

UNIVERSITY-NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

REPORT OF UNOLS WORKING GROUP
ON JOINT SHIP SCHEDULING

- Part I BACKGROUND
- Part II SHIP SCHEDULING
- Part III ASSESSMENT OF 1981 SHIP FUNDING
- Appendix Background Papers & Documents
 (Separate Enclosure)

R. P. DINSMORE
Chairman and Recorder
25 August 1980

REPORT OF UNOLS WORKING GROUP

ON JOINT SHIP SCHEDULING

Part I

BACKGROUND

In accordance with the action of the UNOLS meeting on 22 May, the *ad hoc* Working Group on Ship Scheduling met at Scripps Institution July 10-11, 1980. Participants were:

G. C. Anderson, University of Washington
H. L. Clark, National Science Foundation
R. P. Dinsmore, Chairman,
Woods Hole Oceanographic Institution
E. Herron (for D. E. Hayes)
Lamont-Doherty Geological Observatory
K. W. Kaulum, Office of Naval Research
J. G. McMillan, National Science Foundation
B. H. Robison, University of California,
Santa Barbara
G. G. Shor, Scripps Institution of Oceanography
T. R. Stetson
University-National Oceanographic
Laboratory System (UNOLS)
T. K. Treadwell, Texas A & M University

The purpose of the meeting was to review and develop various existing proposals for joint and cooperative ship scheduling into a realistic and agreed upon plan for submission to UNOLS members. A further purpose of the meeting was to examine proposed 1981 ship usage data and projected funding support, and ascertain the potential impacts on 1981 ship deployment and scheduling.

Role of the Working Group

The exact role of the Working Group was discussed at some length, especially regarding recommendations on the makeup and distribution of the UNOLS fleet. Several members argued that

rearrangements within the UNOLS fleet including layups, assignments, and construction are pertinent to the overall scheduling problem and should be within the role of the Group. Others held that the composition of the fleet was the subject of several ongoing studies: OSB, NACOA, CAO, OTA, etc., and should not be part of this group's deliberations except where short term layups become part of the scheduling process.

The latter view prevailed; however, papers and inputs by members which already had been submitted and which include a discussion of the makeup of the UNOLS fleet are included as Appendix II.

Meeting Documents and Materials

Documents giving background materials and other inputs to the meeting agenda were reviewed. An inventory of these is given below and copies are attached with Appendix I.

1. Draft Plan for Joint Scheduling of large research ships of the UNOLS fleet, May 1, 1980 (R. P. Dinsmore).
2. JOI, Inc., memo and draft Letters of May 13, 1980, regarding concern and support of ships; and final letters to RADM Baciocco and Dr. F. Johnson of June 9, 1980,
3. Letter on overall fleet problem; May 28, 1980 (J. H. Martin).
4. Proposed plan for rational operation and funding of academic research ships, 7 June 1980 (G. G. Shor).

5. Suggestions for optimizing ship usage, 12 June 1980 (H. T. Rossby).
6. Report Summary: U.W./O.S.U. regional scheduling of R/V THOMPSON and R/V WECOMA, July 10, 1980 (G. C. Anderson).
7. Report Summary: Future use of R/V THOMPSON and R/V CONRAD, July 10, 1980 (G. C. Anderson).
8. Letter re ship arrangements and scheduling, July 3, 1980 (B. H. Robison).
9. Memo convening 10 July 1980 Working Group meeting, 10 June 1980 (R. P. Dinsmore).

Meeting Report

A draft of the meeting report was sent to all participants on July 23, 1980. A copy also was sent to the UNOLS Advisory Council for review at its meeting on 7-8 August 1980. Based on comments³ received and recommendations of the Advisory Council the following report has been compiled. In instances where the consensus view of the *ad hoc* Committee do not agree with the Advisory Council, both have been included and so noted.

In the interest of correctness certain data has been incorporated which was either not available at the July meeting, or subsequently corrected by appropriate Federal offices or UNOLS members.

Meeting Notes:

The meeting was convened at 0830 hours, 10 June 1980, in Room 114 of Scripps Administration Building and adjourned at 1600 hours on 11 June 1980. The members are very much indebted to Scripps for hosting the meeting and attending to many logistic details.

Part II

SHIP SCHEDULING

The Working Group recommends that arrangements for National and Regional ship scheduling should be implemented as soon as possible. The goals for these plans should be:

- Assure the most effective, efficient and economic utilization of ships.
- Closer coordination and cooperation between ship operating institutions.
- Long-range voyage and expedition planning.
- Improved mechanisms for scheduling scientists from non-operating labs, and meeting needs of Federal Agencies.
- Oversight of ships' conditions and capabilities especially in the areas of standardized equipment and procedures.

In order to accomplish these goals better for scheduling purposes, it is recommended that the larger vessels of the UNOLS fleet be divided into groups having common operating or geographic considerations. The Working Group has recommended three groups: "Eastern" and "Western" Regional Fleets, and a "Long-Range" Fleet. To the former would belong most sea-going UNOLS ships of less than 200 feet, and the latter would include the six larger ships. Each fleet would have a cognizant coordinating group comprising one representative from each of the operating institutions, a member of the UNOLS Advisory Council, and observers from the Federal Sponsoring Agencies.

On this basis the fleet makeup would be as follows:

<u>Western</u>	<u>Long-Range</u>	<u>Eastern</u>
ALPHA HELIX	MELVILLE	GYRE
KANA KEOKI	T. WASHINGTON	ISELIN
WECOMA	T. G. THOMPSON	CZRV #1
CAYUSE	KNORR	CZRV #2
VELERO IV	ATLANTIS II	CAPE HENLOPEN
NEW HORIZON	CONRAD	ENDEAVOR
		OCEANUS

In reviewing the above, the UNOLS Advisory Council considered that the large ships constituting the proposed "Long-Range Fleet" would be better constituted as a part of the respective regional fleets. The UNOLS Advisory Council therefore proposes two major divisions -- Eastern and Western Groups as follows:

<u>Western</u>	<u>Eastern</u>
MELVILLE	KNORR
T. WASHINGTON	ATLANTIS II
T. G. THOMPSON	CONRAD
ALPHA HELIX	GYRE
KANA KEOKI	ISELIN
NEW HORIZON	CZRV #1
WECOMA	CZRV #2
CAYUSE	CAPE HENLOPEN
VELERO IV	ENDEAVOR
	OCEANUS

A good case can be made for each of these arrangements. Those favoring a separate large ship fleet argue that those ships bear the brunt of economic and operational scrutiny. Long-range voyages and expeditions are usually drawn from this group. And it is suggested that the large ships require longer term (two-year) scheduling.

Note: The Advisory Council recommended that MOANA WAVE temporarily be deleted from the list of UNOLS ships until its return from current Navy assignment.

On the other side it is submitted that more schedule interaction exists between large and small ships in a given region than between large ships in different oceans. Furthermore, two scheduling groups overlapping the same area would be an undesirable situation.

The majority of participants and reviewers appear to be of the latter persuasion.

Coordinating Groups

It is intended that each of the fleet components exercise a strong role in ship scheduling, operations, layups, review, and oversight with regard to the fleet as a whole. In order to insure cognizance within the region, each group should include representatives from all major operating institutions within the region. Makeup of the groups is recommended as follows:

Western

U. Alaska
U. Hawaii
U. Washington
Oregon State U.
Moss Landing Lab
U. Southern California
Scripps Institution
Member, Advisory Council
Observers: NSF, ONR

Eastern

Texas A & M
Rosenstiel School
Duke U.
U. Delaware
U. Rhode Island
Lamont-Doherty
Woods Hole
Member, Advisory Council
Observers: NSF, ONR

It should be noted that regardless of whether or not a separate large ship group is identified, the regional groups would include all major operators (i.e., LDGO in the Eastern and U. Washington in the Western).

If a Long-Range Fleet component of large ships were separately identified, its coordinating group would comprise the following:

Long-Range

U. Washington
Scripps Institution
Lamont Doherty
Woods Hole
Member, Advisory Council
Observers: NSF, ONR

Each of the coordinating groups would include, as a full member, a UNOLS Advisory Council member who represents an institution which does not operate a major ship. The role of this member will be to directly represent the interests and needs of ship users from non-operating institutions. This arrangement is undertaken to insure that the parochial interests of the operating institutions are at least partially balanced by an advocate of the growing group of ship users who work at institutions which do not operate ships. This will also allow for a more accurate representation of the needs of the scientific community as a whole on the coordinating groups.

Procedures

In the conduct of this scheme the following procedures are recommended:

- 1). Close and continuing liaison between members of the Group should be maintained.
- 2). Requests for ship use will be submitted to the intended operating lab and to the UNOLS Office. Regional group members will circulate copies of, or inventories of, ship use requests as they are received. *It is intended that all members be aware of all requests within the region.*
- 3). Initial ship operating schedules will be prepared by

individual labs considering the UNOLS Fleet as a whole. Preliminary schedules and subsequent iterations will be circulated to all members of the Group. Even at this stage care should be exercised to place the proposed use on the most appropriate ship and to avoid duplications.

4). Regular meetings will be held as frequently as necessary in order to develop schedules; and in any event well before the semi-Annual UNOLS meetings. Opportunities exist to meet again at the UNOLS meetings. Additional meetings between sub-groups of the region will be necessary to coordinate special activities within the region or between regions.

Spring meetings are for the purpose of developing the best possible ship schedules using the following criteria:

- Knowledge of funded scientific programs
- Appropriateness of ships assigned
- Combining compatible projects
- Minimizing unproductive transits

Fall meetings will produce the final schedules for the ensuing year assuming that both science and ships' operations funding are reasonably well known. At this stage all ship schedules should be revised using the above criteria, stressing both appropriateness and efficiency. In addition, the anticipated costs of ship operations *vis-a-vis* projected agency funding shall be reviewed to determine potential funding shortfalls or surplus. Recommendations should be made to the funding agencies regarding practical alternatives in case of a funding shortfall. Alternatives to be considered include:

- Reduction of operating days
- Further combination of projects
- Deferment of projects
- Ship layups for significantly economic periods

5). Based on the criteria for effective scheduling, and on the needs and resources of science and facilities funding, the coordinating group is to have authority and responsibility to recommend specific ships for temporary periods out of service. Such recommendations shall be included within the schedule and shall be transmitted specifically to UNOLS and to funding agencies.

6). Permanent retirement from the fleet or other disposition may be a matter of consideration by the coordinating groups based on accumulated out-of-service or unscheduled periods. Other factors in this determination include ship capability and material condition. Such recommendations shall be transmitted by the group to UNOLS via the Advisory Council and to funding agencies.

7). Although meetings are intended to be working sessions between members, nothing should preclude a potential investigator or user from attending a meeting for the purpose of discussing ship use requirements or problems.

8). The evolution of major expeditions and distant voyages should be the development of scientific meetings and discussions, but the planning and scheduling for such cruises should rationally be a long-range effort through a coordinating group. This should ensure the widest participation possible as well as develop sound funding arrangements well

in advance. In this regard, information should be communicated widely to all potential participants.

9). In the event that a ship is proposed to operate as a "dedicated" facility, the coordinating group can assist in developing participation in the facility. Conversely, the group must ensure that investigators displaced by the dedicated operation are accorded opportunities on other vessels.

10). Chairing of the coordinating group(s) should be rotated amongst the members probably on an annual basis. In addition to setting the meetings, the chief role of the chairman is to ensure that the principles and procedures are observed.

11). Recommendations of the coordinating groups in the matter of joint schedules shall be transmitted concurrently to UNOLS Members, the Advisory Council, and to Federal Sponsoring Agencies.

