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Beyond the initial planning session Ed Chin, George Grice, and Hal Spuhler have all reviewed and commented on drafts of the plan. Jean DeBell's participation is part of an agreement with the Oceanography Section whereby she spends approximately two days per week working with NOLS. During the preparation of this document she has contributed weekends and evenings as well in an admirable demonstration of cooperation across organizational lines.

The author is also indebted to an array of secretaries who participated in the production of this document, namely, Georgianna Brown, NOLS secretary, Kathy Simms and Lyn Smith, who have served part-time with NOLS, and the weekend volunteers without whom the task would never have reached completion on schedule, Veronica Butler, Faithy Graham, Arcelia Jackson, Edna Romeo, Andrea Milner and Alice Mason.

NSF, of the Federal and of the non-Federal sectors. "Communication ..." will be followed closely by NSF-NOLS since, in order to function effectively, NOLS must serve as a clearinghouse of information moving in both directions between the Federal sector and the academic sector. "... coordination" is intrinsic to all levels of management.

Coordination of NOLS support with other Federal agencies, particularly the Navy, is crucial to better management of the resources of the oceanographic academic sector. The General Accounting Office (GAO) has reported to Congress the need for improved management of support for oceanographic facilities by both NSF and Navy. The proposal that both agencies agree to express intent, two years in advance, to commit support for operation of ships and other shared facilities is consistent with GAO recommendations.

The NOLS plan is a means for improving the capability, efficiency and effectiveness of the academic oceanographic community for coordination, assessment and planning of facilities and their utilization to meet the research requirements of the community. The plan offers to the community the opportunity to assume a greater degree of responsibility and leadership with respect to the expenditure of Federal funds for oceanography.

6. Management

NOLS objectives relevant to this activity are as follows:

- To provide a management capability shared appropriately between the Foundation and the academic oceanographic community

- To assure the viability of the academic oceanographic community by improving and stabilizing Federal support through improved coordination among the Federal agencies involved

In the broadest sense the entire NOLS plan could be characterized as "management," involving the following elements:

- Utilization of facilities

- Information acquisition and analysis

- Evaluation and planning

- Communication and coordination

- Funding

Although all of these management elements are interdependent, responsibility for them ranges through a spectrum from principally academic to exclusively Federal. The spectrum is reflected in the above list in which "Utilization of facilities," to be managed primarily by the academic sector, lies at the opposite end from "Funding," which is the province of NSF-NOLS. "Funding" can be identified as a special controlling or modulating element since the entire System can be expanded or contracted to correspond to levels of "Funding." "Funding determines <u>what</u> is available for <u>whose</u> utilization. "Information acquisition ..." will be carried out at the regional level, with some guidance from NSF-NOLS; whereas "... analysis" will involve all levels of the System. "Evaluation and planning" will involve a management loop consisting of the CCPA, NSF-NOLS and other relevant portions of

Agencies other than NSF and Navy are included only as observers or consultants since their support for the academic fleet is minimal. The structure of these panels will improve interagency coordinating efforts with respect to academic oceanography by avoiding the pattern of past arrangements in which (1) mission-oriented in-house representation was mixed with that for academic oceanography and (2) all agencies had equal representation regardless of their dollar investment in actual support.

NSF will undoubtedly continue to be involved in a multiplicity of Federal panels, committees, councils, etc. concerned with oceanography. It is proposed, nonetheless, that Federal coordination pertaining to NOLS support be confined solely to the structure shown in Figure 5. (See Part III for detailed structure and function of panels.) NSF-NOLS per se is involved at the panel level of this structure; AD/NI provides the interface for NOLS with any other Federal coordination.

Non-Federal coordination will be concerned with entities such as committees, panels or boards of the National Academy of Sciences and the National Academy of Engineering, industry and not-for-profit organizations.

A key feature of NOLS is the long-range commitment of funds for support of relatively expensive facilities and operations. The research support programs will need to incorporate this same feature in order to assure their grantees an advantageous position in competition for use of ships and other facilities whose schedules must be planned well in advance. The lack of sufficient advance notice in response to research proposals is a recognized handicap under the present mode of scheduling ships.

All oceanography support programs will need to develop their own methods of gathering information to assess advance facility requirements. NSF-NOLS will need to develop a calendar for receiving assessment information from them on a continuing basis.

Coordination with the academic sector. Coordination with the regional level is achieved through interaction between the NSF-NOLS Regional Coordinators and the Regional Operating Committees. At the level of the CCPA, which represents the entire academic sector, coordination is achieved through the NOLS Project Officer, who acts as an observer at meetings and transmits to that Committee information from the Federal sector.

Coordination with other portions of the Federal sector and the non-Federal sector. Inasmuch as the preponderance of Federal support for academic oceanography derives from NSF and Navy, the mechanism for coordination between them will be used by NOLS for coordination with the rest of the Federal sector. The panels shown in Figure 5 include, in addition to the basic membership of NSF and Navy, observers or consultants from other Federal agencies involved in support of oceanography in the academic sector.

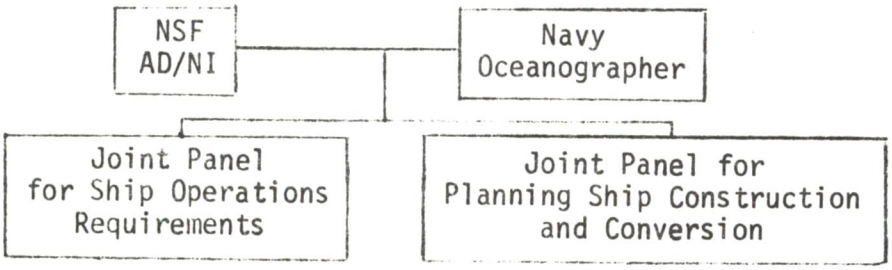

Figure 5

the recommendations of the National Commission for Marine Resources and Engineering Development (Stratton Commission).

