

UNIVERSITY - NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

**UNOLS Ship Scheduling Committee
Report of Meeting**

June 25, 1990

**Board Room
American Institute of Architects
1735 New York Avenue, N.W.
Washington, D.C.**



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The UNOLS Ship Scheduling Committee met at 8:30 a.m. in the Board Room, American Institute of Architects, Washington, D.C. The meeting was called by Michael Rawson, Committee Chair. A list of attendees is Appendix I.

Notification of the meeting, agenda and requests for schedules, operating and cost information were by UNOLS Office letter dated June 6, 1990 (Appendix II). The June 6 letter provides agenda for both the Ship Scheduling Meeting (June 25) and a Schedule Review Meeting (June 26). The Schedule Review Meeting was called at the direction of George Keller, UNOLS Chair. Its report follows that of the Ship Scheduling meeting.

Schedules, cost and operating information had been furnished in advance of the meeting. Tables 1 and 2, summarizing for the UNOLS fleet, days of operation, costs and daily rates for both 1990 and 1991 were available at the meeting. (Table 2, for 1991 includes some changes provided during the June 25 meeting.)

ANALYSIS OF COST AND OPERATING INFORMATION FOR 1990

Summaries of Ship Use and Costs for 1990 (Table 1 and Appendix III) show that during the interval of October, 1989 to June, 1990, projections of fleet costs had been drastically reduced. Total costs had been lowered \$6.45 million and the NSF part decreased by \$8.32 million. As a consequence, potential shortfalls had been eliminated. Factors in this substantial reduction were: Neither the KNORR nor MELVILLE operated during 1990, and EWING operated for only a part of the year. A few NSF-funded research projects were deferred to 1991; all Class II ships currently project lower 1990 costs than was the case in October, 1989. NSF costs for Class II ships have decreased by \$6.4 million and total costs for the class have decreased by \$7.1 million. NSF costs for Class III intermediates was lowered by about \$800 thousand, and Class IV ships by about the same. Projections for ONR funding to the fleet had risen modestly, and projections for fundings from other sources had risen by about \$1.7 million. This last increase was due in large part to inclusion of Harbor Branch Oceanographic Institution ships in the summary, with their NOAA and institution funding.

ANALYSIS OF COST AND OPERATING INFORMATION FOR 1991

Even preliminary analysis of cost and operating information for 1991 (Table 2) is sobering. Total costs are projected at over

TABLE 1

July 4, 1990

Summary of Ship Use and Costs
Year: 1990

SHIP/CLASS	FUNDING								Daily Rate
	NSF		NAVY		OTHER		TOTAL		
	Day	Dollars	Day	Dollars	Day	Dollars	Day	Dollars	
MELVILLE	0	0	0	0	0	0	0	0	--
KNORR	0	24	0	0B.	0	0	0	24	--
ATLANTIS II	148	2,161	70	1,022	63	920	281	4,103	14,601
EWING	117	1,580	83	1,120	1	14	201	2,714	13,502
T.G. THOMPSON	0	(83)	0	(83)	0	0	0	166	--
T. WASHINGTON	231	2,616	64	725	6	68	301	3,408	11,323
MOANA WAVE	169	1,576	0	0	112	1,044	281	2,620	9,324
CLASS II TOTAL	665	8,040	217	2,950	182	2,046	1,064	13,035	
AVE: (4)	166	2,010	54	738	46	512	266	3,259	
EDWIN LINK	0	0	21	105	54	602	75	707	9,427
ENDEAVOR	127	1,075	79	696	0	0	206	1,771	8,597
OCEANUS	97	952	55	540	15	147	167	1,639	9,814
GYRE	118	767	27	176	73	475	218	1,417	6,748
ISELIN	268	2,327	4	35	0	0	272	2,362	8,684
NEW HORIZON	104	886	34	290	99	843	237	2,018	8,515
SEWARD JOHNSON	12	65	40	218	121	1,107	173	1,390	8,035
VICKERS	10	123	0	0	0	0	10	123	12,300
WECOMA	186	1,701	49	448	0	0	235	2,149	9,145
CLASS III TOTAL	922	7,896	309	2,508	362	3,174	1,593	13,576	
AVE: (9)	102	877	34	279	40	353	177	1,508	
PELICAN	29	115	0	0	74	296	103	411	3,990
LONGHORN	0	0	41	82	75	170	116	252	2,172
POINT SUR	75	441	78A.	459	19	112	172	1,011	5,878
CAPE HATTERAS	150	943	10	63	24	150	184	1,156	6,282
ALPHA HELIX	96	1,148	0	0	4	48	100	1,196	11,960
R. SPROUL	112	497	10	44	30	133	152	675	4,439
CAPE HENLOPEN	40	240	11	66	13	78	64	384	6,000
R. WARFIELD	102	550	0	0	2	11	104	561	5,394
CLASS IV TOTAL	604	3,934	150	714	241	998	995	5,646	
AVE: (8)	76	492	19	89	30	125	124	706	
BLUE FIN	61	117	0	0	36	70	97	187	1,928
LAURENTIAN	25	105	0	0	30	126	55	231	4,200
BARNES	125	214	2	3	24	41	151	259	1,715
CALANUS	53	92	22	38	13	22	88	152	1,727
WEATHERBIRD II	230	875	12	48	1	4	243	927	3,814
<CLASS IV TOTAL	494	1,403	36	89	104	263	634	1,756	
AVE: (5)	99	281	7	18	21	53	127	352	
FLEET TOTAL	2,685	21,273	712	6,261	889	6,481	4,286	34,013	
AVE: (26)	103	818	27	241	34	249	164	1,308	

A. Includes NPS (CNOC) 73 days, \$429K

B. Does not include Navy funds for refit

TABLE 2

July 4, 1990

Summary of Ship Use and Costs
Year: 1991

SHIP/CLASS	FUNDING								
	NSF		NAVY		OTHER		TOTAL		Daily
	Day	Dollars	Day	Dollars	Day	Dollars	Day	Dollars	Rate
MELVILLE	144	1,879	70	913	5	65	219	2,859	13,053
KNORR	241	3,494	34	493	27	391	302	4,378	14,496
ATLANTIS II	251	3,891	16	248	27	419	294	4,558	15,503
EWING	345	4,952	0	0	0	0	345	4,952	14,354
T.G. THOMPSON	143	2,137	30	395B.	0	0	173	2,532	14,635
T. WASHINGTON	281	3,444	16	196	0	0	297	3,641	12,258
MOANA WAVE	248	2,245	41	371	26	235	315	2,851	9,070
CLASS II TOTAL	1,653	22,042	207	2,616	85	1,110	1,945	25,771	
AVE: (7)	236	3,148	30	374	12	159	278	3,681	
EDWIN LINK	28	244	22	88	125	1,312	175	1,644	9,394
ENDEAVOR	157	1,447	63	573	30	273	250	2,293	9,172
OCEANUS	98	848	112	969	10	87	220	1,904	8,655
GYRE	138	994	0	0	30	216	168	1,210	7,202
ISELIN	283	2,434	32	275	0	0	315	2,709	8,600
NEW HORIZON	128	1,100	52	447	42	361	222	1,908	8,595
SEWARD JOHNSON	20	135	54	406	99	1,238	173	1,778	10,277
VICKERS	197	1,958	0	0	3	29	200	1,987	9,785
WECOMA	205	1,989	42	407	0	0	247	2,396	9,700
CLASS III TOTAL	1,254	11,149	377	3,165	339	3,516	1,970	17,829	
AVE: (9)	139	1,239	42	352	38	391	219	1,978	
PELICAN	0	0	0	0	100	400	100	400	4,000
LONGHORN	15	45	0	0	85	255	100	300	3,000
POINT SUR	96	566	74A.	437	15	89	185	1,092	5,902
CAPE HATTERAS	219	1,302	0	0	10	60	229	1,362	5,948
ALPHA HELIX	199	1,630	0	0	4	33	203	1,663	8,192
R. SPROUL	168	720	0	0	26	111	194	831	4,286
CAPE HENLOPEN	41	246	2	12	27	162	70	420	6,000
R. WARFIELD	124	701	0	0	0	0	124	701	5,635
CLASS IV TOTAL	862	5,210	76	449	267	1,110	1,205	6,769	
AVE: (8)	108	651	10	56	33	139	151	846	
BLUE FIN	70	140	0	0	30	60	100	200	2,000
LAURENTIAN	138	414	0	0	30	90	168	504	3,000
BARNES	124	225	0	0	23	42	147	267	1,816
CALANUS	142	270	14	27	0	0	156	296	1,897
WEATHERBIRD II	200	1,350	0	0	10	67	210	1,418	6,752
<CLASS IV TOTAL	674	2,399	14	27	93	259	781	2,685	
AVE: (5)	135	480	3	5	19	52	156	537	
FLEET TOTAL	4,443	40,800	674	6,257	784	5,995	5,901	53,054	
AVE: (29)	157	1,407	23	216	27	207	203	1,829	