Part III

ASSESSMENT OF 1981 SHIP FUNDING

In addition to developing a joint ship scheduling scheme, the Working Group was charged with examining proposals for 1981 ship operations support and comparing these with anticipated funding in order to assess the extent of the funding problem and its potential impact.

Proposal data were examined from sixteen operating institutions representing twenty-seven¹ ships of which four appeared to be less than a full year's operation. Data available are shown in Table 1. Total 1981 costs and profile of proposed support is shown by the following along with comparable 1980 estimates.

<u>Sponsor</u>	<u>\$ M</u>			
	<u>1981 Proposed 6/30/80</u>	<u>1980 Proposed 6/30/79</u>	<u>1980 Outlook 7/1/79</u>	<u>1980 Actual 7/1/80</u>
NSF	25.119	19.160	17.5	18.157
ONR	3.423	3.600	3.5	3.276
OTHER	4.707	4.311	4.8	3.801
Total	33.243	27.071	25.8	25.276

1 - On the recommendation of the Advisory Council, the MOANA WAVE is not included in these data inasmuch as its current operation and support is outside the scope of UNOLS.

TABLE I
1981 SHIP COST DATA
FROM PROPOSALS TO NSF

30 June 1980

	Op. Days *-Estimate #-Part Year	Total Cost \$K	NSF Portion	ONR Portion	"Other" Portion
THOMPSON	290	2,140	1,808	229	103
WASHINGTON	293	2,747	2,110	638	--
CONRAD	270	2,072	1,328	744	--
MELVILLE	326	3,249	3,249	--	--
KNORR	277	2,649	1,329	96	1,224
ATLANTIS II	293	2,870	2,479	392	--
Total		15,727	12,303	2,099	1,327
<i>Average</i>	<i>292</i>	<i>2,621</i>			
KANA KEOKI	321	1,360	818	390	153
WECOMA	273	1,690	1,597	--	93
ENDEAVOR	273	1,766	1,533	58	175
OCEANUS	264	1,689	1,171	409	109
NEW HORIZON	228	1,530	429	107	993
ISELIN	248	1,384	893	112	379
GYRE	270	1,826	926	135	764
VEMA	# 225	1,052	701	70	281
Total		12,307	8,068	1,281	2,947
<i>Average</i>	<i>263</i>	<i>1,538</i>			
ALPHA HELIX	163	932	835	--	97
CAYUSE	200	465	370	--	95
VELERO IV	192	629	629	--	--
E. B. SCRIPPS	167	523	470	34	19
CZRV #1	## 140	580	580	--	--
CZRV #2	## 140	325	325	--	--
EASTWARD	# 128	492	492	--	--
WARFIELD	160	463	451	--	12
Total		4,409	4,152	34	223
<i>Average</i>	<i>193</i>	<i>551</i>			
HOH	140	66	50	--	17
ONAR	200	145	114	--	30
LONGHORN	162	256	154	9	92
CALANUS	171	184	184	--	--
BLUE FIN	245	159	94	--	65
Total		810	596	9	204
<i>Average</i>	<i>183</i>	<i>162</i>			
TOTAL		33,243	25,119	3,423	4,701

Anticipated support in 1981 according to the best estimates available appears to be:

	<u>\$ M</u>		
	<u>High</u>	<u>Low</u>	<u>Probable</u>
NSF	22.0	20.0	21.0
ONR	4.1	3.2	3.4
<u>OTHER</u>	<u>6.2</u>	<u>5.5</u>	<u>6.1</u>
Total	32.3	28.7	30.5

An analysis of these figures reveals that the probable total 1981 funding is about \$2.7M less than currently projected costs. Of this net shortfall, about \$4.1M is NSF; ONR is about even; and a \$1.4M surplus exists in "other" support which has not yet been proposed (largely USGS ship funds for Bering Sea work). If this latter amount can be distributed, a \$2.7M shortfall still remains in hoped-for NSF support.

Meeting the Shortfall

At this stage for 1980 planning (July, 1979) the anticipated shortfall appeared to be \$27.071M - \$25.8M = \$1.3M. It is not uncommon to record a projected shortfall between original proposed costs and projected funding. In the past this has been made up by deferred maintenance and operations. However, escalating fuel and other costs in late 1979 made it clear that the proposed 1980 figures were highly understated and that the real shortfall would have been twice the amount indicated or as much as \$3.0M. Clearly, "normal" practices would not have sufficed, and the shortfall was largely met by layups in the fleet during

1980:

MELVILLE - 6 months
CONRAD - 10 months

It probably can be assumed that 1981 proposals have caught up with inflation trends, and some cutbacks in support probably can be tolerated without major perturbations. It is difficult to assess the full extent of this, but certainly not much in excess of \$1.0M leaving a \$1.7M shortfall or as much as \$3.1M if other outside support (such as the \$0.8M USGS) cannot be realized.

Summarizing, it appears realistic to state that for currently proposed or projected operations by the UNOLS fleet in 1981 a funding shortfall of between two and three million dollars can be forecast.

In order to meet this shortfall, the following measures may be considered:

- Retirements
- Reduced Ship Operations
- Layups

Retirements

Retiring a ship, that is, striking it permanently from the inventory of the UNOLS fleet is a step which arouses the most discussion and controversy. On one hand it is the most predictable and cost saving measure available. It is usually done on ships which have reached the end of their useful life or are so little employed that the conclusion is easily reached. However, when it becomes a matter of eliminating a ship because the entire fleet is under utilized, it becomes another matter. In general,

it is a step favored by institutions not operating ships, but viewed with nervousness and concern by ship operators (it might be their ship).

Those opposing the elimination of a capable ship argue that forthcoming science projects should and will need that capability. Furthermore, history has shown that a ship once removed is an irrevocable action. Those favoring a match of current ship usage to ship capacity have the advantage of statistics on their side.

The Working Group was not prepared to recommend the retirement of any ship at this time. (An exception here is the VEMA which the Group understands already is planned for retirement sometime in 1981.) The Group recognizes, however, the many recommendations for and strong trends which may dictate a resort to this measure. It recommends that the fleet coordinating groups make such recommendations based on demonstrated and cumulative non-productivity over a period of years.

Reduced Ship Operations

Still another approach to reduced ship costs lies in amending the concept of operations. If and when large ship operating days total less than 280, they are referred to as "under utilized" and some sort of a taint applies. All-out efforts are made by our operators to maintain high averages often at the expense of maintenance and other considerations. The 1981 proposals show a large ship (over 200 ft.) average of 292 days and an intermediate ship average of 272 days. If these days were reduced by about 10%, savings in fuel alone would be significant along with improvements in shipboard maintenance.

As an example: if the large ship average were 260 days/year (still a respectable number in comparison to other fleets), a 30-day savings in fuel, food, and overtime would amount to as much as \$3,000/day. This would result in a six-ship cost reduction of \$540,000. Similar reasoning for eight intermediate ships (25 less days @ \$1,500/day) should save \$300,000, and smaller vessels might realize \$100,000. The total of this would amount to about \$1.0M which is in the same order as the very first set of reductions shown earlier (Pg. 14) and probably duplicates it but in a more or less planned-for fashion. It is apparent that it does not fully compensate for the anticipated shortfall.

Advantages of reduced operating days are:

- Reduced overall costs - especially in view of increasing fuel and overtime.
- More maintenance availability by ships crew.
- Preserves numbers of ships from retirements due to overcapacity; hence retaining geographic and capability range.

Disadvantages are:

- Increased daily rates would probably apply to those sponsors who fund on a daily rate basis.
- Total savings is probably not as great as a full fledged layup. That is, six ships operating 180 days less will not save as much as one ship out of service for $\frac{1}{2}$ year.
- Although shipboard maintenance will be improved, the added opportunities for maintenance may tend to devour the savings.

In general, the Working Group favored further consideration of reduced operating days as a systematic means of planned cost savings.

Ship Layups

The Working Group considered that recommendations for lay-

ups are within the purview of the scheduling process but that adequate information must be available regarding the distribution of funded science support, or that layups be planned well in advance so that proposal planning, both science and ship operations can proceed in an orderly fashion. In other words, ships should be layed up that have no work to do, or ship and science planning should start in the full knowledge that certain ship(s) will not be available.

The Working Group recommends that the Fleet Coordinating Groups be empowered to recommends layups as a part of the scheduling process when that Group is fully advised of the profiles of funded science projects.

Regarding layups, the Working Group recommends that up-to-date information should be compiled on the cost savings of layups of various durations. It was noted that in view of fuel costs becoming a dominant factor, the previously considered "six-month minimum layup" may be becoming obsolete. Furthermore, because several operators have now gone to a salary and benefit cost accrual system, shorter term layups are more cost effective than before.

Another factor is the inclusion of planned maintenance with a layup period. For example, if each of the six large ships each went to a biennial four-month maintenance availability, the result would be three ships each layed up four months per year (12 months equivalent out of service), and that overall fleet maintenance would be systematically improved.

In regard to the 1981 situation, the Working Group is not in a position to recommend specific layups inasmuch as inform-

ation on funded science programs was not available to it.

However, based on overall statistics and the current stage of ship scheduling, the Working Group considers that about two one-half year layups of larger vessels, and two one-half year layups of smaller vessels will be required in order to meet the projected shortfall in ship operating support.

1980 SHIP COST DATA
FROM PROPOSALS TO NSF

30 June 1980

	Op. Days *-Estimate #-Part Year	Total Cost \$K	NSF Portion	ONR Portion	"Other" Portion
THOMPSON	266	1,921	1,886	35	--
WASHINGTON	299	2,358	1,510	825	23
CONRAD	# 23	116	--	--	116
MELVILLE	# 178	1,537	1,485	--	52
KNORR	247	2,033	837	732	463
ATLANTIS II	323	2,681	2,765	--	--
Total		10,646	8,483	1,592	654
<i>Average</i>	284	2,248			
KANA KEOKI	239	918	326	517	75
WECOMA	279	1,478	1,351	26	101
ENDEAVOR	263	1,415	1,040	97	278
OCEANUS	257	1,383	861	350	185
NEW HORIZON	210	1,250	647	354	249
ISELIN	171	1,074	728	88	258
GYRE	254	1,555	559	126	870
VEMA	366	1,334	838	36	459
Total		10,407	6,350	1,594	2,475
<i>Average</i>	291	1,301			
ALPHA HELIX	144	912	862		50
CAYUSE	182	390	233	--	153
VELERO IV	180	606	471	--	--
E. B. SCRIPPS	161	461	286	89	86
EASTWARD	216	764	626	--	138
WARFIELD		499	389	--	109
Total		3,632	2,870	89	536
<i>Average</i>	176	605			
HOH	111	38	25	1	12
ONAR	172	94	70	--	24
LONGHORN	100	140	101	--	39
CALANUS	187	176	176	--	--
BLUE FIN	230	143	82	--	61
Total		591	454	1	136
<i>Average</i>	160	147			
TOTAL		25,276	18,157	3,276	3,801

A P P E N D I X

Background and Supporting documents
incident to the proceedings of the
Meeting of the UNOLS Working Group
on Joint Ship Scheduling
10-11 July 1980

1. Draft Plan for Joint Scheduling of Large Research Ships of UNOLS Fleet, May 1, 1980 (R.P.Dinsmore).
2. JOI, Inc., memo and draft letters of May 13, 1980, regarding concern and support of ships; and final letters to RADM Baciocco and Dr. F. Johnson of June 9, 1980.
3. Letter on overall fleet problem; May 28, 1980 (J.H.Martin).
4. Proposed plan for rational operation and funding of academic research ships, 7 June 1980 (G.Shor).
5. Suggestions for optimizing ship usage, 12 June 1980 (T. Rossby).
6. Report Summary: U.W./O.S.U. Regional scheduling of R/V THOMPSON and R/V WECOMA, July 10, 1980 (G.Anderson).
7. Report Summary: Future use of R/V THOMPSON and R/V CONRAD, July 10, 1980 (G.Anderson).
8. Letter re ship arrangements and scheduling, July 3, 1980 (B.Robison).
9. Memo convening 10 July 1980 Working Group meeting, 10 June 1980 (R.P.Dinsmore).

