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*Mentees of*  
FID. April 8-10, 1991

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Albritt, West, Kaubum, Keller, Ransberg, UNOLS Office.*

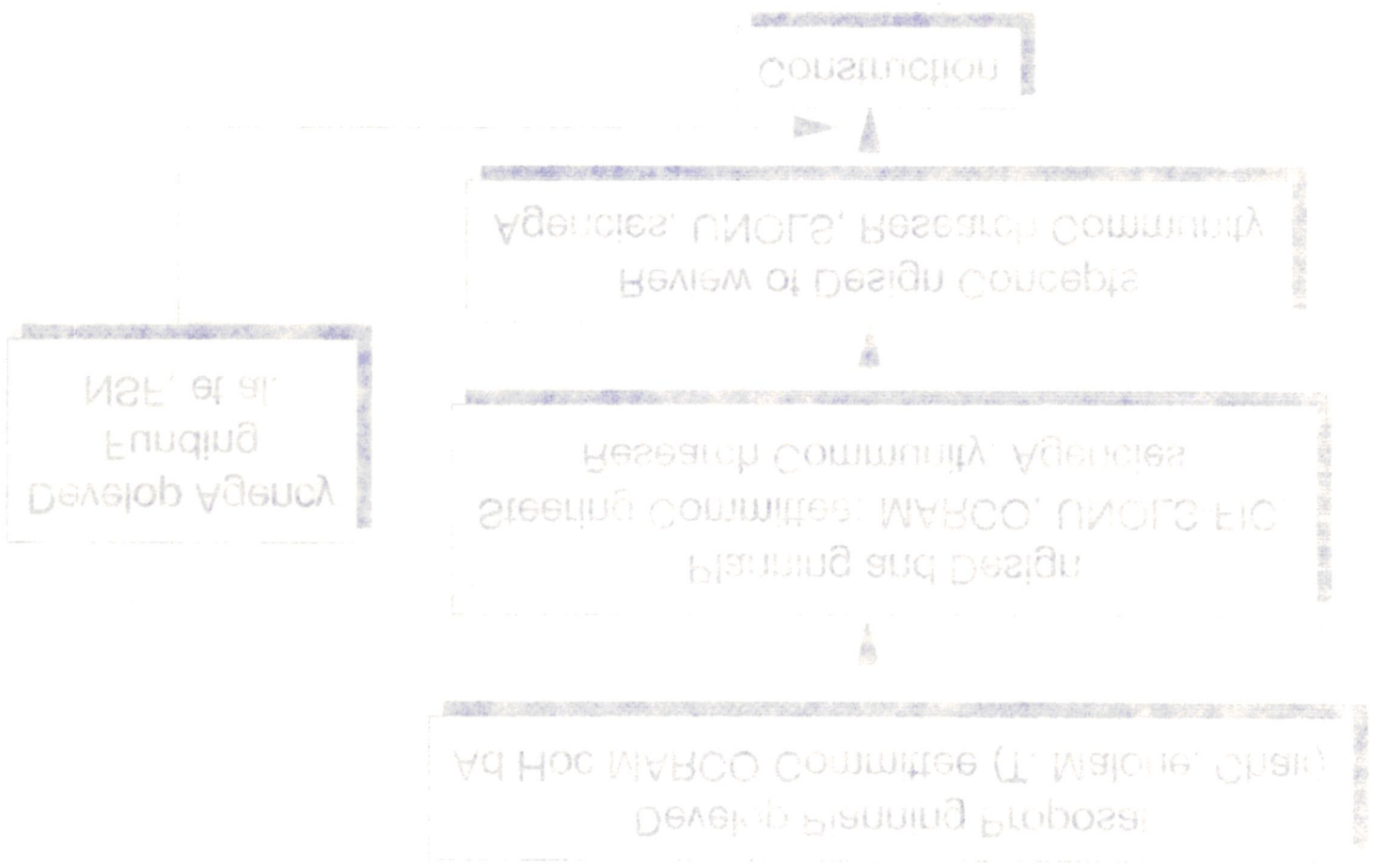
- Mix of vessels for future regional needs
  - participation in construction and operations
- Coordination of efforts to increase interagency
- "Middle Atlantic vessel," of various designs
- Most appropriate and effective linkage

## UNOLS-MARCO issues to resolve



## **UNOLS-MARCO Issues to Resolve**

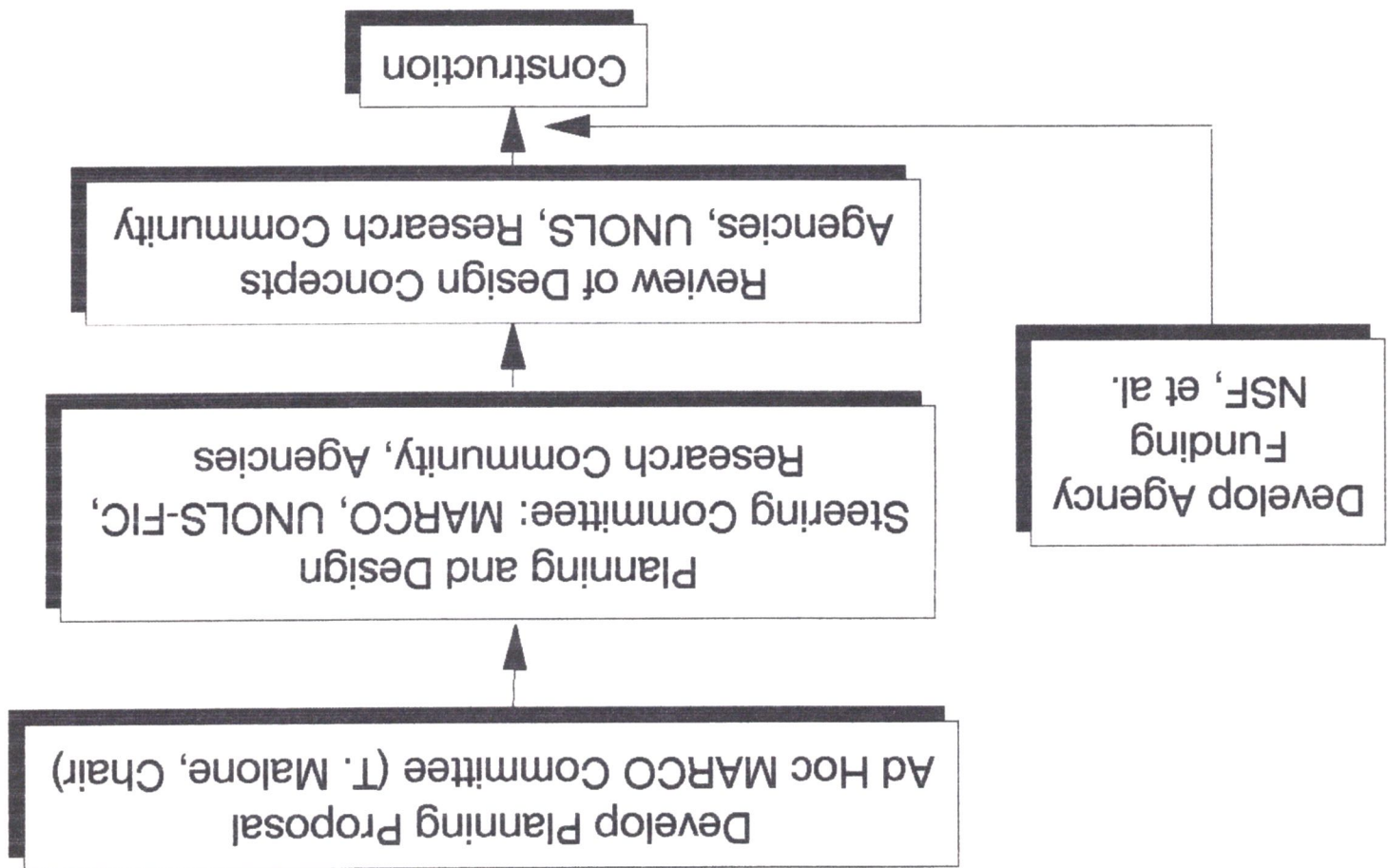
- Most appropriate and effective linkage
- "Middle Atlantic vessel" or various designs
- Coordination of efforts to increase interagency participation in construction and operations
- Mix of vessels for future regional needs