A. Includes NPS (CNOC) 69 days, \$407K

B. Includes NAVSEA 30 days, \$395K

\$53 million, to operate for 5,901 days. Neither of these totals can be achieved; less money is available for ship operations, and funded research projects will require far fewer days.

Estimates for Navy use of the fleet, \$6.2 million for 674 days, appear to be realizable. Although some adjustments are likely to result from pending funding decisions and a few important projects have not yet been finally accommodated on appropriate ships, satisfactory adjustments should be reached. Estimates for Other use (other federal, state and private), \$6.0 million for 784 days, also appear realistic. There are questions on only a few individual projects; satisfactory adjustment can be reached.

Estimates for NSF-UNOLS ship use, \$40.8 million for 4,443 days, drastically exceeded both the agency's budget for ship operations and approved science program ship needs. In the ten years 1981-1990, NSF funded an average 3,202 ship days annually. The highest five years, 1984-1988, averaged 3,406 ship days. Budget projections for 1991 provided by NSF, while still uncertain, suggest that about \$28 million might be available for ship operations (\$28.5 million for ship operations, ALVIN, aircraft, etc., plus \$1.5 million ODP, less about \$2 million for ALVIN). By any of these measures, more than 1,000 ship use days and \$12 million must be trimmed from proposed NSF ship use. Estimates are that 2,428 ship days costing \$23.5 million are in support of science projects already funded by NSF; the remaining 2,015 ship days costing \$17.3 million are for science projects still pending. This analysis indicates that far fewer than 1,000 additional ship days will be approved; only about \$4 - 4.5 million are available to fund projects still pending in June, 1990 for 1991 operations.

SCHEDULES FOR 1991

Individual operators presented scheduling information for 1991. Detailed schedules for all UNOLS ships can be seen on the OMNET electronic bulletin board SHIP.SCHED91. During presentations by individual operators, NSF science program representatives and ONR representatives were available to provide information on research funding decisions already reached. Since most of the schedules presented included many research projects whose funding would not be decided until August panels, program representatives could not answer to most scheduling issues. **Schedules are characterized for individual ships:**

ALPHA HELIX: The schedule advanced is almost entirely in support of NSF projects. Most of the schedule is in support of Division of Polar Programs projects for which funding decisions will not be available until January, 1991; the ALPHA HELIX schedule will not be resolved until then. Work would be in Resurrection Bay and the Gulf of Alaska through March; at the ice edge in the Bering Sea and along the Aleutians April through October; and again in Resurrection Bay, Gulf of Alaska and Prince William Sound in November and December.

ATLANTIS II: The AII would operate in the northeast Pacific for all of 1991. After a non-ALVIN project on the EPR in February, ALVIN/ATLANTIS II would conduct dive projects off California in the Guaymas Basin and on Fieberling Guyot from February to July, then on the Gorda-Juan de Fuca Ridge system July through October. November and December are open for ALVIN or non-ALVIN projects. Most projects are for NSF, with some NOAA and ONR funding. About 60% of the NSF work has funding decisions pending.

BARNES: A 147-day schedule has been advanced for work in Puget Sound and Lake Washington (March, April and August-November) and in the Columbia River (June, July). Most of the work is in support of funded NSF projects. The state/institution supports 23 days.

BLUE FIN: A schedule was advanced for 100 days, all local in the mid-Atlantic Bight. Most projects would be for NSF, the rest for DOE. Most projects are funded; more work could be accommodated throughout the year.

CALANUS: Estimates are for 156 days' operations in Florida waters, the Bahamas, Gulf of Mexico and Exuma. Most would be in support of NSF projects; 103 days were not yet funded.

CAPE HATTERAS: The proposed schedule is for 229 days, from the Gulf of Maine to the Florida Slope and Sargasso Sea. Work includes seismics and coring, benthic and micro-biology, and physical oceanography. The schedule is 95% in support of NSF but only about 20% of the NSF portion is yet funded.

CAPE HENLOPEN: Only 70 days are scheduled, mostly on the mid-Atlantic Shelf, with one Chesapeake Bay project. Of 41 days proposed to NSF, 25 days are not yet funded.

ENDEAVOR: A schedule of 283 days is projected for work in the northwest Atlantic. Work is in the Florida Straits and Gulf Stream (January, February); off Barbados, off Bermuda and in the Sargasso (February-April); in the Gulf of Maine and Newfoundland Basin (May); again off Bermuda and the Sargasso (June, July); then Newfoundland Basin, Sargasso, mid-Atlantic Bight and Gulf Stream (July-November). The latter part of the year is held open to begin a proposed mid-life rehab. Of 161 days proposed for NSF, 113 are not yet funded.

EWING: The tentative schedule for 345 days begins in the south Atlantic, then to Southern Ocean, southeast and northeast Pacific, southwest Pacific and, tentatively, returns to the north Atlantic. All projects are NSF, and virtually all are funded. Availability of equipment (e.g., GLORIA), two-ship operations and the global character of projects make for several long transits.

GYRE: A tentative schedule includes 168 days, 138 for NSF projects; 96 NSF days are not yet funded. The GYRE would work in

the Gulf of Mexico March through November and would have one project in the southwest Atlantic, involving long transits, in December.

ISELIN: The schedule is for 301 days; there are 283 NSF days, of which 134 are not yet funded. Projects are in the eastern Caribbean, Florida Straits, Sargasso off Georgia in the Gulf of Mexico (January-September). Work on the Amazon Fan and Plume is scheduled for October-December followed by a last Florida Straits project.

SEWARD JOHNSON: The schedule is for 173 days; 20 NSF, 54 ONR and 99 HBOI. Half of the NSF days are not yet funded. Projects are scheduled near the Bahamas in February, August and October and in the northeast Atlantic, Mediterranean and equatorial Atlantic from April to July. The schedule is open in November and December.

KNORR: A tentative schedule has 302 days divided among projects for NSF (241 days), ONR (34 days) and other sponsors (27 days). The NSF portion includes 34 days not yet funded. After completion of outfitting and transit to the south Pacific (January), the schedule centers on WOCE projects in the Pacific (February, March, May-August), mooring recoveries in the equatorial Pacific and warranty shipyard. After an August transit back to Woods Hole, the schedule has mooring recovery south of Ireland (September, October) and two cruises using ARGO-JASON in the Sargasso and on the Mid-Atlantic Ridge (October-December). Uncertainty about KNORR's availability from shipyard, together with both ONR and NSF research project commitments, are delaying resolution of this schedule.

