTALS/SALARIES-WAGES	398,610.00	219,317.77
211	MAINTENANCE-DECK	31,000.00	15,412.52
212	MAINTENANCE-ENGINEERING	66,000.00	32,776.54
213	MAINTENANCE-COMM & ELEX	13,500.00	6,497.57
214	MAINTENANCE-NAVIGATION	4,000.00	1,829.56
215	MAINTENANCE-STEWARD	500.00	
216	MAINTENANCE-SCIENCE	4,500.00	2,774.00
210	SUBTOTAL- MAINTENANCE	119,500.00	59,290.19
221	OVERHAUL - DECK		
222	OVERHAUL - ENGINEER	12,000.00	
223	OVERHAUL - COMM & ELEX	1,500.00	342.02
224	OVERHAUL - NAVIGATION		
225	OVERHAUL - STEWARD		
226	OVERHAUL - SCIENCE		
220	SUBTOTAL - OVERHAUL	13,500.00	342.02
200	SUBTOT-REPAIR,MAINT,ALTS	133,000.00	59,632.21
311	FUEL	110,500.00	42,484.46
312	LUBE	5,000.00	2,430.70
313	MISC	800.00	8.93
310	SUBTOTAL - FUEL&LUBE OIL	116,300.00	44,924.09
320	FOOD	32,000.00	13,555.69
331	INSURANCE - VESSEL		
332	INSURANCE - PERSONNEL		
333	INSURANCE - LIABILITY&PD		
330	SUBTOTAL - INSURANCE	17,000.00	

RV THOMPSON FINANCIAL STATUS

CODE	CATEGORY	BUDGETED AMT	EXPENDED
340	UTILITIES		
351	STORES- DECK	5,000.00	3,398.30
352	STORES- ENGINEER	7,000.00	3,656.03
353	STORES- COMM & ELEX	1,500.00	769.97
354	STORES- NAV.	500.00	108.25
355	STORES- MEDICAL	100.00	153.60
356	STORES- SCIENCE	1,000.00	456.59
350	SUBTOTALS- STORES	15,100.00	8,542.74
360	STEWARD SUPPLIES	2,000.00	675.88
370	TRAVEL & PER DIEM	6,000.00	1,433.37
381	OUTPORT	5,000.00	2,827.53
382	COMMUNICATIONS	3,000.00	2,258.97
383	MORALE & WELFARE	3,000.00	2,297.50
384	MEDICAL SERVICES	500.00	271.40
385	TRUCK	200.00	353.44
386	SHIPS BUSINESS	1,100.00	797.25
337	FREIGHT & EXPRESS	4,400.00	2,307.43
388	DOCKSIDE ASST	1,000.00	1,187.70
389	OTHER MISC	1,800.00	1,392.07
380	SUBTOTAL - MISCELLANEOUS	20,000.00	13,693.29
390	SHORE FACILITIES OPERAT.	16,000.00	12,932.13
501	COMPUTER & CALCULATORS	25,000.00	16,041.25
502	DATA AQUIS. SYSTEM	22,500.00	9,790.02
503	STD/CTD	14,000.00	11,084.13
504	SCI RADAR & RDF	1,500.00	671.68
505	WINCH READOUTS	4,500.00	2,282.15
506	NAVSAT	1,000.00	350.81
507	DEPTH SOUNDERS & RECORD.	3,000.00	2,569.81
508	COND CABLE & SLIPRINGS	15,500.00	7,772.03
509	TV, XBT, & MISC.	2,000.00	903.80
511	UW PUMPING SYSTEM	7,000.00	3,864.49
512	CORING & DREDGING EQUIPT	2,500.00	1,181.60
513	CHEM LAB EQUIPT	750.00	370.65
514	ARRIVAL & DEP. INSPECT	4,000.00	2,029.56
515	ELEX SPARES/TEST EQUIPT.	1,250.00	791.29
516	SCI SYSTEMS ADMIN	2,000.00	935.89
540	SUBTOTAL-SCIENCE SYSTEMS	106,500.00	60,639.16
500	SUBTOTAL-OTHER EXPENSES	388,787.00	156,396.35

RV THOMPSON FINANCIAL STATUS

CODE	CATEGORY	BUDGETED AMT	EXPENDED
601	MAROPS SALARY SHARE	27,000.00	15,325.25
602	MAROPS FRINGE BEN SHARE	4,500.00	2,329.36
600	MAROPS SAL&WAGE SHARE	31,500.00	17,654.61
700	SUBTOTAL-DIRECT COSTS	889,010.00	453,000.94
801	INDIRECT COSTS-TGT PERS	41,554.00	23,472.98
804	INDIRECT COSTS-MAR OPS	13,132.00	7,202.86
800	SUBTOTAL-INDIRECT COSTS	54,686.00	30,675.84
900	TOTAL OPERATING COSTS	948,696.00	483,676.78
AAA	DAYS AT SEA	259.90	
AAB	DAILY COST RATE	3,650.23	

UNIVERSITY OF SOUTHERN CALIFORNIA
ALLAN HANCOCK FOUNDATION
UNIVERSITY PARK
LOS ANGELES, CALIFORNIA 90007

20 Jan 75

TO U.N.O.L.S. MEMBERS

The University of Southern California structures Marine Technicians in a "technical support group" within the Marine Operations. The senior technician, called the Technical Support Supervisor, reports directly to the Marine Superintendent. Manpower and technical help is also supplied by trainees in a cooperative "on the job" Seaman Technician training program with graduates in Oceanographic Technology, Fullerton College.

Funding for Marine Technician support:

N.S.F. Oceanographic Facilities and Support-
Other Facilities and Support Operations

Funding for the Seaman Technician Training program:

Ship operations, other than N.S.F.

Problems,lie with the recognition and job description for shipboard marine technicians, particularly with the Federal government, eg. the Veterans Administration recognizes the U.S.C. training program and G.I. Bill benefits are available, but the V.A. lists the technician in the catagory of Scientific helper.

Details of the Marine Technician structure and training program are available on request.

Paul F. Irving
Manager
Marine Operations

pI/sc

UNOLS MARINE TECHNICIANS MEETING
Kingston, Rhode Island January 22, 1975

Comments on the Oregon State University, School of Oceanography Technical Support Structure.