Coordination within NSF. Since NOLS support is concerned with the availability to all qualified scientists of the facilities, vehicles and equipment required to perform research and carry out major programs in oceanography, it provides a service function to all other NSF support programs for oceanography. Facilities should be supported not because they are there but because they are needed. The academic sector of NOLS will be expected to assess and justify the collective needs of the oceanographic community. In addition, NSF support programs (for research projects, IDOE, NOSCP, etc.) must create their own capability for assessing needs in order that these may be communicated to the academic sector. IDOE is identifying shiptime requirements of individual programs; on the other hand research projects do not routinely identify shiptime (or other facility) requirements and only belatedly were the shiptime needs of NOSCP pointed up. The NOSCP example, in which communications to the institutions performing pre-site surveys have come independently from at least four separate sources (both from within NSF and from outside), illustrates clearly the need for a clearinghouse. The following figure shows NSF-NOLS in this useful communication position:

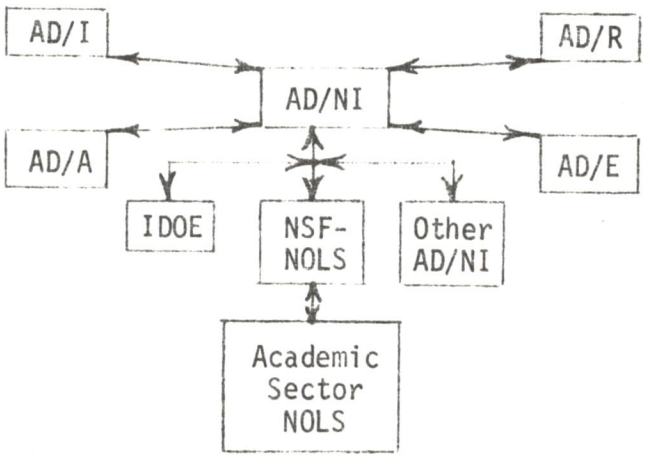

Figure 4

5. Coordination

The NOLS objectives relevant to this activity are as follows:

- To assure the viability of the academic oceanographic community by improving and stablizing Federal support through improved coordination among the Federal agencies involved

- To provide a formal mechanism among the Federal, academic and non-Federal sectors for coordination concerning utilization and acquisition of academic oceanographic facilities

Coordination will be one of two major activities of NSF-NOLS. It will consist of three categories of effort:

- Coordination within NSF

- Coordination with the academic sector of NOLS

- Coordination with those other portions of the Federal sector and the non-Federal sector which are concerned with support of academic oceanography

The success of the NOLS plan will depend in large measure on the effectiveness of these efforts. The need for improved coordination within the Federal sector on behalf of academic oceanography is, in fact, one of the major justifications for establishing NOLS. This aspect of NOLS responds to one of

- Requirements involving demands on the resources of the oceanographic community, including personnel as well as facilities, from other NSF-supported programs (IDOE, IBP, etc.). Information of this nature would be transmitted via NSF-NOLS or at meetings of CCPA with representatives of such programs.

- Regional and interregional requirements. These requirements represent the spontaneous input of the academic community and must be carefully examined by the CCPA for future trends and new directions.

- Inventories maintained by the Operating Committees and additional information or analyses requested of these Committees by the CCPA.

The assessment and planning functions of the CCPA are interrelated and, therefore, are described simultaneously:

- Work out priorities for use of NOLS-supported facilities to implement large-scale programs which make large-scale demands on System's resources, based on requirements received from NSF and other Federal agencies (via NSF-NOLS) and from EROC and WROC.

- Make up a three-to-five-year calendar of recommended priorities described above to permit long-range planning of facility use within each region.

- Evaluate continually the existing facilities of the System to estimate whether they are sufficient to match needs. Similar assessment will be generated at the local level by each regional Operating Committee and will be reviewed by CCPA in light of its own assessment.

- Review cruise plans of all NOLS vessels and recommend requirements for cruise reporting.

4. Planning

NOLS objectives relevant to this activity are as follows:

- To provide means to assess requirements for additional facilities in terms of priority needs of the entire academic oceanographic community and of national goals in oceanography

- To improve the capability of the academic oceanographic community collectively to develop long-range plans for utilization and acquisition of facilities

The focus of the long-range planning capabilities of NOLS is the Central Committee for Planning and Assessment (CCPA). This Committee is strategically located in the System to provide a formal channel of communication between the academic sector, in which it lies, and NSF-NOLS in the Federal sector. In this position CCPA will be best able to develop long-range facility plans for the community. Information upon which planning will be based flows from two directions to the CCPA. It comes from the academic oceanographic community via the Operating Committees and from the Federal side via NSF-NOLS. Categories of information upon which planning will be based are as follows:

- Constraints or boundaries in the form of support estimates transmitted by NSF-NOLS. Planning estimates with respect to NOLS support will be made available to CCPA with a 2-year lead time wherever possible. Assuming continued multiple-agency support of facilities, NSF-NOLS will also attempt to obtain and pass on to the CCPA reliable information concerning future facilities-support levels from other Federal agencies.

- Evaluate the above information and justifications in terms of long-range program requirements. Perform this function on a continuous basis.

- Recommend to NSF-NOLS priorities for acquisition of facilities.

NSF-NOLS will:

- Receive and evaluate recommendations from the CCPA as a basis for advanced budget preparation and for co-ordination, where appropriate, with other Federal agencies.

- Inform CCPA concerning those facilities which are appropriate for inclusion in NOLS.

- Solicit a specific proposal and detailed budget from the institution designated to supervise the construction and to undertake the operation of any given facility.

- Recommend NSF action on specific proposals.

3. Facilities Acquisition

The NOLS objective relevant to this activity is as follows:

- To provide means to assess requirements for additional facilities in terms of priority needs of the entire academic oceanographic community and of national goals in oceanography

NOLS is based on the conviction that large expensive facilities of all varieties which lend themselves to cooperative use should be available for use on a merit basis to those qualified scientist who can make a contribution to the national oceanographic effort. Although the actual operation of specific facilities will continue to be handled by individual institutions, appeals to NSF-NOLS for funds for new facilities will be considered only if they serve the oceanographic community as a whole. The procedures for submission of facility needs are described in this section.

Two portions of the NOLS structure will play a key role in determining those facilities for which funds will be sought. These are:

- The Central Committee for Planning and Assessment (CCPA) which represents the academic sector of NOLS

- NSF-NOLS which is the focus of internal NSF and Federal coordination for NOLS

The CCPA will:

- Receive (1) information from EROC and WROC concerning the existing facilities and (2) justifications for new facilities. Justifications will include, for each new facility, rough estimates of costs for construction or conversion, indication of the institution likely to operate the new facility and estimates of future operating costs.

- Operating Committee will submit to CCPA, with an estimate of annual operating cost, a justification for the use of the facility in terms of regional demands

- CCPA will evaluate and forward such requests to NSF-NOLS with their recommended priorities

- NSF-NOLS will inform CCPA and the initiating Operating Committee whether the facility is appropriate for inclusion in NOLS and will accordingly solicit proposals from institutions

When funds are available to begin operating support for any given facility, procedures similar to those described in Section 1. Regional Ship Use, will be set in motion by the Operating Committees as follows:

- Advertise availability of the facility giving its description, ground rules for its use and indicate how to apply for use

- Receive and evaluate user requests and maintain continual inventory of requests

- Develop criteria for selection of users and maintain continual inventory of users

- Develop assessment capability for determining effectiveness of joint-use arrangements for each facility

2. Use of Other Regional Facilities

NOLS objectives relevant to this activity are as follows:

- To create a cooperative system from the existing set of academic oceanographic institutions

- To provide means for matching available oceanographic facilities with facilities requirements of those qualified scientists who can make a contribution to the national oceanographic effort

