UNIVERSITY - NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

COMPOSITION, DISTRIBUTION AND MANAGEMENT

OF THE UNOLS FLEET

A REVIEW

Prepared by

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May 1985

UNIVERSITY - NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

EXECUTIVE SUMMARY

1. The UNOLS Fleet once again has a recurring excess of shiptime available compared to the demand from funded scientific projects. This mostly is due to decline of the funding for ocean science from $ 84M (1967-dollars) in 1971 to $ 68M (1967-dollars) in 1985. It also results from changes in the fleet through the independent actions of operator institutions. The excess is around 2 to 2.5 ships/year, and it shows no sign of diminishing in the immediate future. The government agencies have been handling the excess by laying-up ships for all or part of given years. They appear willing to continue in this manner. Therefore, we recommend that UNOLS begin to take an active role in identifying ships for lay-up as part of the standard East-West scheduling process. We also recommend that federal agencies that approve or fund changes to the fleet by single UNOLS members take full account of the effects of those changes on total fleet capacity and thus on the magnitude of our recurring excess in shiptime.

2. After review of the physical condition of the fleet, based on the NFS/ONR inspections of 1984, it is concluded that 7 of the 27 ships are less capable than they need to be for full support of modern oceanography. By class:

- 3 of the 6 large ships are below optimal operating standards (the AGOR-3 class ships)
- 1 of the intermediate ships is inadequate
- 3 of 13 small ships are inadequate.

There are no significant deficiencies in terms of safety.

3. Ship demand has been consistently short in the Southeast. We recommend that NSF and ONR review the possibility of reassigning a Miami-based ship elsewhere, *provided the review indicates that no greatly increased demand will be forthcoming.*

4. We continue to urge formation of a consortium of institutions for operation of a ship in the Central California area. However, we urge careful review of whether demand really would increase in response to assignment of a ship to CENCAL.

5. The Advisory Council recommends that the UNOLS Fleet Replacement Committee proceed aggressively with their replacement study and that they should continue to receive the support of UNOLS. The appropriate federal agencies, notably ONR and OCE-NSF, should be receptive to the Committee's recommendations. Although tentative replacement plans call for a fleet with about the same number of ships as at present, the new fleet will be ship-for-ship larger and more expensive to operate. We remind the institutions that there are budgetary constraints on replacement of present ships by larger, more capable ships that are more expensive to operate. The agencies should consider that expanded, multi-disciplinary research, as described in the NSF Long-Range Plan, will require a more capable fleet that is significantly more expensive to operate.

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INTRODUCTION

In May, 1982, the National Science Foundation and the Office of Naval Research gave the UNOLS Advisory Council a charge to develop specific recommendations for the organization, utilization and management of the academic fleet, and to evaluate the fleet on a ship-by-ship basis. The Council accepted that charge and in its continuing deliberations on the fleet has reviewed and updated the basic report (Composition, Distribution and Management of the UNOLS Fleet, 14 October 1982; update, March 1983). The charge from the government agencies merely prompted the Advisory Council to undertake a task mandated to it in the UNOLS Charter. It was resolved in March 1983 that a review would be made every three years. Therefore, in January 1985 the Advisory Council again has initiated a review of the status of the fleet and we present this draft report for consideration of the UNOLS membership.

The report was written from our fog-shrouded vantage point in early 1985. The situation is not particularly alarming, and the report is not dramatic. On the other hand there are important problems in the fleet and with fleet management, and we hope the UNOLS community will give them serious, active attention. The Advisory Council welcomes debate about the issues we raise here, and we encourage you to comment on the report and take an active role in the continued examination of the fleet.

THE MARINE SCIENCE SCENE

Over the past five years the academic marine science community has experienced stress from the general economic condition of the nation and from competition with other sciences for resources. Analysis of the ocean science research budgets for the past 20 years (Table 1) shows that the real inflation-corrected funding has been declining since 1972 and is now stagnant, if not still declining. At the same time this score of years has been a period of unparalleled advance in all sciences, particularly in the marine sciences which have changed radically our scientific view of the Earth by discoveries in every subdiscipline. These discoveries range from the plate tectonics model in marine geology to an explanatory physics for oceanic circulation. Matching these advances, and making them possible, has been parallel evolution of technology. At present, technology is changing faster than the ocean fleet (in the broadest sense of ships, buoys, satellites, and submersibles) can change.

TABLE 1
Oceanography Funding in Federal Ocean Program

	--IN CURRENT DOLLARS--					--IN 1967 DOLLARS--			
Yr	TOTAL	NSF	DOD	DOC	C.P.I.	TOTAL	NSF	DOD	DOC
67	61.5	24.8	28.6		100.0	61.50	24.80	28.60	
68	78.1	38.3	30.5		104.2	74.95	36.76	29.27	
69	78.4	34.9	34.3		109.8	71.40	31.79	31.24	
70	78.4	30.3	33.2		116.3	67.41	26.05	28.55	
71	101.5	49.4	32.1	19.7	121.3	83.68	40.73	26.46	16.24
72	119.4	65.7	30.0	20.5	125.3	95.29	52.43	23.94	16.36
73	109.9	57.3	27.3	21.5	133.1	82.57	43.05	20.51	16.15
74	116.1	61.1	28.4	19.7	147.7	78.61	41.37	19.23	13.34
75	124.1	65.7	27.7	19.5	161.2	76.99	40.76	17.18	12.10
76	128.9	65.0	31.8	19.8	170.5	75.60	38.12	18.65	11.61
77	144.6	73.8	31.8	23.5	181.5	79.67	40.66	17.52	12.95
78	157.6	78.9	37.0	26.9	195.4	80.66	40.38	18.94	13.77
79	172.9	88.8	40.4	28.8	217.4	79.53	40.85	18.58	13.25
80	207.3	97.5	45.5	40.2	246.8	84.00	39.51	18.44	16.29
81	218.9	95.0	53.8	42.9	272.4	80.36	34.88	19.75	15.75
82	172.2	104.9	18.1	20.7	289.1	59.56	36.29	6.26	7.16
83	179.2	107.8	20.1	20.5	298.5	60.03	36.11	6.73	6.87
84	191.4	127.8	13.5	21.1	313.4	61.07	40.78	4.31	6.73
85	222.5	138.5	20.9	29.3	325.9	68.27	42.50	6.41	8.99

Information on funding in current dollars (the first five columns) extracted from Federal Marine Science Budget Summary Fiscal Years 1975-1985, Committee on Atmosphere and Oceans, Subcommittee on Marine Research. Note that there are year-to-year changes in agency definition of "ocean research", so that the numbers must be used with care. For example, DOD changed its categories between 1981 and 1982, resulting in an artifical decrease. The overall impression conveyed by the numbers is correct.

Oceanography is entering a period of even stronger competition for finite funds. At the same time it is entering a period of rapid advances in the equipment that can be applied to ocean problems. We must sustain the valuable work in progress, and we must find the resources to employ the new technology which promises to reveal whole new orders of natural phenomena. Thus, UNOLS must look to maintaining a fleet of research vessels, to enhancing the capabilities of this fleet with new vessel designs, and to expanding its view to include satellites, seafloor installations, and other new systems.

One response of the oceanographic community to the financial requirements of this expanding set of opportunities has been the Long Range Plan of the Ocean Science Division (OCE) of the National Science Foundation. It was developed by OCE with advice from its Advisory Committee composed of active oceanographers. The plan examines the core programs and identifies initiatives for future support. It concludes that a core program will

continue to be needed to provide basic support across the full spectrum of ocean sciences for a mix of small to large projects ($10,000 to several millions per year). These will include single and multi-discipline projects and their associated equipment acquisitions.