Steps To Be Taken

"Next Generation" Coastal Ocean Research Vessel

"Next Generation" Coastal Ocean Research Vessel  
Steps To Be Taken

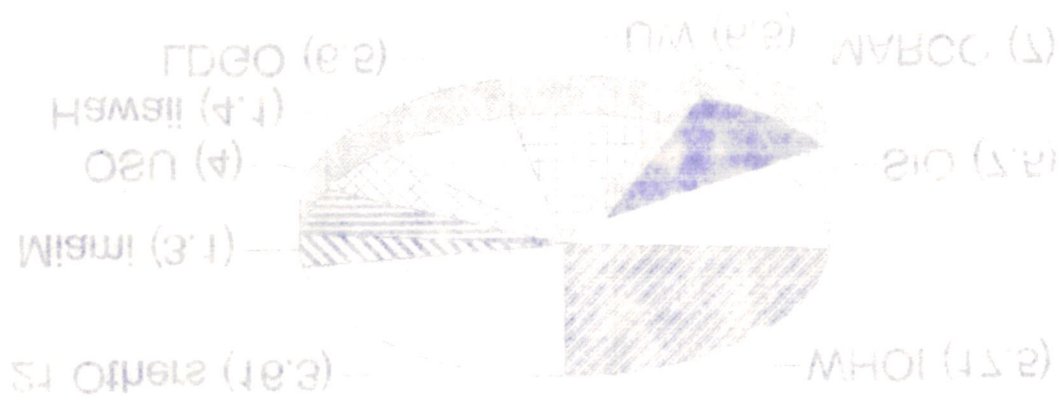


- Laboratory space and equipment
- Underway sensors & acoustics
- Turnaround time
- Net sampling
- Mooring deployment/recovery
- Ability to work on shelf
- Position keeping and handling
- Speed
- Draft
- Scientific party (ca. 50)
- Crew size
- Cost efficiency

Some Design Considerations  
Coastal Ocean Research Vessel

## Coastal Ocean Research Vessel Some Design Considerations

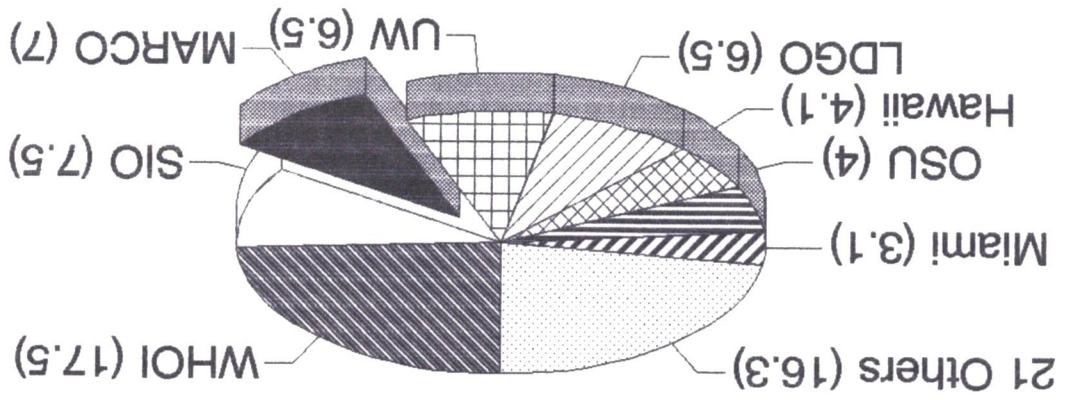
- Cost efficiency
- Crew size
- Scientific party (ca. 20)
- Draft
- Speed
- Position keeping and handling
- Ability to work on shelf
- Mooring deployment/recovery
- Net sampling
- Turnaround time
- Underway sensors & acoustics
- Laboratory space and equipment



FY 1990 (\$ millions)

# NSF OCEAN SCIENCE RESEARCH AWARDS

# NSF Ocean Science Research Awards FY 1990 (\$ millions)



planning, pooling and standardization

- Achieve economical operation of vessels and facilities through
- Promote shared use and avoid duplication of specialized facilities
- Improve availability and quality of research vessels and other facilities

research programs

- Mechanism for coordination and implementation of regional

education

- Stimulate regional interest and support for marine research and

government

- Mechanism for exchange of information between scientists and
- Forum to discuss and represent priorities for marine science

MARCO Objectives



## MARCO Objectives

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- Stimulate regional interest and support for marine research and education
- Mechanism for coordination and implementation of regional research programs
- Improve availability and quality of research vessels and other facilities
- Promote shared use and avoid duplication of specialized facilities
- Achieve economical operation of vessels and facilities through planning, pooling and standardization

- Bermuda Biological Station for Research
- University of North Carolina System
- Duke University
- Old Dominion University
- College of William and Mary
- University of Maryland System
- University of Delaware
- Rutgers, the State University of New Jersey
- State University of New York Stony Brook

**Consortium for Oceanography  
Middle Atlantic Research  
MARCO**

- State University of New York, Stony Brook
- Rutgers, the State University of New Jersey
- University of Delaware
- University of Maryland System
- College of William and Mary
- Old Dominion University
- Duke University
- University of North Carolina System
- Bermuda Biological Station for Research

**MARCO**  
**Middle Atlantic Research**  
**Consortium for Oceanography**

## ACADEMIC FLEET PLANNING: 1991 STATUS

### Planning Issues

- Planning for 1990s based on financial models with stable, modest growth for disciplinary base programs of NSF and ONR coupled to major increases in global change research. Valid model?
- NOAA role minimal in past with most projects using NOAA fleet ships. Increased NOAA use of academic ships? Increased academic use of NOAA ships?
- Submersible science report by UNOLS (1990) recommends major restructuring/expansion of facilities support. Changing role of ships versus submersible systems? Costs. National versus international.