A PLAN FOR JOINT SCHEDULING OF
LARGE RESEARCH SHIPS OF THE UNOLS FLEET

Summary

This plan proposes an arrangement for planning and scheduling large ship use (over 200 feet) in order to meet growing economic pressures and to provide the most effective application of the available resources. Ship use planning and scheduling would be a function of an advisory group comprising ship operations, the two major Federal Agencies, and a body of individual scientists drawn from the UNOLS community. Specific functions of this group would be to review proposed use for large ships and recommend assignments based on scientific merit, science needs, ship capabilities, geographic distribution, and available funding. Other functions would include the development of major expeditions, recommend temporary or permanent layups as required, oversight of ship material condition and capabilities, and cognizance of dedicated facilities.

Background

Since the inception of UNOLS in 1972, the "large ship" component has shrunk from nine ships to six¹ and of the remaining six an average of one ship per year has been, or is projected to be, out of service. The reason for this decline is in part due to

1 - UNOLS ships over 200 feet:

<u>1972</u>		
MELVILLE	KNORR	GILLISS
WASHINGTON	ATLANTIS II	CONRAD
THOMPSON	CHAIN	VEMA

<u>1980</u>	
MELVILLE	KNORR
WASHINGTON	ATLANTIS II
THOMPSON	CONRAD

addition to the fleet of capable intermediate sized ships and to an alleged decline in science demands for large ships. The chief reason, however, seems to be the increasing costs of the ships in relation to science project funding and the failure of available funds to match the increasing costs. Whatever the reason, a six-ship fleet appears to be the best that UNOLS can aspire to, and economics may reduce the "active" fleet to five, or even fewer, ships.

The current (1980) cost of the UNOLS fleet is about \$26M for 26 ships. The six large ships represent almost half of this (\$12.5M). It is not surprising to see pressures for reducing this number especially in view of alleged trends toward less use of these ships. Others hold that the "trends" are not entirely valid and that the need for large ships is as great or greater than it ever was and that any further reduction in this number would be a severe loss to this Nation's oceanographic research program.

In earlier times a ship assigned to a laboratory was utilized chiefly by that laboratory. Furthermore, most of the large ship users were located at the labs operating those ships. This balance no longer exists.

Coordinated and other cooperative projects have brought about an increasing number of ship users from without the operating laboratory. Furthermore, there are now only four institutions operating large ships whereas the number of ship users is becoming more diversely spread over a greater number of labs both within and outside UNOLS. These factors along with increasing economic pressures

have brought about an urgent awareness that the large ship resource -- and the funds they represent -- must be husbanded in the most effective manner possible.

Several schemes are being advanced to meet the situation described above. These include centralized or regional operations, cognizance by a single Federal Agency, consortia arrangements, and various concepts of "national facilities". Most deal with the entire UNOLS fleet; few include the element of scientific merit, and none have been fully defined to deal with the problems at hand.

Within the UNOLS concept, all ships are recognized as national resources, and the chief ingredient of UNOLS is cooperation and uniformity of purpose in order to assure access to all ships by qualified investigators. Nevertheless, control and scheduling of the ships remains with the operator, and a good case can be made for this. Only in UNOLS "National Facilities" does a community effort become the guiding influence in operating and scheduling. In the case of ALVIN the national facility operation has worked with good results. It has been suggested that certain elements of that operation be applied to the operation and scheduling of the large ships.

Discussion

The singling out of the large class of UNOLS ships for a joint, cooperative arrangement is probably the most reasonable and feasible approach. It is on these six ships that most of the pressures have been centered. Those charged with viewing (and meeting) overall

fleet costs have concluded that only here can budgets be balanced. Large ship advocates point out that these ships carry most of the interinstitutional programs and constitute a national resource. If these ships are to effectively demonstrate their worth and at the same time be cost effective, it is essential that some sort of common framework be explored. Smaller ships are not considered to pose the same problems at this time. Thus any massive effort to include them in any similar arrangement would be an enormous, unnecessary and probably chaotic undertaking. The large ships represent only four operators with a geographical balance, and if manageability is to be tested, it should be confined to these ships.

It is proposed that these ships be separated from the main body of UNOLS and formed into a national pool of university research ships under a single advisory body. Here some of the same principles of UNOLS national oceanographic facilities would be adapted but with specific applications to meet the purposes intended. For example, if a ship by reason of funding or other consideration should be layed up, this body might be the most effective instrument for achieving that decision. Additional matters include planning for long voyages, oversight of ships' conditions and capabilities, and "dedicated" ships. The principal role, of course, would be ship scheduling to assure the most effective, efficient, and economic utilization of ships. Being born out of necessity in these times of reduced ship availability, the element of scientific merit is readily available through this process. The following sections deal with specific applications of this proposal.

(1) Organizational Framework is probably best achieved through the UNOLS system whose charter is intended for this sort of thing. Other frameworks could be JOI, OSB, a Federally constituted group, or a new independent body. UNOLS has chains of communication to most academic institutions and an infrastructure already functioning in allied matters. The UNOLS Charter probably would need amending, mostly in the form of an annex, to provide for a new large ship operations council or something of that sort. This would best be served by a body comprising one representative appointed *ex-officio* by each large ship operating institution, one each from NSF and ONR as major funding and ship-owning agencies, and a group of individual experts of varying disciplines elected from the major ship use institutions. This would result in a group of about 11-13 persons of whom about half are institution or agency members and those remaining comprise an independent review group. In much the same way as the UNOLS Advisory Council and the UNOLS ALVIN Review Committee, this group perhaps termed the Ship Utilization Review Council (SURC) would nominally report to the UNOLS Chairman but would have the statutory authority of interacting directly with Federal agencies (and operating institutions).

(2) Ship Scheduling would be the principal role of the Review Council and would achieve for the first time a fully coordinated approach for a distinct block of ships. Advantages here would be an overview of the full inventory of ship requests. This alone will be a formidable task. The ALVIN Review Committee in considering 1981 received and reviewed 19 requests. For the same year Woods

Hole alone received 28 requests for large ship use. With six ships to schedule the job will be at least six times as great and probably more. Factors involved with ship scheduling include:

- Timeliness and Format of requests - Sufficient information must be received in time for the group to make reasonable judgments.
- Qualification of Investigators - Is project funded or what is likelihood of funding?
- Ship Requirements - Is a large ship needed? What special ship capabilities are needed? What are available?
- Ship Days - What number of days actually are required to accomplish the project?
- Area and Time Frame - How stringent? What fits exist with other projects. Can project be deferred?
- Compression - Can projects be combined?
- Views of Funding Agencies - What science priorities exist? Past history; future projections?
- Ship Operator Views - Institution priorities? Ability to perform; constraints on ship operations?
- Ship Funding - What is outlook for facilities funding? How many ships and ship days will this support?
- Scientific Merit - What is best science that can and should be supported if priorities are invoked?

Under a single scheduling body, considering the above factors, the best possibility exists for an effective coordinated ships' sched-

ule supporting the entire oceanographic community. It goes without saying that the closest liaison with all UNOLS scheduling officers must be established and maintained in order to assure orderly interface with the intermediate and smaller vessels in the UNOLS fleet.

(3) Expedition Planning - The development of long voyages would be better served and made more efficient by this sort of coordinated approach. Such planning has already become interinstitutional in nature but presently has no rational basis for development. As a result, duplications have arisen in ship assignments and oversights have occurred in science applications.

(4) Ship Capabilities - Joint scheduling should include an overview of ships' material condition and capability of conducting research in accordance with UNOLS criteria now under development. Ship deficiencies would become more apparent along with the pressures for correction. The goal here would be the awareness of uniform standards and the ability to fit intended projects with the ships best located and suited to serve them.

(5) Dedicated Ships - The need for and assignment of a ship or ships for dedicated purposes: geology and geophysics, Seabeam, or other use can be facilitated through this body in view of the obvious interaction with the remainder of the fleet. Such an assignment could be temporary or for a longer term, but it becomes *per se* a National Facility (or should be). A national review mechanism for dedicated ship use becomes immediately available as well as a regulated approach for treating the "other" science projects of the operating institution which would be displaced.

(6) Ship Layups - Layups are rationally a function of total needs, scheduling arrangements, and available funds. With the ship use "pooled" under the arrangement described here, a mechanism is established for best identifying if a layup is required and which ship it ought to be. Working with the Federal agencies on one hand and the scheduling process on the other, the "Council" would be in the best possible position to recommend (and make stick) layups ranging from short term to permanent, if necessary.

The question arises that if this is an effective mechanism, why would it not be suitable for application to all seagoing ships -- or at least to the intermediate size vessels? The answer is that it might well be, but it might also be premature to involve up to ten or more additional operators and proportionately greater use proposals until the mechanism has at least been tested. The scheme described above involves only four operators and probably includes most of the problem areas that seem to be in contention. Certainly the big ships are the center of most of the current funding problems and controversy. If it works, consideration should be given to its extension.

On the other hand, the mechanism, if established, should have a self-destruct clause for its automatic elimination after one or two cycles if it does not prove effective.

Recommendation

It is submitted that this arrangement or a similar one addressing the same goals should be considered as a matter of urgency and that a suitable mechanism be instituted under UNOLS in

order to deal with the large ship planning and scheduling process in a cooperative and orderly manner.


This proposal has been developed in consultation with several of UNOLS members and community of ship users in whose behalf it is submitted. By copy hereof to the UNOLS Chairman it is requested that it be discussed at the forthcoming UNOLS meeting.

M E M O R A N D U M

May 13, 1980

TO: JOI, Inc. Board of Governors

Enclosed is a draft letter to NSF on our May 8 meeting. A similar letter will go to Baciocco. I believe we agreed it would be useful to get something to Johnson and Baciocco prior to the May 22 meeting, if possible. Please call in your suggestions to either Jack Clotworthy or me. Although we may not have an agreed upon letter by May 22, I would hope that we might have a "draft" that either Tex Treadwell or Clotworthy could discuss with NSF and ONR prior to the UNOLS meeting and that Tex might discuss at the UNOLS meeting itself.


John A. Knauss, Chairman
JOI, Inc. Board of Governors

JAK:abb
Enc.
cc: John Clotworthy

May 13, 1980

Dr. Francis Johnson
National Science Foundation
1800 G. Street, N.W.
Washington, D. C. 20550

Dear Dr. Johnson:

I have been asked on behalf of the JOI Board of Governors to inform you of some discussions we have had recently on a subject of mutual concern-- the scheduling and support of the so-called large ships (greater than 150 feet) of the UNOLS fleet. JOI institutions operate 100% of that fleet and we estimate that members of our institutions are responsible for well over 80% of the UNOLS programs undertaken aboard these ships. We are concerned, as is NSF and ONR, that these ships be used as effectively as possible.