Beyond the core programs, initiatives are developed in the Long Range Plan that should attract support from the national scientific leadership and from the government. These initiatives push beyond the present scale of ocean science in the U.S., and if they attract new funds, they will require modification of the UNOLS fleet and other oceanographic facilities in the not too distant future. The initiatives incorporate only two major scientific themes, a recognition of the interdisciplinary character of the most promising new lines of research. These are 1) Global Ocean Studies and 2) Ocean Lithospheric Studies. Global Ocean Studies will be an attempt to achieve a fully integrated view of the fluxes and balances of water, energy, and biological and chemical species in the oceans and at their boundaries. New technical tools must be mustered and applied ranging from satellite remote sensing through genetic engineering. Lithospheric Studies will apply our growing capability in seafloor imaging and seismic analysis to provide a picture of the Earth at a new level of resolution. This will include submersible observation and sampling of a wide array of seafloor features, extended application of satellite geodesy, a seafloor seismic net, and other newly available techniques.

The draft of the Long Range Plan notes that just continuing the core programs will require overhaul and replacement of the present academic fleet with adjustments in number and types of ships in step with changing scientific needs. The new initiatives may or may not require increases in the size of the fleet, but they will certainly require that UNOLS and the oceanographic community generally begin to operate and manage an expanded array of equipment.

This report on the present status of the UNOLS fleet should be considered by its readers in this context of changing and expanding requirements brought by new directions and new initiatives in marine science. It should also be considered in light of the continuing financial strictures that we have operated under for about a decade and which promise to continue for some time to come.

Funded science drives the UNOLS fleet. At present NSF, ONR, and other agencies are paying for shiptime used by their funded projects. However, it will be shown below that we are far short of dollars to operate the fleet at full capacity in 1985 or 1986. The real shortfall is in funded science, a result of the decline we have documented. NSF staff estimates indicate that only about half of good, fundable science is receiving support. The Advisory Council has no sure-cure prescription for this problem. We suggest, however, that reversing several trends would help:

1. Universities and research institutes have come to rely more and more heavily on federally-funded science to cover their basic operating expenses. Money is taken not only to back research opportunities, but to fund basic faculty salary and the entire spectrum of operating expense. Some of our oceanographic institutes were formed because federal funds can

be used in this way, and more and more of them are turning to this mechanism to stay fiscally afloat. The trend for state and private institutes to invest nothing in research on their premses must be reversed. We urge the institutes to begin developing funding sources beside the federal government for their operating expenses, especially investigator salaries. The Federal agencies should be encouraged to recognize those situations where their support has the buying-power leverage of non-federal funds. This is contrary to present policy, but it makes good economic sense. It would also be useful if NSF had some negotiating rights in matters of overhead rates, overhead cost accounting practices, and overhead distribution. Institutions with the most inflated overhead rates must be drawing money from our science that is not in fact used to pay the genuine overhead expense we incur.

2. We must open our activities to public view and review so that the excitement of oceanographic progress will be shared by our supporting public. UNOLS and its individual institutions should aggressively market their science and their facilities. Our efforts should be coordinated with other joint efforts to promote ocean science, such as the Marine Division of NASULGC, the Board of Ocean Science and Policy of the NAS, the Board of Governors of JOIDES, JOI Inc. and appropriate advisory committees.

3. We need to compete aggressively for ship operating funds going to inefficient maritime programs in federal agencies not presently using UNOLS ships.

4. Schemes must be found to enhance our efficiency and cost effectiveness. Our current arrangements do not produce much reward for cost reduction. We would prefer to be more specific about such schemes, but for now a simply note that demonstrable efficiency will be a key issue as new funding is sought for new departures in ocean science.

THE UNOLS FLEET

Ships included in the Advisory Council's review of the UNOLS fleet are those designated by the membership in October, 1984 and shown in the following table.

Ships Considered in Fleet Study

Class	Name	Length (ft)	Built/Converted	Operated by
A	KNORR	245	1970	WHOI
	MELVILLE	245	1969	Scripps
	THOMPSON	209	1965	U Washington
	MOANA WAVE	213	1973/1984	U Hawaii
	OSPREY			converted to R/V 1985

B	ATLANTIS II	210	1963	WHOI
	CONRAD	209	1962	L-DGO
	WASHINGTON	209	1965	Scripps
	MOORE	165	1967	U Texas
C	ENDEAVOR	177	1976	U Rhode Island
	GYRE	182	1973	TAMU
	ISELIN	170	1972	U Miami
	NEW HORIZON	170	1978	Scripps
	OCEANUS	177	1975	WHOI
	WECOMA	177	1975	Oregon State U.
	KANA KEOKI	156	1967	U Hawaii -out of fleet 1984
D	ALPHA HELIX	133	1966	U Alaska
	CAPE FLORIDA	135	1981	U Miami
	CAPE HATTERAS	135	1981	Duke/UNC
	CAPE HENLOPEN	120	1976	U Delaware
	R. G. SPROUL	125	1981/1985	Scripps
	VELERO IV	110	1948/1972	USC -out of fleet 1985
E/F	BLUE FIN	72	1972/1975	Skidaway
	BARNES	66	1966/1984	U Washington
	CALANUS	64	1971	U Miami
	CAYUSE	80	1968	MLML
	LAURENTIAN	80	1974	U Michigan
	E. B. SCRIPPS	95	1965	Scripps -out of fleet 1984
	R. WARFIELD	106	1967	Johns Hopkins U.

STATUS OF THE UNOLS FLEET

In the Advisory Council's reexamination of recommendations in "Composition, Distribution, and Management of the UNOLS Fleet" made in March 1983, it was found that, First, "...ship use has increased substantially in 1983 [relative to 1981 and 1982] and as projected for 1984, particularly in the largest ship categories. Second, a strong decision has been made to proceed with refitting of the MOANA WAVE as a replacement for the KANA KEOKI at Hawaii. Third, and most important, propects for funding in oceanography have improved." . . These changes "allow us to recommend that all of the Class A, B, and C ships be retained in the UNOLS Fleet for the foreseeable future, although some Class C ships must show stronger use in 1984 and beyond if they are to be retained indefinitely. ... Ship categories and regions with excess capacity in 1983 and projected excess capacity for 1984 must be reassessed in spring, 1984. Potential for increase to full utilization must be realized or retirements and transfers may be indicated in Classes C and D. Specifically, C and D ships in the southeast (ISELIN and CAPE FLORIDA), and D ships in the Pacific (VELERO IV and ALPHA HELIX) must reach a fuller utilization."

Since that report, the Council has readdressed questions concerning Class C and D ships. At our meeting of October 24, 1984, we recommended: 1) That

"Based upon schedules and research vessel use patterns ... it is timely and appropriate for one of the two major research vessels operated by the University of Miami to be transferred to another geographic region with greater demand for research vessel time." CAPE FLORIDA was suggested specifically. 2) Preparation "by an academically-based, central California consortium (such as the proposed CENCAL consortium), specifically formed for the purpose, including but not necessarily limited to the University of Southern California, University of California at Santa Barbara, University of California at Santa Cruz, The Moss Landing Marine Laboratories of the California State University System, and the United States Naval Postgraduate School", of "comprehensive proposals to operate two research vessels" in the central California region. 3) Replacement of R/V VELERO IV, and that USC develop a scheme for management of a new vessel in cooperation with the consortium recommended for the central California area. 4) That "academic institutions with strong programs of research and education in the ocean sciences and related fields be encouraged to review their regional needs for a research vessel and be invited to submit comprehensive proposals to the funding agencies for the transfer and operation of the R/V CAYUSE as a UNOLS vessel."

Since 1983 a number of changes have been made to the UNOLS Fleet (or are in progress) which together result in a significant increase in capacity. Table 2 roughly quantifies the impact of the following changes:

ATLANTIS II to submarine tender, replacing LULU
FRED H. MOORE added to the UNOLS Fleet,
ROBERT G. SPROUL replacing E. B. SCRIPPS
MOANA WAVE, with stretch, replacing KANA KEOKI,
OSPREY proposed as a replacement for VELERO IV.