The Regional Operating Committees will assess whether there are in existence other facilities than ships which might be included in NOLS regional use arrangements; however, funds may not be available for support of the operation of such facilities in Fiscal Year 1972. This activity will begin with:

- Identification of existing oceanographic facilities appropriate for shared use, such as submersibles, other research vehicles, data acquisition systems, docks, piers, shops and other maintenance areas, instrumentation development laboratories, data processing centers and specialized research laboratories

- Assessment of regional needs for new facilities which lend themselves to regional cooperative use

In order to initiate operating support for an existing facility the following steps must be taken:

- Operating Committee will obtain from operator institution agreement to include the facility in NOLS

- Maintain workable interface with institutional ship-operations staff at all ship-operating institutions in region. This interface is an essential ingredient in the entire scheme because the marine operations staff have a complex job to carry out with respect to maintenance and overhaul of vessels, intercruise turn arounds, mechanical breakdowns, etc. Decisions concerning where ships will go, what kinds of programs shall be carried out and by which specific scientists clearly must be made in the light of the realities of the ships' own operating capabilities and material limitations.

- Maintain a review process for all criticism concerning ship operations within the region.

Other comments. Regions may opt to develop different procedures and separate subcommittees for scheduling long-range versus short-range vessels. Such subcommittees should not, however divide the community into separate groupings and should not duplicate Committee functions, such as maintenance of regional information systems, which clearly are general rather than specific with respect to nature of cruises and ships, communications within region, etc.

Since most of the 32 ships in the present fleet receive support from several sources, the Operating Committees may be able to schedule annually only that portion of shiptime which is supported by NOLS. Maximal effective utilization of ships will be achieved if other support sources agree to allow the NOLS Operating Committees to schedule all or most of the shiptime which they support. Assuming (1) that multiple support for ship operations continues and (2) that NOLS Operating Committees handle most of the scheduling, priorities for scheduling blocks of shiptime will take into account the percentage of operating support by source.

It is understood that when this activity for Regional Ship Use is first undertaken by the Operating Committees, many of the ships in each region will already be scheduled for some time in advance. The Operating Committees will need to begin by collecting information on all existing cruise plans and schedules, adding cruise participants where appropriate and proposing alterations to less firmly committed portions thereof. This means there will be a transition period in which ships will be partially scheduled by institutions and partially by the Operating Committees. By year n+2 all ships will be scheduled by the Operating Committees.

- Maintain a continual inventory of available ships, their operating characteristics and equipment. This information will be distributed periodically to all potential users or institutions.

- Maintain continually updated cruise plans of all NOLS ships in region. This information will also be distributed periodically.

- Maintain regularly updated survey of long-range or unfulfilled requests for shiptime. This will be based on information submitted by individual scientists.

- Identify probable geographical areas of operation for specific ships in NOLS regional fleet. This first stage in cruise planning will be developed for at least two years hence (year n+2) and will be based on (1) constraints communicated by CCPA for blocks of region's shiptime to accommodate large national programs and (2) consensus among region's ship users and (3) communications between Operating Committees.

- Select cruise participants giving priority to those who have:

  (1) Federally supported research projects (at academic institutions) which require shiptime

  (2) Other supported projects which require shiptime

  (3) Projects without support but deemed of merit

For large ships, schedules will be roughed out by EROC and WROC for year n+2. Cruises will be scheduled to allow room for later adjustments. Short-range vessels will be scheduled on a short-term basis, say year n+1 or year n where possible.

1. Regional Ship Use

NOLS objectives relevant to this activity are as follows:

- To create a cooperative system from the existing set of academic oceanographic institutions.

- To provide means for matching available oceanographic facilities with facilities requirements of those qualified scientists who can make a contribution to the national oceanographic effort

This activity will be one of several assigned to the Eastern and Western Regional Operating Committees. Since it is likely to be the first major activity undertaken by these Committees, it will serve as a model for arranging joint use of other types of facilities. Beginning with extensions of Foundation ship support in Fiscal Year 1972, the two regional Operating Committees will carry out certain functions previously associated with the annual review of ship operations proposals by Foundation staff and the former Ship Operations Review Panel. This latter panel will no longer be needed since its functions will be incorporated into the procedures for regional ship use.

To achieve the goal of cooperative ship use, the Eastern and Western Regional Operating Committees will:

- Identify all justifiable ship requirements within the region. This requires a communication channel between the Operating Committees and all potential users at academic institutions in the region for the purpose of informing them of the availability of ships and ascertaining their requirements for these facilities. Instructions for user access to the Operating Committees should be clear cut. Individual scientists must plan their ship needs well in advance and make their needs known.

V. OPERATION

Each of the six sections presented in Part V defines a separate activity associated with NOLS. Recommendations from the oceanographic community may modify the details of operation ascribed to these activities, as the NOLS committees come into existence and take on their functions. At present these definitions represent an approximation of how all the elements in the System will work together.

All of these activities are interrelated and their descriptions are necessarily repetitious. Collectively, these sections show the proposed interactions among the structural elements of NOLS and how each of the separate activities and elements contributes to the whole System and to the achievement of NOLS objectives.

Four of these activities center or originate in the academic sector and two in the Federal sector.

3. Administration - This item covers the estimated costs of maintaining the permanent NOLS committees and their staff. The figure for FY 1971 includes estimates for the Organizing Committees on the assumption that their meetings will be held before June 30, 1971. It also includes some of the estimated costs for establishing the permanent committees. The figure for FY 1972 for CCPA ($50,000) includes costs of the Committee (travel, per diem and compensation) and related office costs. The combined figure for the Operating Committees ($150,000) includes not only support for the Committee members but also includes funds for consultants (such as for material inspection of ships) and related office costs.

(Other Facilities) This is a new support item to be developed under NOLS. Until the Operating Committees and CCPA are functional and have had time to begin assessing the resources of the System and identifying other common-purpose facilities, it is impossible to derive reliable estimates for this item. It should be possible, however, during FY 1972 to identify one or more facilities appropriate for collective use. Therefore, a small allowance has been made in the budget for FY 1972.

2. Acquisitions - The definition of facilities used in this text (see p. 2 of the Introduction) is such that the categories "Shore Facilities" and "Equipment" are not as clearly separable as they appear to be in Table I.

(Ships) The amount designated for FY 1971 represents the probable investment in the conversion of R/V GILLISS. That for FY 1972 derives from the NSF Budget and will be used for a priority ship replacement. Figures for subsequent years will be based on an assumed combined effort by NSF and Navy to replace most or all of the vessels now 20 or more years old.

(Shore) Although this figure for FY 1972 is too small to provide for a substantial shore facility, it may be sufficient for urgently needed renovations or modifications of existing shore facilities important to NOLS operations. Alternatively, this item may be combined with "Equipment."