There is no consensus as to whether or not we have the correct number and mix of ship facilities for the 1980's, and we are aware of a number of proposals and studies, planned or underway, to look at this question. One of our concerns is that we not foreclose any options that might come from these studies, by subjecting important components of this fleet to ad hoc permanent lay-ups. At the same time we wish to develop new modes of cooperative scheduling and operations that will allow us to respond more effectively to any future decisions or changes in the component parts of this fleet and make most effective use of what is one of the nation's most important scientific facilities, the large ship UNOLS fleet.

There have been a number of meetings between member institutions, including one all day meeting in St. Louis May 8, and we expect there will be more such meetings in the future as we work out possible arrangements and

plans, but on the basis of our May 8 meeting we believe we have come far enough along in our thinking to share our ideas and to suggest that it might be useful for a few of us to meet with you and Admiral Baciocco and members of your staffs to further explore these ideas.

In essence we have divided the fleet into four component parts which we have tentatively labeled as follows:

<u>National</u>	<u>Underway G&G</u>	<u>East Coast Regional</u>	<u>West Coast Regional</u>
ATLANTIS II	CONRAD	ENDEAVOR	KANA KEOKI
KNORR	THOMPSON	GYRE	NEW HORIZON
MELVILLE		COLUMBUS ISELIN	WECOMA
WASHINGTON		OCEANUS	

Strict division of ships into these classifications will probably not be possible until calendar year 1982; we hope to use the next year as a transition period, and also as a shakedown for developing and refining the elements of our plan. You will note that VEMA is not a component of this fleet. Sometime in 1981 we expect her to be retired from the UNOLS fleet and her underway seismic gear and other geophysical equipment to be transferred to the THOMPSON, making the latter a "dedicated G&G ship" operating primarily in the Pacific and Indian Oceans. Similarly we expect CONRAD to be out of service during part of 1981 as she undergoes a major overhaul and upgrading. When she returns to the fleet we expect her to be primarily a dedicated G&G ship for the Atlantic. The extent to which THOMPSON and CONRAD are fully dedicated ships will depend first of all on whether there is sufficient funded science to support two such ships, but secondly on the ability of our proposed plan to fully satisfy the scheduling needs of Lamont-Doherty and University of Washington scientists for adequate ship time on other UNOLS ships. We will

not list MOANA WAVE in our inventory of the West Coast Regional fleet until such time as she is released from her Navy program.

For this plan to work, it will require cooperation and good will on the part of all of us. To maximize the scientific and cost effectiveness of this fleet for a given calendar year we need as realistic an estimate of funds available for ship operation as early as possible in the previous calendar year, (hopefully in January) not only from NSF, but from ONR and any other federal agency that will be a part of this compact. With this figure in hand we can make a preliminary estimate of what fraction of this fleet, if any, will be underfunded for the next year. At the same time we will, through our institutions, regional consortia, or otherwise, issue a call to marine scientists from our institutions and others, for ship requests for the next year. Knowing the ship-request pressure on ships of the different "fleets," as well as having a reasonably firm estimate of the available funds to operate the fleet, we believe we can, through successive iterations during the spring, develop a fleet schedule that will efficiently match the capabilities of the fleet with the needs of our science.

It is our hope that by mid-summer there will be sufficiently firm information on both ship support funds and funded science that we can make one last iteration of this schedule and submit a total fleet support proposal for the individual institutions. The combined ship budgets would stay within the limits set by the participating agencies. Although we have briefly considered the idea of NSF handling all ship support funds through an interagency agreement similar to what you now have for support of ALVIN, we do not think this is necessary at this time, and in fact, there may be some advantages in keeping separate the ship support funds from the different agencies.

A key element to this plan is the further development of regional and other arrangements for ship scheduling prior to the final adjustments that must be made after July 1. As you perhaps know the University of Washington and Oregon State have been working on a joint scheduling arrangement for two years. The University of Rhode Island, Lamont-Doherty, and Woods Hole have developed preliminary plans for similar arrangements. With the transfer of VEMA's seismic equipment to THOMPSON, Lamont and the University of Washington are also expecting to develop a special relationship. We expect to see more such regional and specialized ship arrangements develop in the future. Perhaps the biggest challenge in all of these scheduling operations, however, is how we schedule the ships of the National Fleet. Woods Hole and Scripps are working on ideas in this area, since the four ships in this fleet are under their jurisdiction. One hope is that if we can agree on tentative "area schedules" early enough for these national ships, we can develop the concurrent research proposals for work in these areas to maximize the use of these important facilities. We all know of times in the past when, because of the vagaries of funding and scheduling, this has not occurred.

We still have considerable work to do in developing the details of our plans, and a number of difficult problems have not been adequately addressed as yet, but all of us are committed to making this plan work and with your cooperation we think we can do it.

Sincerely,

John A. Knauss, Chairman
JOI, Inc., Board of Governors

JAK:abb

cc: Admiral Baciocco
Mary Johrde
Gordon Hamilton
JOI Board of Governors
Chairman UNOLS
UNOLS Advisory Committee

M E M O R A N D U M

June 10, 1980

TO: JOI Board of Governors

By now you have received Tex Treadwell's letter to me of May 29 indicating the desire of UNOLS to be actively involved in the scheduling problem we discussed at our St. Louis meeting, May 8. UNOLS has appointed a committee to "try to iron out the discrepancies and come up with a recommended procedure which will meet the aims of both JOI and UNOLS." I agree with Tex that it is essential that JOI and UNOLS "work together in trying to solve this complex and extremely important problem." It will be difficult for UNOLS to come up with a lay-up protocol that JOI does not agree with. On the other hand, UNOLS represents a somewhat larger group of ship users than we do.

At any rate, as you can tell by comparing drafts, I modified the letter to Baciocco and Johnson to omit any detailed discussion of regional fleets, national fleets, etc., until such time as we can agree, if possible, on a common plan. In Treadwell's letter, he indicated that he would like me to designate certain JOI members to work with the UNOLS Working Group. It is my understanding that this group is going to do much of its initial effort by correspondence rather than meeting together. Under the circumstances, it would seem that asking those members of the JOI Board of Governors, with representatives on the UNOLS Working Group, to serve as that interacting group, might be the most expeditious. This would then mean Jim Baker, John Steele, Manik Talwani, Ross Heath, Bill Nierenberg, and myself. I suggest as a first step that you meet with your representative on the UNOLS working group and attempt to explain the rationale for the decisions we made at the St. Louis meeting. Some of the UNOLS working group were at that meeting.



John A. Knauss, Chairman
JOI, Inc., Board of Governors

JAK:abb

cc: JOI Office
UNOLS Working Group



June 9, 1980

Albert J. Baciocco, Jr.
Rear Admiral, USN
Chief of Naval Research
Department of the Navy
Arlington, Virginia 22217

and

Dr. Francis Johnson
National Science Foundation
1800 G. Street, N.W.
Washington, D. C. 20550

Dear Dr. Johnson and Admiral Baciocco:

I have been asked on behalf of the JOI Board of Governors to inform you of some discussions we have had recently on a subject of mutual concern-- the scheduling and support of the so-called large ships (greater than 150 feet) of the UNOLS fleet. JOI institutions operate 100% of that fleet and we estimate that members of our institutions are responsible for well over 80% of the UNOLS programs undertaken aboard these ships. We are concerned, as is NSF and ONR, that these ships be used as effectively as possible.

There is no consensus as to whether or not we have the correct number and mix of ship facilities for the 1980's, and we are aware of a number of proposals and studies, planned or underway, to look at this question. One of our concerns is that we not foreclose any options that might come from these studies, by subjecting important components of this fleet to ad hoc permanent lay-ups. At the same time we wish to develop new modes of cooperative scheduling and operations that will allow us to respond more effectively to any future decisions or changes in the component parts of this fleet and make most effective use of what is one of the nation's most important scientific facilities, the large ship UNOLS fleet. There have been a number of meetings between member institutions, including one all day meeting in St. Louis May 8, and we expect there will be more such meetings in the future as we work out possible arrangements and plans.

As you know UNOLS is also deeply concerned about problems of rational scheduling of the UNOLS fleet. Both UNOLS and JOI have concluded that for at least the larger ships we need a scheduling mechanism that is broader than a single institution, but more tractable than a single UNOLS fleet scheduling effort. Although there are some differences in the JOI and UNOLS approaches, there is also much that is common. At the recent UNOLS annual meeting, at which both of you spoke, Captain Treadwell, Chairman of UNOLS, appointed a UNOLS working group to try to iron out discrepancies between our two approaches and to develop a plan which would meet the aims of both JOI and UNOLS. We in JOI plan to work closely with this group. We hope to have at least the elements of an agreed upon plan in place by early fall.

TO: Rear Admiral Baciocco, Jr.
and
Dr. Francis Johnson

June 9, 1980

For any plan to work, it will require cooperation and good will on the part of all of us. To maximize the scientific and cost effectiveness of this fleet for a given calendar year we need as realistic an estimate of funds available for ship operation as early as possible in the previous calendar year, (hopefully in January) not only from NSF and ONR but from any other federal agency that will be a part of this compact. With this figure in hand we can make a preliminary estimate of what fraction of this fleet, if any, will be underfunded for the next year. At the same time we will, through our institutions, regional consortia, or otherwise, issue a call to marine scientists from our institutions and others for ship requests for the next year. Knowing the ship-request pressure on ships of the different "classes," as well as having a reasonably firm estimate of the available funds to operate the fleet, we believe we can, through successive iterations during the spring, develop a fleet schedule that will efficiently match the capabilities of the fleet with the needs of our science.

It is our hope that by mid-summer there will be sufficiently firm information on both ship support funds and funded science that we can make one last iteration of this schedule and submit a total fleet support proposal for the individual institutions. The combined ship budgets would stay within the limits set by the participating agencies. Although we have briefly considered the idea of NSF handling all ship support funds through an interagency agreement similar to what you now have for support of ALVIN, we do not think this is necessary at this time, and in fact, there may be some advantages in keeping separate the ship support funds from the different agencies.

A key element to our plan is the further development of regional and other arrangements for ship scheduling prior to the final adjustments that must be made after July 1. As you perhaps know the University of Washington and Oregon State have been working on a joint scheduling arrangement for two years. The University of Rhode Island, Lamont-Doherty, and Woods Hole have developed preliminary plans for similar arrangements. With the transfer of VEMA's seismic equipment to THOMPSON, Lamont and the University of Washington are also expecting to develop a special relationship. We expect to see more such regional and specialized ship arrangements develop in the future. Perhaps the biggest challenge in all of these scheduling operations, however, is how we schedule such ships as KNORR, MELVILLE and ATLANTIS II. One hope is that if we can agree on tentative "area schedules" early enough for these so-called national ships, we can develop the concurrent research proposals for work in these areas to maximize the use of these important facilities. We all know of times in the past when, because of the vagaries of funding and scheduling, this has not occurred.

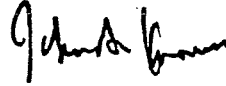
We and UNOLS still have considerable work to do in developing the details of our plans, and a number of difficult problems have not been

TO: Rear Admiral Baciocco, Jr.
and
Dr. Francis Johnson

June 9, 1980

adequately addressed as yet, but all of us are committed to making this plan work and with your cooperation we think we can do it.

Sincerely,



John A. Knauss, Chairman
JOI, Inc., Board of Governors

JAK:abb

cc: Mary Johrde
Gordon Hamilton
JOI Board of Governors
Chairman UNOLS
UNOLS Working Group
JOI Office

MOSS LANDING MARINE LABORATORIES

P.O. BOX 223
MOSS LANDING, CA 95039
(408) 633-3304

May 28, 1980

Captain Robert Dinsmore
Woods Hole Oceanographic Institution
Woods Hole, Massachusetts 02543

Dear Bob:

Here are my thoughts about the overall fleet problem that we have been asked to work on. Hopefully, these thoughts represent viewpoints of ship users (from non-ship-operating institutions), small ship operators and selected large ship operators.