Inclusion of the ATLANTIS II conversion in Table 2 results from the choice of the date of the original AC Fleet Study as a comparison date. ATLANTIS II was laid up in 1982, but was part of the UNOLS Fleet before that. LULU was never part of the UNOLS Fleet. The conversion was intended to reduce the large ship component of the fleet while protecting the investment in ATLANTIS II and solving successfully the serious problem of adequate launch and recovery facilities for ALVIN. All of the other changes have been initiated by individual UNOLS institutions and are not part of a coherent overall plan for the fleet. They add to fleet capability either by addition of new ship days or by replacing smaller ships with larger and more expensive ones. The Advisory Council notes that while each of the changes considered individually is beneficial to the UNOLS fleet, and enhances our support of ocean science, in aggregate they substantially increase costs. Excluding the ATLANTIS II, this would be about $2.0 M/year, if we had support for full operation. Examination of operating days for the UNOLS Fleet in the years 1982-1984 and of projected operations in 1985 (Table 3) shows that the present, larger capacity cannot be fully utilized by demand that is backed by scientific project funding. *We are again in a situation where there is more ship capacity than we have the funded science to justify.*

In 1985, according to information from NSF-OCE, approximately 2.5 ships in classes C and above will probably have to be layed up. The lay-ups result

from 1) the overcapacity discussed just above, and 2) from the insufficiency of funds to carry the costs of ships that are not being fully utilized by funded scientific projects.

At the beginning of 1985 there appeared to be a shortfall between needed operating costs and available operating funds of $3.39M. This was considerably larger than we had experienced in recent years, and it derived from a sudden reduction in funds from sources other than NSF and ONR. Information then available indicated that the reduction was from $7.3M in 1984 to $4.2M in 1985. There were several parts to an explanation of this change. First, other sources were exceptionally high in 1984 ($7.3M, up from $5.4M in 1983), so the drop in 1985 was mostly a return to the usual level. Second, 1984 was a major year for the CalCOFI program funded from California state monies, while 1985 is not. This accounts for about $0.7M of the change. Third, there were substantial reductions in use of UNOLS ships by the Minerals Management Service. However, there were shifts in other sources broadly spread across the fleet and across the spectrum of user agencies.

As of March 1985 there appears to have been an increase (relative to January) in other sources amounting to $1.4M, most of it provided by state and institutional funds. At present, money from "other sources" for ship use in 1985 is about equal to the 1983 level. In order to make up some of the remaining gap between costs and available funds, agencies and operators have negotiated a part-year lay-up of the KNORR and a full year lay-up of the ISELIN. There is still an apparent shortfall of $1.4M that is now being addressed by NSF and individual institutions. If further reductions in operations are still required in 1985, they will be less draconian than those already taken.

In 1986 the Advisory Council (with information supplied by the agencies) projects a comparable excess in UNOLS fleet capacity to that in 1985. In order that ships in the UNOLS fleet have reasonably efficient and full schedules, at least 5,600 days of operations would have to be purchased. There would need to be that many days of demand from funded scientific projects. We see no trend in the support of oceanographic science which suggests that seagoing programs will be supported to that degree in 1986. There are plenty of good scientific projects being proposed, but there are not enough funds to support the scientific effort required to utilize 5,600 ship days. Moreover, the agencies do not have the ship operating funds to cover that much use, unless the missing "Other Sources" funds reappear. The Council estimates that about two ship-years of lay-ups will be necessary in 1986.

It appears that recurring lay-ups are a cost control device acceptable to the federal officials concerned with the UNOLS fleet. The practice has been with us for a long time, and it seems to be permanent. Therefore, *The Advisory Council recommends that UNOLS take a direct part in selecting ships for lay-up to save money. Because lay-up recommendations will arise from the scheduling process, the East, West, and Joint Scheduling Committees of UNOLS should produce recommendations for lay-ups as early as possible each year.* The earlier they are identified, the more the impact upon people and equipment can be reduced. For UNOLS to perform this onerous task by negotiation will be difficult, but it will be a faster, more responsible form of management than having lay-ups imposed by agency officials. To do this the scheduling committee will need early, accurate budget forecasts from the agencies. We

certainly have early ones for 1986, and we commend the National Science Foundation for assembling and disseminating that data.

TABLE 2

Cumulative Changes to the Expected Costs of Full Operation of the UNOLS Fleet Since 1982

Date of Change	Change	Changes in Cost ($M) Increase	Decrease	Net
1983	ATLANTIS II substituted for LULU	3.1	1.1	+2.0
1984	FRED H. MOORE added	0.5		+0.5
1985	ROBERT G. SPROUL replaced ELLEN B. SCRIPPS	0.5	0.4	+0.1
	MOANA WAVE replaced KANA KEOKI	1.9	1.3	+0.6
1986	OSPREY to replace VELERO IV	1.4	0.6	+0.8
	TOTAL NET CHANGE			$ 4.0M

TABLE 3

UNOLS Fleet Capacity and Operating Days by Class

Class	Ship	1982 CAP/USE	1983 CAP/USE	1984 CAP/USE	1985 CAP/USE	1986 CAP/USE	REMARK
A	KNORR	260/258	260/279	260/208	260/196	260/273	Part year in 1985
	MELVILLE	175/175	260/257	260/194	260/259	260/258	Part year in 1982
	THOMPSON	260/269	158/158	260/264	260/272	260/258	Part year in 1983
	MOANA WAVE	---	---	---	260/331	260/311	In fleet in 1985
	OSPREY	---	---	---	---	260/170	In fleet 1986
	TOTAL A	695/702	678/694	780/666	1040/1058	1300/1272	
B	ATLANTIS II	---	---	260/331	260/257	260/260	Did not operate 82, 83
	CONRAD	260/284	260/268	260/310	260/338	260/305	
	WASHINGTON	260/240	155/155	260/293	260/254	260/365	Part year in 1983
	MOORE	---	---	64/64	260/58	260/111	In fleet 1984
	LULU	209/209	40/40	---	---	---	
	TOTAL B	729/733	455/463	844/998	1040/907	1040/1041	
C	ENDEAVOR	240/248	240/227	240/238	240/249	240/306	
	GYRE	240/236	240/249	240/261	240/237	240/269	
	ISELIN	---	240/225	240/233	---	240/193	Did not operater 1982, 1985
	NEW HORIZON	240/242	240/209	240/254	240/191	240/255	
	OCEANUS	240/225	240/253	240/244	240/250	240/278	
	WECOMA	240/236	240/254	240/214	240/212	240/220	
	KANA KEOKI	240/192	240/286	155/155	---	---	Out of fleet late 1984
	TOTAL C	1440/1379	1680/1703	1595/1599	1200/1139	1440/1521	
D	ALPHA HELIX	225/177	225/138	225/115	225/155	225/241	
	C. HATTERAS	225/251	225/235	225/255	225/225	225/240	
	C. FLORIDA	225/203	225/180	225/219	225/228	225/174	
	R. SPROUL	---	--	32/32	225/160	225/150	In fleet 1984
	C. HENLOPEN	225/163	225/69	225/166	225/201	225/175	
	VELERO IV	225/147	225/131	225/93	85/85	---	Out of fleet late 1985
	TOTAL D	1125/941	1125/753	1157/880	1210/1054	1125/980	

TABLE 3 (continued)

UNOLS Fleet Capacity and Operating Days by Class

Class	Ship	1982 CAP/USE	1983 CAP/USE	1984 CAP/USE	1985 CAP/USE	1986 CAP/USE	REMARK
E/F	BLUE FIN	200/136	200/160	200/129	200/180	200/120	
	CALANUS	200/155	200/120	200/88	200/172	200/214	
	CAYUSE	200/136	200/127	200/85	200/119	200/214	
	HOH	200/30	---	---	---	---	Out of fleet late 1983
	ONAR	200/132	200/185	40/40	---	---	Out of fleet late 1984
	LONGHORN	200/58	200/66	---	---	---	Out of fleet late 1984
	LAURENTIAN	---	---	---	---	---	
	E.B. SCRIPPS	200/109	200/135	155/155	---	---	Out of fleet late 1984
	WARFIELD	200/97	200/124	200/133	200/145	200/172	
	BARNES	---	4/4	200/102	200/190	200/200	Entered fleet 1983
	TOTAL E/F	1600/853	1404/921	1395/732	1000/806	1000/886	
	TOTAL*	5579/4608	5342/4534	5771/4875	5490/4964	5905/5700	

*Includes LULU 1982, 1983

Notes for Table 3:

1. 1985 based on March 1985 estimates, with KNORR laid up part of season, ISELIN all season.