(Equipment) Funds in this category will be used to upgrade shipboard equipment in order to "equalize" the ships in the fleet; to provide a pool of readily available equipment replacements for shipboard and other shared use; and to acquire or develop other appropriate items which lend themselves to shared use.

TABLE II
SUPPORT OF SHIP OPERATIONS, FISCAL YEARS 1962-72
IN MILLIONS OF DOLLARS

Fiscal Year	NSF	ONR	All Other[a]	Total
1962	1.31	2.76	0.83	4.9
1963	3.50	3.17	0.82	7.5
1964	3.67	3.56	0.89	8.1
1965	4.28	3.7	0.89	8.9
1966	6.97	3.88	0.89	11.7
1967	6.38	4.01	0.73	11.1
1968	6.88	4.28	0.84	12.0
1969	6.98[b]	4.75	0.88	12.6
1970	7.40	4.5	1.33	13.2
1971 (est.)	9.3	4.2	1.04	14.5
1972 (est.)	10.7	4.0	1.0	15.7

a Includes other Federal agencies, state and private sources

b Figure corrected for 12 months. Amount actually obligated was 8.64 for 15 months

TABLE I
INITIAL BUDGETS FOR NOLS
IN MILLIONS OF DOLLARS

Kinds of Support	Year 0 FY 1971	Year 1 FY 1972
Operations:		
Ships	7.5[a] 1.8[b] 9.3	8.1[a] 2.0[b] .6[c] 10.7
Other Facilities	0	.4[c]
Acquisitions:		
Ships	.4	2.8[d]
Shore Facilities	0	.4[c]
Equipment	0	1.8[c]
Administrative:	.08[e]	
CCPA		.05[c]
EROC & WROC		.15[c]
Total	9.8	16.3

a NSF Budget line item for Support of Ship Operations
b Contributions to ship support from programs such as IDOE
c NSF Budget line item for Specialized Facilities, Equipment and Support Services
d NSF Budget line item for Construction of an Oceanographic Research Vessel
e Estimate for Organizing Committees and establishment of permanent committees

3. Budget Estimates

Estimates for NOLS support shown in Table I for FY 1971 and 1972, include only three of the four kinds listed in the previous section, 2. Funding Procedures, namely support for Operations, Acquisitions and Administration. Estimates for Core Staff have not yet been developed and therefore have been omitted. In this Table Year 0 (FY 1971) designates the year of organization of NOLS. The budget for Year 0 consists of items transferred from other portions of NSF to NOLS. FY 1972 is designated as Year 1 since it is the first year in which NSF budget requests included NOLS as a separate entity. The column for Year 1 identifies the sources of funds for support of specific NOLS activities. Ship-operations support is shown as deriving from a specific budget line item and from "other programs" (particularly IDOE).

Budget projections, such as those for FY 1971 and 1972 contained in Table I, are derived in the following fashion:

1. Operations - (Ships) The cost of supporting the present fleet of 32 ships is a "known" quantity. One can derive future levels of required support by making one set or another of assumptions. The assumptions being used are:

    - Operation of a constant-size fleet whose cost varies primarily with cost of living

    - Cost-of-living increases of about 6% per year

    - Multiple-source support with stabilized ONR support of about $4.0 million per year and a total of about $1.0 million from all other sources combined (see Table II for trends in these sources in recent years)

C. General Characteristics of NOLS Support

1. Continuing

a. Involves advance commitments as follows:

FY n-2	FY n-1	(1) FY n	(2) FY n+1	(3) FY n+2

During any Fiscal Year, FY n

(1) funds are obligated in accordance with commitments made during FY n-2

(2) commitments are reconfirmed for FY n+1

(3) commitments for support levels for FY n+2 are developed by the Federal sector based on needs projected by both the academic and Federal sectors

b. Involves simple procedures for renewal by repeated amendments of grants or contracts

c. Involves awards to individual institutions responsible for operation of specific facility(ies)

2. Single project, non-continuing

a. Involves awards similar to those for facilities support now provided

b. Involves awards to individual institutions which will assume responsibility for construction or conversion

As the outline indicates, detailed proposals will be provided only for the <u>initiation</u> of operations support for any given facility. Hence the ships now receiving operations support will need no detailed proposals for continuing awards but only

2. Funding Procedures

This plan incorporates simplified procedures for NOLS support. Simplification will be applied to (1) proposals, (2) review and evaluation process and (3) mechanisms for awarding funds. The following outline describes the nature of NOLS support:

A. Kinds of NOLS Support

1. Operations - for any type of ship, shore or other facilities to be used collectively

2. Acquisitions - for construction or conversion of facilities to be used collectively

3. Administrative - for cost of maintaining committees

4. Core Staff - for salaries (or partial salaries) of technicians and of other support personnel not included directly in 1. Operations but necessary thereto

B. Modes of NOLS Support

1. Continuing

   a. Requires start-up proposals initially and only renewal budgets (+, - or same) thereafter

   b. Use for A.1, A.3 and A.4

2. Single project, non-continuing

   a. Requires single specific proposal for project and draft of start-up proposal for subsequent operations support, if anticipated

   b. Use for A.2

and those from non-operator institutions will be recommended by the Host Institutions with review and approval by NSF; membership shall consist of representatives from three categories:

(a) scientists actively engaged in oceanographic research

(b) institutional administrators

(c) marine operations staff

4. Accomplishment of meetings of Organizing Committees at which

   (a) Size, membership and procedures for EROC and WROC are planned

   (b) Four members for CCPA are proposed (two by each Committee)

   (c) Several alternative institutions are proposed to administer committee support for each of the Operating Committees

5. NSF-NOLS funding action based on proposals for committee support received from institutions chosen by NSF

readily available information concerning immediate and advance user requirements; location, nature and availability of facilities; and needed or actual support. Given the size and complexity of this task, permanent supportive staff will be required by the Committees for this purpose.

The Information Analysis Officer is also concerned with analysis of the efficiency and effectiveness of NOLS. He will work with NOLS Committees to design formats for their reports to the Federal sector. He will also carry out analyses of the System, where necessary, based on information derived from the Committees.

Facilities Management involves the coordination and review of recommendations received from the academic and from the Federal sectors for construction or renovation of facilities. The term "facilities" includes, in this context, ships, submersibles, other research vehicles, data acquisitions systems, docks, piers, shops and other maintenance areas, instrumentation development laboratories, data processing centers, specialized research laboratories.

This plan calls for implementation of the initial phase of NSF-NOLS staffing by or before July 1, 1971.

Academic Sector - NOLS

The scheme for implementation of the academic committee structure of NOLS involves the following steps:

1. Selection by NSF of two Host Institutions, one in the Eastern Region and one in the Western Region, each of which will, with NSF advice, develop the cost estimates and make the arrangements for a meeting in its region of a short-term Regional Organizing Committee

2. NSF-NOLS funding action for support of the meetings of the Regional Organizing Committees

3. Designation of members to serve on the Regional Organizing Committees; representatives from ship-operator institutions will be recommended by their institutions

increases to allow expansion of the Facilities Management activity, this function can reasonably be combined with another.