LAURENTIAN: A schedule was advanced for 168 days. Of 138 days proposed to NSF, 113 are not yet funded. Projects are in Lake Michigan (April, May and July-October) and in Lakes Huron, Erie and Ontario in June.

EDWIN LINK: The tentative schedule has 175 days; 28 NSF, 22 Navy and 125 NOAA. Funds are still pending for the NSF days. Work is scheduled for January-March and May-October near the Bahamas, in the Gulf of Mexico, the western Atlantic and in the Caribbean. The schedule is open after mid-October.

LONGHORN: 100 days are scheduled based on 15 days for NOAA, 14 for the University of Texas and 70 proposed days. All work would be in the Gulf of Mexico. Available for assignment except in May and June.

MELVILLE: The schedule is for 219 days beginning in mid-April on shipyard availability. Projects are in support of NSF, 144 days; ONR, 70 days; and other sources, 5 days. Funds for 15 NSF days are still pending. Work would be in the northwest Atlantic (April-August), transit to the Pacific in September, an outfitting period and WOCE transects in the south Pacific

(November, December). The schedule for the MELVILLE (as with the KNORR) is confounded by uncertain availability dates and rigid project demands from both ONR and NSF.

MOANA WAVE: The 315-day schedule includes 248 NSF days; 41 ONR days and 26 days funded by a private source. Funds for 86 NSF days are pending. Scheduling is constrained by a funded project in the western Pacific early in the year and by a coordinated two-ship project in the equatorial Pacific late in the year. Work would be in Hawaiian waters January, February; in the western Pacific, March-August; and (optionally) in Hawaiian waters and the equatorial, September-December.

NEW HORIZON: A 222-day schedule is advanced, all in the San Diego area. Work is for NSF 128 days, ONR 52 days and University of California 42 days; 52 NSF days are not yet funded. Work is off southern California and near Fieberling Guyot February through October with projects on the EPR, off Mexico and Baja California in November and December.

OCEANUS: The schedule is for 220 days; 98 for NSF, 112 for ONR and 10 for NOAA. Funds are still pending for 39 of the NSF days. The schedule begins at the first of the year with two time-constrained projects, one near Bermuda, the other off New Jersey, and another project near Bermuda. After shipyard in March, there are a series of north Atlantic projects off New Jersey, south of the Azores, in the Sargasso and near Bermuda. The schedule is open after mid-November.

PELICAN: A schedule of about 100 days is anticipated, all in local Gulf of Mexico waters. Projects will be supported by Other government, state and local funds. Additional work could be accommodated through most of the year.

POINT SUR: After a shipyard period, a variety of projects would be undertaken for 185 days in support of NSF (96 days), Navy, including CNOC, (74 days) and state/university (15 days). Funds are pending for 43 NSF days. All work is in waters off central and southern California.

ROBERT GORDON SPROUL: A schedule has been advanced for 194 days, in support of NSF (168 days); and Other sources (26 days). Funds for 86 of the NSF days are pending. Projects are off southern California, except for work near Guadalupe Island, the Columbia River and the Gulf of California.

THOMAS G. THOMPSON: The schedule is predicated on delivery of the ship May 31, 1991 and outfitting, shakedown and transit through mid-July. Operations are all in support of JGOFS (NSF, 143 days) in the central Pacific. All of the JGOFS (NSF) work is pending; decisions are not expected until September.

VICKERS: A schedule of 200 days has been advanced, in support of NSF (197 days) and NOAA (3 days). 60 days for NSF are not yet

funded. Projects are in southern California basins (January-April, September-December), two projects in the equatorial Pacific (June-September) and one on the East Pacific Rise (April-June). Negotiations are initiated to work in support of NOAA climate programs in 1991 and beyond.

RIDGLEY WARFIELD: The schedule has 124 days in Chesapeake Bay, all in support of NSF. Funding is pending for 30 days. A proposal has been submitted to re-engine the WARFIELD. This would take the ship out of service for part of 1991.

THOMAS WASHINGTON: The schedule of 297 days supports NSF (281 days) and ONR (16 days). Funds are pending for 80 NSF days. Scheduling is constrained by availability of SeaMARC II logistics and weather for operating out of and south of Easter Island. Projects are on the East Pacific Rise (January); Antarctic Ridge (February, March); a two-ship project on the EPR south of the Equator (March, April); in the northeast Pacific (June-August); and in the western Pacific (August-December).

WEATHERBIRD II: The schedule is for 210 days (NSF 200, 10 other sources); funds are pending for 66 NSF days. Work is in support of several time series, all within 100 miles of Bermuda. Additional conversion is being proposed for during 1991.

WECOMA: A schedule is advanced for 247 days (NSF 205, ONR 42). Funds are pending for 32 NSF days. Projects are off the northwest U.S. coast except for one long deployment to the equatorial Pacific. This project in October-December must overlap a MOANA WAVE project.

INFORMATION FROM FUNDING AGENCY REPRESENTATIVES

Don Heinrichs, NSF/OCFS provided information on NSF's budget request for 1991, noting that the tables (see Appendix IV) were as provided for the UNOLS Council in February, 1990. The request was before Congress on June 25.

The NSF budget request was the source for estimates of NSF funds available for 1991:

Ship Operations	\$28.5 million
less ALVIN, etc.	<u>2.0 million</u>
	\$26.5 million
plus funds from ODP	<u>1.5 million</u>
	\$28.0 million

It was also noted that the \$2.6 million for Ship Upgrades includes \$1.3 million for the EWING debt.

Don Heinrichs also provided an NSF analysis of **Academic Fleet Cost Projects** (Appendix V). The projection had four models:

- Low costs where operational days were as in 1984-89 averages, the WASHINGTON retires in 1992, AGOR-24 is not built, ALPHA HELIX retires in 1995 and a western Arctic ice-capable ship becomes operational in 1996;
- Average costs as above except WASHINGTON continues to operate, and ALPHA HELIX retires in 1996;
- Optional costs as in low costs except AGOR-24 becomes operational in 1994 and WASHINGTON retires in 1994, and all ships are fully utilized;
- High costs have full utilization of AGOR-23 and -24 immediately.

Summaries are provided for 1991 costs for a 24-ship fleet (that does not include SEWARD JOHNSON, EDWIN LINK, PELICAN and LONGHORN), and the various cost options are compared to budget projections through 1997.

As had been announced, NSF/DPP will obtain a Research Vessel with Icebreaking Capability on a 10-year lease-build contract. The RVIB will be available in 1992. The POLAR DUKE is under optional lease until 1994.

Keith Kaulum, ONR, reported that ONR will continue to budget \$5 million for direct funding of ship operations. With funds from programs, about \$7 million should be available for UNOLS ship operations.

ONR is concerned that moving their project south of Iceland from the KNORR to the MELVILLE will, if MELVILLE is further delayed, jeopardize their project. (Delays could also seriously impact NSF's WOCE.)

DISCUSSION OF SCHEDULES AND COSTS FOR 1991

In addition to the compelling problem of adjusting fleet costs to the funds available from sponsoring agencies (as discussed above, **Analysis of Cost and Operating Information, 1991**) several critical problems were identified:

1. Contingencies must be developed to accommodate both OCE and ML-ML work if KNORR and MELVILLE are further delayed.
2. Three ships would be in the western Pacific in 1991; their schedules should be reviewed to see if consolidation could reduce overall costs.