2. 1986 based on March 1985 estimates that reflect Ship Time Requests, but very few funding decisions. Agencies estimate that funded science requirements will be for same or fewer days as 1985. They estimate a similar limit for operating facilities funding. This suggests that 1986 will ultimately settle at 4,900-5,000 days.

3. Table 3 includes "capacity" as well as use. When ships were in repair, or laid up because of insufficient demand, capacity has been equated to use (e.g., see MELVILLE, 1982, THOMPSON 1983, AII 1982, 1983, WASHINGTON, 1983, ISELIN 1982, 1985, as noted.)

TABLE 4

Funding for Fleet Operation*

Source	1982	1983	1984	1985	1986
NSF	21.8	23.6	24.2	25.0	25.6(?)
ONR	3.6	4.0	4.3	4.2	?
Other	5.1	5.4	7.3	5.6	?
Total	30.5	33.0	35.8	34.8	?

*includes LULU costs:

	1982	1983
NSF	$0.6M	0.2
ONR	0.2	0.1
Other	0.3	0.1

Table 5

UNOLS Fleet Capacity, 1982-1986

Year	Days Operation Classes A-F	Capacity Classes A-F	Capacity A-D
1982	4608	5579	3979
1983	4534	5342	3938
1984	4880	5771	4376
1985	4964	5490	4490
1986	5700	5905	4905

CONDITION OF THE FLEET AND OPERATIONAL PERFORMANCE

The Advisory Council has two sources of information on this subject: 1) NSF has supported a detailed inspection of UNOLS vessels over the past two years, and the results are available to us. 2) UNOLS Cruise Assessment forms.

The material condition of the UNOLS Fleet can be separated into two general categories: 1) platforms, and 2) scientific equipment. The two are related, since the adequacy of a platform limits the effectiveness of scientific equipment.

The condition of hulls and associated ship systems is a function of

- Original construction standards
- Age
- Maintenance, both continuous and major refits
- Flexibility for response to changing scientific needs

Deficiencies in two or more of these categories usually render a ship unfit for effective service.

Criteria for scientific equipment are similar, except that developing technology can render existing equipment obsolete before it wears out. Equipment deficiencies are usually more readily corrected than hull deficiencies.

Hulls and Ship Systems

The 26 UNOLS ships range in age from 4 to 37 years. The median age is 15. All of the larger ships are over the median age, while all but one of the intermediate ships are less than the median age. The smaller vessels are evenly split. One small ship (VELERO IV) is clearly over the age at which maintenance becomes inefficiently expensive.

All but four of the vessels were constructed as research vessels, and except for two aluminum hulls (WARFIELD and CAPE HENLOPEN) can be expected to have service life of 30 years. Two vessels (KNORR and MELVILLE) will require new propulsion systems if full service life is to be expected. Of the four conversions, one tug (BARNES) was built to high construction standards and should have a 30 year service life. Two oilfield supply hulls (MOORE and SPROUL) and one wooden hull (BLUE FIN) have probable service lives closer to 20 years. A listing of service life expectations based on a 30 year age criterion is presented in Figure 1. This "starting point" should , of course, be modified by condition and effectiveness of individual ships.

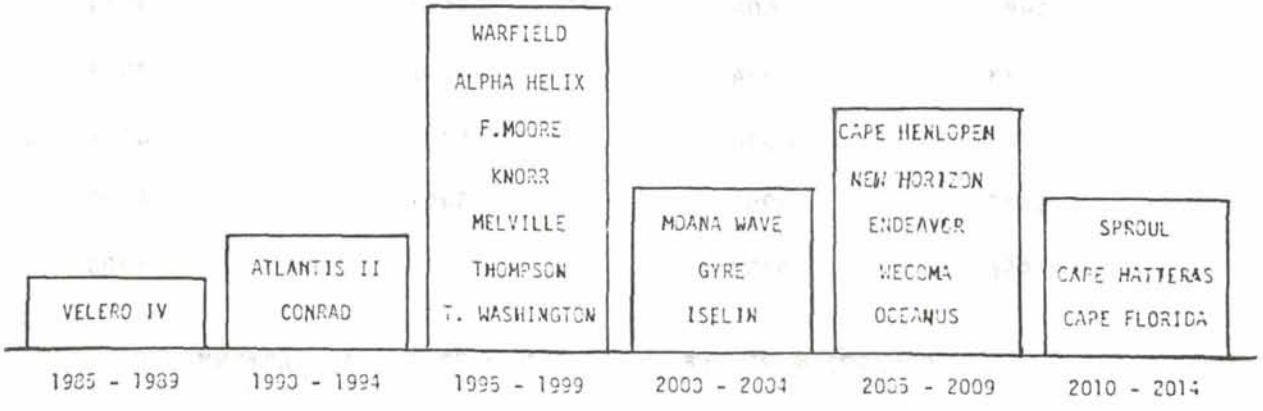

Figure 1: PROJECTED RETIREMENTS FROM UNOLS FLEET
Based on 30-Year Age Criterion

Current maintenance of the fleet is fair to good. The recent emphasis on maintenance by sponsoring agencies has turned around what was becoming a deteriorating situation. Maintenance is not seen to be a limiting factor to full service life, except in several of the smaller vessels for which recent inspection reports indicated the need for improved maintenance.

The ability to respond to changing scientific needs probably is the dominant concern with respect to fleet condition. Three of the larger ships are of the AGOR-3 Class which served as the basic design for AGOR's 3 to 13 and where minor variations in design attempted to keep up with changing scientific requirements. These requirements now have exceeded the capability of that class to fully respond. Most of the intermediate and smaller (Classes C and D/E) are newer and in more favorable situations, but one Class C and three smaller ships may be considered as inadequate to their current service. In all, 7 of the 27 UNOLS ships are less than optimal to meet ongoing or projected needs. These opinions are derived from ship inspection reports and reports by the operators themselves.

Review of these hull and science-support conditions indicates the following ships are candidates for replacement at the dates indicated:

- VELERO IV..... now
- MOORE..... 1987
- BLUE FIN..... 1991
- CONRAD..... 1992

In terms of safety there are no significant deficiencies. Deficiencies found in the NSF inspection program were promptly corrected, and the operators of the UNOLS fleet are to be congratulated on their responsible attention to safety.

Scientific Equipment

The principal concern in this category is winches. Despite a recent upgrading program by sponsoring agencies, about half of the ships in the fleet have oceanographic winches which are inadequate to meet ongoing needs. Inadequacies include excessive failure rates, small size for typical applications, imprecision in spooling, and insufficient power. No winches now in service have ship motion compensation, which will be a requirement for many applications in the near future.