Regional Coordinators will work closely with the Regional Operating Committees and with the institutions represented therein. This plan proposes that one, and in time perhaps both, of these positions be filled by "rotators" from the oceanographic community. At the outset the Project Officer will assume one of the two coordinating functions in order to have a direct role in the evolution of the System within the academic sector. Accordingly, the Project Officer will participate in organizing meetings of the System and its committees, thereby following developments from the beginning.

The Information Analysis function is concerned with the design and development of NOLS procedures for regional information systems upon which facilities utilization, assessment and planning depend. These information systems consist of the continual inventories described under "Functions of the EROC and WROC" (p. 10) and are repeated here:

- ship cruise plans and ship schedules
- schedules for other shared facilities
- potential and actual users of shared facilities
- proposals, grants and contracts for research involving the use of shared facilities
- physical characteristics and material condition of all shared facilities
- demonstrable facilities requirements
- annual operating costs of all shared facilities

In order to function effectively, NOLS must serve as a clearinghouse of pertinent information which flows in both directions between the Federal sector and the academic sector. In the latter the Operating Committees will carry out the actual information gathering and handling with NSF-NOLS review. Improved planning for and utilization of facilities depends on having

1. Development of the NOLS Organization

NSF - NOLS

The nucleus of NSF-NOLS was established on October 1, 1970, when NSF support functions for oceanographic facilities were transferred from the Assistant Director for Research to the Assistant Director for National and International Programs. At this time, the NOLS Project Officer assumed responsibility for the development of the NOLS organization. Functions anticipated for the first stage of the System's development are as follows:

- Coordination for the Eastern Region and the Western Region
- Information Analysis
- Facilities Management

Based on budget levels anticipated for FY 1972, particularly for facilities, it appears that three staff members could handle these functions in the following fashion:

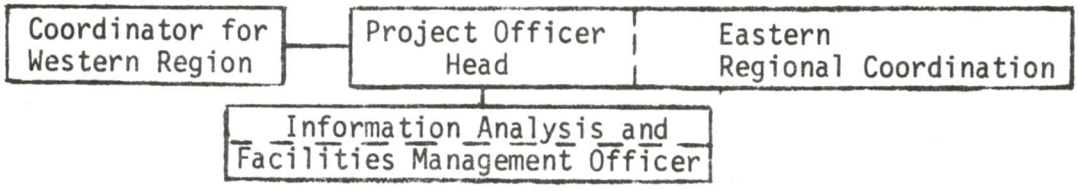

Figure 3

This arrangement shows the Project Officer serving also in the capacity of Coordinator for the Eastern Region (might be either Eastern or Western Region depending on the person recruited for the other position). At a later stage when NOLS is fully operational, a second regional coordinator will be needed. Two other functions are also combined, namely that for Information Analysis and for Facilities Management. Until such a time as the budget for acquisition of facilities

IV. IMPLEMENTATION

Part IV describes the steps involved in creating the NOLS organization and implementing its activities. For NSF-NOLS this includes identifying the staff functions which must be filled initially, providing "start-up" support for the Organizing Committees and the permanent committees (EROC, WROC and CCPA) and managing subsequent NOLS support. For the academic sector this includes planning and organizing the permanent committees, with NSF approval and support, and assuming assigned functions involved in coordination, assessment and planning of facilities and their utilization.

The information is presented in the following sections:

Functions of Joint Panel for Planning Ship Construction and Conversion

- Develop long-range plans for construction or conversion of vessels and other research platforms for the academic sector, based on assessments and recommendations received from CCPA via NOLS, from represented agencies and from the non-Federal sector

- Seek agency(ies) commitments for support and develop calendar for implementing construction or conversion projects

- Monitor actual construction or conversion projects

- Maintain close communications with Joint Panel for Ship Operations Requirements

Functions of Joint Panel for Ship Operations Requirements

- Recommend to agency(ies) support levels for FY n+2 based on (1) budget recommendations for ship-support increments and (2) projected shiptime requirements received from CCPA via NSF-NOLS

- Recommend via NSF-NOLS to CCPA the set of ships to be operated in FY n+2 based on projected shiptime requirements, projected costs of operations and committed Federal support

- Review and forward via NSF-NOLS to CCPA anticipated or confirmed requirements for shiptime based on projected agency support of large-scale programs

- Assess established cruise schedules to assure fulfillment of shiptime needs for agency-funded projects

- Maintain close communications with Joint Panel for Planning Ship Construction and Conversion especially concerning discrepancies between needs for certain types and numbers of vessels and their availability

- Review and reconfirm on an annual basis agency support levels for FY n and n+1

Composition of the Joint Panel for Ship Operations Requirements

NSF:

NOLS Coordinator for Eastern Region
NOLS Coordinator for Western Region
1 Other Representative

Navy:

3 Representatives

NOAA:

1 Observer (Office of Sea Grant Programs)

AEC:

1 Observer

Composition of Joint Panel for Planning Ship Construction and Conversion

NSF:

1 NOLS Representative
1 Other Representative

Navy:

2 Representatives

Technical Consultants - 1 each from NOAA, Maritime Administration and Others

- Monitors all active grants and contracts for the construction or renovation of facilities
- Evaluates performance on completed grants and contracts for construction or renovation of facilities
- Coordinates and reviews recommendations from CCPA for construction or renovation of facilities
- Assumes other responsibilities appropriate to an NSF Program Officer

Coordinator for Western (or Eastern) Region

- Acts as observer on Operating Committee in his region
- Follows closely all NOLS activities in his region through continual communication with regional NOLS Committee, academic institutions and participating scientists
- Reviews and resolves (with cognizance of other Regional Coordinator) problems relating to NOLS activities in this region
- Follows closely (with other Coordinator) interregional communications and activities of the regional NOLS Committees
- Reviews with other Coordinator and recommends NSF action on institutional requests for NOLS support of facilities operations (forwarded by CCPA) and for Committee support
- Monitors all active grants and contracts awarded to institutions in his region for operation of facilities and for Committee support
- Serves as member on Joint Panel for Ship Operations Requirements

NSF-NOLS Composition

- Project Officer - Head and Coordinator for Eastern Region
- Information Analysis and Facilities Management Officer
- Coordinator for Western Region

NSF-NOLS Functions

Project Officer

- Serves as observer at meetings of CCPA
- Serves as NOLS contact with Navy and other Federal agencies
- Serves as NOLS contact with other oceanographic activities in NSF
- Serves initially as Coordinator for Eastern (or Western) Region

Information Analysis and Facilities Management Officer

- Supervises design and development of NOLS regional information systems and carries out NSF-NOLS system analyses
- Serves as member on Joint Panel for Planning Ship Construction and Conversion