The Oregon State University, School of Oceanography is based in Corvallis, Oregon, on a campus noted for a strong physical science background. The total university enrollment is 16,000 students with the School of Oceanography offering graduate study to about 110 full time students.

The Oceanography School has four research vessels ranging in size from 180 feet down to 33 feet in length. They are the: R.V. Yaquina, R.V. Cayuse, R.V. Paiute and the R.V. Sacajawea. Statistics on the research vessels can be found later in this report. The marine support facilities are located 60 miles west of Corvallis at Newport, Oregon, just one mile from the Pacific Ocean. Access time to the ocean from Corvallis with a cruise on the R.V. Yaquina is about two hours. This assumes, of course, the cruise equipment is already aboard.

Approximately 55 people (of which 38 hold professorial rank) are on our academic staff and serve as principal investigators. A second group of 75 people form our technical staff. All of these positions require B.S. or advanced degrees and serve to complement the scientific programs of the principal investigators. At least 30 civil service personnel man the ships and marine operations. Another 10 people in this same category serve in the technical shops as machinists or electronic technicians.

Generally speaking, there is not a pool of seagoing technical support people. Our management structure is largely one of "distributed technology", i.e., each investigative group accounts for their own seagoing needs.

Funds for all technical support personnel are provided for and directed by principal investigators on individual grants.

The exception is one identifiable seagoing "scientific" technician provided for by our ship support program. This person is available to help on any type of cruise. He also serves as an aid to those scientists from other universities using the research vessels. Ship operations also classifies two alternating shipboard electronics technicians as part of the seagoing technician complement. Their prime objectives are to maintain the permanent scientific shipboard electronics equipment, i.e., depth recorders, salinographs radio equipment, radars, etc. All equipment taken aboard by the scientific party is maintained by their own group.

The largest "classic" technician group is maintained by the Geophysics branch. They have three to four engineer/technicians on their staff dedicated to maintaining a wide variety of geophysics research equipment

Most research groups function with a capable "jack-of-all-trades" party chief and supplement the work force with our own students or students from a near-by community college with a program in marine technology. Having your own technical support staff responsive to your immediate needs is good. Any type of responsive action is rarely achieved with personnel pools without unique managements. There are disadvantages to the current distributed technology management but it is difficult to envision a better system under the specific program funding (as contrasted to block funding) now vogue with the funding agencies.

Oregon State University, School of Oceanography

RESEARCH VESSEL DESCRIPTIONS

R/V YAQUINA, a deep-sea vessel, is equipped to carry out all types of marine research. At sea about 70% of the time, YAQUINA is usually on cruises lasting up to 30 days; however, occasionally she sails on extended cruises.

YAQUINA is equipped with three large electric winches for lowering equipment into the ocean. The deep-sea coring winch has almost six miles of 1/2-inch wire rope for coring operations and for lowering heavy dredges to collect geological and biological material from the deep ocean floor. The 3/16-inch wire on the hydrographic winch is used only for light-weight gear. This winch is used mainly for bringing up water samples from as deep as 30,000 feet. The trawl winch, with 3/8-inch wire, is used to tow nets and recording instruments from the stern of the ship.

Quarters are provided for 19 crew members and for 17 scientists. In addition, eight oceanographic laboratories are available to the scientists for sample and data processing.

STATISTICS

Length:	180 feet
Tonnage:	900 tons displacement
Speed:	12 knots
Range:	6,500 miles
Main Engines:	Two 500 h.p. GM 6-278A

R/V CAYUSE is well equipped. She is designed for research in the area of the continental shelf and slope off the Pacific Northwest coast, and she fills the gap between the 180-foot deep-sea vessel YAQUINA and the 33-foot coastal water vessel PAIUTE. From home port in Newport, CAYUSE sails on cruises ranging from 1 to 60 days.

Part of the time CAYUSE is used for coastal oceanography and marine fisheries research under the Sea Grant College program. Oceanographic technicians from other institutions in Oregon are trained on this vessel as a part of the Sea Grant program.

CAYUSE has a hydrographic winch with over a mile of 3/16-inch wire rope and a deep-sea winch with 3/8-inch wire designed for obtaining samples with dredges, trawls, nets, coring tubes and water samplers down to depths of approximately 4 miles. The main boom has a capacity of 3 tons for work with the deep-sea winch. An auxiliary boom has a one and a half ton capacity and is used to handle ship supplies and scientific equipment.

There are quarters for seven crew members and for eight scientists, plus a wet laboratory.

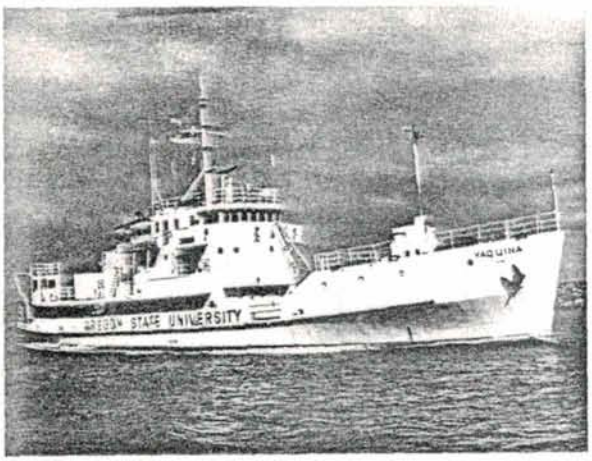
STATISTICS

Length:	80 feet
Tonnage:	173 long tons displacement
Speed:	10 knots
Range:	4,500 miles
Engine:	380 h.p. Caterpiller D 353

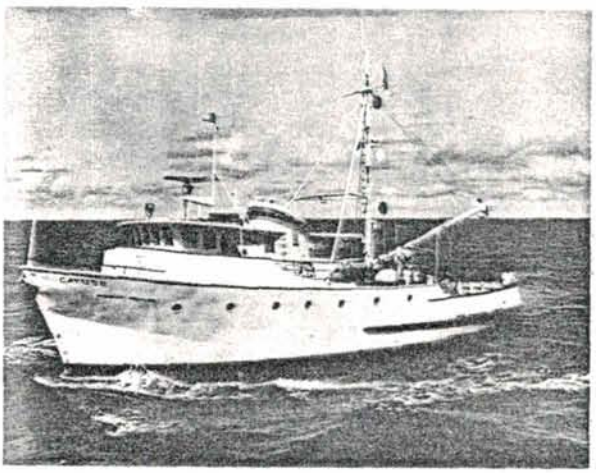
R/V PAIUTE, a 33-foot boat of sport-fishing design, is used for estuarine and coastal work. Essentially a coastal day boat to be operated within 25 miles of Newport, this vessel is used for research projects in the bay and along the coast. It is also used for testing equipment and for investigating potential sites for scientific instrument installations.