Related to winches is the wire and cable situation. The establishment of the UNOLS wire "pool" has been a significant step in assuring an adequate supply system and for obtaining reduced purchase costs. However, the quantity of cable now in the system is inadequate to meet our needs. Purchases to increase the available stock have been curtailed by a change in cable availability. The change is that the sole manufacturer of torque balanced wire rope, virtually required for modern oceanographic applications, is closing its operation without any immediate replacement. Eventually this situation may be corrected when the patents are transferred to a smaller manufacturer willing to produce for a specialty market, or when foreign sources develop. We must build our stock soon. The urgent attention of the agencies and UNOLS to this problem will be required, if we are not to see

scientific projects left at the dock for lack of suitable wire. (We note that this problem is getting immediate attention both by actions of individual institutions and efforts in connection with the UNOLS wire pool.)

A major deficiency of the current fleet is in the area of precision echo sounding and sub-bottom profiling (3.5 kHz). Two large vessels (KNORR and MELVILLE) are substandard owing to the character of their hull and propulsion systems. Perhaps they can be improved by a propulsion modernization program. Three of the medium-sized ships and about half of the smaller ships presently carry substandard echo sounding equipment.

Overside handling capability is lagging behind the growing needs of our scientific programs, both in terms of size and of complexity of arrays to be handled. It is estimated that about half the fleet (all sizes) are limited in handling overside gear by virtue of lift capacity or general design of handling equipment, or because of ship maneuverability. Larger more maneuverable cranes and A-frames will be required soon, some with motion compensation, if emerging requirements are to be met. Many of the steering and propulsion systems of our present fleet are inadequate to the exacting maneuverability requirements for placement and recovery of arrays that are an increasing part of modern oceanography.

Most shipboard laboratories are substandard. About half of this is due to general problems of the ships; the rest can be attributed to poor installations and maintenance. Deficiencies include small size, poor location, substandard cabinetry, small or inadequately filtered power supplies, inadequate ventilation, and poor deck drainage in wet labs. On most vessels the deficiencies are correctable, and corrections should be undertaken by the operators.

It is concluded that the present condition of the fleet is mixed and presents us with substantial problems.

Ship Performance - UNOLS Cruise Assessment Forms

Results from UNOLS assessment forms provide a more positive evaluation of the fleet than does the NSF-sponsored inspection by maritime experts. The forms reflect fleet performance from the user point of view. The forms also have been providing ship operators with direct interaction with users with regard to performance after completion of cruises. This has been particularly helpful in the case of users from institutions other than the operating institution. This direct interaction does interfer, however, with the form as an instrument for open evaluation of performance in the fleet, tending to remove criticism from the forms finally submitted to UNOLS. Eventually we may have to change the manner in which the forms are distributed and collected in order to solve that problem. We are not prepared to recommend a change at this time. Comments from cruises in 1983 and 1984 have been generally favorable. Most problems encountered have been relatively minor, or at least repairs have been prompt and satisfactory. There were very few breakdowns of either hull systems or scientific support equipment that required termination or cancellation of cruises. The frequency with which users speak favorably of the ships crew, officers and marine technicians is impressive. Clearly the UNOLS fleet attracts capable maritime staff who participate in the spirit of seagoing science.

Filing of the cruise assessment forms is uneven throughout the fleet. The Advisory Council feels these forms are valuable, and we encourage both the ship operators and ship users to see that they are returned to the UNOLS Office.

The Advisory Council finds the current UNOLS fleet to be remarkably well operated and in acceptable material condition. The fleet supports today's ocean research, in spite of increasing demands on equipment due to the changing nature of investigations, advancing age of ships and an almost inevitable creeping obsolescence. That the level of support provided by the fleet is acceptable is a tribute to the excellence of staffing, both ashore and afloat. This excellence of staffing is corroborated by user appraisals. None of the excellence perceived by users belies the problems demonstrated by the NSF sponsored inspections. The Advisory Council believes that the user forms partly reflect the expectations of the users. They know what the ships can and usually do provide, and they don't complain if they get it. That does not mean the fleet is all that the rapidly modernizing science of oceanography needs. Improvements and replacements are becoming urgent.

OUTSTANDING ISSUES IN MANAGEMENT OF THE UNOLS FLEET

In preparation for this report, the Advisory Council has informed the UNOLS membership (17 July 1984) about issues of recurring concern. None is fully resolved, and concern continues about all of them. We address three of them here:

- Schedule shortfall in the Southeastern sector
- Apparent inadequacy of UNOLS ship facilities relative to potential scientific demand in the Central California area
- Effects of member institutions proceeding urgently and directly with ship replacements.

Ship Demand Problems in the Southeast

User demand for shiptime in the southeastern U.S. has been persistently low, and schedule shortfall has been focused through the early 1980's at the University of Miami. It was necessary to lay-up the ISELIN (operated by the Rosenstiel School of Marine and Atmospheric Sciences, RSMAS, of the University of Miami) for this reason in 1982, and this situation has recurred in 1985. In response to our request for comment on recurring issues, RSMAS has submitted to the Advisory Council a prospectus for developing more demand among their own staff for shiptime. This prospectus is included in this report as an appendix. The Advisory Council feels that the prospectus demonstrates that the RSMAS staff are strong users of shiptime already. The problem with the ships located in Miami is not that RSMAS scientists don't use UNOLS ships, they do. It is that the overall community of UNOLS scientists do not have projects requiring two full ship years per year in the Florida-Caribbean area. The measures proposed by RSMAS to generate more ship use among their staff might bear fruit in two to five years, but we can see no expectation of great increase in demand during 1985-1987. Lay-ups of RSMAS-operated ships

will recur through that interval and will not fully utilize UNOLS resources for which there appears to be real demand elsewhere.

We recommend that the transfer of a Miami-based ship should be reviewed by NSF and ONR, and that NSF should take the initiative to reassign one of the ships, provided (we stress this) the review indicates that no greatly increased demand will be forthcoming.

An aspect of the RSMAS response to our continued concern about low demand for its ships requires comment. The prospectus focuses solely on changes that might be made at RSMAS itself. However, there is a large and well-supported oceanographic community in the state of Florida. If the view is expanded to include Georgia there is regionally a great deal of oceanographic activity. RSMAS might look into forming a cooperative organization in the region for sharing of facilities and promotion of oceanographic operations in the Florida area. The possibilities that might develop through cooperation among Florida State University, the Florida Institute of Oceanography, the University of South Florida, Florida State University, Florida Institute of Technology, Harbor Branch Foundation, and perhaps the Skidaway Institute of Oceanography strike us as exciting. There certainly is very little funding visible on the national scene to support any expanded research at RSMAS (or anywhere else), so advantage must be taken of personnel and resources already on the scene. Demand for ship use that resides at this set of institutes might well ride in RSMAS hulls in the near future. The positive response of Texas A&M and the University of Texas to an earlier suggestion we made that they develop a scheme for cooperation has brought them many advantages. We think that the Florida institutions could benefit similarly.

Central California

Increased need for ship facilities along the central California coast has arisen through growth of marine science at Moss Landing Marine Laboratory, the University of California-Santa Cruz, the University of California-Santa Barbara, and the U. S. Naval Postgraduate School (NPS) at Monterey. Ship resources available to these schools are being reduced by the necessary retirement of the ACANIA operated by NPS. CAYUSE was moved to MLML in the late 1970's to meet central California needs for local operations, but it has proved as hard to use in California as it was in Oregon. Users experience unacceptable rates of seasickness. Use rose, then fell off.

The Advisory Council is on record favoring provision of a suitable ship to institutions in this region, provided they organize a consortium for scheduling and operating it. We recommend that the group include the University of Southern California in order to enhance both demand for a ship based in central California and the user base for OSPREY (if that ship is converted for scientific work). At this report, negotiations for a consortium (CENCAL) are still in progress. It is our understanding that final agreements to participate await availability of a suitable ship. However, NSF representatives characterize their problem in finding a ship for CENCAL as absence of a proposal to serve as a basis for action. Given this situation, we recommend the following steps to prospective CENCAL members:

1. Complete formation of CENCAL.
2. Prepare a proposal to serve as operator of a suitable vessel, perhaps naming one already in the UNOLS fleet, and submit it to NSF.