3. Schedules for four small ships in the mid-Atlantic are weak or potentially weak. Review to see if consolidation could reduce costs.
4. In a worst-case scenario, ENDEAVOR and OCEANUS could end with inefficient schedules. Examine contingencies.
5. The University of Hawaii would like MOANA WAVE to support the commercial work scheduled; there are time constraints on their response. They urge that those interests be considered.

NSF PROPOSALS

E. R. Dieter, NSF/OCFS, noted that guidelines for Ship Operations and other facilities proposals are being rewritten. She asked for comments on draft Guidelines. She also noted that strict adherence to published Guidelines will be expected. Proposals not in compliance can be returned, and will usually be delayed.

The Ship Scheduling Meeting was adjourned at 4:45 p.m.

**UNOLS
Ship Schedule Review
Report of Meeting
June 26, 1990**

The UNOLS Chair, George Keller, had directed that a meeting be held immediately following UNOLS Ship Scheduling Meetings to improve the scheduling process by reviewing proposed schedules (see letter dated February 12, 1990 in Appendix II).

The review group, Mike Rawson, Chair; George Shor; E. R. Dieter, NSF; Keith Kaulum and June Keller, ONR; and Bill Barbee met on June 26, 1990 at NSF, Washington, D.C. Jack Bash, URI, selected UNOLS executive secretary, was present for part of the meeting as a nonparticipating observer.

The meeting followed the **Agenda** (see Appendix II).

MATCH BETWEEN PROSPECTIVE FUNDING AND ESTIMATED SHIP OPERATIONS COSTS

The Group reviewed summaries of ship operations cost estimates (Tables 1 and 2, from Ship Scheduling meeting). 1) Their assessments: There is, potentially, a shortfall of \$12.8 million, arising largely from work proposed for NSF funding. 2) The schedules submitted and the costs estimated for the UNOLS fleet include over 2,000 days and \$17.3 million proposed for NSF to support projects whose funds are pending. The review group estimates that much less than half of these days will be funded; NSF has only \$4 - 4.5 million available to fund these pending 1991 operations.

REVIEW OF 1991 SCHEDULES

The schedules of all ships were reviewed individually and then an integrated fleet schedule was examined. Recommendations were developed concerning many individual ships. The recommendations were generally to enhance schedule efficiency by minimizing transits, etc., and urging that efficient contingencies be developed if significant portions of their not-yet-funded schedules were not realized.

Problems identified with the fleet schedule were as discussed in the Ship Schedule Meeting: 1) Further delays to MELVILLE and KNORR would jeopardize ONR's ML-ML program and NSF's WOCE program. 2) Three ships propose work in the western Pacific during 1991. Operators should be urged to work toward combined schedules that would enhance efficiency. The group also noted that one project funded for the western Pacific requires repeat support after six months and one year. Agencies must recognize their degree of commitment. 3) Schedules for four small ships in the mid-Atlantic are weak or potentially weak. Operators should work toward cost reducing consolidation. 4) There could

be a problem with east coast intermediate ship schedules if much of their not-yet-funded schedule is not realized. Contingencies should emphasize cost savings.

The review group developed letter recommendations regarding each ship (as listed on Table 2), addressing their evaluations relative to the findings above. The letter recommendations were to be presented in draft to the UNOLS Council at their July 12, 13 meeting. After Council deliberation, recommendations would be made by the UNOLS Chair to each UNOLS Operating Member. (Note: Letter recommendations were sent on July 23, 1990.)

**SHIP SCHEDULING MEETING
American Institute of Architects
1735 New York Avenue, NW - Washington, Dc**

June 25, 1990

Attendees:

**Neil Anderson, National Science Foundation
Roger Baier, National Science Foundation
William D. Barbee, UNOLS Office
Harry Barnes, Bermuda Biological Station for Research
Jack Bash, University of Rhode Island
Douglas Biggs, Texas A&M University
Ann Burns, Lamont-Doherty Geological Observatory
Larry Clark, National Science Foundation
Joe Coburn, Woods Hole Oceanographic Institution
Bruce Cornwall, Johns Hopkins University
James W. Coste, University of Hawaii
Patrick Dennis, Joint Oceanographic Institutions, Inc.
Emma R. Dieter, National Science Foundation
Linda Duguay, National Science Foundation
David Epp, National Science Foundation
Lind M. Goad, University of Michigan
George Grice, Woods Hole Oceanographic Institution
James Griffin, University of Rhode Island
Grant Gross, National Science Foundation
Douglas Hammond, University of Southern California
Don Heinrichs, National Science Foundation
Don Hoffer, University of Rhode Island
Dave Hurd, National Science Foundation
Ron Hutchinson, University of Miami/RSMAS
William K. Jeffers, University of Washington
Keith Kaulum, Office of Naval Research
June Keller, Office of Naval Research
Dick Lambert, National Science Foundation
Dean Letzring, Texas A&M University
Quentin Lewis, DUKE/University of North Carolina
Don Liberatore, Harbor Branch Oceanographic Institution
R.L. Longfield, University of Hawaii
Bruce Malfait, National Science Foundation
Scott McKeller, National Oceanic & Atmospheric Administration
Don Moller, Woods Hole Oceanographic Institution
Greg Mountain, National Science Foundation
Stewart Nelson, Office of the Oceanographer of the Navy
Don Newman, University of Southern California
Ken Palfrey, Oregon State University
Mike Prince, Moss Landing Marine Laboratories
Steve Rabalais, Louisiana Universities Marine Consortium
Michael Rawson, Lamont-Doherty Geological Observatory
Tom Royer, University of Alaska
George Shor, Scripps Institution of Oceanography
Tom Spence, National Science Foundation
Joe Ustach, DUKE/University of North Carolina
Richard West, National Science Foundation**

UNIVERSITY-NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

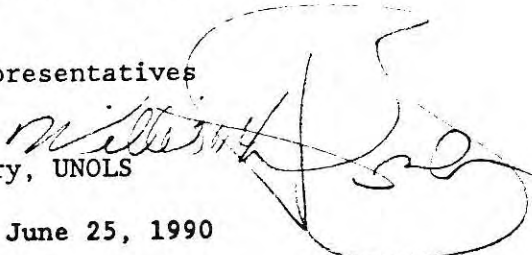
An association of institutions
for the coordination and support
of university oceanographic facilities

UNOLS Office, WB-15
School of Oceanography
University of Washington
Seattle, Washington 98195
(206) 543-2203

June 6, 1990

TO: UNOLS Ship Scheduling Committee

CC: UNOLS Members
Federal Agency Representatives

FROM: William D. Barbee 
Executive Secretary, UNOLS

SUBJECT: Schedule Meeting, June 25, 1990

The first 1990 meeting of the UNOLS Ship Scheduling Committee has been called:

Board Room
American Institute of Architects
1735 New York Avenue NW
Washington, DC
8:30 a.m.
June 25, 1990
(Expect to adjourn by midafternoon)

The objectives of the meeting are:

1. to discuss the ship scheduling process for 1991,
2. to quickly review operations, schedules and costs for 1990, to reveal changes, surprises, problems, and
3. to examine and summarize schedules and costs projected for 1991.

Schedules and costs for both 1990 and 1991 will have been provided by UNOLS Operating institutions (via SCHEDULERS.EAST.GULF or SCHEDULERS.WEST) and appropriate information should be on SHIP.SCHED90 or 91. Summaries of cost information will be provided (in format similar to attachments to this letter) for comparison with NSF, ONR and other funding for 1991.

A Schedule Review Meeting will be held on June 26 among Mike Rawson, George Shor, Dolly Dieter, Keith Kaulum and Bill Barbee to review and analyze 1991 schedules and develop recommendations to improve fleet schedule efficiency. This meeting was initiated by the UNOLS Chair, in response to funding agency concerns with the UNOLS scheduling process in recent years. (See February 12, 1990 letter, attached.)

Materials for the Meeting:

1. By telemail to SCHEDULERS.EAST.GULF or SCHEDULERS.WEST, not later than June 15, 1990:

- a. Cost Information for 1990 and 1991:

1990	NSF	Navy	Other	Total
Ship Days				
Ship \$K				

1991	NSF	Navy	Other	Total
Ship Days				
Ship \$K				

- b. Schedules for 1990 and 1991, in approved format. You will not need to bring extra copies of the material in 1a and 1b if you have submitted the material via telemail by June 15.
2. Bring to the Meeting:
 - a. Summaries of Unfilled 1991 Shiptime Requests. Please bring 10 copies of any unfilled 1991 Ship Time Requests that you hold. If you don't KNOW it's filled, list it.
 - b. NEW THIS YEAR. Narrative description of each ship's 1991 schedule. One paragraph saying where and when ship is scheduled, kind of work (e.g., Spring Bloom Studies) and time constraints on any projects. List any problems that you foresee (e.g., 90 days still not funded) together with contingency plan for if the bad thing happens. Blue water ships should also provide a map with schedule track; ships whose work is all regional (at home) needn't provide a chart. Ten copies, please.

WDB/cml

Enclosures: (5)

AGENDA
UNOLS Ship Scheduling Meeting
Board Room
American Institute of Architects
1735 New York Avenue NW
Washington, DC
8:30 a.m.
Monday, June 25, 1990

The Ship Scheduling Committee will be called into session by Mike Rawson, Chair.

Briefing on UNOLS Ship Scheduling Process for 1991. Mike Rawson, together with NSF and ONR representatives, will brief the Scheduling Committee on the process for 1991. Objectives, Chairman's February 12 letter, Schedule Review Meeting, Letters to individual schedulers, Timely development of Operational Schedules.

Projections of Fleet Schedules and Costs for 1991. Based on cost and operating information provided earlier on telemail, Scheduling Committee Chair will present an overview for 1991. Funding/scheduling problems for 1990 can, hopefully, be resolved.

Schedules for 1991. Individual presentations by institutions of their tentative schedules for 1991 and projected costs. (Should be as you submitted via telemail.) Identify problems: unfunded projects, multiple bookings, schedule inefficiencies, etc. Recap 1990 problems only as necessary. You may want vu-graphs, for your presentations.)

Information from Funding Agency Representatives. NSF/OSRS Science Program representatives will provide their best information on the funding status of individual NSF projects tentatively scheduled for 1991. (Program reps will have UNOLS schedules as posted to SHIP.SCHED91 prior to the meeting. Critical that all schedules are posted!) From NSF, ONR and other agencies as desired, on 1991 ship ops funding available, ship days required by science programs, science funding decisions available. Recap of 1990 schedule/funding problems as necessary.

NSF representatives will review changes in proposal guidelines for marine technician, instrumentation, shipboard equipment and ship ops proposals for 1991.

1991 Schedule Refinement. Scheduling Committee Chair will provide direction and moderate discussion on schedule problems (e.g., multiple bookings, unmet requests, funding match, pending science funding decisions). Preliminary evaluation of overall fleet schedule efficiency. This discussion should provide a starting point for Schedule Review Meeting to be held on June 26.

Recommendations. Ship Scheduling Committee recommendations to go forward to the UNOLS Council, Operating institutions or funding agencies as appropriate will be developed at the **Schedule Review Committee**.

WHAT TO PROVIDE FOR THE SHIP SCHEDULING MEETING, JUNE 25, 1990:

1. By telemail to SCHEDULERS.EAST.GULF or SCHEDULERS.WEST, not later than June 15, 1990:

a. Cost Information for 1990 and 1991:

1990	NSF	Navy	Other	Total
Ship Days				
Ship \$K				
1991	NSF	Navy	Other	Total
Ship Days				
Ship \$K				

b. Schedules for 1990 and 1991, in approved format. You will not need to bring extra copies of the material in a 1a and 1b if you have submitted the material via telemail by June 15.

2. Bring to the Meeting:

a. Summaries of Unfilled 1991 Shiptime Requests. Please bring 10 copies of any unfilled 1991 Ship Time Requests that you hold. If you don't KNOW it's filled, list it.

b. **NEW THIS YEAR.** Narrative description of each ship's 1991 schedule. One paragraph saying where and when ship is scheduled, kind of work (e.g., Spring Bloom Studies) and time constraints on any projects. List any problems that you foresee (e.g., 90 days still not funded) together with contingency plan for if the bad thing happens. Blue water ships should also provide a map with schedule track; ships whose work is all regional (at home) needn't provide a chart. Ten copies, please.

AGENDA
UNOLS Schedule Review Meeting
NSF/OCE
1800 G Street NW
Washington, DC
8:30 a.m.
Tuesday, June 26, 1990

The group of Mike Rawson, George Shor, Dolly Dieter, Keith Kaulum and Bill Barbee will meet to review ship schedules for 1991.

The review will include:

1. Analysis of match between prospective funding and estimated ship operations costs;
2. Review 1991 schedules on individual ship, regional and fleet basis; preliminary recommendations to increase ship, regional and fleet efficiency;
3. Address any specific problems (e.g., extensive transits, double bookings, science projects not accommodated, marginal schedules, regional/fleet inefficiencies);
4. Develop guidance letters for each ship/institution (to include general fleet schedule/funding questions and specific ship/institution questions);
5. Begin to formulate recommendations for transmittal to UNOLS Council, agencies, UNOLS institutions. (Cover: funding match, potential lay-ups, reassignments, retirements, etc., schedule efficiency of individual ships, regions, over-all fleet, and rationalize any P.I. not accommodated.)

November 1, 1989

Summary of Ship Use and Costs
Year: 1989

SHIP/CLASS	FUNDING							
	NSF		ONR		OTHER		TOTAL	
	Day	Dollars	Day	Dollars	Day	Dollars	Day	Dollars
MELVILLE	148	1,752	70	829	6	71	224	2,652
KNORR	0	(260)	0	(14,805)	0	0	0	-
ATLANTIS II	192	3,267	16	272	14	238	222	3,777
CONRAD 4.	58	749	42	534	3	38	103	1,321
T.G. THOMPSON 3.	0	72	0	100	0	3	0	175
T. WASHINGTON	230	2,565	23	256	8	90	261	2,910
MOANA WAVE	285	2,544	0	0	10	90	295	2,634
CLASS II TOTAL	913	10,949	151	1,991	41	530	1,105	13,469
AVE: (5)	183	2,190	30	398	8	106	221	2,693
ENDEAVOR	193	1,500	40	310	23	178	256	1,988
OCEANUS	228	1,801	24	190	0	0	252	1,991
GYRE	91	506	0	0	56	291	147	797
ISELIN	175	1,468	52	436	0	0	227	1,904
NEW HORIZON	68	606	63	561	41	365	172	1,532
OSPREY	0	350	0	0	0	0		350
WECOMA 2.	158	1,382	62	542	0	0	220	1,924
CLASS III TOTAL	913	7,613	241	2,039	120	834	1,274	10,486
AVE: (6)	152	1,269	40	340	20	139	212	1,748
PELICAN	19	74	0	0	62	372	81	446
POINT SUR 1.	61	373	86	525	16	98	163	996
CAPE HATTERAS	187	1,167	0	0	12	75	199	1,241
ALPHA HELIX	115	1,133	0	0	38	374	153	1,508
R. SPROUL	83	404	17	83	16	78	116	565
CAPE HENLOPEN	83	548	19	125	28	185	130	858
R. WARFIELD	114	670	0	0	1	6	115	676
CLASS IV TOTAL	662	4,369	122	733	173	1,188	957	6,290
AVE: (7)	95	624	17	105	25	170	137	899
BLUE FIN	44	77	0	0	56	98	100	175
LAURENTIAN	54	216	0	0	2	8	56	224
BARNES	70	148	2	1	30	47	102	197
CALANUS	88	204	20	46	45	104	153	354
WEATHERBIRD	218	512	4	9	15	35	237	556
< CLASS IV TOTAL	474	1,157	26	56	148	292	648	1,506
AVE: (5)	95	231	5	11	30	58	130	301
FLEET TOTAL	2,962	24,088	540	4,819	482	2,844	3,984	31,751
AVE: (23)	129	1,047	23	209	21	124	173	1,380

1. Navy includes NPS (CNOC) 75 days, \$458K
2. Navy includes NORDA 22 days, \$192
3. Funding to sustain shore support, UW
4. Other is JOI (Ocean Drilling Program?)

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July 31, 1989

**Summary of Ship Use and Costs
Year: 1990**

SHIP/CLASS	FUNDING							
	NSF		ONR		OTHER		TOTAL	
	Days	Dollars	Days	Dollars	Days	Dollars	Days	Dollars
MELVILLE	35	447	62	793	0	0	97	1240
KNORR	149	1952	28	367	35	459	212	2778
ATLANTIS II	a. 197	2704	77	1057	39	535	313	4296
BERNIER	217	2930	117	1580	0	0	334	4510
T. WASHINGTON	344	3914	0	0	0	0	344	3914
MOANA WAVE	f. 178	1669	0	0	102	957	280	2626
CLASS II TOTAL	1120	13616	284	3797	176	1951	1580	19364
AVE: (6)	187	2269	47	633	29	325	263	3227
ENDEAVOR	158	1343	54	459	0	0	212	1802
OCEANUS	217	1595	48	353	6	44	271	1992
GYRE	107	696	0	0	23	150	130	846
ISELIN	216	1815	26	219	0	0	242	2033
NEW HORIZON	b. 180	1404	22	172	98	766	300	2342
OSPREY	52	624	0	0	0	0	52	624
WECOMA	206	1854	69	621	0	0	275	2475
CLASS III TOTAL	1136	9331	219	1824	127	960	1482	12114
AVE: (7)	162	1333	31	260	18	137	212	1730
PELICAN	26	120	0	0	35	161	61	281
POINT SUR	d. 95	599	65	410	15	95	175	1103
CAPE HATTERAS	205	1223	10	60	32	191	247	1474
ALPHA HELIX	171	1881	0	0	56	616	227	2497
R. SPROUL	c. 133	580	4	17	8	35	145	632
CAPE HENLOPEN	56	370	0	0	29	191	85	561
R. WARFIELD	124	657	0	0	0	0	124	657
CLASS IV TOTAL	810	5430	79	487	175	1289	1064	7205
AVE: (7)	116	776	11	70	25	184	152	1029
BLUE FIN	50	100	0	0	50	100	100	200
LAURENTIAN	39	156	16	64	30	120	85	340
BARNES	123	259	4	6	18	34	145	299
CALANUS	e. 128	282	0	0	45	99	173	381
NEW SHIP	250	950	0	0	0	0	250	950
< CLASS IV TOTAL	590	1747	20	70	143	353	753	2170
AVE: (5)	118	349	4	14	29	71	151	434
FLEET TOTAL	3656	30124	602	6178	621	4553	4879	40853
AVE: (25)	146	1205	24	247	25	182	195	1634

- a. NOAA 39 days, \$535K
- b. UC 32 days, \$250K, DOE 32 days, \$250K, NOAA 17 days, \$133K, NASA 7 days, \$55K, JOI 10 days, \$78K
- c. DOE 8 days, \$35K
- d. ONR includes NPS (CNOC) 60 days, \$378K
- e. NOAA 45 days, \$99K
- f. SSI (private) 102 days, \$933K

5

UNIVERSITY-NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

An association of Institutions
for the coordination and support
of university oceanographic facilities

Research, Graduate Studies,
and International Programs
Oregon State University
Administrative Services A312
Corvallis, OR 97331-2140
(503) 737-3467

February 12, 1990

TO: UNOLS Ship Schedulers

FROM: George H. Keller, UNOLS Chairman *George Keller*

SUBJ: Attempt to improve upon ship scheduling process

A number of problems emerged from the UNOLS ship scheduling process last year that were due to a combination of things, from both the UNOLS side and the federal agencies side. One thing that is essential to a well informed procedure is for each operator institution to list its tentative schedule, especially prior to the scheduling meetings. Last fall, there were some schedules being handed out at the scheduling meeting. It is imperative that these schedules be available in a timely fashion. I am asking that you list your schedule on telemail starting this month, and update it once each month thereafter. This alerts each operator to what is out there in the way of ship-time requirements, and brings a much more informed group to the June and September scheduling meetings.

Starting this year, the chairmen of the east and west coast scheduling groups will, along with the UNOLS executive secretary, meet with representatives of the federal funding agencies right after the scheduling meeting. This is to insure a sound communication link with the funding agencies. Mike Rawson, who represents the Ship Scheduling Committee on the UNOLS Council, will then bring to the Council a status report and any recommendations that might be appropriate. The Council will then review the information and make whatever recommendations it may consider appropriate to the funding agencies and the operators. In other words, the Ship Scheduling Committee, along with inputs from the federal agencies, will present the findings of their analysis of the scheduling situation (through Mike Rawson in this case), and the UNOLS Council will make recommendations on the pertinent issues.

The process will be followed after the June and September ship scheduling sessions this year.

Please assist in the overall process by listing and updating your tentative schedule each month. Thank you for your assistance.

cc: Mike Rawson
William Barbee
Dolly Dieter
Keith Kaulum
Austin Yeager
George Shor
UNOLS Council Members

PROFILES OF FUNDING CYCLES \$ MILLION

	OP DAYS	NSF	ONR	OTHER	TOTAL	SHORT FALL
1988	4,731	28.7	6.0	4.2	39.0	-
1989	3,743	24.0	4.8	2.8	31.8	-

1990 COST PROJECTIONS

	NSF		ONR		OTHER		TOTAL	
	Days	Dollars	Days	Dollars	Days	Dollars	Days	Dollars
July 1989 (Anticipated)	3,656	30.12	602	6.18	621	4.55	4,879	40.85
Proj. Shortfall		28-29? (1M-2M)		6.2		4.6		38.8-29.8 (1M-2M)
Sept. 1989* (Anticipated)	3,579	29.59	567	6.08	646	4.79	4,792	40.46
Proj. Shortfall		*** ?		6.08		4.79		? ?
June 1990 (Anticipated)	2,685	21.27	712	6.26	889	6.48	4,286	34.01
Proj. Shortfall		21.3 -		6.3 -		6.5 -		34.1 -

* Projections for Ship Use and Costs are from Ship Operations Proposals dated October, 1989.

** NSF budget was uncertain and no firm estimate was provided at the September, 1989 meeting.

SHIP OPERATIONS
SUMMARY OF 1991 PROJECTIONS
\$ MILLION

	NSF		ONR		OTHER		TOTAL	
	Days	Dollars	Days	Dollars	Days	Dollars	Days	Dollars
June 1990 (Anticipated)	4,443	40.80	674	6.26	784	6.0	5,401	53.05
Proj. Shortfall		28.0 12.8		6.26 -		6.0 -		40.26 12.8

NSF GEOSCIENCES 1992 - 1996 BUDGET PLANS

Capital Equipment, Major Facilities

● Complete acquisition of R/V EWING	6.5M
● Midlife refits and upgrades of NSF intermediate and small ships	10.0M
● Improved drilling and logging for ODP	5.0M
● Acquisition/construction of ice-capable ship for western Arctic	45.0M
	\$66.5M

Science Instrumentation, Equipment

● Increase proportional to overall budget growth	\$57.8M
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Technology Development

● Increase about 25 percent above overall budget growth	\$67.6M
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TOTAL	\$191.9M
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NOTE:

Capital equipment, instrumentation and technology development projected as 13.5% of total ocean sciences funds

NSF Ocean Sciences Budget

	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>Change 87-91</u>
OSRS	66.5	67.2	70.9	72.9	88.6	33.2%
OCFS	37.2	37.2	43.6	42.5	47.4	27.4%
ODP	30.0	30.6	31.4	32.0	35.0	16.7%
	133.7	135.0	145.9	147.4	171.0	27.9%

FY 1991 BUDGET INCREMENT

• Global Geosciences	\$19.2 M
• Disciplinary Base	\$1.4 M
• Ocean Drilling Program	\$3.0 M
	\$23.6 M

FY 1991 BUDGET PROFILE

Science	\$104.6 M
• Disciplinary Science	75.4
• Global Geosciences	29.2
• Education & Human Res.	(4.1)
Facilities	\$66.4 M
• Disciplinary Science	54.6
• Global Geosciences	11.8
• Capital Equipment	(3.3)

OCEAN SCIENCES DIVISION DETAIL

	Actual <u>FY 1989</u>	Estimates <u>FY 1990</u>	Requested <u>FY1991</u>
Ocean Sciences Division	\$ 145.9 M	\$ 147.4 M	\$ 171.0 M
Ocean Sciences Research	70.9 M	72.9 M	88.6 M
Ocean Drilling Program	31.4 M	32.0 M	35.0 M
Oceanographic Facilities	43.6 M	42.5 M	47.4 M

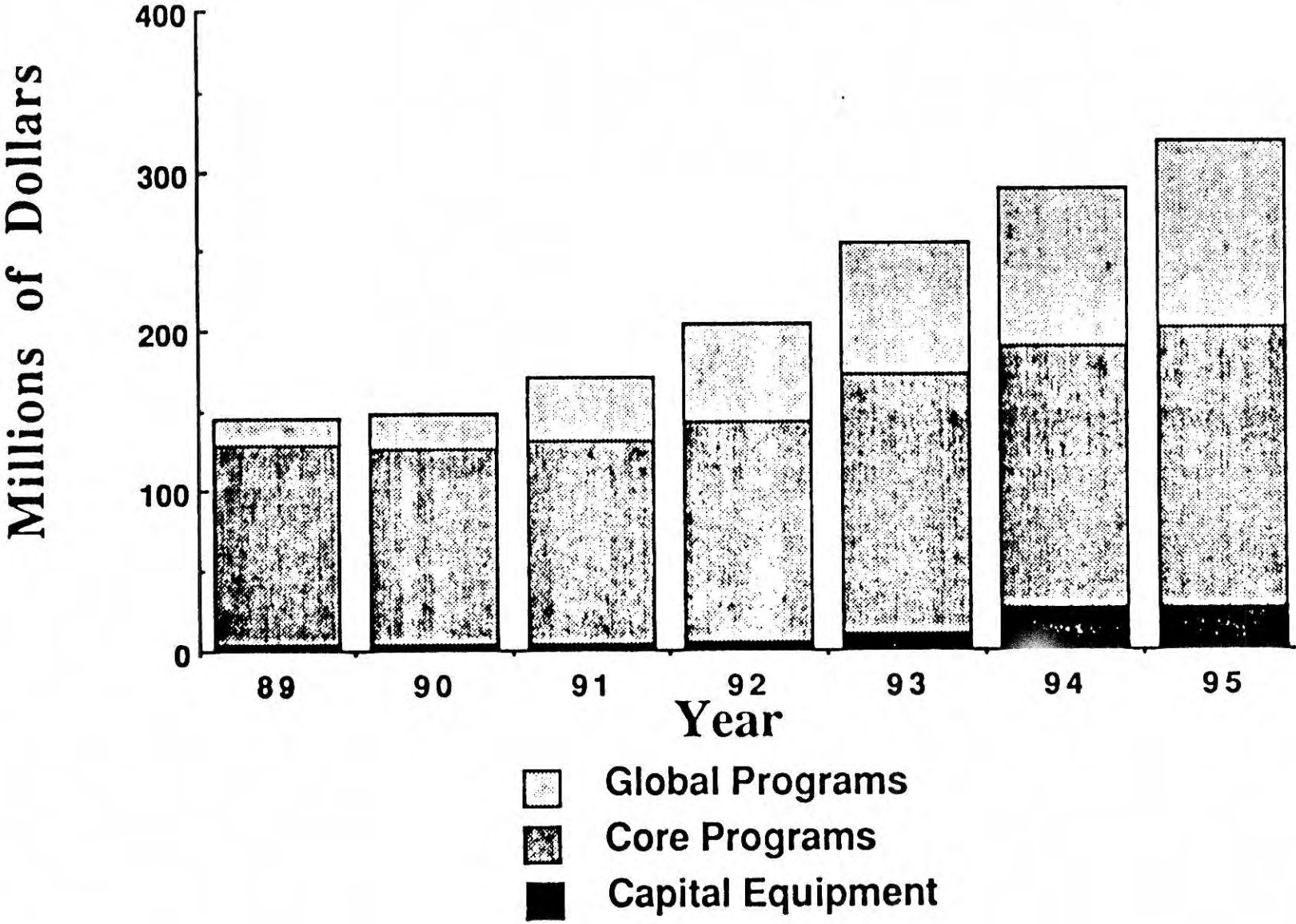
OCEANOGRAPHIC FACILITIES DETAIL

Operations			
Ship operations	24.6 M*	25.5 M*	28.5 M*
ALVIN, Aircraft, etc.	1.3 M		
Marine Techs	<u>3.4 M</u>	<u>3.6 M</u>	<u>4.2 M</u>
	29.3 M	29.1 M	32.7 M
Infrastructure			
Science instruments	1.6 M	3.8 M	4.0 M
Shipboard Equipment	0.9 M		
Ships, Upgrades	2.8 M	2.8 M	2.6 M
UNOLS, Misc.	<u>0.7 M</u>	<u>0.4 M</u>	<u>0.5 M</u>
	6.0 M	7.0 M	7.1 M
Technology, Centers, Reserves			
Technology Development	4.5 M	3.2 M	4.2 M
AMS Center	1.8 M	1.8 M	1.8 M
Cross Directorate/Reserves**	<u>2.0 M</u>	<u>1.4 M</u>	<u>1.6 M</u>
	8.3 M	6.4 M	7.6 M

* Plus \$1.5 M from ODP (1989), \$1.3M (1990), \$1.5 M (1991)

** Cross-directorate/Reserves previously distributed

OCE Long-Range Plans (1989-95)