PAIUTE has been used extensively to aid YAQUINA in stationing oceanographic instrument buoys. Training students to work at sea and to carry out nearshore research is part of the schedule for PAIUTE in conjunction with the Sea Grant College program.

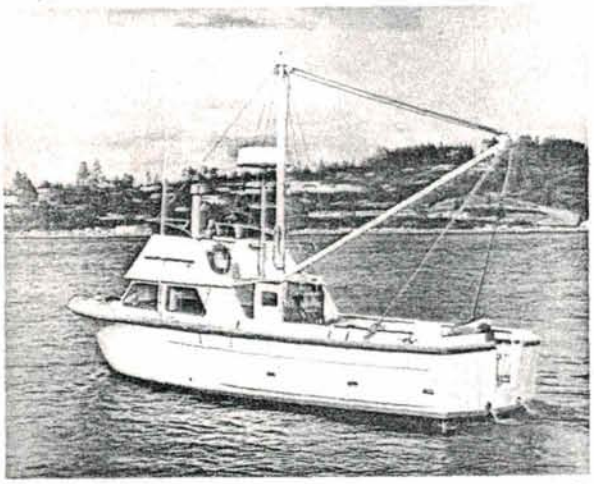
R/V SACAJAWEA is based in Astoria, Oregon. She is a 37-foot aluminum boat and capable of sufficient speed to permit a day's sampling at a maximum number of stations located in the Columbia River. The vessel is used for radio-ecological studies in the Columbia estuary, the upper river, and the ocean, for measuring sea and swell conditions at the Columbia River mouth, for collecting biological samples near shore, and for studying thermal and chemical pollution along the Oregon coast. SACAJAWEA is used extensively in training Marine Technicians enrolled in that program at Clatsop Community College, near Astoria. SACAJAWEA is powered by a M440 Chrysler engine, capable of 20 knots. Equipment aboard includes a radiotelephone, depth finder, and two pilot stations.



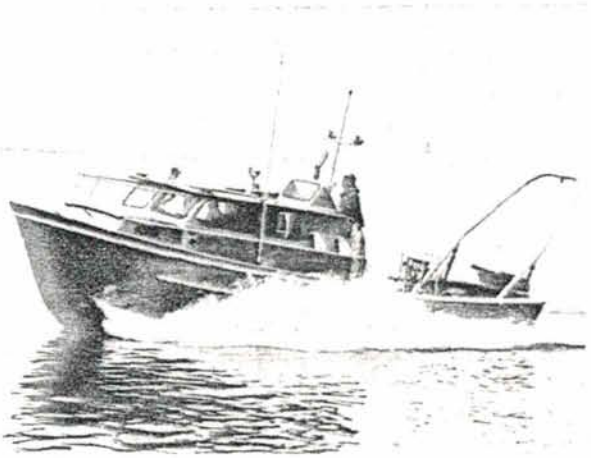
R/V YAQUINA has been operated as an Oceanography research vessel since September 1964.



Commissioned in the spring of 1968, R/V CAYUSE was built for Oceanographic research at Oregon State University.



R/V PAIUTE was built for Oceanographic research and instruction in 1966.



R/V SACAJAWEA was built in 1970 for use in research and instruction.

UNIVERSITY OF RHODE ISLAND

Graduate School of Oceanography

Working Paper for UNOLS Marine Technician Meeting, 22/23 January 1975

I. URI's Working Definition of Marine Technicians

At URI the term "marine technician" is used to designate that pool of persons which provides technical assistance to researchers who use our vessel TRIDENT. Presently, it includes three technicians who work mostly on current meter preparation, deployment and recovery and five persons who support our geological, biological, physical and chemical cruises.

It does not include other cruise-related service personnel such as data processors, computer programmers, or data archivists. Nor does it include individuals who work for a specific research grant.

II. Marine Technicians Organizational Structure at URI

The basis of our marine technician system is that we maintain an institutional pool of eight persons who provide technical support services to TRIDENT users. Three of the eight technicians specialize in current meter operations and the other five maintain, operate and repair a pool of instrumentation that includes reversing thermometers, the STD system, the shipboard computer, the seismic profiling system, etc.

Each of these groups has a supervisor who reports to the Director of Scientific Services. He, in turn, reports directly to the Dean of the Graduate School of Oceanography.

Both of the supervisors, the senior marine technician and an electronic engineer, go considerably beyond providing routine logistical and repair support. They have designed and built various electronic interfaces for our computer and STD system. They have played a major role in specifying and selecting our seismic profiling system, and they have designed, built, and tested other sensors.

The senior marine technician is a member of our ship committee which schedules and sets policy for the TRIDENT operation.

Seven of the eight technicians have a formal background in electronics and the remaining person has a degree in biology or chemistry. Each technician is expected to be proficient in a number of routine data collecting techniques; in addition, he has a specialty such as the operations, maintenance, repair and programming of the shipboard computer or the operation, maintenance, and repair of the seismic profiling system.

III. Service Performed by URI Marine Technicians

We have found it useful not to rigidly define all the services that the marine technician will perform. We feel that remaining flexible and responsive is a necessary quality for a technical support group. This philosophy is, perhaps, a bit idealistic because it has the effect of continually overtaxing our facilities.

In general, the marine technicians become involved in a cruise during the scheduling process. The senior marine technician's input on the availabilities of equipment and personnel is an important factor in scheduling the ship. Once the ship is scheduled, the marine technicians are responsible for providing the equipment from the institutional pool. They will insure the equipment is in good working order and installed aboard the ship and the necessary spare parts and supplies are available. During the cruise, they assist in the operations of the data collection devices, repairing and maintaining them as needed.