The proposal should particularly document the basis for believing that substantial demand will appear in response to a more suitable ship. This is particularly important in view of the fact that CAYUSE is not attracting much use at present. We note that formation of CENCAL promises to bring into UNOLS substantial ship support money that has not previously been available. This includes:

1) $0.5M that NPS has as a standing budget for ship operations in replacement of ACANIA, and 2) substantial use and funding from the USGS for Exclusive Economic Zone surveys that are required by law and for which present USGS facilities are inadequate. In recognition of the latter item, USGS has declared their interest in being a signatory member of CENCAL.

While CENCAL has favorable aspects, the demand for shiptime from funded oceanographic projects on the west coast in 1985 and projected for 1986 certainly does not justify added ship capacity. Statements by representatives of the USGS at the May UNOLS meeting implied much reduced interest in use of UNOLS ships. They are contractually committed to the use of facilities from the United Kingdom for their planned GLORIA survey of the EEZ. That will take most of the resources previously projected by them for expenditure on UNOLS vessels. Agencies reviewing a proposal from CENCAL to operate a ship should assure themselves that CENCAL really will generate new demand from funded science that is not reflected in present requests for UNOLS shiptime.

Expansion of Fleet Capacity by Independent Actions of Members

At the same time that an intense planning effort is underway for replacement of the UNOLS fleet as a whole, several member institutions have replaced or are moving to replace the vessel that they operate. These efforts are taking different courses. Each merits a word of review.

Scripps Institution of Oceanography has replaced the ELLEN B. SCRIPPS with a new, small ship, the ROBERT G. SPROUL. The SPROUL clearly will be more serviceable to users than was SCRIPPS. It is quieter and larger. There was so far as we can tell almost no cost increase associated with the change. The 1983 daily rate for E.B. SCRIPPS was $3,334, while the projected 1985 rate for ROBERT G. SPROUL is $3,660 (+9.8%). That is about the inflation rate, and the increase in use is from 135 to 187 days. Concern in 1984 about the cost creep caused by the change to SPROUL seems misplaced.

The AC recommended in October 1984 that NSF should urge the University of Southern California to proceed with a comprehensive proposal for conversion of OSPREY, a tuna boat they have purchased, as a replacement for VELERO IV. We urged that the proposal detail:

- Conversion plans and costs together with the basis for estimation.

- Evaluation of hull welds and development of a plan for compartmentation.
- Analysis of the user market for OSPREY
- Expected operating costs

Materials submitted by USC in January 1985 show that they have modified their conversion plans significantly, taking account of various comments from the UNOLS community. Adequate hull compartmentalization is still a concern. While the present plan shows small water-tight compartments fore and aft, they appear inadequate to float the hull in the event of flooding of the central section. Layout of the laboratories is greatly improved.

The change from VELERO IV to OSPREY is not a swap of new for old in the same class; rather it represents a marked increase in vessel capability, size and (most important) operating costs.

Cost creep also has occurred as the MOANA WAVE was brought back into UNOLS service and stretched. The stretch provides such a marked increase in capability and size of MOANA WAVE that we have reclassified her in all of our tabulations in this report as a Class A research vessel. There will be substantial associated increases in costs. The changes at Hawaii were made after review by the federal agencies and with their approval (although the Advisory Council expressed various reservations). One of the consequences of the change is increased operating costs, an increase which, again, must be drawn from a reduced total budget.

Overall these and other changes producing cost creep have produced part of the present necessity for ship lay-ups. The lay-ups are the result not only of inadequate funding for seagoing science (and thus inadequate demand for UNOLS ships), but also of inadequate funds for ship operations per se. If the problem is not to get even worse, everyone will have to restrain their ambitions somewhat as they move to change and upgrade the ships that they operate.

UNOLS is a responsive group working with responsive, as opposed to initiating, agencies. We cannot control the activities of our members. We do urge that the fleet-wide impacts always be considered by institutions making changes to their ships and that the agencies review such changes with the full, national fleet in view.

All of the analysis in the report to this point suggests that lay-ups will be the budget balancing mechanism for at least several years when projected costs exceed available funds. In 1985 lay-ups of ISELIN for a full year and KNORR for one-half year were identified and administered by NSF. MOANA WAVE was also slated for a one-half year lay-up until other fundings was found for part of her schedule. The mechanism by which specific ships and institutions are chosen for lay-up appears to us to be rather unclear and ad-hoc. We propose that UNOLS discuss the general problem of who will identify ships for lay-up and what criteria will be applied. Perhaps it is easiest to leave this piece of administration in the usually friendly hands of NSF, but it might be more responsible behavior for the Advisory Council to look at it.

The Advisory Council has been observing the UNOLS ship scheduling process for several years through attendance of our members at the scheduling group meetings. We feel there are some questionable practices that should be cited. 1) Schedules are often unrealistic during early stages of the negotiations, and some operators have not been willing to identify projects that are unlikely to actually be proposed for funding or that are very unlikely to obtain it. This is understandable, but not helpful. 2) During mid-year negotiations there is a tendency to remove non-NSF projects that are not definitely funded, but to leave projects seeking NSF funding on the schedule indefinitely. This is partly explained by NSF's own decision schedule, but it also reflects the tendency of operators to show as much NSF work as possible to strengthen their hands for operating proposals due on 1 July. Consider the following data:

As of February/March 1984 scheduling meeting
5,889 days requested at $41.7M
Of that amount NSF = $28.7M
Other = $ 7.6M

As of October 1984 scheduling meeting
5,213 days requested at $36.8M
Of that amount NSF = $28.4M
Other = $ 4.2M

There was essentially no change in the dollars sought from NSF, despite the fact that NSF announced in March that the available NSF funds were only $25.0M. We think that NSF and the operators need to settle on the part of their schedules that NSF will support before the date for submission of operating proposals.

Planning for Fleet Replacement

The Advisory Council has reviewed the efforts to date of the UNOLS Fleet Replacement Committee (FRC). The FRC, established by UNOLS in October, 1982 and implemented in late 1983, has made good progress toward defining the fleet requirements for academic oceanography into the twenty-first century. They have developed a replacement schedule that would have roughly the same number of ships, with a similar range of sizes, as the present UNOLS fleet. However, ship-for-ship it would be larger, more technologically advanced, more capable in support of the emerging ocean science. This modern fleet would include a majority of general purpose ocean research vessels and a smaller number of special purpose vessels (i.e., geology/geophysics ship, ship to support deep submergence vehicles, ice reinforced ship for polar research, or others with highly specilized construction, equipment or technology requirements).

Studies by the Fleet Replacement Committee are in an early stage. Nevertheless their preliminary replacement schedule is consistent with developing Navy (ONR) plans for research vessel construction, with the construction philosophy in NSF's Ocean Sciences Division and, at the same time, incorporates construction plans at individual UNOLS institutions (e.g., University of Texas G&G ship). The Advisory Council endorses these early

efforts by the Fleet Replacement Committee, and agrees with the direction that those studies are taking. Recent trends in ocean research are toward operations requiring more capable ships and advanced technology. Our assessment, based on the FRC's preliminary fleet model, is that their replacement schedule would evolve a UNOLS fleet with the requisite enhanced capability and modern technology. At the same time, acquisition of new fleet capability would be consistent with requirements and funding projected by the Navy through ONR and by the National Science Foundation in Long Range Plans of the Ocean Sciences Division.