ACADEMIC FLEET COST PROJECTIONS

LOW COSTS

- Operational days are the same as 1984-1989 averages (adjusted for lay-ups and refits)
- WASHINGTON retired in 1992
- AGOR-24 not constructed
- ALPHA HELIX retired in 1995
- Ice-capable ship starts operation in 1996

AVERAGE COSTS

- Operational days same as 1984-89 average
- AGOR-24 not constructed
- WASHINGTON continues to operate
- ALPHA HELIX retired in 1996
- Ice-capable ship starts in 1996

OPTIMAL COSTS

- Full utilization of all ships
- AGOR-24 starts operation in 1994
- WASHINGTON retired in 1994

HIGH COSTS

- Maximum utilization of all ships
- AGOR-23 and AGOR-24 at full use immediately

PREDICTIONS OF ACADEMIC FLEET COSTS

1991

CONSTANTS	SHIPS	DAILY RATE (\$)	LOW COST		AVGERAGE COST		OPTIMAL COST		HIGH COST	
			DAYS	Cost (\$K)	DAYS	Cost (\$K)	DAYS	Cost (\$K)	DAYS	Cost (\$K)
Class I	MELVILLE	13600	225	3060	225	3060	270	3672	271	3686
	KNORR	13600	201	2734	201	2734	270	3672	280	3808
Class II	BERNIER	13500	250	3375	250	3375	270	3645	300	4050
	MOANA WAVE	8439	296	2498	296	2498	270	2279	333	2810
	ATLANTIS II	12687	298	3781	298	3781	270	3425	310	3933
	T.WASHINGTON	11631	264	3071	264	3071	270	3140	293	3408
Class III	OCEANUS	7442	234	1741	234	1741	250	1861	262	1950
	WECOMA	7780	230	1789	230	1789	250	1945	246	1914
	ENDEAVOR	8217	240	1972	240	1972	250	2054	259	2128
	GYRE	7187	258	1854	258	1854	250	1797	262	1883
	ISELIN	8241	212	1747	212	1747	250	2060	232	1912
	NEW HORIZON	7917	231	1829	231	1829	250	1979	254	2011
Class IV	POINT SUR	6190	157	972	157	972	230	1424	192	1188
	CAPE HATTERAS	6964	207	1442	207	1442	230	1602	166	1156
	ALPHA HELIX	8477	189	1602	189	1602	230	1950	160	1356
	SPROUL	4415	144	636	144	636	230	1015	241	1064
	CAPE HENLOPEN	5613	171	960	171	960	230	1291	153	859
	WEATHERBIRD II	6000	180	1080	180	1080	230	1380	250	1500
	R.WARFIELD	4820	128	617	128	617	130	627	135	651
Class V	LAURENTIAN	3807	58	221	58	221	120	457	120	457
	BLUE FIN	1816	121	220	121	220	120	218	130	236
	BARNES	1747	131	229	131	229	130	227	184	321
	CALANUS	2038	150	306	150	306	150	306	205	418
Variables										
	AGOR23	13700	0	0	60	822	100	1370	120	1644

TOTAL FLEET COSTS (\$)	\$37,734,100	\$38,556,100	\$43,395,130	\$44,342,837
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CORE BUDGET *

Projected NSF	\$26,000,000
Projected ONR	\$7,000,000
Projected Other	\$3,000,000
Total Core Funds	<u>\$36,000,000</u>

BUDGET minus COSTS

LOW	\$1,265,900
AVERAGE	\$443,900
OPTIMAL	(\$4,395,130)
HIGH	(\$5,342,837)

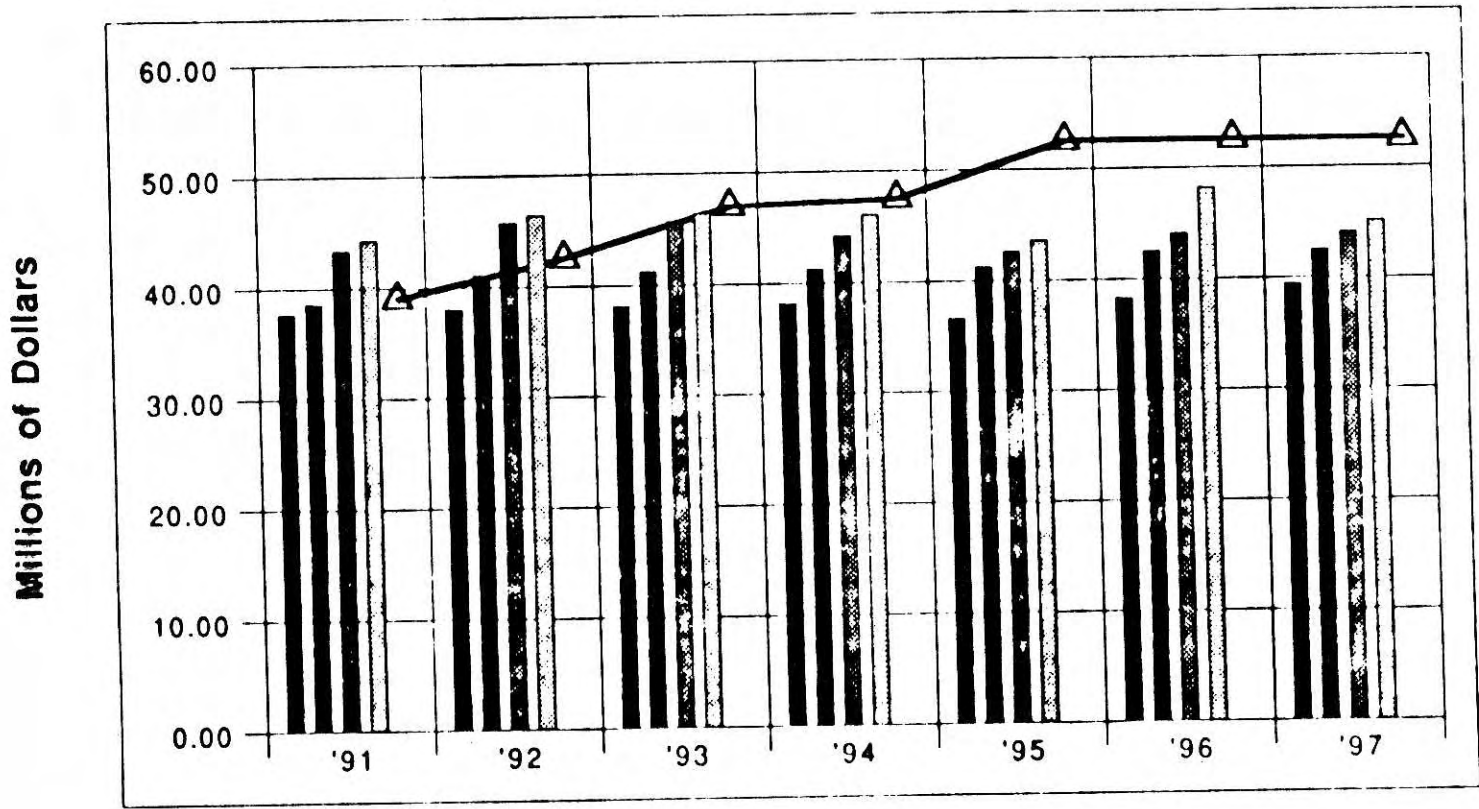
GLOBAL CHANGE FUNDS

NSF	\$3,000,000
NOAA	

TOTAL SHIP OPERATIONS BUDGET	\$39,000,000
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*estimate based on level funding

PROJECTED FLEET COSTS VS BUDGET



■ LOW

■ AVERAGE

■ OPTIMAL

■ HIGH

△ BUDGET