1. Ships Greater Than 200 Feet.

- a. Some argue that one should be permanently deleted from the fleet.
- b. Others argue that one should be layed-up, as all six will be needed eventually.

Whether a or b is correct is unknown; nevertheless, we simply cannot afford to spend half of the NSF operating money on only six ships. One or more has to go, and go permanently. Selecting the ship is the problem. I think everyone agrees that Melville and Knorr should be retained because of their unique size. Because of special crewing problems, it would be best for the overall fleet to eliminate AGORs.

2. The community is somewhat ambivalent about the new class of coastal RVs. Some would rather see the money put in OCEANUS class RVs (OCRV).

3. Many members of the community are opposed to using new ship construction money for ship ops in 1981. This solves a short-term problem, but makes the long-term problem far worse. We are using funds to buy gas for the old Buick instead of buying the VW that will alleviate the long-term problem. This should not be allowed to happen.

On the basis of the above information, I suggest the following: If it is not too late, the 1981 and 1982 new construction money should be combined in order to build another OCRV. This will add another very popular, efficient, proven RV to the fleet. The new OCRV would be used to replace the deleted AGOR. For example, UW might be willing to trade THOMPSON for the new OCRV. THOMPSON

Captain Robert Dinsmore
May 28, 1980
Page Two

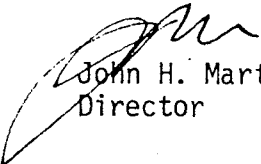
could be sent to Lamont to replace CONRAD, which I hear is due for a \$1.5 million refit.

These are, of course, just thoughts. Whether they have any value remains to be determined. I am convinced of one thing, however. It is time to get on with the long-term problem. Rotating lay-ups for big ships delays the inevitable and the use of new construction money for operations makes the long-term problem much worse.

Appended is a table with suggested changes for the fleet during the 1980s.

See you at SIO.

Best regards,



John H. Martin
Director

SUGGESTED CHANGES IN ACADEMIC R/V FLEET DURING THE 1980s

Ship Name	Keep/Delete	Replacement	Other Information
MELVILLE	keep	-	
KNORR	keep	-	If insufficient demand/funds for big ships, KNORR or ATLANTIS II would be layed-up first Best AGOR to Lamont for dedicated G&G
ATLANTIS II	keep	-	
CONRAD	delete	best AGOR	
J. GILLISS	deleted	CRV*	
T.G. THOMPSON	delete or transfer	OCRV**	
T. WASHINGTON	delete or transfer	OCRV	
VEMA	delete	-	
ENDEAVOR	keep	-	
OCEANUS	keep	-	
WECOMA	keep	-	
GYRE	keep	-	
MOANA WAVE	delete	-	Leave on assignment to NAVELEX
C. ISELIN	keep	-	
NEW HORIZON	keep	-	
KANA KEOKI	keep	-	
ALPHA HELIX	keep	-	Half NSF***
EASTWARD	deleted	CRV	
VELERO IV	delete	CRV	
R. WARFIELD	keep	-	Half NSF
E.B. SCRIPPS	delete	-	
ACONA	deleted	-	
CAYUSE	keep	-	Half NSF
LONGHORN	keep	-	Half NSF
BLUEFIN	keep	-	Half NSF
HOH	delete	One 80-100'	Half NSF
ONAR	delete	-	
CALANUS	keep	-	Half NSF

*CRV new NSF design coastal RV.

**OCEANUS class RV.

***Half operating funds from NSF, half from other sources.

COMPOSITION OF FLEET IN 1990

> 200	4	(MELVILLE, KNORR, ATLANTIS II, best available AGOR)
150 - 199	9	(5 OCRVs, 4 other)
100 - 149	5	(3 CRVs, 2 other)
< 100	5	(Half of operating funds from NSF, half from other sources)

Total: 23



SCRIPPS INSTITUTION OF OCEANOGRAPHY
OFFICE OF THE DIRECTOR

LA JOLLA, CALIFORNIA 92093
PHONE: (714) 452-~~1234~~ 2853
TWX: 910-337-1271
CABLE: SIOCEAN, LA JOLLA, CA

7 June 1980

Capt. Robert Dinsmore
WHOI
Woods Hole, MA 02543

Dear Bob:

I tried last week to write a very detailed document, with all of the ancillary problems solved in excruciating detail--and as a result accomplished nothing. This week I made another try, with only a more general outline; plan I was written before Dirk Frankenburg visited here Friday, and was based on my understanding of what NSF was proposing to do about proposal deadlines next year. Plan II was written after he spoke, since I then realized that their intentions were for a less radical change than I understood. There undoubtedly could be a Plan III, which would be our response to no change at all--but that would merely be Plan II done in a panic.

You will all undoubtedly find within this plan some assumptions with which you may not agree. It is my belief (substantiated to some extent by an analysis of our own past expenditures, done in a very superficial manner) that "lavups," if carefully planned, are not as expensive as everyone seems to believe. Most of the apparent cost of keeping a major ship idle at the dock is due to bad bookkeeping practices (of which we have been at least as guilty as everyone else). Similarly, the apparent reduction in "daily rate" by keeping ships extremely busy (up to 365 days a year) is not as great as it appears, since many of the savings are merely due to passing costs along to the following year. If a ship operates at a very high level of use, and if crew members accumulate compensatory time off and vacation that they cannot take during that year, the apparent cost per day is reduced on a "cash account" basis--and then falls into the next year when vacations, comp time, voyage repairs, and overhauls come due. We need to go to proper "accrual accounting."

I discussed some of this with Frankenburg, and naturally he was interested and asked if I could get someone (preferably a good cost accountant) to go through our books and see if one could determine (a) what is the true cost of a lavup, and (b) what is the optimum number of days a year to use a research ship, given the fact that we are not amortizing original investment and that we have a particular set of fringe benefits, seapa, comp time, etc, for our crews. I fully intend to do this, as part of the attempt to make our own Marine Facilities operation more efficient--but obviously won't get it done in time to be of any help in our present problems.

At any rate, enclosed are two versions of "the plan." The ball is now in somebody else's court.


George Shor

cc: UNOLS ad hoc Committee (Dinsmore, Hayes, Robison, Martin, Anderson)
Tex Treadwell
W A Nierenberg

A PROPOSED PLAN FOR RATIONAL OPERATION AND
FUNDING OF ACADEMIC RESEARCH SHIPS

Plan I

We request that the National Science Foundation do the following:

- (1) Require that all proposals for scientific work that requires a significant amount of NSF-funded ship time (roughly, more than 5 days on a major ship, 10 days on an intermediate size ship) be submitted early enough to be reviewed and passed upon by early May for ship use in the following calendar year.
- (2) Allocate funds tentatively, based on estimated ship costs and requested time for approved programs, up to about 90-95% of funds available, with the remaining 5-10% to be allocated on a "block funding" basis to cover late requests, sudden inspirations, targets of opportunity, or coverage of additional "below the line" approved programs.
- (3) Inform all operating institutions of the approved programs, including the number of days of ship time, ship name or type requested, and total funds available to cover approved ship costs. If more programs are approved than the estimated funds available, some priority must be indicated showing which are "above the line" and which are "below the line", to be supported in that calendar year only if funds are available and scheduling can be made to fit.

If this were to be done, the UNOLS member institutions should be prepared to do the following:

(1) Operators will agree mutually on joint-scheduling groupings involving a small number of institutions in each group. Groupings must be by mutual agreement of the institutions involved, and would logically involve separation of ships by size, geography, and/or specialized capabilities. Proposed groupings have been:

a) World-wide ships over 200'. This includes Knorr, Melville, Atlantis II, and Thomas Washington, and possibly Thomas Thompson and Conrad.

b) Pacific Regional ships. This includes New Horizon, Wecoma, Kana Keoki, and possibly Moana Wave and Thomas Thompson.

c) Atlantic Regional ships. This includes Oceanus, Endeavor, Columbus Iselin, Gyre, and possibly Conrad.

d) Dedicated ships. Thus far this includes possibly Conrad and Thomas Thompson, if they are dedicated to geology and geophysics only.

e) Smaller ships, again on a regional basis (but smaller regions). Subgroupings here would include, for example Ellen B. Scripps, Valero IV, and Cayuse in southern California, and other similar groupings for the Gulf coast, southern Atlantic, northern Atlantic, etc.

(2) As soon as information is available from NSF about funded research programs and available ship operating funds in support of them, representatives of operating institutions will meet in the groupings listed in (1) to work out viable schedules. To do this they will need as complete information as possible from PIs

on ship capabilities required, station locations and station times, and scientific party size, logistic problems, and any other relevant information, and cost data from the operating institutions. Assignment of work to ships should take into account the expressed preference of proposed users, geography (to reduce deadhead time and travel/shipping costs), and total operating funds available to the grouping.

3) There will obviously be times when requested schedules for particular ships or for ships in particular operating groupings will be too heavy or too light to be accommodated economically (or at all). Some inter-group trade-offs may need to be made to solve these problems in the best of cases, and should be made where possible. This essentially requires that scheduling meetings of the different groups be held at about the same time, or iteratively. In other cases, the solution will not be that simple. The situation of excessive scheduling is unlikely if NSF and other agencies are careful not to show "above the line" more ship time than can be reasonably supported with funds available.

4) Underscheduling, which can result in uneconomic use of operating funds is more likely, and requires more careful analysis.

It is not clear how real costs vary with intensity of operating schedule. Each institution should, therefore, look closely at its past cost records to determine how real costs vary with schedule in a general sense, and for specific cruises. If accrual accounting is used (in which costs of vacation and compensatory time off, and overhauls, are charged to the operating periods in which costs are incurred, rather than the slack periods during which vacation is taken and overhauls are performed) instead of the cash accounting methods used by most institutions, most of the distortion of cost figures would be removed; it is urged that institutions shift over to an accrual method as quickly as possible.

5) Given a knowledge of real cost figures and schedule demands, institutional representatives should reach agreement within each operating group on the most practical and economical schedule that will complete the scientific work adequately. If this requires that a ship be taken out of operation, it should be done for a period between 6 months and a year. In determining which ship should be "laid up," due weight should be given both to user preferences, and to overhaul schedule. In general, the most economical time to remove a ship from operation is at the time that a biennial USCG inspection or an ABS inspection is due. Overhaul costs can be reduced if done without tight deadlines, and a layup period can provide this opportunity if it is expected that the ship is to be restored to operation at the end of the layup period. User preferences should be given weight, as in the long run if demand and funding continue to be less than the total available ship time, this should be the deciding factor in any permanent removals of ships from the fleet. Any ship that has an uneconomic base request of use (before trade-offs) from funded scientific programs for three years in succession should be a prime candidate for permanent removal from the operating fleet.

6) Other funding. It is assumed above that NSF funding is the primary source of funding for UNOLS ship operations. However, it should not be the only source, and operators should make every effort to find funding from other sources. This search should not be limited to the traditional sources, in ONR, DOE, etc. If an institution wishes to operate an oceanographic ship so as to make ships more accessible to its own staff, it should give strong consideration to providing some portion of the support of that ship from institutional or state funds. It seems odd that some operating institutions make a strong effort to obtain state or

institutional funds for support of research staff, faculty, technicians, and support facilities ashore, but put little or none of their own funds into operation of the research ships on which these others depend. Such search for funding support should be a continuing effort. It becomes most critical at the time of the first iteration of joint scheduling, and it should not only be permissible but urged that any institution facing a layup of a ship be encouraged to find other funds to operate the ship in lieu of layup.