The Advisory Council recommends that the UNOLS Fleet Replacement Committee proceed aggressively with their replacement study and that they should continue to receive the support of UNOLS. The appropriate Federal agencies, notably ONR and OCE-NSF, should be receptive to the Committee's recommendations as they plan for and implement replacements for research vessels. We note that although tentative fleet replacement plans are for a fleet with about the same number of units as at present, the new fleet would be, ship-for-ship, larger and more expensive to operate. UNOLS and its member institutions must keep in mind that there are budgetary bounds to our ability to replace individual research vessels with larger, more capable, but more expensive-to-operate ships. At the same time, funding agencies should realize that their plans for expanded research programs will require a more capable research fleet, a fleet significantly more expensive to operate.

The process of enhancing UNOLS fleet capability has already begun. Scientific program decisions to emphasize various facets of oceanographic research have led to requirements for greater vessel capability and decisions to provide more capable and more expensive ships. The list is fairly long. The excitement and success of ALVIN deep submersible research and the need to make this a global program prompted replacement of the support ship LULU with the larger, modified ATLANTIS II. Because of far-flung operating areas, exciting projects, and the need for more space and equipment, the KANA KEOKI has been replaced by a stretched MOANA WAVE. Inability to meet regional science requirements and rising maintenance costs on the ELLEN B. SCRIPPS led to replacement by the ROBERT G. SPROUL. Community need for a modern multi-channel seismic research ship, institutional capability and interest and scientific program demands are impetus for Unversity of Texas plans to build a large vessel for geology and geophysics and to retire the FRED H. MOORSE. The inadequacy of the VELERO IV to meet modern research support requirements off California are behind plans to retire that ship and replace it with a much larger converted OSPREY. Central California programs are not well-supported by the CAYUSE, and there are requests for replacement by a more weather-capable and larger vessel. In each of these cases, a set of support operations has or will be replaced by a more capable but more expensive set. The sum increase to the UNOLS fleet budget is significant.

CONSIDERATION OF NEW FLEET MANAGEMENT OPTIONS

The Advisory Council discussed the efficiency of the present modes of management for the UNOLS fleet during preparation of this report. This section is the report of a subcommittee on new management options.

While the existing UNOLS ship operations are considerably more cost effective and scientifically efficient than corresponding operations within

the Federal Government, there is still a need to examine the situation continuously so that operations keep pace with changing scientific needs and economic realities. There is a continuous trend toward more sophisticated data collection, processing and interpretation. Are the research platforms keeping pace with this demand, or are they holding back our research? It may be desirable, for example, to have fewer, better facilities, rather than more which are incapable of advanced programs. Is our management system suitable to provide new resources to meet changing needs? Can individual institutions recognize and react to these needs, or are needs so large that many institutions are affected and action is required on a national scale.

One way to look at the situation is to break down the fleet into several components, each of which may have a separate mode of management tuned to the scale of the respective operations. Consider the following categories:

1) A fire-engine or standby operational mode. That is, we could have some ships available on short notice to do scientific tasks that come up on an immediate basis and to handle overflow from the regular fleet. These ships would not operate with full, advance schedules.

2) Local or regional ship operations. In general, these may be smaller or intermediate ships that do not undertake world-wide cruises. They would be primarily used by scientists of the operating institution, though not restricted to that.

3) Deep-sea, worldwide ships with most operations including scientists from more than one institution.

4) Specialized facilities, of which the ALVIN-ATLANTIS II and JOIDES RESOLUTION operations are present examples.

Assuming we can categorize ships within the UNOLS Fleet in this way, then would we obtain improved management by doing so and developing a new management mode for each class? The specialized facilities already are characterized by tailored management, which involves planning of the scientific program and scheduling by a group of scientists representing the oceanographic community as a whole (or at least all of those with relevant interests). This process is monitored closely by the funding agencies to ensure fair and efficient operation. In effect, the price for assurance for continued funding is a tighter management scheme than for other facilities, and one involving individuals from outside the operator's institution. We note that these specialized facilities have only developed when broad support from the community as a whole has been essential to their initial funding or continued operation.

It may be timely to consider whether something like the system for specialized facilities should be applied to ships with worldwide operations. A start on this has been made through formation of UNEPC, but perhaps it should be strengthened and given the same sort of relationship to the federal agencies as have the ALVIN Review Committee and the Deep-Sea Drilling Program. The Committee we envision would take proposals from all sources and put together the most efficient overall schedule for this class of ships as a whole. It would play a leading role in promoting expeditionary work according

to region and routes. It would oversee the operation of this fraction of the fleet in a general way and serve to invigorate operations for scientific productivity.

Regional ship operations would be established and changed according to scientific demand, much as the UNOLS Fleet has traditionally been managed. However, the new management mode would be for each ship operation to be as autonomous as possible. Monitoring for operation according to national standards would continue, but the present coast-wide scheduling efforts might be simplified by allowing this set of ships to take on the "our ship" character to which they naturally tend anyway. The strength of this tendency for intermediate and small ships has been clear in the last several cycles of the UNOLS ship scheduling groups. Perhaps it is best to give it free rein.

Those ships of the UNOLS Fleet which are not being operated at capacity because of insufficient scientific demand or insufficient funds should be put in a standby status. This would keep the ship materially ready, but would not require full crew or major costs. Minimum upkeep, insurance, dockage costs would run about one-tenth of full operational costs, yet at short notice these ships could be activated. The advantage to the UNOLS community of having at least some such ships scattered around our coasts would be that we could respond to fast-breaking events in the ocean. During the El Nino of 1982/83 the response of the oceanographic community was so close to nothing as to make no difference. That was the biggest event in the ocean during the history of modern oceanography, but we could not arrange to study it. The reason was that our ship facilities are almost entirely scheduled so far in advance, with such strong commitment to particular projects and scientists, that no changes can be made that aren't very damaging to many people. We need some alternatives. Perhaps we should view the present excess capacity of the UNOLS Fleet as available to provide some operational flexibility.

It was noted at the beginning of this section that the UNOLS Fleet is a relatively effective operation. The "if it ain't broke, don't fix it" adage might be taken to apply. However, the current long range objectives of the oceanographic community might be well served by some thoughtful redesign of our ship management system.

Statement on Ship Distribution and Assignment

John Van Leer
Vice Chairman, RSMAS School Council
Rosenstiel School of Marine and Atmospheric Science
University of Miami

The UNOLS Advisory Council has recently recommended the transfer of ORV CAPE FLORIDA to the central California region. The School Council at RSMAS believes this to be an ill advised move based upon 1) recent improvements in faculty recruitment and ship use at RSMAS; 2) improved service by a streamlined marine department at RSMAS; 3) poor suitability of "Mud Boat" type ships for service off central California coast particularly in winter. Further we have seen no demonstrated demand in the Central California region aside from the Naval Postgraduate School. The following background material addresses these issues.

SHIP OPERATIONS AT RSMAS/UNIVERSITY OF MIAMI
RSMAS Background

RSMAS has long been committed to seagoing oceanography. It has one of the largest and most diverse research and teaching programs in marine science and engineering in the world and is a recognized leader in tropical oceanography. Recently we have taken several steps to strengthen our seagoing capabilities.

Dean Alan Berman and each division, under the guidance of the School Council have spent long hours developing and integrating action plans for the next five years. An important part of these plans is the strengthening of our ship operations (see below), developing interdisciplinary seagoing programs, and identifying the kinds of oceanographers we must add to our faculty in a hiring policy that involves all of RSMAS through its School Council. Seagoing scientists are the top priority as we expand the RSMAS faculty. An improved image for the city of Miami in the last two years has significantly helped RSMAS to recruit and to retain quality faculty.

RSMAS on its Virginia Key campus has one of the largest, best and most diverse graduate schools of marine and atmospheric sciences together with ocean engineering. The University of Miami also has a strong undergraduate program in Marine Science on its Coral Gables campus. We believe that regular seagoing research experience for students as a routine part of their education is important.

We the faculty believe that it is in national interest to maintain and enhance RSMAS as the center of excellence for oceanography in the southeastern United States. Such a center includes a major multi-ship marine operation.