## ACADEMIC FLEET PLANNING: 1991 STATUS

### COMMENTS/ISSUES RE UNOLS PLAN

#### Small Ships

- No UNOLS recommendations; many have non-traditional sources of support. True? False?
- Local versus regional operations. Coastal research directions -- larger ships?
- Next generation ship?

#### Ice-capable Ships

- NATHANIAL PALMER under long-term charter for Antarctic operations
- UNOLS Plan calls for intermediate size ship. Is this sufficient capability to meet western Arctic, central Basin and eastern Arctic requirements?
- Identified as highest (time) priority in NSF capital construction plan. An Arctic nation without an Arctic ship!

## ACADEMIC FLEET PLANNING: 1991 STATUS

### COMMENTS/ISSUES RE UNOLS PLAN

#### Intermediate Ships

- Maintain existing ships with refits to increase capabilities in early 1990s (GYRE, OCEANUS, ENDEAVOR, WECOMA); but scientific demand declining in 1980s
- MOANA WAVE and VICKERS are closer in capability and operating mode to intermediates than new large ships; eight ships versus six ships?
- UNOLS Plan implies reduction of group by two ships; excess capacity now; future trends??
- Geographical distribution -- three Pacific, three Atlantic? Institutional versus regional requirements?
- Intermediate ships mainly of same age; block obsolescence in 2000-2010 time frame
- Next generation ship? SWATH?

## ACADEMIC FLEET PLANNING: 1991 STATUS

### COMMENTS/ISSUES RE UNOLS PLAN

#### Large Ships

- Identified needs for high- and medium endurance ships to be met by 1994; assumes construction of NAVY AGOR-24 (KNORR, MELVILLE, THOMPSON, EWING, AGOR-24)
- Submersible handling ship at present is ATLANTIS II; 27 years old, marginal for science demands
- NSF long range plans show 1997 replacement; unfunded at present
- Navy plans identify AGOR-25 for 1996 delivery; replacement for ATLANTIS II ??
- UNOLS Plan has "general purpose" ships replaced/phased out; three ships with one replacement (WICKERS, WASHINGTON, MOANA WAVE ?)
- Operating institutions for AGOR-24 and AGOR-25 not required to be current large ship operator
- Impacts ??

## ACADEMIC FLEET PLANNING: 1991 STATUS

### UNOLS FLEET IMPROVEMENT PLAN (1990)

- Six high or medium endurance, general-purpose large vessels; one or more capable of supporting a deep-diving submersible
- Ice-worthy research vessel capability for both polar regions
- Six intermediate general-purpose vessels with improved capability
- No recommendation on required number of small UNOLS ships

	<u>Existing</u>	<u>Recommended</u>
<b>Large ships</b>		
High-endurance	3	3
Medium-endurance	1	2
General purpose	3	0
Submersible handling	1	1
	8	6
<b>Intermediate</b>		
General purpose	6	6
Ice-capable	0	1
	6	7
<b>Small</b>		
General purpose	9	?



## ACADEMIC FLEET PLANNING: 1991 STATUS

### 1990 Activities

### Sponsor

- EWING begins operation (replaces CONRAD) NSF
- KNORR and MELVILLE stretch and modernization underway Navy
- THOMPSON under construction (replaces old THOMPSON) Navy
- VICKERS conversion to R/V (replaces VELERO IV) USC
- WEATHERBIRD II begins operation (replaces WEATHERBIRD I) BBS
- EDWIN LINK and SEWARD JOHNSON designated UNOLS ships HBOI
- Planning study for midlife refits of OCEANUS-class ships (ENDEAVOR, WECOMA, OCEANUS) NSF
- Conceptual design study for Arctic ice-capable ship NSF
- Updated UNOLS Fleet Improvement Plan completed NSF/ONR

## NSF FY 1991 BUDGET APPROPRIATION

### OCEANOGRAPHIC CENTERS AND FACILITIES

- Increase of \$5.3 Million or 12.4% to \$47.7 M
- Focus on facilities, field operations and technological requirements of Global Geosciences program
  - ship and technical support for Global Geosciences field programs funded by research programs
  - ocean technology support for ecosystems dynamics sampling systems and operations of accelerator mass spectrometry facility
  - upgrading of scientific support equipment in academic research fleet to meet global change research needs

### OCEAN DRILLING PROGRAM

- Increase of \$3.0 Million or 9.4% to \$35.0 M
- Focus on operational costs, development of crustal drilling technology, and individual investigator support
  - measurement and sampling tools for high-temperature environments
  - experiments to measure crustal deformation and fluid flow in boreholes
  - high latitude field programs to define regional geologic framework for future drilling
  - support for analysis of geochemical and geophysical logging data

## NSF FY 1991 BUDGET APPROPRIATION

### OCEAN SCIENCES

- Total Funds are \$164.8 Million
- Increase of \$17.4 Million or 11.8% over FY 1990
- Global Geosciences increase by \$14.0 M or 64.2%
- Other programs increase by \$3.4 M or 2.7%

### OCEAN SCIENCES RESEARCH SUPPORT

- Increase of \$9.2 Million or 12.5% to \$82.1 M
- Focus on Global Change and new investigations
  - implementation of WOCE with hydrographic sections in Pacific, initiation of surface drifter program, and Atlantic process experiments
  - expansion of JGOFS with Pacific equatorial biogeochemical flux program
  - initiation of RIDGE field programs
  - participation of TOGA Coupled Ocean/Atmosphere Response Experiment
  - long lead-time instrumentation and model development for GLOBEC
  - increase number of awards to new and young investigators