7) Assuming that agreement is reached among the operating institutions within regional/type scheduling groups, the individual operating institutions should submit their ship operating proposals to NSF according to these plans.

* * * * *

The above deals with an optimum plan for operation starting in 1981, assuming that NSF does the things they have proposed. An interim plan for the present year will be dealt with in a later chapter of this continuing epic.

Plan: 11
We understand that it is the intention of the National Science Foundation to require that most scientific proposals requesting significant amounts of NSF-funded ship time be submitted early in the calendar year (for ship use in the following calendar year) so that they can be reviewed by a panel meeting in April, and that some remaining requests will be considered at a panel meeting in September. Assuming that this will be the case in 1981, for ship use in 1982, we request that they also do the following:

- (1) Insist that the April panel date be met by major ship-using proposals, defined as ones that require more than two months of time on a major research ship (or equivalent dollar value of time on a smaller ship).
- (2) Allocate funds tentatively, based on estimated ship costs as provided by ship operators and on requested time for approved programs, up to 95% of total ship operating funds available, based on approved programs, as soon as the September panel results are available, and inform operating institutions of the amounts.
- (3) Inform all operating institutions of the approved programs, including the number of days of ship time, ship name or type requested, and total funds available to cover approved ship costs. If more programs are approved by NSF than estimated funds available in the ensuing year, some priority must be indicated showing which are "above the line" and have priority for that year's funding, and which are "below the line," to be taken to sea in that calendar year only if funds are sufficient and if schedules can be made to fit.
- (4) After all else is done, allocate a small percentage of ship operating funds (about 5%) on a block-funding basis, to take care of late requests, sudden inspirations, targets of opportunity, or coverage of additional "below the line" approved programs.

If this were to be done, the UNOLS member institutions should be prepared to do the following:

(1) Operators will agree mutually on joint-scheduling groupings involving a small number of institutions in each group. Groupings must be by mutual agreement of the institutions involved, and would logically involve separation of ships by size, geography, and/or specialized capabilities. Proposed groupings have been:

a) World-wide ships over 200'. This includes Knorr, Melville, Atlantis II, and Thomas Washington, and possibly Thomas Thompson and Conrad.

b) Pacific Regional ships. This includes New Horizon, Wecoma, Kana Keoki, and possibly Moana Wave and Thomas Thompson.

c) Atlantic Regional ships. This includes Oceanus, Endeavor, Columbus Iselin, Gyre, and possibly Conrad.

d) Dedicated ships. Thus far this includes possibly Conrad and Thomas Thompson, if they are dedicated to geology and geophysics only.

e) Smaller ships, again on a regional basis (but smaller regions). Subgroupings here would include, for example Ellen B. Scripps, Valero IV, and Cayuse in southern California, and other similar groupings for the Gulf coast, southern Atlantic, northern Atlantic, etc.

(2) As soon as information is available from NSF about funded research programs and available ship operating funds in support of them, representatives of operating institutions will meet in the groupings listed in (1) to work out viable schedules. To do this they will need as complete information as possible from PIs

page 1

on ship capabilities required, station locations and station times, and scientific party size, logistic problems, and any other relevant information, and cost data from the operating institutions. Assignment of work to ships should take into account the expressed preference of proposed users, geography (to reduce deadhead time and travel/shipping costs), and total operating funds available to the grouping.

3) There will obviously be times when requested schedules for particular ships or for ships in particular operating groupings will be too heavy or too light to be accommodated economically (or at all). Some inter-group trade-offs may need to be made to solve these problems in the best of cases, and should be made where possible. This essentially requires that scheduling meetings of the different groups be held at about the same time, or iteratively. In other cases, the solution will not be that simple. The situation of excessive scheduling is unlikely if NSF and other agencies are careful not to show "above the line" more ship time than can be reasonably supported with funds available.

4) Underscheduling, which can result in uneconomic use of operating funds is more likely, and requires more careful analysis.

It is not clear how real costs vary with intensity of operating schedule. Each institution should, therefore, look closely at its past cost records to determine how real costs vary with schedule in a general sense, and for specific cruises. If accrual accounting is used (in which costs of vacation and compensatory time off, and overhauls, are charged to the operating periods in which costs are incurred, rather than the slack periods during which vacation is taken and overhauls are performed) instead of the cash accounting methods used by most institutions, most of the distortion of cost figures would be removed; it is urged that institutions shift over to an accrual method as quickly as possible.

5) Given a knowledge of real cost figures and schedule demands, institutional representatives should reach agreement within each operating group on the most practical and economical schedule that will complete the scientific work adequately. If this requires that a ship be taken out of operation, it should be done for a period between 6 months and a year. In determining which ship should be "laid up," due weight should be given both to user preferences, and to overhaul schedule. In general, the most economical time to remove a ship from operation is at the time that a biennial USCG inspection or an ABS inspection is due. Overhaul costs can be reduced if done without tight deadlines, and a layup period can provide this opportunity if it is expected that the ship is to be restored to operation at the end of the layup period. User preferences should be given weight, as in the long run if demand and funding continue to be less than the total available ship time, this should be the deciding factor in any permanent removals of ships from the fleet. Any ship that has an uneconomic base request of use (before trade-offs) from funded scientific programs for three years in succession should be a prime candidate for permanent removal from the operating fleet.

6) Other funding. It is assumed above that NSF funding is the primary source of funding for UNOLS ship operations. However, it should not be the only source, and operators should make every effort to find funding from other sources. This search should not be limited to the traditional sources, in ONR, DOE, etc. If an institution wishes to operate an oceanographic ship so as to make ships more accessible to its own staff, it should give strong consideration to providing some portion of the support of that ship from institutional or state funds. It seems odd that some operating institutions make a strong effort to obtain state or

institutional funds for support of research staff, faculty, technicians, and support facilities ashore, but put little or none of their own funds into operation of the research ships on which these others depend. Such search for funding support should be a continuing effort. It becomes most critical at the time of the first iteration of joint scheduling, and it should not only be permissible but urged that any institution facing a layup of a ship be encouraged to find other funds to operate the ship in lieu of layup.

7) After the May scheduling meetings, operating institutions should submit their proposals to NSF showing not only costs involved for a schedule that includes all funded programs and proposed programs not yet reviewed, but also comparative costs for lower levels of operations. After the final reviews are received from the September panel meetings, if OFS will notify operators in each grouping of the total of approved programs and funds available for ship support for each, a repeat session should be held to revise schedules as in (5), with revised budgets to be resubmitted by each institution in accordance with the agreed-on plan of scheduling and layups.

Some Suggestions for Optimizing Ship Usage

by

Thomas Rossby

We live in a time of hightening funds for operating ships in support of basic research in Oceanography. This is rather ironic because it is also a time of rapidly growing awareness of the complexity of oceanic processes, growing numbers of people actively involved in ocean research, and also a growing number of agencies supporting research in the oceans. I do not understand all aspects of this problem. At certain times it appears we have an excess of ship capacity, yet at other times there seems little difficulty putting ships to work. There is at least general agreement that the skyrocketing costs of fuel are a very real part of the problem, and one that is going to get worse -- not better. In these notes I will try to address the problem of ship costs from several points of view and how they can be reduced. These include increasing usage efficiency, short term rotating layups, long term layups, fleet reduction, and alternative measurement methods.

First of all, the basic message has sunk in: Operating ships is getting costlier relative to the research. This is very important, for at least the community is more conscious of these problems and perhaps thinking about them.

Topics

1. Greater efficiency of Usage
 - i) Regional scheduling
 - ii) Shared ship usage
 - iii) ancillary programs

2. Layup programs
 - i) Short term
 - ii) Long term
 - iii) Mothballing
 - iv) Redefinition of full usage
3. Changes in Fleet Structure
4. Alternative Methods of Measurement

1. Greater Efficiency of Usage

- i) Regional scheduling

By regional scheduling is meant the joint scheduling of ships operated by institutions in a given region -- not the scheduling of ships to operate in a certain region. (While the latter can feed back on the former, it can only do so as the scientific requirements for research in given areas become evident.) The principal advantage appears to be that regional coordination of ships can result in more efficient utilization by reducing "dead" steaming, by encouraging joint or coordinated usage of the ships for more than one program, etc. In this writer's opinion it does not mean that an individual's access to the institution's vessel should be subjugated entirely to such a regional scheduling counsel. It is everyone's interest that a ship continue to substantially serve its own institution. Similarly use of other ships, especially UNOLS ships, should be recognized by the funding agencies and not be held against the user's institution for not using its own vessel.

In summary, requests for shiptime can be done on a regional basis. These are then sorted according to areas of interest, possible collaborative arrangements, institutional considerations, etc. The regional ship scheduling committee,

after possible further inquiries related to the above questions, reports back to the institutions and ship requesters. Further interactions are, of course, possible but the final result then becomes the program basis for each institution's ship operations proposal.

ii) Shared ship usage

This is an obvious concept to those who are familiar with multidisciplinary cruises. It is also obvious in cases where different specialists concentrate on different aspects of the same phenomenon. But this kind of sharing of the platform need not require convergent interests, it can occur whenever there is a recognition that the ship is operating in approximately the same area. If there is space available to accommodate both programs (even if the cruise is lengthened in time), clearly the utilization of the ship is increased. In this period of increasing specialization this may be difficult to accomplish, both from a programmatic point of view, as well as space requirements of each activity, but one suspects that there are many cases where, with a little extra effort, joint ventures would be beneficial to each party. At present, mechanisms for this kind of planning do not exist. Perhaps the regional scheduling counsel will help.

iii) Ancillary programs

The ROSCOP form which must be filled out at the end of a cruise has a special table for "ancillary programs". I was reminded that N.S.F. does not recognize these activities in terms of shiptime and that any time required therefore must come out of the chief scientist's program. This is not difficult to understand. It might be worth exploring the merit of establishing a procedure for supporting such ancillary activities formally. After all, one wonders if there are not many ideas or activities that go untried because an investigator

iii) Mothballing

It would be interesting to hear what the costs of mothballing are. The seat-of-the-pants' feeling is that this is not a viable solution. The principal reason being that the makeup of the UNOLS fleet is changing substantially in direct response to the changing costs of operating ships. Mothballing, in effect, preserves the status quo rather than encourages planning for the future.

iv) Redefinition of full usage

At the last UNOLS membership meeting it was suggested that full employment of a ship be based on fewer days at sea. As I understood it, the argument is based on the concept that as fuel costs become dominant each individual ship costs less, if it is operated for fewer days each year. For this to work presumably requires that the crew rotate onto other ships during the non-operating period of time, otherwise it is difficult to see how this arrangement differs from all ships undergoing a short-term layup. A viable solution along these lines may require greater centralization of ships to regional operating centers so that crews can be transferred between ships?

3. Changes in Fleet Structure

The high cost of the large UNOLS ships relative to the rest of the fleet is causing everyone to take a hard look at their role and the extent to which they serve specific and unique requirements. Certainly no one disputes the need for some of these ships. The question is instead whether we need all of them all the time.

The success of the Oceanus class ships has made it clear that a large number of shipusers are comfortable with the capabilities of this size of ship. It is also well-known that this class is relatively stable in heavy weather compared to other vessels. If it were not for the fact that even this design predates

the time of rising fuel costs one might take this as a hint that the fleet might benefit from having more of these vessels. Instead there is a need to reexamine alternative forms of power, specifically wind power for propulsion (or at least wind-assisted power).