RSMAS Ship Use Patterns

RSMAS investigators consistently use large amounts of ship time on oceanographic vessels. For example, RSMAS projects were conducted aboard non-RSMAS vessels during 1983-1985 for an average of 514 days/yr. as seen in Table I. This has been on a world-wide basis, and generally due to a deliberate attempt to reduce federal costs of ship operation in keeping with the UNOLS concept, rather than only utilize RSMAS ships in locations where other ships are available. Use of RSMAS ships has been dominated by investigators from WHOI and RSMAS as seen in Table II. In 1984, WHOI used 214 days and RSMAS 108 days. This has considerably changed in the 1985 schedule where WHOI will only occupy 35 days and RSMAS investigators will use 215 days. This strong growth in RSMAS ship use occurred during a year when the physical oceanographers (usually the major ship users) were largely occupied on non-RSMAS ships in the Indian Ocean and South Atlantic. A continued increase in the need for ship time by RSMAS investigators is foreseen because of the addition of new seagoing faculty and the development of new programs.

Table I
DAYS USE OF NON-RSMAS SHIPS BY RSMAS INVESTIGATORS

	1983	1984	1985
Deans Office (code 100)	0	6	6
Marine & Atmospheric Chemistry (Code 200)	267	200	242
Meterology & Physical Oceanography (Code 300)	135	189	69
Ocean Engineering (Code 400)	38	10	28
Marine Geology & Geophysics (Code 500)	20	37	88
Biology & Living Resources (Code 600)	56	80	70
TOTAL DAYS	516	522	503

Table II
SHIP OPERATIONS BY 1984
THREE VESSEL OPERATION

DAYS AT SEA	100%		546.75
DAYS UM	20%		108.75
DAYS UNOLS	80%		438.00
WHOI		49%	214.25
U. ME.		9%	40.00
SIO		9%	38.00
SUNY		3%	13.25
OTHER		30%	132.50
		100%	438.00

PLANNED
SHIP OPERATIONS CY 1985
TWO VESSEL OPERATION

DAYS AT SEA	100%		382.00
DAYS UM	56%		215.00
DAYS UNOLS	44%		167.00
WHOI		22%	36.00
U. MD.		19%	32.00
OTHER		59%	99.00
		100%	167.00

LOGICAL ASSIGNMENT OF SHIPS TO RSMAS

All three RSMAS ships were designed and built in Florida for the sea state conditions and shallow water ports found in the southeastern United States and are a direct outgrowth of "Mud Boat" or shrimp boat designs which have proved cost effective. This was one of the major reasons that CAPE FLORIDA and CAPE HATTERAS were assigned to the schools in the southeast. Ships with such hull forms can typically work in the local sea conditions 80 to 90% of the time.

Sea conditions on the central California coast, north of Pt. Conception, are considerably rougher particularly in winter. The large shallow draft surface following vessel like ISELIN or CAPE FLORIDA. Ships with deeper draft like WECOMA of the "OCEANUS" class are an outgrowth of "Fish Boat" designs for work in the rougher average conditions found in the North Atlantic and Pacific oceans. A mud boat design might be expected to work effectively less than half the time during winter on the central California coast. Robert W. Rowlands, Deputy Chief for Marine Programs U.S.G.S. says, "The COLUMBUS ISELIN is a very questionable vessel for eastern Pacific operations". (See Appendix II, Advisory Council Meeting, October 24, 1984.)

RECENT CHANGES IN MARINE OPERATIONS DEPARTMENT

Management Philosophy

The Marine Operation Committee with the guidance of the School Council and strong support from Dean Berman has labored for over two years to streamline our marine operations and make them more responsive to science. Mr. James Gibbons, who recently retired has left RSMAS with three sound ships and was crucial in appointing the new-manager and his staff. Mr. Gibbons was responsible for all RSMAS facilities. However, the new Marine Operations manager is only responsible for ships and marine facilities.

The organization and operation of the Marine Operations Department is based on the principle that it is an integral part of the School. It solicits the comments and suggestions of the research community and strives to develop an atmosphere of close cooperation which will ultimately provide better platforms for our science.

Background of our New Marine Operations Manager

Ron Hutchinson has 24 years of experience in the marine profession encompassing all disciplines of ship construction and repair. He has worked for Bellinger Shipyard Inc., Jacksonville, Florida; 2) carried out ship design and naval architecture work, as Vice President of R.F. Matzer and Associates, Inc., Jacksonville, Florida (the builder of all three RSMAS ships), duties ranged from drafting to hull form design work; 3) has managed ship operations in the positions of Port Engineer and Marine Superintendent at the West India Shipping Company, West Palm Beach, Florida.

Management of Ship Operations, University of Miami

The Marine Operations office has moved all its personnel to the RSMAS Ship Facility, Dodge Island rather than being separated in two locations. This move has not only eliminated most of the logistical problems of the past and has developed an awareness on the part of the ships's crew of the overall operation and their relationship to it. We are all working for a common goal of, "better research through better ships".

Some reassignments of ships' crew have been made in order to capitalize on the skills of individuals by placing them in positions which will benefit their careers, the vessel users, the marine department and ultimately, the School. For example, we intend to operate CALANUS this year with one permanent seaman and cruise masters from our pool of qualified seamen. This operating mode not only provides experience for our staff in the area of command but also will assist in establishing a lower daily rate for the CALANUS.

Supervision, guidance and instruction of our "in house" shore support staff has greatly improved the condition of our vessels. For instance, we have been able to correct all deficiencies noted in the 1983 Abstech Reports and simultaneously carry out additional projects to enhance and/or upgrade our vessels and support facilities. By maximizing the utilization of the shore support facilities, equipment, and personnel, funds previously spent on sub-contractors and technical specialists have been saved resulting in lower operational cost and ultimately lower daily rates for the RSMAS ships. Table III shows a comparison of daily rates charged in 1984 and the proposed rates for 1985.

DAILY RATES FOR

	1984	1985
CALANUS	$2,000	$1,518
CAPE FLORIDA	$5,200	$4,852
COLUMBUS ISELIN	$6,500	-------*

*Daily rate not established during 1985 layup and refurbishment period.

Upgrading ISELIN and CALANUS

A proposal has been submitted for upgrading ORV CALANUS to provide additional laboratory space, to install a larger stern "A-frame" and to improve its accommodations. A second proposal is being prepared for submittal to the National Science Foundation to upgrade and modernize the ORV ISELIN. The laboratory spaces will be brought up to a standard suitable for modern chemistry and electronics; the stern "A" frame and side gallows frame will be raised and quarters aboard the vessel are slated for improvement. Acoustical tests are scheduled at a rate of 2 days/month in an effort to "diagnose and cure" the depth sounding problems encountered with ISELIN.

Marine Technical Groups at RSMAS

In addition to routine radio/radar maintenance personnel RSMAS maintains two seagoing technical groups. The Current Meter Facility under the direction of Mr. P. Bedard maintains one of the largest inventories of current meters and acoustic releases in the U.S. and a host of profilers including both shipboard and moored Doppler Profilers, Cyclesondes, XCP's and Pegasus. The services and equipment of the group are available to investigators both inside and outside RSMAS. This group requires the use of a large vessel to launch and recover moorings. For shallow water operations the ORV CAPE FLORIDA is ideal. For deep water mooring work the additional deck area of ORV COLUMBUS ISELIN is needed.

The Shipboard Technician Group under the direction of Mr. R. Findley maintains a large inventory of shipboard oceanographic equipment such as Neil Brown CTD's, Rosettes, XBT systems, Sail System, echo sounders and related data logging equipment. This equipment is available, along with a technician for operation and maintenance, to all UNOLS investigators. Lastly, Mr. Paul Eden of RSMAS operates and maintains the oceanographic communication, satellite ground station for the entire UNOLS community.