Functions of the CCPA

- Work out priorities for use of NOLS-supported facilities to implement large-scale programs which make large-scale demands on System's resources, based on requirements received from:

  - NSF (via NSF-NOLS)

  - other Federal agencies (via NSF-NOLS)

  - EROC and WROC

- Review and coordinate NOLS regional activities having national implications

- Evaluate on a continuing basis and report periodically to NSF-NOLS

  - material condition of shared facilities

  - utilization rates of shared facilities

  - effectiveness of shared use of facilities

- Develop and forward, with recommendations, long-range plans for facilities based on projected requirements received from EROC and WROC

- Serve as communications channel between Operating Committees and NSF-NOLS

- Review and forward all requests for NOLS support from Operating Committees recommending priorities

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- Review and forward all requests for NOLS support from Operating Committees recommending priorities

Minimal Requirements for Composition and Characteristics of the CCPA

- Shall consist of five members serving staggered terms

- Initial membership shall be determined as follows:

  Two members selected by each Organizing Committee (Eastern Region and Western Region)

  One member designated by NSF

- With the exception of the one member selected by NSF, continuing membership shall be determined by selection procedures based on recommendations made by the Organizing Committees and agreed upon by NSF.

- Schedule ships and other common-purpose facilities

- Review and forward budget requests from institutions in region for all NOLS support

- Evaluate regional NOLS activities on a continuous basis

- Maintain a single channel for formal communications between regions (via the four Committee members assigned this function)

    - to forward shiptime requests and requests for use of other shared facilities from one region to the other as appropriate to match specific scientists' needs to specific ships and other facilities

    - to ascertain overlaps among regional schedules and to make adjustments

    - to work out interregional adjustments to accommodate long-range ship requirements for national programs such as IDOE, NOSCP, IBP, etc.

    - to plan coordinated operations between Eastern Region and Western Region

- Maintain a single channel for formal communication between CCPA and the regions (via the four Committee members assigned this function)

    - to receive from the Federal sector (via NSF-NOLS and the CCPA) long-range ship requirements for national programs such as IDOE, NOSCP, IBP, etc., which involve advance assignments of blocks of shiptime and of geographical areas of operation

    - to forward from the academic sector to CCPA projected requirements for long-range cruises generated at the regional level

    - to forward from the academic sector to CCPA projected requirements for new facilities and for facility modifications

Functions of the EROC and WROC

. Develop and maintain communication channels with:

- appropriate academic institutions in the region in order (1) to inform scientists of the availability of facilities, (2) to ascertain scientists' requirements for these facilities and (3) to inform scientists of the nature of on-going programs

- each other via a formal interregional communications link in order (1) to exchange information concerning schedules and scheduling problems of mutual interest, (2) to coordinate facility operations and (3) to assemble projected requirements for long-range cruises

- CCPA in order (1) to transmit regional schedules and program plans, (2) to transmit budget requests, (3) to transmit justifications for new support and (4) to transmit annual reports on regional activities

. Develop and maintain continual inventories for region including:

- ship cruise plans and ship schedules

- schedules for other shared facilities

- potential and actual users of shared facilities

- proposals, grants and contracts for research involving the use of shared facilities

- physical characteristics and material condition of all shared facilities

- demonstrable facility requirements

- annual operating costs of all shared facilities

Permanent Committees

The permanent committees provide the structure through which the academic sector undertakes its responsibilities in NOLS.

Minimal Requirements for Composition and Characteristics of EROC and WROC

- Shall consist predominantly of scientists actively engaged in oceanographic research

- Membership shall rotate and discipline balance shall be maintained

- Shall provide equitable representation among region's ship-operator institutions, either directly or by rotation

- Shall include membership from institutions which are <u>not</u> ship operators

- Shall provide a clearly defined input mechanism for institutional administrators and marine operations staff (e.g., as working panels or consultants)

- Shall have no fewer than seven members (institutional consensus will recommend actual size)

- Shall have two members of each Committee (EROC and WROC) assigned to the function of continual interregional communications and communications with the CCPA

Functions of the Organizing Committees

- Recommend for approval by NSF:

  - the size of Operating Committees (need not be same for Eastern Region and Western Region)

  - the method for selecting initial Operating Committees and for selecting future members, including scheme for assuring equal representation, directly or by rotation, of all operator institutions and representative non-operator institutions

  - membership for initial Operating Committees

  - detailed procedures for Operating Committees based on general guidelines provided by NSF-NOLS

  - two members (per Organizing Committee) for membership on CCPA, method for selecting future CCPA members and length of service

Short-Term Committees

NSF designated Host Institutions (one in each region) will arrange and solicit participation of all operator institutions and representative non-operator institutions in the selection of Organizing Committee membership, with review and approval by NSF.

Minimal Requirements for Composition and Characteristics of Organizing Committees

- Two in number--one for Eastern Region and one for Western Region

- Exist only to set up permanent organization for academic sector of NOLS by means of organizing meetings. Cease to exist when permanent organization comes into existence

- Members from ship-operator institutions will be recommended by their institutions and those from non-operator institutions will be recommended by the Host Institutions with review and approval by NSF

- Membership shall consist of representatives from three categories:

  Scientists actively engaged in oceanographic research

  Institutional administrators

  Marine operations staff

INTERRELATIONSHIP OF NOLS WITH OTHER OCEANOGRAPHIC ACTIVITIES

SCHEMATIC

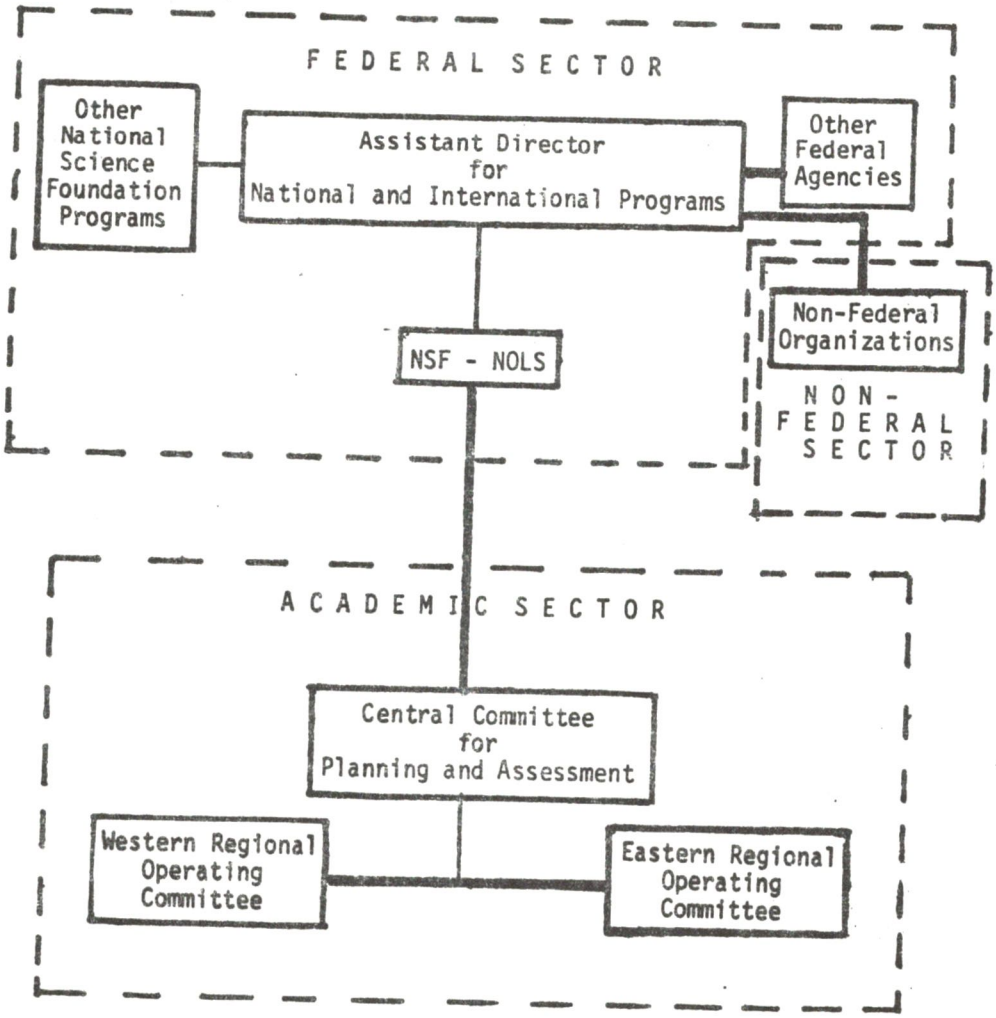

Figure 2

III. NOLS AND NOLS-INTERRELATED ORGANIZATIONS

Part III describes the organization of NOLS and its interrelated elements, presenting its structure and functions. NOLS is organized into two major divisions: one which comprises the "academic sector" and one which lies within the "Federal sector" and communicates with those portions of the Federal and non-Federal sectors which are concerned with academic oceanography. Figure 2 shows these interrelationships.

The academic sector has the responsibility for planning and managing, with NSF review, the operation of ships and other facilities to meet the facilities requirements of those qualified scientists who can make a contribution to the national oceanographic effort. This is to be accomplished through a set of committees.

The Federal portion of NOLS is centered in NSF-NOLS. Its functions are to be accomplished through: (1) NSF-NOLS staff; and (2) two panels whose members represent NSF, Navy and other Federal agencies concerned with oceanography.

II. OBJECTIVES OF NOLS

- To create a cooperative system from the existing set of academic oceanographic institutions

- To provide means for matching available oceanographic facilities with facilities requirements of those qualified scientists who can make a contribution to the national oceanographic effort

- To provide means to assess requirements for additional facilities in terms of priority needs of the entire academic oceanographic community and of national goals in oceanography

- To improve the capability of the academic oceanographic community collectively to develop long-range plans for utilization and acquisition of facilities

- To provide a management capability shared appropriately between the Foundation and the academic oceanographic community

- To assure the viability of the academic oceanographic community by improving and stabilizing Federal support through improved coordination among the Federal agencies involved

- To provide a formal mechanism among the Federal, academic and non-Federal sectors for coordination concerning utilization and acquisition of academic oceanographic facilities

improved planning for a national oceanographic program will be possible only if long-range commitments and a consequently higher degree of certainty can be introduced into the support function from the Federal side. The present random method for support of academic oceanography involves a considerable waste of time and resources owing to the lack of certainty and advance information. The NOLS approach is designed to assure maximum return for every dollar invested in the academic research fleet and other shared facilities.

The following acronyms are used in this text:

AEC - Atomic Energy Commission

IBP - International Biological Program

IDOE - International Decade of Ocean Exploration

NOAA - National Oceanic and Atmospheric Administration

NOSCP - National Ocean Sediment Coring Program

OMB - Office of Management and Budget

ONR - Office of Naval Research

proposed to no regional divisions at all, i.e., just one collective scheduling and operating group. A system based on seven regions offers too little consolidation to overcome existing fragmentation; on the other hand, a system based on no division whatever offers the prospect of an unwieldy arrangement leading to rigid centralized control. A division into two large areas is less restrictive and offers considerable flexibility. Since certain basic organizational structures must be repeated within each region, no matter the number, it follows that the complexity and cost will be held to a minimum if there are no more than two regions. Arguments for more than two would need to justify the attendant increased cost and complexity. The justification presented here for two regions is based on the conviction that a possible need for further subdivision, such as for the Great Lakes or the Gulf, could be managed within the organizational structure of the larger region.

The proposed System depends on agreement to the following conditions:

(1) Only those institutions which elect to participate in the System under NOLS guidelines will receive NOLS support for acquisition and operation of ships and other shared facilities.

(2) The Foundation will, in so far as possible, express its intent two years in advance to commit NOLS support for operation of ships and other shared facilities, i.e., in any Fiscal Year n, the agency commits support for FY n+2, reconfirms support for FY n+1, while actually obligating funds for FY n.

(3) The Foundation will, in coordinating ship-operations support with the Navy, urge that agency to make the same advance commitment. If such an agreement cannot be obtained from the Navy, the Foundation will seek from OMB approval for single-agency support by NSF and the additional funds required. Other contributing agencies will be urged to make the same advance commitment.

(4) NOLS will not necessarily participate in future operations support of oceanographic facilities which are added to the existing set without full cognizance and concurrence of the System.

Item (1) above constitutes the institutional <u>quid pro quo</u> for NOLS and items (2) and (3) constitute the Federal <u>quid pro quo</u>. The plan is based on the premise that it will not be possible to effect any real improvement in the management of operations support for ships and other facilities without these agreements. Improved utilization of oceanographic resources, including people as well as facilities, and

GEOGRAPHIC AREAS OF RESPONSIBILITY FOR WESTERN REGIONAL AND EASTERN REGIONAL OPERATING COMMITTEES (WROC & EROC)

W R O C

List of States and Operator Institutions

Alaska (U of Alaska)

Arizona
*Arkansas

California (U of Cal Scripps; Stanford U ; U So. Cal)

Colorado

Hawaii (U of Hawaii)

Idaho

Iowa
Kansas
Missouri

Montana
Nebraska
Nevada
New Mexico
North Dakota
Oklahoma
Oregon (Oregon State U)
South Dakota
Utah
Washington (U of Washington)
Wyoming
Pacific Territories