On the whole, there has been remarkably little change to ships over the years. Does this mean that present ships have been highly successful, or that much thought has been put into ship design for oceanographic use? The question assumes relevance when one realizes that many of the present ships were built for quite different purposes, or designed to explore novel technologies, or when one realizes that present day winches are possibly slower than were the ones on the Challenger more than 100 years ago.

4. Alternative Methods of Measurement

In recent years we have witnessed the development of moored instrumentation for the measurement of currents, temperature, turbidity; we also have pressure gauges, inverted echo sounders and sediment traps. These are examples of autonomous systems. Chemists have used shipboard flow through systems for studies of the upper ocean. XBTs are unique in that the ship remains underway during the measurement phase. They are only one of many parameters that could be sampled with expendable sensors, but as yet only temperature is available.

With increasing interest in ground truth information one might expect NASA or NOAA to take the lead in developing autonomous "ground truth" packages for shipboard use. They could, for example encourage the implementation of the SAIL concept on UNOLS vessels (hardly a high cost item) and insert in the loop a system for sampling (extracting) those parameters they were particularly anxious to secure. Given the advent of NOSS five years hence it isn't too soon to begin!

Why are bottles always attached to a wire and lowered by winch? Would it not be much simpler to throw a "rosette" of bottles over the side ballasted to sink to the level of the deepest bottle sample, at which point weight is dropped and various samples taken during ascent. In the meantime the ship can spend a few hours doing something else before recovering the bottles.

At a higher level of science fiction (but not unreasonably so) one could imagine slowly propelled floats navigating themselves via an underwater OMEGA system (moored SOFAR floats). Each one of the autonomous vehicles could be equipped to conduct processor programmed surveys. For example

- i) Physical Oceanography: temperature, $\frac{\partial t}{\partial z}$ as a function of depth and position, mass transport (via DR).
- ii) Chemistry: salinity (if stable sensors could be developed), likewise oxygen, turbidity, ?....
- iii) G & G: bathymetry, gravimetry, magnetics...
- iv) Biology: chlorophyll, biomass (acoustically or photographically),...

The underwater OMEGA system would send out programmed acoustic signals from which a vehicle could determine its position, etc. At prescribed times, the vehicle would return to a predesignated recovery site, such as Bermuda, etc.

These are not unreasonable ideas, but they would be impossible to implement at the single project level.

This last section is not intended to be specific. Instead it is meant to illustrate by example how it might be possible to defeat the costs of ships by other methods of measurement. Some of these are not given much consideration significantly because of the money involved and because we are a small community with only a limited amount of engineering capability available. Another reason, however, is that ships [and their costs] are largely taken for granted by the user. A certain number of days is requested and allocated. At the time of the

cruise the ship is expected to be available for loading, etc. How the ship got there and what happens to it after the cruise is not a major concern. Most of us in the scientific community simply do not have the time to worry about ships, ship utilization and much less the design of platforms for future use.

U.W./O.S.U. REGIONAL SCHEDULING OF R.V. THOMAS G. THOMPSONAND R.V. WECOMA

The following is a brief summary of some of the scheduling procedures developed by U.W./O.S.U. We are encouraged by the results to date and believe that our experience may be useful to the discussion on regional and national scheduling.

The northwest regional scheduling has been a continuing process over the past two years and is not accomplished in one or two annual meetings. Rather, it has required a frequent exchange of information. During critical times, we exchange information sometimes on a one or two week basis and, at times, daily. As a minimum, schedules and new information are exchanged monthly.

Schedules for each institution are prepared for the following calendar year one or two months prior to the UNOLS meeting in May. A good deal of telephone exchange takes place during this period. A meeting is then held between Anderson and Keller to identify and to begin to solve the existing problems. We have found that the Portland Airport conference rooms provide a convenient place to meet and the meeting lasts for about half a day. An attempt is made to accommodate most of the ship requests, sometimes by way of several alternate plans, and to assign each ship to a particular geographic area. These schedules are then forwarded to the UNOLS office and are presented at the May UNOLS meeting. All requests from both *Thompson* and *Wecoma* are listed in each institution's proposal to NSF. We have not attempted to schedule large meetings among P.I.'s from both institutions and see no reason to do so. We do, however,

encourage direct communication among individual scientists to expedite the process. Anderson and Keller also take the opportunity throughout the year to discuss scheduling when they attend other meetings.

We have found the above procedures to work very well and would recommend that they continue as part of larger regional or national groups. A number of problem areas have been identified and some are listed below for discussion purposes.

As you might suspect, the ships are not completely interchangeable for carrying out the science. Some investigators have developed their gear around the capability of a certain ship, creating an inflexible situation. In addition, differences in the mode of operation between institutions can raise problems. Some specific examples are:

1. The *Thompson* in its present configuration is not well suited for all types of coring whereas *Wecoma* is.
2. *Wecoma* cannot handle the U.W. deep tow because of cable problems.
3. Except for cranes, winches, etc. the *Wecoma* does not provide much scientific gear whereas the *Thompson* provides a CTD system and computer. Also, scientists have access to a suite of pooled equipment.
4. The inventory of ships in the northwest region does not contain a coastal-size vessel capable of working in unprotected waters.
5. When an investigator is assigned to a ship from a different institution, travel and shipping costs may be required which exceed the original project budget.

Probably, one of the greatest problems we will confront in regional and national scheduling is the varying capability of ships in the academic fleet. From our experience to date, we cannot over-emphasize the importance of tackling this problem immediately. The UNOLS Technology Assessment Committee is set up precisely to attack this type of problem so we, at least, already have the mechanism in effect. As a beginning, each institution should rapidly develop a set of detailed operating procedures, what capabilities, gear, services, etc. are available, and procedures to get access to the various needs. The investigator has to know these things well ahead of time to carry out his program effectively. Some uniformity in content and style of these procedures would be helpful.

SUMMARY OF DISCUSSION BETWEEN U.W. AND LAMONT REGARDING FUTURE USE OF
R.V. THOMAS G. THOMPSON AND R.V. ROBERT CONRAD

An agreement has been reached between U.W. and Lamont to move toward an association which would utilize the *Conrad* in the Atlantic and the *Thompson* in the Pacific as partially dedicated G & G vessels. With the impending lay-up of *Vema*, Lamont requires access to a G & G vessel in the Pacific and wishes to utilize the *Conrad* partially for disciplines other than G & G. The U.W. wishes to develop this capability in the *Thompson* to serve, as a minimum, the G & G needs of the northwest institutions as well as those of Lamont. *Vema* equipment would become available to be placed aboard the *Thompson* in early 1982.

The above plan was presented to JOI, Inc. in May, 1980. Since that time, Dr. Tom Pyle, ONR has been contacted regarding the proposed G & G conversion of the *Thompson*. He indicated that a proposal for a seabeam system would be in order. At the present time, U.W. is preparing a proposal for costs of the G & G conversion, including a seabeam. Both Lamont and O.S.U. will be kept advised of the progress of the proposal preparation and will have input to it in the final stages.

Scheduling arrangements for G & G use of the *Thompson* remain to be developed. We believe that about 6 months per year among U.S./Lamont/O.S.U. scientists would be a suitable arrangement. The remaining 6 months of the year would be available to other disciplines and G & G work could supposedly compete for part of this allotment as well if the demands were there.

Some Random Discussion Items

1. Keep the scheduling schemes as simple as possible. Avoid further bureaucracy. Use existing personnel or committee structures where possible.
2. The present institutional representatives are the logical choice to form the members of the regional or national scheduling committees.
3. Each institution should be allowed to develop a preliminary schedule of its own before the larger meetings are held.
4. The scientific review is done at the funding stage. Let us not attempt to duplicate this process.
5. Use one of the existing national committees for final review or approval before scheduling plans are presented to the funding agencies, e.g. UNOLS Advisory Council.
6. Set up information exchange network procedures among institutions of regional or national groups.
7. Layups should be determined by members within each of the scheduling groups. Determining factors? - utilization of each ship, future projections, condition ship, etc.
8. What criteria do we use to separate requests for ships in the national group from those in a regional group? It appears that there must necessarily be a considerable amount of overlap.
9. What pressures can we put on investigators to have proposals ready for the April NSF panel meeting rather than August. Renewal proposals do not fit into the proposed revised NSF timing of panel meetings for timely action on ship time requests.
10. Do we attempt to deal with the small vessels at the present time? If not, when, and by whom?



MARINE SCIENCE INSTITUTE

SANTA BARBARA, CALIFORNIA 93106

July 3, 1980

Captain R. P. Dinsmore
Woods Hole Oceanographic Institution
Woods Hole, Massachusetts 02543

Dear Bob:

Here are some thoughts for consideration by our UNOLS working group. I have just returned from a cruise and time is short so I will send copies directly to the other members of the group rather than through the UNOLS office.

The role of the UNOLS fleet is to serve the field research needs of academic oceanographers; we cannot lose sight of the fundamental fact that the ships are but the means to an end. The problems faced by this working group require us to focus on the ships themselves but if our decisions "preserve the fleet" at the expense of scientific research then we will have failed.

As it stands presently the UNOLS system works well, ship time is available for most funded research programs, and the restrictions on research are generally due to low funding levels rather than to limited ship capabilities. Our problem is to deal with a situation where rising ship costs preclude the continued operations of the fleet in this current fashion. More money would ease the situation but this seems an unlikely prospect in the near future. Even if additional funds for oceanography were available the will of the scientific community would be to apply the majority of such funds to research programs, with ship support at a lower priority. Our task is to reorganize the UNOLS system so that it is most responsible to the needs of the scientific community in the face of rising costs yet retains an appropriate capability for the future.

The simplest approach would be to let attrition trim the fleet--but this would undoubtedly be chaotic and because the ships are extensions of their operating institutions it would become an ordeal of power struggles instead of a natural selection process by survival of the fittest ships. Another approach is to acknowledge that the system works pretty well as structured and to anticipate that within 5-7 years the funding situation will balance out so that we can resume most current practices. In the meantime we must reduce the size and composition of the fleet through lay-ups, by leasing ships out to other sources of support, and by getting rid of inefficient ships.

Lay-ups can undoubtedly save money but the scale of the funding shortfall is such that massive lay-ups involving as much as a third of the fleet might be necessary to deal with the problems solely in this way; and this would severely limit our ability to support the scientific needs for field research. The most obvious candidates for long-term lay-up are the six ships in the 200+ ft class and the savings here would stem primarily from reduced fuel usage. Short-term (up to 1/3 of the operating year) lay-ups of smaller ships could be effectively managed by a

regional control group particularly so, if crew assignments could be made intra-regionally. However, the lay-up of small ships offers only a relatively small savings of money with a disproportionately large negative effect on the scientists who use them.

Leasing UNOLS vessels to other sources of support is a practical solution that offers significant savings without permanently removing the ship from the fleet. For example, the Division of Polar Programs at NSF needs a research vessel but it is unlikely that they will receive sufficient funds to build a new one. Furthermore, it would cost several million dollars to refit the ELTANIN/ISLAS ORCADAS and return her to the fleet for polar research. By transferring KNORR or MELVILLE to the status of dedicated polar research vessel it could be refitted and supported by DPP for a set period of time. This could be based on an alternating basis whereby both ships were ice strengthened and each spent alternate years scheduled by their home institutions and DPP. Thus one year MELVILLE might work the Southern Ocean during the southern hemisphere summer and the Arctic Ocean during the northern hemisphere summer, while KNORR worked the Atlantic and/or Pacific Oceans out of WHOI. The following year KNORR would make the polar shuttle while MELVILLE worked out of SIO. Alternatively, a single vessel would be ice-strengthened and be used exclusively by DPP, while the other ship alternated on an annual basis between scheduling by WHOI and SIO or the appropriate regional control groups. Similar strategies with other vessels and other agencies (EPA, DOE, USGS, etc.) could remove the financial burden of several vessels yet retain them for future utilization within the UNOLS fleet should the need arise and the funding situation allow it.