## NSF FY 1991 BUDGET APPROPRIATION

### NSF

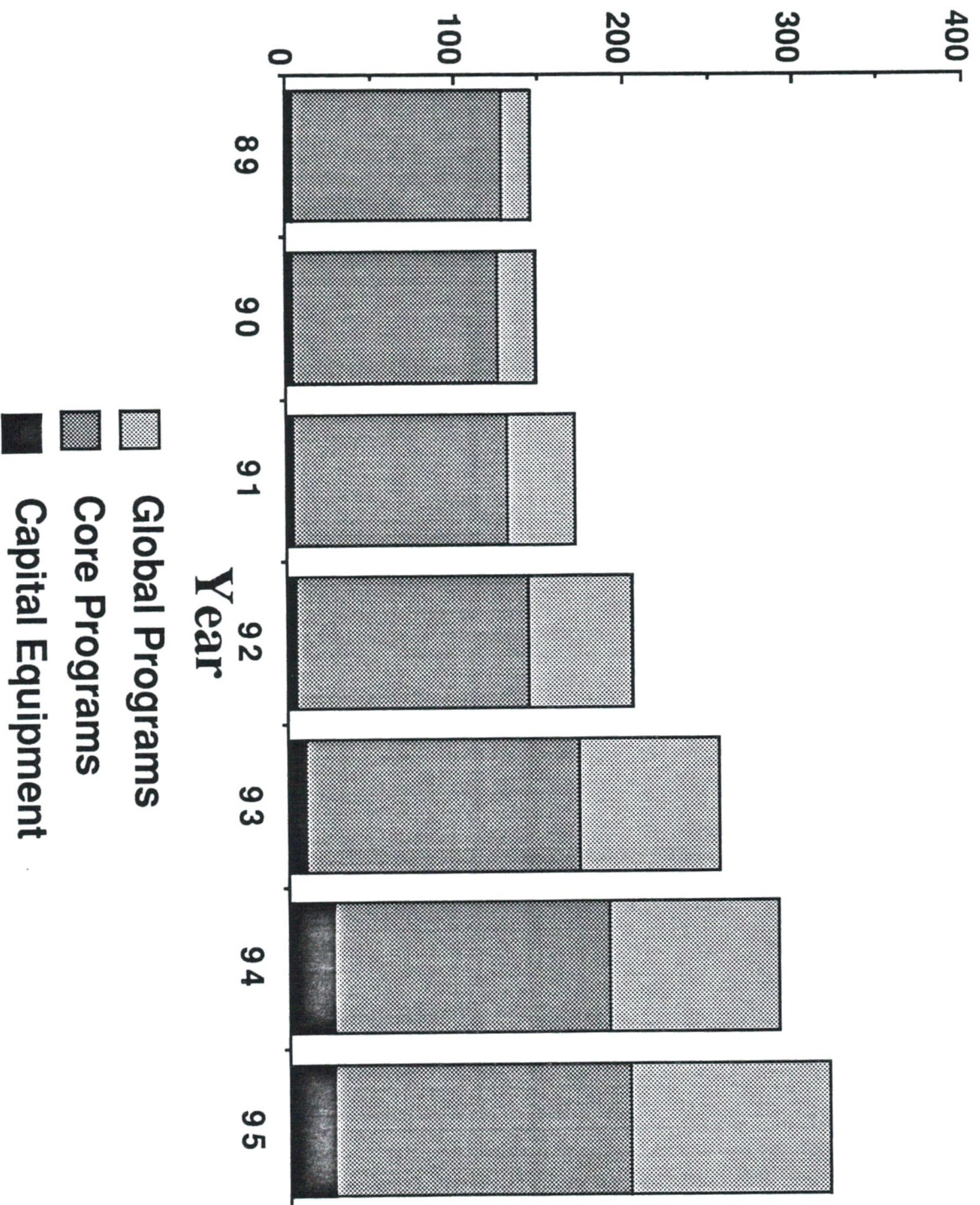
- Total Funds are \$2.316 Billion
- Increase of \$232 Million or 11.1% from FY 1990
- Increase maintains Administration commitment to doubling the Foundation's budget
- Research and Related Activities increases by \$101 M or 6.4%
- Science and Engineering Education increases by \$102 M or 46.2%
- U.S. Antarctic Program increases by \$23 M or 15.1%

### GEOSCIENCES (less Antarctic Program)

- Total Funds are \$367.7 Million
- Increase of \$42.7 M or 13.1% from FY 1990
- Increases for
  - Global Geosciences
  - New research investigations and instrumentation
  - New program in Arctic social sciences
  - Science and Technology Centers

# OCE Long-Range Plans (1989-95)

Millions of Dollars



NSF OCEAN SCIENCES BUDGET

	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>Change 88-91</u>
OSRS	67.2	70.9	72.9	82.1	22.2%
OCFS	37.2	43.6	42.5	47.7	28.2%
ODP	30.6	31.4	32.0	35.0	14.4%
	135.0	145.9	147.4	164.8	22.1%

FY 1991 BUDGET INCREMENT

- Global Geosciences \$14.0 M
- Disciplinary Base \$0.4 M
- Ocean Drilling Program \$3.0 M

\$17.4 M

FY 1991 BUDGET PROFILE

- Science \$99.7 M
  - Disciplinary Science 75.7
  - Global Geosciences 24.0
  - Education and Human Resources (3.1)
- Facilities \$65.1 M
  - Disciplinary Science 53.5
  - Global Geosciences 11.6
  - Capital Equipment (2.6)

OCEAN SCIENCES DIVISION DETAIL

	Actual FY 1989	Actual FY 1990	Estimates FY 1991
Ocean Sciences Division	\$ 145.9 M	\$ 147.4 M	\$164.8 M
Oceans Sciences Research	70.9 M	72.9 M	82.1 M
Ocean Drilling Program	31.4 M	32.0 M	35.0 M
Oceanographic Facilities	43.6 M	42.5 M	47.7 M

OCEANOGRAPHIC FACILITIES DETAIL

Operations			
Ship Operations	24.6 M*	22.4 M*	27.4 M*
ALVIN, Aircraft, etc.	1.3 M	1.4 M	1.4 M
Marine Techs	<u>3.4 M</u>	<u>3.7 M</u>	<u>4.2 M</u>
	29.3 M	27.5 M	33.0 M
Infrastructure			
Science Instruments	1.6 M	1.8 M	4.0 M
Shipboard Equipment	0.9 M	2.1 M	
Ships, Upgrades	2.8 M	3.4 M	2.6 M
UNOLS, Misc.	<u>0.7 M</u>	<u>0.6 M</u>	<u>0.5 M</u>
	6.0 M	7.9 M	7.1 M
Technology, Centers, Reserves			
Technology Development	4.5 M	3.5 M	4.2 M
AMS Center	1.8 M	1.8 M	1.8 M
Cross Directorate/Reserves	<u>2.0 M</u>	<u>1.8 M</u>	<u>1.6 M</u>
	8.3 M	7.1 M	7.6 M

\* Plus \$1.5 M from ODP (1989), \$1.0 M (1990), \$1.7 M (1991)

**FY 1992 BUDGET REQUEST**

Subactivity	FY 1991		FY 1992		Change
	Current Plan	Request	Current Plan	Request	
Atmospheric Sciences .....	\$114.52	\$132.78	\$18.26		15.9
Earth Sciences .....	68.33	74.67	6.34		9.3
Ocean Sciences .....	164.80	188.50	23.70		14.4
Arctic Research Program .....	14.95	17.69	2.74		18.3
Science and Technology Centers .....	5.10	5.90	0.80		15.7
Total, Activity .....	\$367.70	\$419.54	\$51.84		14.1

**OCEAN SCIENCES**

\$188,498,000

**SUMMARY OF REQUEST**

The FY 1992 Budget Request for Ocean Sciences (OCE) is 188.50 million, an increase of \$23.70 million, or 14.4 percent, over the FY 1991 Current Plan of \$164.80 million.