*Might be regarded as appropriate to EROC because of proximity to Gulf

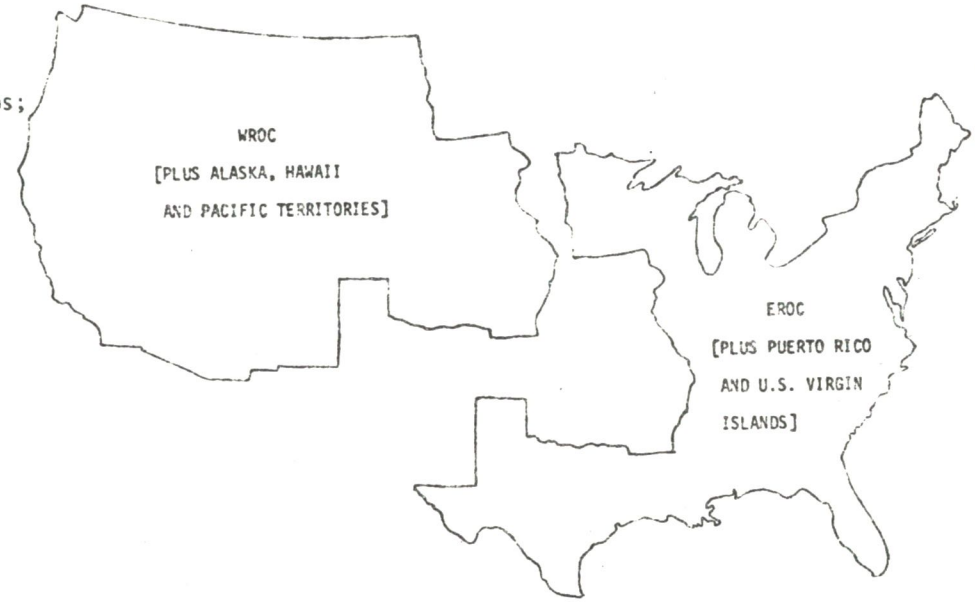

Figure 1

E R O C

List of States and Operator Institutions

Alabama
Connecticut
Delaware
Dist. of Columbia
Florida (Fla. State U; Nova U; U of Miami)
Georgia (U of Georgia)
Illinois
Indiana
Kentucky
Louisiana
Maine
Maryland (Johns Hopkins U)
Massachusetts (WHOI)
Michigan (U of Michigan)
Minnesota
Mississippi
Ohio
New Hampshire
New Jersey
New York (Columbia U, Lamont)
North Carolina (Duke U)
Pennsylvania
Rhode Island (U of Rhode Island)
South Carolina
Tennessee
Texas (Texas A&M)
Vermont
Virginia
West Virginia
Wisconsin
Puerto Rico and U.S. Virgin Islands

to abandon block support and return to piecemeal support under individual research project grants.

The recent Stratton Commission report noted the lack of sufficient capability within any single academic oceanographic institution to mount large-scale efforts for study of the oceans. The Commission observed correctly that it will not be possible in the decade of the 1970's for each of the major institutions to have all the needed facilities and that cooperative arrangements must be worked out to assure, for all qualified scientists, opportunity of access to the more costly facilities.

For these reasons--(1) the present condition of fragmentation stemming from the random distribution of facilities and scientists among some 18 ship-operator institutions; (2) the rising cost of supporting this fragmented system; (3) the decline of ONR support and the concomitant shift of major responsibility to NSF; (4) the need for improved accountability for operations support in terms of research to be performed; and (5) the need for improved means to utilize existing facilities in the most efficient way to carry out priority programs--NSF proposes to develop a National Oceanographic Laboratory System (NOLS) which will provide a means for better management of academic oceanographic facilities, both with respect to their Federal support and their utilization for research. The term "facilities" includes, in this context, ships, submersibles, other research vehicles, data acquisition systems, docks, piers, shops and other maintenance areas, instrumentation development laboratories, data processing centers, specialized research laboratories.

The objective of the NOLS approach in contrast to some others, such as that of university-national laboratories proposed by the Stratton Commission, is to preserve to the maximum extent the independence and integrity of existing oceanographic institutions and concurrently to create a mechanism for cooperative utilization of oceanographic facilities. This objective will be achieved by an association of institutions in a national System in which utilization and acquisition of oceanographic facilities will be justified in terms of the facilities requirements of those qualified scientists who can make a contribution to the national oceanographic effort. Individual institutions will continue to operate facilities, but scheduling, assessment and planning with respect to their utilization and acquisition will be handled cooperatively by the System.

The management plan proposed in this document divides responsibilities between the oceanographic institutions and the National Science Foundation in a way that will serve to minimize unnecessary administrative efforts at both levels. The proposed NOLS plan is based on a division of the country into two parts--an Eastern Region and a Western Region (see Fig. 1). Alternatives considered ranged from the seven regions initially

I. INTRODUCTION

The decade of the 1960's began on a note of growing interest on the part of the Federal establishment in study of the oceans. At the end of the 1950's, the National Academy of Sciences formed a Committee on Oceanography (NASCO), which focused national attention on the need for more research ships, laboratories and trained oceanographers for pursuit of oceanic studies. NASCO's plan for the Sixties gave particular attention to the universities and private research institutions, since they are the source of newly trained oceanographers as well as the operating base for fundamental research. The National Science Foundation and the Office of Naval Research responded by providing additional facilities (ships, laboratory buildings, piers), operating support and project support, and by encouraging additional institutions to emphasize oceanographic research and training.

By the end of the decade this Federal support had produced a proliferation of ship-operator institutions (now 18, operating 32 ships) each with its own aspiration to expand and develop for itself the full range of currently available facilities. The cost of maintaining and operating this set of ships has risen steadily, while ONR funding, at one time the dominant support for the academic sector, has declined. The burden for providing the major support has shifted to NSF and with it the attendant problems of determining how to plan for the future support of oceanography in the academic sector.

In acknowledgement of its growing responsibility NSF moved, in the mid 1960's, to stabilize the support of ship operations by providing single annual block grants for this purpose. Other agencies continued to link ship-operations support directly to research projects. This change in NSF policy considerably increased the efficiency of ship operations in the academic sector since it provided a measure of certainty that the ships could be kept in fulltime operation. On the other hand, NSF block support has tended to become a partial subsidy, which is difficult to defend in any specific amount when NSF budgets are prepared and difficult to show accountability for in terms of individual research projects served. Without such accountability, it is also difficult to assess whether available shiptime matches the requirements of Federally supported projects. Therefore, a mechanism must be introduced to achieve improved accountability for obligation of large blocks of funds for operation of ships and other facilities, since the only acceptable alternative may be

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NATIONAL SCIENCE FOUNDATION
Washington, D. C.

NATIONAL AND INTERNATIONAL PROGRAMS

NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM
(NOLS)

TITLE:

NOLS PLANNING DOCUMENT

NOLS Project Officer, Miss Mary K. Johrde

Submitted: December, 1970

NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM
(NOLS)

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