IV. Present Funding of Marine Technicians

At present we have three sources of funding for our marine technicians:

a) NSF/OFS

b) Research grants

c) Institutional funds

The first two are generally insufficient to cover our costs and, therefore, unreimbursed institutional funds have been used on an emergency basis. As time goes on, it gets progressively more difficult to justify these institutional funds to support federally sponsored research projects. We have never declined to schedule a cruise on the basis of lack of funding for marine technicians.

Until a few years ago, our major funding was from ONR; only token amounts came from NSF through research grants. None of our marine technician support has ever been included in our ship operations budget. As a result of the ONR cutback, we devised a system for associating costs with individual cruises and research grants. The theory was that each principal investigator would write these costs into his budget - if funding was granted, monies would be transferred to the marine technician account.

At about this time, NSF/OFS began accepting proposals for marine technician funding. We reasoned that we could reduce our rates to individual grants by the

amount of the NSF/OFS contribution. The system has not worked. Among the complications in monitoring such a scheme are the following factors:

a) Timing. When a research proposal which includes use of the ship is prepared, we may not know the extent of the NSF/OFS contribution and can not, therefore, set an appropriate rate. The situation is further complicated by the fact that our NSF and ONR funding periods are different.

b) Changes in the schedule. As the ship schedule is changed throughout the year, a cruise may be lengthened without additional funds being provided for marine technicians.

c) Visiting scientists. A cruise may be scheduled by an investigator from another institution who has not provided for these costs.

d) Some NSF program directors apparently believe that these costs are being covered by NSF/OFS and so have not provided for these costs in their budgets.

The system we devised contained two types of costs:

a) A salary cost for marine technician (including overhead, fringe, and overtime). Records show that we spend about one day ashore in cruise preparation for every marine technician manday at sea. Since using days at sea is compatible with our system of keeping records on ship utilization, we have used that as a base for our calculations. Our current rate is about $137.00/manday at sea.

b) Our second charge is designed to cover the annual cost of supplies, repair and maintenance of equipment from the institutional pool. To arrive at this rate, we divide the anticipated cost by days at sea. The resulting charge is an average cost. We use this system rather than an actual cost for each cruise because of the difficulty in calculating the actual cost; i.e., who should pay for repairing or overhauling the magnetometer, the echo sounder, or the XBT system? This system has worked well for our ONR supported researchers; it has not worked for the vast majority of our cruises, which are NSF supported (for 1975, 164 days are for NSF and 9 days for ONR). We have very little experience with other funding agencies.

V. Problems Associated with Marine Technicians

In preparation for this meeting, we have identified three major problem areas associated with marine technicians:

a) Funding and the assignment of costs. This is our greatest problem. Our anticipated costs for 1975 are about $206,000. About 30% of this has been received from NSF/OFS; the amount we will receive from individual research grants is still in question since some proposals are still under review - I would guess it will amount to between 30-40%. This will leave us with a deficit of 30-40% (60 -80 thousand dollars). Since institutional funds are particularly scarce this year, we have little choice but to reduce our services.

b) Recruitment of qualified technicians. The average tenure of our marine technicians other than supervisory personnel is about two years. Since it takes about a year to fully train an individual, we get only one year of his productivity before we must find a replacement. Some factors affecting the recruitment and high turn-over rate are:

   1) Capable people who are willing to spend 5 to 6 months per year at sea are hard to find. As the equipment gets more sophisticated, so must the technician.

   2) We have virtually no mechanism for offering career incentives to our marine technicians. Ambitious, imaginative people soon recognize this fact. Attempts have been made to find other positions for good people when they tire of going to sea; we have been marginally successful at this.

c) Lack of a mechanism for sharing information. There is a need, both on the administrative and nuts and bolts level, for a mechanism by which marine technicians can share information. We feel that the formation of a group comparable to R.V.O.C. would serve some useful purposes. Among these might be:

   1) Sharing technical information

2) Personnel recruitment and career advancement
3) Sharing of specialized equipment or personnel
4) Compilation of comparative statistics on utilization and costs
5) Exchange of computer programs

ORGANIZATIONAL STRUCTURE, ACTIVITIES AND FUNDING MECHANISMS CONCERNING THE MARINE TECHNICIAN GROUPS AT THE HAWAII INSTITUTE OF GEOPHYSICS UNIVERSITY OF HAWAII

1. Total Concept

On a total concept basis there are four groups of marine technicians at the University of Hawaii. One group consists of personnel assigned to specific vessels and charged with duties and responsibilities relating directly to the operation and maintenance of shipboard scientific instrumentation, systems and equipment, primarily systems electronics and general deck operations. This group, funded jointly by NSF-OFS and non-NSF research contracts, is designated as the Technical Assistance Group (marine technicians in the traditional sense) and is available as required to assist scientific parties for all cruises.

A second group, composed of specialists, is supported directly by individual scientific contracts, grants or State funds and concentrates on specific equipment and systems such as gravimeters, shipboard computers, O.B.S. systems, bathymetry navigation, etc., at sea and assists with data reduction and analysis when ashore.

The third group, designed as the Shore Support Group, funded under ship operations as marine operations staff, has support duties and responsibilities associated with both the maintenance and operation of ships, and the design, construction and maintenance of heavy oceanographic equipment such as winches, cranes, etc.

The fourth group, consisting of shore-based personnel and supported by scientific contracts and grants and State funds, is designated as the Instrument Design and Development Group. This group consists of electronics and instrumentation technicians, machinists, an instrument maker and an electronics engineer. Their duties and responsibilities are primarily the design and construction of marine instrumentation.

2. Structure

a. Marine Technicians - Technical Assistance Group

The marine technicians which compose the Technical Assistance Group report directly to the chief scientist while at sea. When ashore they report to the Marine Superintendent through their respective lead electronics or instrumentation technician. Lead technicians act as department supervisors for the maintenance of shipboard scientific inventories and systems and equipment maintenance.

The HIG Scientific Coordinator for marine operations coordinates with the Marine Superintendent regarding overall cruise requirements, including the classification of marine technicians needed for each leg of individual cruises.

b. Specialists

These technicians specializing on specific systems or equipment report to the chief scientist at sea and individual principal investigators or project task leaders for data reduction and analysis activities ashore. They are normally associated with specific scientific contracts and grants.

c. Shore Support Group

These technicians report directly to the Marine Superintendent. Their services to vessel maintenance and heavy oceanographic equipment design, construction, and maintenance are coordinated by the Marine Superintendent with vessel masters, principal investigators, or the HIG Scientific Coordinator as appropriate.

d. Instrument Design and Development Group

This group, which includes personnel assigned to the HIG Machine Shop, Prototype Laboratory and Electronic Shop, are funded by science contracts and grants and State funds and report to their respective facility supervisors. Instrumentation and systems design and construction requirements are coordinated by facility supervisors and individual principal investigators.

3. Present Funding Mechanisms and Problems

As stated above, funds for HIG marine technician activities are derived from NSF-OFS, individual scientific contracts and grants, and State funds earmarked for ship operations. Funding for technical personnel funded under contracts and grants other than OFS has, as we all know, been somewhat less than adequate in recent years. At HIG we have been able to maintain viable soft-money technical support generally by imposing exceedingly heavy work loads on these personnel. Under the present funding climate we expect to maintain our current level of activity.

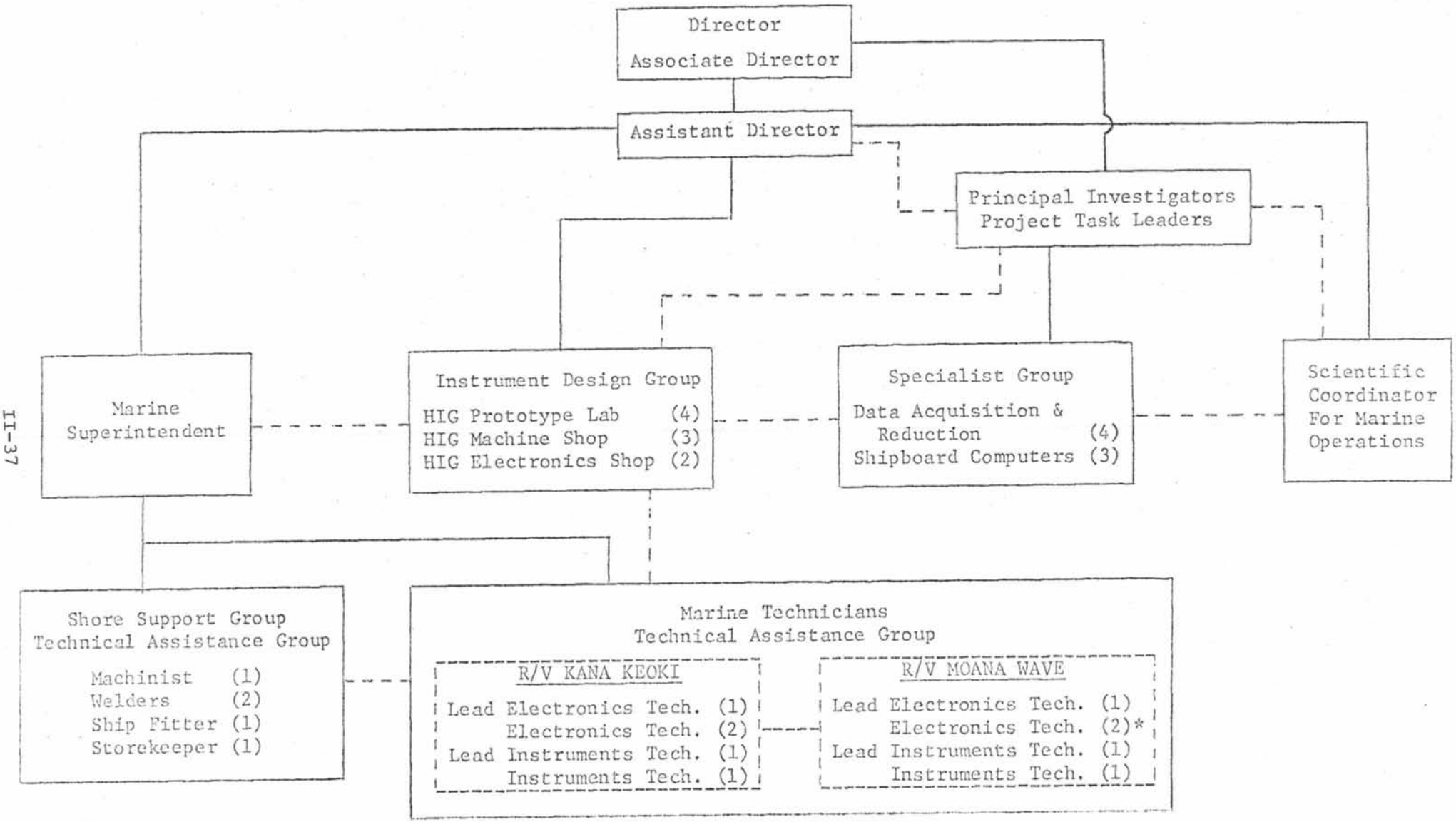
Of the 31 technical personnel associated with marine activities at HIG, 5.5 are State funded. An increase in such personnel would of course contribute much to the alleviation of the funding problems presently being encountered, however, hard-money State technical positions have been frozen within the University in recent years. This situation is not expected to change substantially, at least in the short-term future.

Marine technician funding provided by NSF-OFS each year has been at a level which necessitates subsidizing this activity with State funds allocated to HIG for ship operations at a level ranging from 40 to 60 thousand dollars in direct costs annually. This is not only a result of a shortage of funds for distribution at the OFS level, but also because of a lack of available funds from individual non-NSF contracts and grants, which require marine technician services at sea on a fair-share basis. This situation, as in the case of NSF-OFS marine technician funding, is not a case of neglect, but a result of the overall lack of funding available for research from all sources. With costs increasing in almost every category, financial obligations are met on a basis of highest priority and previous commitments.

Because marine technicians are considered by HIG to be an important, and indeed mandatory, oceanographic facility, the allocation of HIG State funds will be continued in support of this facility as necessary. The problem here of course is the growing demand for the services of these personnel, along with the increase in the types and complexity of oceanographic equipment and systems and is already dictating the need for additional marine technician personnel, both in number, because of unavoidable specialization, and in quality, because of increased responsibilities.

State funds available to HIG for ship operational support were cut 40% in 1973 and are expected to continue at their present level for the next fiscal year. Level State funding for ship operations is a constraint to the required expansion of the HIG marine technician facility in view of other priorities. Therefore, if additional Federal funding does not become available to support these activities, the corresponding decrease in data acquisition efficiency will ultimately cost a great deal more in terms of program effectiveness than increased operational support to institutions.

ORGANIZATIONAL STRUCTURE OF MARINE
TECHNICIAN RESOURCES AT HIG



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BASICS OF SHIP AND TECHNICIAN SUPPORT AT TEXAS A&M

Ship operations and technicians are considered by most funding sources to be a service function which must be directly related to accomplishing agency-supported research.

ONR provides directly-related ship and technician funding for specific projects -- no block funding.

NSF provides directly related ship funding for specific NSF science projects. They also MAY provide an uncertain amount of ship funding for non-NSF research, but this is far from certain.

NSF also provides block funding for technicians for less than half of that needed for NSF research. Present NSF policy is that the individual science projects should provide the remainder of the technician funding.

NSF science grants sometimes include funds for technicians related to the specific research.

There is a relevant internal problem within NSF. The Office of Facilities Support (which provides all our NSF ship funds, and much of our NSF technicians funds) belives that the science support groups should help carry more of the funding load. The science support groups, however, are often reluctant to provide technician funds, saying that it is the job of the Facilities Support Office. The universities are caught in the middle.

TAMU provides block funding for both ship and technicians for student training and research, and to support unfunded, "seed corn" faculty research ship and technician needs.

Other agencies, such as BLM, provide ship and technician support only as required to carry out their specifically funded research.

EVOLUTIONARY STATUS: We are still in the throes of an evolutionary change in the Federal government, wherein the Navy's role in academic oceanography is decreasing drastically, and that of NSF and other agencies building up. Navy, however, has been dropping faster than others are building; there is a funding gap. This has a particular impact at TAMU; which until about three years ago was largely Navy-supported. Our shift to a broader base of research, ship, and technician support is progressing, but there is still a lag in replacing Navy programs with others.

SOURCES AND MIX OF TECHNICIAN SUPPORT: There are only four obvious sources of support for technicains:
(a) Block funding from NSF or other agency, or by the university;
(b) Support from an agency directly tied to a piece of scientific work;
(c) Support of technicians through the university payroll, not directly tied to any specific science project;
(d) Support of persons doing technician or quasi-technician work as part of the ship's budget, either as crew members or as part of the shore staff.

TAMU now has, of its general technician group, about the following ratio of support from these sources:

(a) -- 29% (2/3 from NSF, 1/3 from university)
(b) -- 23%
(c) -- 18%
(d) -- 0%

The fact that these add up to only 70% reflects a funding shortfall for the current CY, due to both ONR and NSF support being below anticipated levels. We are working to overcome this deficit in several ways: First, by trying to place additional technicians on the university payroll. Second, to increase the amount of support given by science grants and contracts, as new or renewal proposals are generated by our staff. Third, to identify personnel now called technicians who are doing largely ship's crew work, or shore support staff work, and transfer them to the ship operations payroll. It is believed that a realistic solution to the probelm must incorporate action in all the funding source areas, not any single one.

The philosophical considerations of technician support are not simple ones. Being a support service, they suffer from the shortcomings common to this category -- no one wants to pay for the janitor, the draftsman, or the technician out of his "science" money. Yet these are all recognized to be necessary to the science being done at all, so is clearly the science source which must pay. The question is how to handle the paperwork.

It may be that a "mix" of funding sources is most workable. If a research project can justify a full-time technician, probably they should support him. When this is not possible, the scientists should be able to turn to a pool of technicians, either with some funds of his own or as a no-cost service, to get assistance. Would perhaps the simplest bookkeeping procedure be to support some of these pool technicians from the university overhead rate? In any event, it is a real cost for a necessary function, which in the final analysis must be borne by those who sponsor the science.

RECRUITMENT, QUALIFICATIONS, AND TRAINING: With the number of "technician training schools" now operational, it is not particularly difficult to recruit technicians. What is difficult is to get a really good one; most of those graduated are generalists at best, and unqualified at worst.

We have concentrated therefore on getting the best techs possible to start with, minimizing out turn-over rate, and emphasizing retention, training, and advancement in responsibility and salary. As equipment, particularly electronic gear, becomes more complex, so technicians are becoming more specialized. We still require all techs to start as fully-qualified generalists, but they soon progress through training and experience to areas of specialization -- STD, computer, deck gear, etc. On-the-job experience and self-study are coupled with formal training at company facilities or at other institutions.

As a practical matter, we expect our techs to spend, on the average, from one-third to one-half of their time at sea. The remainder is ashore, preparing for or following up on cruises, or carrying out work connected with the academic program or the nonseagoing aspects of research. Experience has shown that a higher at-sea ratio not only slights the work ashore, but quickly results in high personnel turnover and lowered personal efficiency during cruises.

TO: R. Dinsmore

FROM: D. E. Hayes, Lamont-Doherty Geological Observatory UNOLS Representative

RE: Your request regarding information on Marine Technicians

DATE: January 21, 1975

L-DGO Institutional Marine Technician Structure

The Office for Oceanographic Facilities and Support, National and International Programs has in the past supported Lamont-Doherty Geological Observatory for one of our research vessels on a yearly basis. Beginning January 1, 1973, Lamont-Doherty also received funds through a grant from the Office of Facilities and Support for the partial support of marine technicians aboard our ships. We are using these funds to support four full-time shipboard technicians and one full-time shore-based technician. The primary task of these technicians is the continuous acquisition of marine geological, geophysical and oceanographic data on Lamont-Doherty ships. These data are necessary as part of our multi-disciplinary investigations of topical problems and are normally not exclusively associated with discipline studies.

Lamont-Doherty at present operates two ships, VEMA and ROBERT D. CONRAD full-time, which are dedicated largely to studies in marine geology and geophysics and to a lesser extent physical/chemical oceanography and marine biology. To obtain underway geophysical data our ships presently carry:

A gyrostabilized gravimeter
A proton precession magnetometer
12 kHz precision depth recorder
3.5 kHz recording sonoprobe
Seismic reflection equipment using an airgun source.

For station work to explore the water column, the seafloor and the underlying crust, the ship is equipped with:

A Ewing type piston corer
A thermograd to measure temperature gradients in the bottom sediments
A core mounted pinger-probe to define details of bottom layering
Bottom camera
Nephelometer
Dredges

For hydrographic studies both the CONRAD and VEMA are equipped to use a salinity temperature and depth recorder (STD). Sonobuoys and receivers for single ship refraction studies are normally carried on both ships. Still other instruments, e. g., ocean

bottom seismometers (OBS), are available for specialized studies and we anticipate that a sophisticated 24-channel seismic system will soon be installed on board CONRAD.

Lamont-Doherty ships normally each carry a complement of about 10 full-time shipboard technicians. This technical staff is supplemented by the chief scientist(s) and by other scientists and technicians involved in special scientific research projects. The regular 10 shipboard technicians are involved almost entirely in the continuous acquisition of both underway and station geological, geophysical and oceanographic data.

In the past we have sought support for six full-time shipboard technicians and two full-time shore-based technicians but have not been successful in obtaining this level of support. The present grant and past grants were not commensurate with NSF-supported research projects and NSF-supported shiptime. We feel it is essential to support this comparatively minimal technician pool in order to enable us to effectively manage and carry out our comprehensive program of acquisition of continuous marine geological and geophysical data and to provide the required technical skill and continuity to support programs in the other marine disciplines.

Our seagoing technicians can be divided into three categories: 1) The first category includes electronic technicians whose main responsibility is the monitoring and maintenance of continuous underway geophysical equipment. 2) The second category includes computer technicians for the operation of the satellite navigation and computer equipment. These technicians are necessary to operate the Magnavox 706 C navigation system on CONRAD or the ANSRN/9 navigation system on VEMA and data acquisition and reduction computers. 3) The third category consists of instrument/winch technicians with the special responsibilities of working with equipment and instrumentation used over the side of the ship while on station.

A nucleus of marine technician support ashore is essential if a viable shipboard program is to be sustained. One shore-based technician must be an electronics supervisor/technician responsible for the recruiting, training and supervision of sea-going technicians. In addition, this technician helps in overhauls and maintenance of shipboard equipment at Lamont-Doherty and provides technical support for the shipboard program. At least one such technician is essential to maintaining an effective shipboard program on a full-time basis and to provide non-discipline electronic assistance in "tooling up" for all short duration project studies. A second shore-based technician is a data supervisor/computer technician who is responsible for the collection, distribution and preliminary reduction of continuous geological, geophysical and oceanographic data obtained at sea. Of equal importance, this data supervisor provides invaluable computerized data retrieval and ship tracks from the existing L-DGO data bank which is essential for the proper planning and execution of all future ship field programs. The data supervisor is also responsible for the training of sea-going computer and data acquisition technicians in order to maintain the highest possible standards in data collection.

Special Problems

Several major problems exist at L-DGO regarding the question of Marine Technicians and their support.

1. The support available in the past has not been adequate to maintain the necessary level of permanent, qualified technician support to provide the non-disciplinary support to implement NSF-funded shipboard projects.

2. There is difficulty in maintaining work and support continuity for highly-skilled technicians who inherently work on discontinuous shipboard projects.

3. In connection with No. 1, it is important to establish a "pool of technicians" to allow for reasonable rotations and vacation time.

WOODS HOLE OCEANOGRAPHIC INSTITUTION

Statement on Marine Technicians
for
UNOLS Meeting at University of Rhode Island
January 22-23, 1975

INTRODUCTION

There are a wide variety and a large number of people engaged in marine technical work at the Woods Hole Oceanographic Institution. There is no formal definition nor job classification for "marine technicians". We operate essentially in two modes are are funded accordingly:

1. A centralized shipboard computer systems group in the Information Processing Center whose operations are funded by a grant from the Office for Oceanographic Facilities and Support of the National Science Foundation, with capital equipment obtained from both the NSF and the Office of Naval Research.

2. The long-time standard method of operation where each project or group supports its own technicians, both on shore and at sea.

SHIPBOARD COMPUTER SYSTEMS GROUP

This group is organizationally in the Information Processing Center and is composed of six or seven technicians, one clerk, one staff engineer, and is supervised by an engineer. It maintains and operates a central computer system on each of the three major vessels as well as a parallel shore-based computer. This group is also responsible for the satellite navigation system and LORAN and OMEGA navigation equipment. Each W.H.O.I. cruise is furnished with a technician for operating and maintaining the computer; most of these technicians are also skilled in software and systems work. They provide aid to the scientists in all areas of computer- and navigation-related work.

Salaries, supplies, spare parts, travel and programming costs are supported by an annual grant from the National Science Foundation. The individual projects do not pay for shipboard computer services. There is, however, an hourly charge for use of the shore-based system. Capital equipment has been acquired over a period of years from:

a) The National Science Foundation, as part of ship's equipment,

b) The Office of Naval Research, in response to proposals from the Information Processing Center,

c) Equipment inherited from projects which had earlier obtained it from ONR or NSF.

This method of management works well and has been able to maintain a highly skilled and motivated group of technicians.

PROJECT OR GROUP TECHNICIANS

There is no single formal structure to this mode of operation. It works much as it has for many years. Technicians who go to sea are selected by the scientists from a variety of sources, but are usually supported by their own department or project. Chief among these sources are the technicians employed on shore for various laboratory duties. Some are taken to sea because of expert knowledge of specialized equipment. An example of this is the Buoy Group which is composed of a set of skilled technicians with long-time experience in their particular function. In other areas, technicians often are called upon to do entirely different work at sea than on shore; in some departments nearly all of the technicians are asked, if necessary, to go to sea from time to time. These can, in no sense, be called professional "marine technicians". Another source is graduate students and guest

investigators with little or no training. Finally, temporary quickly-trained watch-standers are often hired to fill out the cruise complement. Also there are cases where the scientist himself or a professional member of the technical staff performs highly-specialized technician duties because no one else is trained.

It is difficult to define or describe a typical cruise. A reasonable estimate is that there is a ratio of from three to five or six technicians per scientist.

PROBLEMS

The problems in these modes of operation are neither new nor unexpected and are, perhaps, the main reason we are meeting today. For the shipboard computer systems, the major problem is to get sufficient centralized funding for both continuity of operation and capital needs.

For the other mode of operation the problems include:

1) Often too much sea duty falls to certain individuals who are specialists.

2) Often a project which has to use highly-specialized equipment does not have either the equipment nor the technicians in its own group.

3) Often there is a shortage of skilled manpower, and many untrained people are given tasks beyond their abilities.

4) Because of the project funding structure, there is a limit to the exchange of technicians among groups and departments.

5) In some cases, there is only one individual in the Institution who is expert on highly-specialized equipment. There is little or no interchange of knowledge because others are too busy in their own tasks to be trained.

6) Often the functions performed at sea are quite different than those performed on shore. The particular technicians are not being trained between cruises on new techniques.

7) Often there are certain kinds of equipment for which there is no specific organizational focus of responsibility.

SOME THOUGHTS ON MARINE TECHNICIANS

The Woods Hole Oceanographic Institution, at this time, does not have any official position on the question of marine technician policy. There have been several meetings, discussions, and internal proposals for new action and organization. Attitudes range from the idea that any "technician pool" is a last resort to be used only when every other approach fails to suggestions for a centralized pool covering a wide area of generalized and specialized activities. These proposals and ideas are still under intensive scrutiny; it is quite possible that concepts developed at this UNOLS meeting will help us in our deliberations.

One approach, which seems highly feasible, is not to talk of "technician pools" but, rather, to concentrate on functional centers which would operate in much the same manner as the shipboard computer systems group is now operating. That is, it appears reasonable to focus perhaps on areas of highly technically specialized work which are needed by many groups of scientists but which are difficult for any single group to support individually. An example is an underwater sensor system for use of scientists in all departments concerned with measurement and sampling in the oceanic water column.

Underwater sensors of several types have become a necessary part of many research programs investigating features of the water column. Data from STD's, CTD's, dissolved oxygen probes, nephelometers, acoustic velocimeters, etc. are either an essential part or a highly desirable accessory for programs in physical oceanography, marine geology, chemistry and biology. General access, by most Institution scientists, to such instrumentation is limited almost to the point of non-existence and the problem is two-fold.

Firstly, no general-use instruments exist, and secondly, the necessary expert electronic technician support is not available on anything other than an occasional, short-time scale, basis.

The various probes, mentioned above, have all been built and used by various groups of scientists in the Institution over the last few years but due to limited finances and manpower availability, no single group has been able to achieve an optimal system.

These problems may be overcome if we are able to define a basic instrumented underwater package, supportable cooperatively on a broad basis throughout the Institution, which also supplies additional channels for the telemetering of data from specialized probes.

Within W.H.O.I. there is presently active consideration of developing a centralized team to cover these functions.

It is my opinion that there are certain basic requirements to the development of any sort of "technician pool" and that the specialized functional group as described above and as used in our shipboard computer systems group has the best chance of meeting these requirements:

1) The "pool" or "center" is not merely a technician group but must be funded to include capital acquisition, supplies, spare parts, travel, etc.

2) The group must be capable of development, calibration, and improvement of the instrumentation or facility as well as its operation.

3) There should be an engineer or scientist in charge of such a group.

4) Technicians' shore time must be spent in the same areas of work as sea duty in order to maintain expertise.

5) The people in the group must feel that they are part of an important functional endeavor. In no sense should such a group operate as a union hiring hall with the personnel waiting around to be tapped for miscellaneous cruise work.

6) It is possible that such a group could have data processing functions on shore which are related to its operations at sea.

In the long run, it seems likely that development of such specialized groups may merge into a general technical services section. At W.H.O.I. the present discussions are considering the development of such an underwater sensor group and placing it under the same management as the Information Processing Center and the shipboard computer systems group.

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January 21, 1975

THE JOHNS HOPKINS UNIVERSITY • BALTIMORE, MARYLAND 21218

CHESAPEAKE BAY INSTITUTE

January 17th, 1975

The Management and Use of

Marine Technicians at CBI

The Chesapeake Bay Institute has two individuals who have the position of "Marine Technician", and a third individual who performs duties both as a Marine Technician and as a senior research assistant. All three technicians are located at our field laboratory in Annapolis under the supervision of our Marine Scientific Supervisor.

One technician is permanently assigned to the R/V RIDGELY WARFIELD and his primary responsibilities are to assist the scientific personnel on cruises as directed. He assists not only in the data gathering but in the preliminary onboard analysis where he is able. He is also responsible for seeing that the onboard scientific equipment is maintained in good operating condition. He is directly responsible to the Chief of Party during field operations and reports to the Captain in other situations. On some cruises where the senior scientist does not feel it necessary to go along, they will send their lab assistants and they will work under the supervision of the onboard Marine Technician in data gathering or sample collecting work.

The WARFIELD technician is classified as part of the exempt supporting staff of the University as a technical specialist, but does not receive overtime and bonus payments at the same level as the vessel crew.

The second individual who is classified as a full time Marine Technician is assigned directly to our Marine Scientific Supervisor at our field laboratory. This technician's duties involve fabricating equipment (buoys, floats, mooring gear, etc.) used in the field; performing low-level maintenance of current meters, acoustic releases, etc.; maintaining non-electronic scientific equipment on our smaller vessels, i.e., the MAURY (65 ft.), D.W. PRITCHARD (42 ft.), and our three smaller boats; participating in cruises on these vessels; and, when we are short of personnel on the multi-boat operations, he acts as Boat Captain/Chief of Party on our smaller (20 ft. size) boats.

He has the same classification as the WARFIELD technician and receives overtime compensation only if he is assigned to a vessel in which the crew receives overtime.

The third individual in this category receives one half of his support from activities as a Marine Technician. The remaining half of his support comes from activities he renders in direct scientific support to certain programs.

His activities as a Marine Technician range from data and sample gathering without senior scientific level supervision to assisting our Programmer in preparing data for analysis.

This individual is classified at the professional staff level of the University personnel system.

The Marine Scientific Supervisor is responsible for the success of our Marine Technicians, but at this time is not part of the funding arrangements for our technicians.

As of January 1975, our technicians are accounted for as follows:

1. WARFIELD - the technician costs are recovered by means of a per day charge that all users pay for the use of the boat. At this time a user has no option as to whether or not he wants this service.

2. The other two technicians costs are recovered through an hourly recovery system. They are required to report twice monthly their activities in half-hour increments, and charges are made against the Technician grant, or the contracts for whom they perform services.