**(Millions of Dollars)**

Program Element	FY 1990		FY 1991		Change
	Actual	Request	Current Plan	Request	
Ocean Sciences Research Support .....	\$72.93	\$88.58	\$82.08	\$97.67	19.0
Oceanographic Centers and Facilities .....	42.45	47.44	47.74	54.45	14.1
Ocean Drilling Program .....	31.97	34.98	34.98	36.38	4.0
Total, Subactivity .....	\$147.35	\$171.00	\$164.80	\$188.50	14.4

**FY 1992 BUDGET REQUEST**

**(Millions of Dollars)**

Program Element	FY 1991		FY 1992		Change
	Current Plan	Request	Current Plan	Request	
Ocean Sciences Research Support .....	\$82.08	\$97.67	\$15.59		19.0
Oceanographic Centers and Facilities .....	47.74	54.45	6.71		14.1
Ocean Drilling Program .....	34.98	36.38	1.40		4.0
Total, Subactivity .....	\$164.80	\$188.50	\$23.70		14.4



PROGRAM ELEMENT	ACTUAL FY 1990	REQUEST FY 1991	CURRENT PLAN FY 1991	ESTIMATE FY 1992
(Dollars in Thousands)				
<b>GEOSCIENCES</b>				
<b>ATMOSPHERIC SCIENCES</b>				
Atmospheric Sciences Project Support	\$53,119	\$63,408	\$59,560	\$69,579
National Center for Atmospheric Research	45,460	49,930	48,530	56,150
Upper Atmospheric Facilities	5,557	6,780	6,430	7,055
<b>Total</b>	<b>104,136</b>	<b>120,119</b>	<b>114,520</b>	<b>132,784</b>
<b>EARTH SCIENCES</b>				
Earth Sciences Project Support	40,778	46,351	44,964	48,802
Instrumentation and Facilities	13,730	18,450	17,050	19,050
Continental Dynamics	5,580	6,730	6,316	6,816
<b>Total</b>	<b>60,088</b>	<b>71,531</b>	<b>68,330</b>	<b>74,668</b>
<b>OCEAN SCIENCES</b>				
Ocean Sciences Research Support	72,925	88,585	82,080	97,668
Oceanographic Centers and Facilities	42,451	47,438	47,735	54,450
Ocean Drilling Program	31,974	34,977	34,980	36,380
<b>Total</b>	<b>147,350</b>	<b>171,000</b>	<b>164,795</b>	<b>188,498</b>
<b>ARCTIC RESEARCH PROGRAM</b>				
Arctic Research Projects	11,960	18,140	14,440	17,160
Arctic Research Commission	486	510	510	530
<b>Total</b>	<b>12,446</b>	<b>18,650</b>	<b>14,950</b>	<b>17,690</b>
<b>SCIENCE AND TECHNOLOGY CENTERS</b>				
Science and Technology Centers	982	4,425	5,100	5,900
<b>TOTAL GEOSCIENCES</b>	<b>\$325,002</b>	<b>\$383,725</b>	<b>\$367,695</b>	<b>\$419,540</b>

1/ Current Plan amounts exclude carryover undigested balances from 1990. See explanation of carryover 1990.

Trip to visit the AGOR 23 in Pascagoula. Those who want to go on tour assemble in lobby at 8:30 to arrange cars.

April 11

• Other business.

• *Compendium of the non-US research fleet*- In the past we have had unfocused discussions of the impact of the continually improving non-US fleet on UNOLS ship usage, future needs of the research community etc. In my opinion a compendium large ships, scientific outfitting of ships in the non-US fleets, current use of non-US ships by US scientists developed for our own and UNOLS purposes might be one way to start.-(Langseth)

• *Update on SWATH designs*- Report on Mitsui SWATH, proposal by SWATH OCEAN for small SWATH, and Woods Hole has proposed to NOAA to assist in the design of a large SWATH R/V- (Bob Dinsmore).

• *Portable African Lake Boat-revisited*. Need to define what role the FIC might play in the design of such a research vessel.- (K. Johnson).

5) Miscellaneous

Lunch

• *Changes in AGOR 24 design*- ONR has drafted a condensed list of changes that they would like to see in the AGOR 24 design. ONR needs a brief report from FIC supporting these changes. (The condensed list is item F in your agenda package).

• Coffee break

• *Request from NOAA* for comments on their Ocean Fleet Modernization Study. See the mandate from G. Brass, Item E in the agenda package. (Bill Barbee will be sending you copies of the three volume report of the study).

4) New items continued

April 10, 9:00

4) New items:  
• *Priority item: Research vessel needs for coastal oceanography*- The objectives and needs of this study need definition. This is our most important new topic. We should leave New Orleans with some specific objectives.-(G. Brass)  
(Don Boesch will report on the Mid-Atlantic Regional Consortium- Item D in agenda package.)

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UNOLS OFFICE

UNIVERSITY-NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

FLEET IMPROVEMENT COMMITTEE  
Telephone 914 359-2900 X518 or 585  
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**Working Agenda for the April 8 to April 11 FIC meeting in New Orleans**

April 8- Trip to visit the KNORR, MELVILLE and PALMER in shipyards west of N.O. Those going on the trip will meet in the lobby of the Hotel Dauphine at 8:30 A.M. Monday to organize cars for the trip.

April 9 (Meeting at Hotel Dauphine-Coffee and danish at 8:30)

1) Approve minutes of October FIC meeting and meeting agenda.

2) Information reports:

• January UNOLS Council meeting- (Brass/Barbee)

• Agencies: NSF (D. Heinrichs), ONR (J. Keller), NOAA (David Yeager)

3) Reports on work in progress:

• Intermediate RV mid-life refits- Update on the planned modifications and schedule- J. Bash

• Arctic Ice Capable Research Vessel- Tom will report on the January 4th meeting of his subcommittee and subsequent actions: (T. Royer)

• Submersible support ship- A revised version of the Cook report will not be ready for the committee to examine. Cook promises new draft by mid-May. (Last draft of report and Langseth's letter to Roger-Item A in the agenda package).

• Scientific Opportunities offered by a Nuclear Submarine (SOONS)- A subcommittee has been formed with R. Pinkel Chairman. The subcommittee has prepared a brief report on the science that could be done from a nuclear sub. (A first draft and a response from admiral Pittenger is Item B in the agenda package.) Future actions of subcommittee need to be defined. -(Langseth).

• Two activities need no further actions.  
Evaluation of the fleet- W. Nowlin was working with Duane Liabie at Glossten on this. (Letter from Worth Nowlin, Item C-1 in agenda package)  
Improving the Science Mission Requirements- The Subcommittee to improve the SMR's will be meeting in Seattle at about the same time as the UNOLS Council. (Letter report from Worth, Item C-2 in agenda package)

Lunch

Compendium of Non-U.S. Research Ships: Mark Langseth will pursue assembly of a compendium of the non-U.S. research fleet to catalog large, non-U.S. research vessels, their scientific outfitting and their level of use by U.S. scientists.

Charlie Miller described his long-standing interest in the establishment of platforms for long-term (years and longer) sampling and measurements in open oceans. He characterized strong community interest and the potential for using drilling platforms. A recent effort to initiate a program had died and he proposed to try to revitalize the effort through FIG and UNOLS. Although possible FIG roles were not clear, the Committee agreed to further consideration based on a report to be submitted.

The Committee agreed to their next meeting in September, 1991 at the Alton Jones Conference Center or at Lamont.

The meeting was adjourned at 3:30 p.m., April 10.

AGOR-24 COR Review: Keith Kaulum, ONR, had requested FIG comments on the AGOR-24 Circular of Requirements (COR). ONR had earlier requested a UNOLS review of the draft COR. A group led by Brian Lewis had provided a review emphasizing shortcomings recognized during construction of AGOR-23. ONR's modified version of the UNOLS review was sent to NavSea (and was the document on which FIG was now requested to comment). NavSea had not been responsive to ONR recommendations for changes to the AGOR-24 COR.

The FIG took a strong position that the AGOR-24 COR should be changed to correct deficiencies recognized during construction of AGOR-23. Making the design changes prior to construction would be much more efficient than constructing as-is and then retrofitting. (Most of the changes will, eventually, be made; they are essential to the ship's mission.) The Committee was in essential agreement with the ONR list, and assigned highest priority to providing eight additional permanent berths and eliminating the present flume-tank stabilizing system. Other high priorities were strengthening the foredeck, providing a foredeck crane and rearranging spaces in the gallery-messing-lounge area. The Committee agreed that stringent noise level controls should be included in the COR, but suggested that measures taken on the AGOR-23 should be satisfactory. The lowest priority was assigned to providing a fully integrated electrical propulsion and auxiliary service system. The FIG Chair will write a letter setting FIG's position to ONR and/or NavSea.

Update on SWATH Designs: Bob Dinsmore, although unable to attend the meeting, had provided information on a Joint Blue Sea McClure - WHOI proposal to NOAA for design, construction and testing of a SWATH vessel; on a proposal by SWATH OCEAN for a 100 ft. SWATH R/V; and on Mitsui specification for a 205 ft. SWATH. The material was provided to FIG members but not discussed.

Bruce Robison and Derek Bayliss, Monterey Bay Aquarium Research Institute, presented Bruce's SWATH Primer and a brief review of SWATH designs under consideration by MBARI.

The SWATH Primer includes parametric relationships such as strut configuration, engine placement, payload and construction costs. Advantages and disadvantages of SWATH's compared to monohulls are also discussed. Bruce will add sections on the history of SWATH designs, a roster of existing SWATH'S and figures.

Derek Bayliss reviewed three responses from Navitech, SWATH Ocean and SEACO-SAIC, to MBARI's request for SWATH concept designs. Science mission requirements underlying the request had evolved from a strict ROV-tender-support ship to a ship for tending rooFs but with significant general oceanographic capability. The concepts range from 110 ft. by 50 ft. and 250 tons displacement to 120 ft. by 55 ft. and 453 tons displacement. Each has special design and arrangement features. MBARI expects to make a decision soon on a bidder to proceed to preliminary design.

A Boat for African Lakes: The FIG had earlier been asked to contribute to the specification and design of a portable African Lake boat. The Committee had declined to participate, but had been urged to reconsider. Although they might be willing to do so, potential committee roles had not been established. More information was requested from the proponents, Duke University Marine Lab.

SOONS: Mark Langseth described a FIC effort to explore Scientific Opportunities offered by a Nuclear Submarine (SOONS). At the last FIC meeting, Craig Dorman, WHOI, had suggested that a nuclear submarine might be made available for academic research. Dick Pittinger, WHOI, had offered advise on how the Navy might be approached on the issue. Based on FIC enthusiasm, Mark Langseth appointed a group chaired by Robert Pinkel to develop some community ideas for research that could be supported by a submarine. The group's report is Scientific Opportunities Offered by a Nuclear Submarine. The report describes a number of worthwhile research opportunities that could be conducted uniquely by a nuclear sub. It was agreed that the report should be circulated through the academic research community and that the Navy should be approached to test their interest. It was not yet clear to whom in the Navy overture should be made. The UNOLS Chair will send an exploratory letter to an appropriate Navy level.

Valuation of the UNOLS fleet: an effort to assign a value to the UNOLS fleet using a recently-developed algorithm. The result should be available in Spring, 1991.

Improving UNOLS Science Mission Requirements: Science Mission Requirements will be improved by developing quantitative criteria to specify seakeeping, sea-kindness and station-keeping capabilities. Attempts to use UNOLS Cruise Assessments as a source of data on sea conditions versus cessation of operations was unsuccessful. (The reports don't have the right information.) Appropriate information could be sought from individual operators and bridge logs, but the FIC will continue to monitor this activity which is being pursued by Worth Nowlin and a small subcommittee.

NOAA'S Fleet Modernization Study: FIC members had been provided with copies of NOAA's Ocean Fleet Modernization Study and requested by the UNOLS Chair to review the study and report on technical aspects, especially on ship efficiency, adequacy of equipment and design of the ocean research part of the NOAA fleet. Mark Langseth offered a general comment that the report was interesting and well-written. A one-volume executive summary is needed to produce a concise story.

Dave Yeager, NOAA, provided a context for the Modernization Study and noted that it will be used to support a NOAA Fleet Modernization Plan. The Plan will include numbers and types of ships, acquisition schedules and various options and costs.

NOAA is considering several options for acquisition, including new construction, leasing, lease-buy options and mixes. The current favorite is 90% construction, 10% lease-purchase. NOAA is open to discussion on various modes of joint use among NOAA programs, NSF and other-agency programs, the UNOLS fleet and the NOAA fleet. (Note also that a significant share of NOAA's new Global Climate Funding is earmarked for academic investigators.)

Charlie Miller agreed to lead a review team for the FIC. The team would work toward a May 7 deadline. Comments were requested from all FIC members, especially Teri Chereskin, Peter Betzer, Bob Dinsmore, Ken Johnson and Mark Langseth.

To initiate the process, the FIG agreed to prepare a Report on Facilities for Coastal Oceanography, to begin by cataloging existing facilities and extend through science mission requirements and concepts of a modern coastal ocean fleet. The report will be drawn by a subcommittee chaired by Don Wright. In addition to FIG members, the subcommittee should seek participation from groups such as COOP, COPD, etc.

Gary Brass noted that the UNOLS Council intends to review the scope and scale of coastal ocean research programs and research vessel and facility requirements for all of the participating federal agencies (see earlier, under INFORMATION REPORTS). These studies should provide the basis for the design of a responsive coastal ocean research fleet. The FIG will undertake efforts beginning with determining the number, mix, and types of ships appropriate to meet requirements for coastal ocean research.

MARCO was ready to interact with UNOLS on developing designs for mid-Atlantic coastal research vessel concepts, on coordination of efforts to increase interagency participation in vessel acquisition and operational support and on fleet design to meet future coastal ocean vessel requirements on regional or national basis.

Communication has been maintained with NSF and other agencies during the development of MARCO. NSF has encouraged the consortium to begin development of a concept for an improved coastal ocean research vessel. Premises for developing a coastal oceanography vessel are that the level of sponsored coastal ocean research is increasing, that all agencies and state program vessel requirements should be considered, that all sponsoring agencies and states should share in vessel acquisition and operations support and that ships and facilities appropriate to support the expanded coastal ocean research programs did not currently exist in or outside of UNOLS.

A group of nine universities and research institutions have moved to form a Middle Atlantic Research Consortium (MARCO). (See Appendix III for details of the Boesch presentation.) MARCO would develop priorities and research programs for the mid-Atlantic, coordinate implementation of regional investigations and programs, help develop and share the use of improved ships and facilities and cooperatively manage ships and shared-use equipment and facilities.

NSF and the UNOLS Council had, for some time, been concerned with the effectiveness of management arrangements and with existing vessel capabilities in the mid-Atlantic. NSF and the Council have urged UNOLS institutions operating in the region to examine their overall management structure and their existing ships as a first step toward developing better arrangements and specifying more appropriate ships. Increased activity in coastal oceanography programs under NOAA, EPA, USGS, MMS, DOE and several states, began to emerge at about the same time, accentuating the need for well-designed, appropriate research vessels.

Don Boesch, Director, Centers for Environmental and Estuarine Studies, University of Maryland, described efforts of mid-Atlantic UNOLS institutions to improve management of UNOLS ships in the mid-Atlantic and to develop coastal oceanography research vessel requirements.

Important to complete the last ship by July 14, 1994 in order to protect grandfathering under current and favorable admeasurement rules.

ICE-CAPABLE ARCTIC RESEARCH SHIP: Tom Royer reported on concept design development for an ice-capable Arctic research vessel. He reviewed the history of UNOLS' effort to develop science mission requirements and a concept design in response to NSF plans and community perception of the needs to support Arctic research. The early target was for a small vessel to work mostly in the western Arctic. But while considering those needs, science mission requirements were developed that required an intermediate vessel. Conceptual design was initiated for an intermediate (not to exceed 200 ft. L.O.A.), but recently NSF has asked the Royer subcommittee to consider a ship that would be capable of working in the central Arctic basin (with an icebreaker escort). Thus, the concept design (through a contract with Glosten Associates) provides for 218 feet in length vessel of 57 feet beam and about 2,400 tons displacement. This ship would be about equivalent to a UNOLS large, high-endurance general-purpose vessel in terms of range, endurance, space, science berths, etc. Although it is yet to be confirmed by model tests, it would have ice-capabilities equal to or exceeding those of the NATHANIEL B. PALMER (i.e., ice class 3, capable of operating in 3 ft. of level ice at 3 knots).

Considerable discussion followed, centered on the question "Is this the right ship to satisfy the research community's one slot for an Arctic RVIB over the next 25 years?" There had been some community expression that the design was still not for a big enough ship. NSF asked for further evaluation to assure that the ship could adequately support long, multi-research mission deployments into the central Arctic. Tom Royer noted that the ship was much larger than its length would indicate and that the design concept portrayed a large, capable ship. He agreed, however, to develop more comprehensive evaluation of the vessel's capabilities for long, demanding missions into the central Arctic.

A few questions arose concerning some elements of the design-space allocations, etc.) Tom Royer will prepare a summary document of the concept, which will be circulated by UNOLS throughout the community of Arctic oceanographic researchers. The committee also endorsed the recommendation for further study of the Thyssen/Waas hull form.

The FIG also urged that the Arctic research vessel be acquired for operation by an academic institution, in the established UNOLS mode.

SUBMERSSIBLE SUPPORT SHIP REPORT: Mark Langseth brought the Committee up to date on the FIG report on a Submersible Support Ship. A subcommittee, chaired by Roger Cook, had earlier produced a draft report on a submersible support ship. The FIG chair had held the report because it focused too strongly on the ATLANTIS II and too limited a description of the science mission requirements. Roger Cook has agreed to provide a more comprehensive report by May, 1991. That report will be circulated to FIG members after which the Committee will proceed toward specifications and recommendations for a submersible support vessel.

COASTAL OCEANOGRAPHY: Discussion of research vessel needs for coastal oceanography was advanced on the agenda so that a presentation could be heard from Don Boesch.



NSF's review of the UNOLS Fleet Improvement Plan (see Appendix II) suggested several issues. If selection of operating institutions for AGOR-24 and AGOR-25, does not include those operating ships that could be phased out (e.g., WASHINGTON, MOANA WAVE), a change in the profile of UNOLS membership could result. Future demand may not be adequate to employ all of the available intermediate ships. The plan doesn't address small ships. Given the emergence of expanded coastal oceanography programs, the mix of ships and their mission specifications adequate to support coastal work may become critical requirements. An ice-capable ship for the Arctic is among NSF's highest priorities. The science mission requirements and concept design currently being developed should be reviewed to assure that the concept is adequate to support a broad segment of federal program needs.

UNOLS and the FIC planning for the academic fleet should be based on assumptions of stable, modest growth within NSF/OCE and ONR. An increased use of UNOLS ships by NOAA programs and increased use of NOAA ships to support academic investigators should both be considered. Further, the UNOLS Submersible Science Study for the 1990's suggests major restructuring and expansion of facilities support to emphasize the broad use of submersibles and ROV's. Potential consequences should be taken into account in fleet planning.

NOAA: David Yeager of NOAA's ONCO discussed the potential for NOAA use of UNOLS ships and Charter of the VICKERS. (Discussion of NOAA's Ocean Fleet Modernization Study was deferred until later in the meeting). NOAA program needs have been estimated at about 6,100 ship days per year, 5,000 for fisheries and charting and mapping programs and 1,100 days for oceanographic and atmospheric research. The research program ship requirements are similar to many NSF and ONR program ship requirements and could often be met by UNOLS ships. The NOAA fleet currently provide these 1,100 days. Marine operations and research program managers are examining ways to use UNOLS ships in support of NOAA programs during the 1990's.

NOAA plans to charter the VICKERS, beginning July 29, 1991. Terms of the charter will include NOAA crewing and operating the ship (using commissioned officers and wage board marine crew), while USC provides maintenance and repair. The VICKERS will be available to support NOAA, NSF, other federal agency and USC program.

FIC members agreed that the VICKERS charter was a favorable development for NOAA and for USC, but that both NOAA and the oceanographic community would be better served if NOAA research ship requirements were integrated into the UNOLS scheduling process along with NSF's and ONR's. In this way the best ships and best schedules would be available to support individual projects, regardless of supporting agency.

RESULTS OF INTERMEDIATE RV'S: Jack Bash reported on the NSF-sponsored mid-life retrofit effort for the OCEANUS-class intermediate ships. A feasibility study has been completed that addresses a long list of desirable upgrades, emphasizing four major needs: increased science berthing, science storage space, improved laboratories and ship maintainability. Individual contract plans have been developed for the three ships/institutions. The schedule is to begin with ENDEAVOR in mid-1992, followed by OCEANUS and WECOMA. It is

and served by the UNOLS fleet. UNOLS efforts should be toward a federal oceanographic fleet concept that would support NOAA, NSF, ONR and other federal ocean research ship needs. The Council recommends the UNOLS model of research vessels operations by academic institutions as the way to manage a federal research fleet. The Council agreed to lead the UNOLS effort to address these and related fleet management issues. The Council requested that the Fleet Improvement Committee undertake an effort toward science mission requirements and concepts for coastal oceanographic ships and facilities. The FIC was also requested to provide a technical review of NOAA's Fleet Modernization Study.

Gary Brass, UNOLS chair, announced that he is working to develop a colloquium on programs in coastal oceanography. The colloquium, featuring program representatives from NOAA, USGS, MMS, DOE and EPA, would be held during the UNOLS council meeting, July 16-18 in Seattle.

Navy representatives also informed the Council that AGOR-24 was secure in the FY-1992 budget and would be built for operation by a UNOLS institution. The ship would follow plans for the AGOR-23 and would be available in about 1995. AGOR-25 remains in Navy budget plans for FY-1994. (ONR issued a solicitation for charter operation of AGOR-24 and/or AGOR-25 on February 7, 1991.)

Ship scheduling and operations: In 1991, all available UNOLS ships would operate, except the WARFIELD. Delays in delivery of the KNORR and MELVILLE would affect the pace of NSF's WOCE field investigations. There were concerns that addition of THOMPSON, MELVILLE and KNORR into the fleet in 1992 would result in a ship operations funding crisis. However, if NSF receives funds as requested in the President's budget, if ONR funds ship operations at about a \$7.5 million level and if NOAA charters a significant proportion of VICKERS operations, funding should be adequate to support approved science projects and employ active UNOLS ships.

NSF REPORT: Don Heinrichs presented information on NSF's ocean programs, on their budget request for 1992 and on activities and issues pertinent to UNOLS and FIC. He also cited NSF concerns with the 1989 Fleet Improvement Plan and discussed implications of the Submersible Science Study for the 1990's.

NSF budget projections for 1992 (based on the President's budget, see Appendix II) are up 14.4% over 1991. Within OCE, Ocean Sciences Research Support would be up 19.0% to \$97.67 million, Oceanographic Centers and Facilities up 14.1% to \$54.45 million and the Ocean Drilling Program up 4% to \$36.38 million. Within OCFs, Ship Operations would rise to about \$28.8 million, not including about \$1.5 million from ODP. OCE increases are about equally divided between Global Change and core programs.

The UNOLS fleet has undergone significant change during the early 1990's. Addition of large ships THOMPSON, EWING and VICKERS together with modernization of the KNORR and MELVILLE solidifies large-ship assets. Planned acquisition of the AGOR-24 and AGOR-25 through ONR and an ice-capable Arctic ship through NSF should provide adequate large-ship capability well into the twenty-first century. Addition of the SEWARD JOHNSON and EDWIN LINK as intermediate ships brought new capability as well as additional ship operations funding (mostly from NOAA).



UNOLS COUNCIL: Bill Barbee, UNOLS, reported on the January 29, 30, 1991 UNOLS Council meeting. Issues concerning UNOLS fleet management dominated the meeting and will be on the UNOLS Council agenda for 1991. Among these issues are: Federal programs in coastal oceanography sponsored by NOAA, MMS, USGS, EPA and DOE are growing during the 1990's, along with NSF and ONR programs. UNOLS must plan for ships and facilities responsive to these expanded program needs. NSF has stated that although their coastal programs are expected to grow, they do not expect to provide most of the facilities support necessary for the multi-agency programs. States and other agencies will have to share in the acquisition and support of facilities. NOAA's Ocean Fleet Modernization Study was nearing completion. It was clear that NOAA's program needs in blue-water oceanographic research, for research in the Arctic and for coastal zone research were much the same as those sponsored by NSF and ONR,

#### INFORMATION REPORTS

Minutes for the October 4, 5, 1990 FIG meeting were approved.

The regular meeting of the UNOLS Fleet Improvement Committee was called by Mark Langseth, Chair at 8:30 a.m., April 9. The meeting followed the agenda (Appendix I) except as noted.

The April 8 visits to KNORR, MELVILLE and NATHANIEL B. PALMER were well conducted and provided much information to the FIG and to other participants. MELVILLE will be valuable re-additions to the UNOLS fleet and PALMER will be a strong asset for academic oceanography. A visit to the THOMAS G. THOMPSON, scheduled for April 11, was cancelled due to uncertainties in the ship's schedule.

Present at the meeting: FIG Chair Marcus Langseth, FIG members Peter Betzer, Teri Chereskin, Ken Johnson, Charlie Miller, Tom Royer and Don Wright; Don Heinrichs, NSF/OCFS and David Yeager, NOAA/ONCO; Gary Brass, Bill Barbee and Jack Bash, UNOLS; and Don Boesch, U. Maryland/CEES, Bruce Robison and Derek Baylis, MBARI.

The Fleet Improvement Committee met in New Orleans on April 8, 1991 for orientation visits to the R/V's KNORR and MELVILLE under modernization in McDermott Shipyard, Morgan City, Louisiana and to the R/V B NATHANIEL B. PALMER, under construction in Edison Chouest Offshore's North American Shipbuilding, Larose, Louisiana. A regular committee meeting was held in New Orleans on April 9 and 10. A visit to the R/V THOMAS G. THOMPSON (AGOR-23), planned for April 11 had to be cancelled.

Meeting Report  
UNOLS FLEET IMPROVEMENT COMMITTEE  
April 8-10, 1991  
New Orleans, Louisiana