Permanent removal of ships from the fleet is also called for given the magnitude of the funding shortfall. Here again, ship size becomes a factor but efficiency increases in importance as a criterion because this action is irreversible. To my admittedly biased mind, several ships seem to be obvious candidates for removal, due to condition, utilization, or expense: EASTWARD, CONRAD, VEMA, CAPE HENLOPEN and HOH. If suitable replacement vessels or scheduling substitutes become available, KANA KEOKI, T. WASHINGTON and T. THOMPSON also seem particularly vulnerable. Removal of ships from the fleet is a drastic but necessary step and if we anticipate no proportional increase in ship support funds for the next 5-7 years, then large ships facing mid-life refits are more suited to removal now and replacement by more advanced designs in the future.

The standing proposals to our working group for reorganization are: to establish the 6 largest ships as a national facility, separate from the rest of the fleet, with regional control; regional scheduling of all ships larger than 150 ft; and centralized/regional scheduling of the entire fleet. Other suggestions have included regional shore support facilities and crewing.

While I believe that some form of centralized scheduling may be inevitable, I have strong reservations about how this concept might be put into effect. By classifying the 6 largest ships as a distinct national facility and thus perhaps as a separate block-funded ship budget sub-unit, we are preserving the status quo and entrenching the commitment to 6 large ships when it seems likely that a reduction of that number to 5 or even 4 might be the most appropriate move.

I expect the regional control groups, constituted as proposed, would be inclined to act according to the proprietary interests of the operator institutions and seek to preserve the large ships even if the opposite course of action were indicated. Furthermore, the imposition of yet another layer of bureaucracy between the scientist user and his ship can only add to his problems in conducting research at sea.

I strongly disagree with the concept that a regional control group would rank research programs according to scientific merit as part of the scheduling process. Determination of scientific merit is the job of the proposal review procedures of the funding agencies and not that of the ship schedulers or operators.

Any regional scheduling system that is not appropriately independent of the operating institutions will continue to promote some of the problems of the current system. For example I can cite the disadvantages presently faced by PI's from non-operator institutions and by young PI's who are not yet established, in getting ship time. PI's from non-operator institutions represent about a quarter of the ship users at present but this group appears to be growing while the group of ship users from operating institutions is static or in decline. Any reorganization plan should be structured such that the interests of PI's from non-operating institutions are well represented.

It seems to me that if we are to reorganize the operating and scheduling procedures of the academic fleet by adopting regional control, we should also consider a redistribution of the ships in the fleet to more readily reflect the needs of the scientific community. I believe that many of our current funding and scheduling problems can be traced to the inappropriate distribution of ships at the present time.

For example, lets assume that the fleet is divided into three regional groups: northeastern, southeastern and gulf, and western. We could provide a balanced response to the needs of the scientists in each region by making the following shifts in ship distribution, and significantly reduce the operating costs of the entire fleet as well.

- 1) Shift KNORR from WHOI to Lamont as an Atlantic-based dedicated geology and geophysics vessel. Retire VEMA and CONRAD.
- 2) Shift ENDEAVOR from URI to Hawaii.
- 3) Shift the second new coastal vessel from Duke to URI.
- 4) Declare T. Thompson as a Pacific-based dedicated geology and geophysics vessel.
- 5) Retire KANA KEOKI and MOANA WAVE.
- 6) Lease MELVILLE to DPP part-time for southern hemisphere summer work in the Southern Ocean.
- 7) A third new coastal vessel, if funded, would go to USC or SIO with the subsequent retirement of either VELERO IV or E. B. SCRIPPS.

This plan would significantly reduce the operating costs of the fleet for NSF and at the same time would provide the seagoing scientists of each region with a balanced research support capability. Likewise, each regional control group would have an adequate group of ships with which to respond to those needs and local control of individual ships can remain largely with the traditional operating institutions.

July 3, 1980

Another area of concern in our efforts to reorganize must be the plan to synchronize the submission of grant proposals which will require ship time. This will create several problems. For one, it will tend to clog the grant review process in the Division of Ocean Sciences at NSF, which generally operates on a quarterly basis. Furthermore, it greatly reduces the flexibility of the individual scientist to manage his research program according to his recent findings. Within DOS this plan will cause problems by creating funding conflicts between large-scale programs which must all compete for funds on an annual basis and proposals from individual PI's for smaller-scale programs which compete at quarterly intervals. Does this mean that the research budget will be divided between large-scale and small-scale classes of proposals to be respectively distributed annually and quarterly? If so it reeks with problems for both sides. Here is a case where the ships are dictating to the scientists, a situation we must avoid as much as possible. I think that this plan needs much clarification before we can incorporate it into a regional scheduling program--particularly in the light of changes afoot at NSF DOS to reorganize the large-scale/small-scale program structure.

Now here's where I should offer a snappy solution to this wretched situation and close the book--but unfortunately none are at hand and I can offer only one more shot and another recommendation. I am strongly opposed to the use of ship construction money for ship operations in 1981. If this money is not to be used to construct the third new coastal vessel then it should be conserved for the acquisition of another OCEANUS-class vessel.

Lastly, I feel that we can ask for a great deal more help from individual PI's in dealing with the problems of ship scheduling. By including the local ship users in annual scheduling sessions at operating institutions, much efficiency is gained in planning. However, most PI's from non-operator institutions do not participate in these sessions and the advantage of including their needs is lost. If we are to move the scheduling responsibilities to a regional group then we should also broaden the information base upon which scheduling decisions are made. This could be simply achieved by increasing the information supplied in ship request forms and by encouraging cooperation between individual PI's through the regional group.

In summary, I suggest that the fleet should be reduced and redistributed as a necessary first step to imposing regional control. There should be no determination of scientific merit by the regional group. The composition of the regional group should accurately reflect the needs of the scientific community over those of the operating institutions. Greater involvement of individual PI's in scheduling should occur.

We should have some interesting discussions at Scripps, see you there.

Sincerely,



Bruce H. Robison

BHR:mga

Office Memorandum

TO : Members of the UNOLS Working Group
on Joint Ship Scheduling

DATE: 10 June 1980

FROM : R. P. Dinsmore

SHIP SCHEDULING STUDY

As you recall, the UNOLS meeting on 22 May 1980 authorized this group to which the following were appointed:

R. P. Dinsmore,	J. H. Martin
Chairman	B. H. Robison
G. C. Anderson	H. T. Rossby
D. E. Hayes	G. Shor
<u>Ex Officio:</u>	

G. H. Keller
T. K. Treadwell

Addresses and phone numbers of the above are attached along with mailing labels to facilitate exchange of information.

The purpose of the Working Group is to review and develop the various existing suggestions for joint and cooperative ship scheduling into a realistic and agreed upon plan for submission to UNOLS members. The two most visible schemes are those presented at the UNOLS meeting; one by me and the other by Bill Hay based on a recent JOI meeting. Copies of these are attached if you do not already have them. Incentive for all this has come from NSF and ONR who are each considering ship management plans and who have admonished UNOLS to get its ship scheduling arrangement in order.

Based on discussions at the UNOLS meeting and on our short meeting afterward, the following points emerged:

1. There are no real differences between the plan I reported on and the JOI plan. The goals are the same, and the players are the same. Our job is to seek out the commonalities and produce an acceptable plan.
2. The plan which I reported on dealt (initially) with only the six large ships. Most of the members felt that the East and West Coast regional fleets as outlined in the JOI document should be implemented sooner rather than later. Further, the regional fleets should include additional vessels such as VECERO IV, ALPHA HELIX, and the new coastal vessels at Duke and Miami.

3. The members did not understand the distinction between JOI terminology of "National" ships and "underway G & G". In a sense these are all national and might best be retained as a block. Quite clearly there was some concern that the JOI arrangement for large ships would fractionate ships and operators from interactive processes.
4. There also was concern that the concept of "scientific merit" scheme reported by me would mean a double jeopardy review process and would probably become both irrational and cumbersome.
5. There was general agreement, at least among operators, that the operating institutions prerogatives should not be totally usurped; that is, the scheduling process should begin with the individual lab, and move to the regional or national level at a later stage.
6. Most members felt that participation by Federal funding agencies was important to a joint scheduling process, but an additional group of experts was viewed with some suspicion on the same grounds as No. 4 above.
7. The nine members who are also members of JOI saw little difference whether the process is under JOI or UNOLS. However, the eight members not from JOI shared a common belief that this is what UNOLS is intended to do.
8. There appeared to be agreement among members, or at least the members of the Working Group, that its work would be confined to scheduling processes and not to the ultimate makeup and distribution of the UNOLS fleet. There are already uncounted studies underway aiming at that issue.
9. It was agreed, however, that the scheduling process should take note of the available funding and short term layoffs (up to one year) that are a part of the scheduling process.

10. Most members, noting the frank words of Admiral Albert Bacciocco and Dr. Frank Johnson at the meeting, attach a sense of urgency toward getting a fair and rational system going.

Future Action

At the Working Group meeting which followed the UNOLS meeting, the following course of action was agreed to:

- a. Each member of the Working Group would take back to his institution the various comments, suggestions, and recommendations which have emerged. Additional inputs will then be compiled from colleagues and principals at the labs involved. Summaries of these are to be circulated among members of the W/G. Mailing labels are attached for this purpose.
- b. Between now and early July, several drafts of possible schemes can be prepared and circulated.
- c. By separate request, each UNOLS member will be requested to furnish to the UNOLS Office a copy of his 1981 Ship Operations Support proposal to NSF (June 30th). Proposed ship schedules and Tables 1(c) will be extracted and assembled for "fleet" analysis.

From this, the extent of 1981 funding problems can be projected along with the makeup of and areas of problems. This, then, would serve as a starting point for joint and cooperative actions.

- d. The Working Group will hold a meeting on July 10th at Scripps. The purpose of the meeting will be: To assemble a scheduling plan for submission to UNOLS, JOI, NSF, ONR, OSB, etc.; and

- To review June 30th ship schedules and tables 1(c) and assess the extent of 1981 funding problems.

- With proposal information and anticipated funding in hand, I suggest that we conduct a moot exercise of testing the plan we assemble against the apparent problems (if any). It should be recognized that this would be a

drill only for which we have not been accredited. However, the makeup of our group should allow us to act responsibly. The results of this will be transmitted to UNOLS and to JOI for use at Fall meetings which each group has indicated will be held.

In planning for the meeting, please be prepared to remain until noon of the following day. Please make your own reservations. Your travel and expenses will be funded by UNOLS. John Martin has requested that the meeting be deferred until July 16th. If you would prefer this date (or either date), please contact me. If a majority so indicate, the date can be changed. If I do not hear from you, I assume you prefer it to remain the 10th.

The general sense of UNOLS members is that NSF and ONR representatives should be full scale participants in these proceedings. Therefore, I would hope that OFS and Code 480 would accept an invitation to come to the meeting.

Thank you all very much for your time and efforts. I hope that we can make a meaningful contribution.


R. P. Dinsmore

RPD:crm
Enclosures

TO: Members of the UNOLS Working Group
on Joint Ship Scheduling

June 10, 1980

The "model" of the fleet arrangement for scheduling purposes as it emerged from the May 22, 1980, UNOLS meeting appears to be:

