

UNIVERSITY - NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

Advisory Council Meeting
October 26, 1988
American Institute of Architects
1735 New York Avenue NW
Washington, D.C.

Advisory Council members, representatives from ONR and NSF, and observers from LUMCON and the University of Miami met at the American Institute of Architects, Washington, D.C. on October 26, 1988. The meeting was called by Art Maxwell, Chair at 8:30 a.m. Items on the Agenda (Appendix I) were rearranged, as reported herein.

Attendees:

Advisory Council

Art Maxwell, Chair
Robertson Dinsmore
Tom Johnson
Robert Knox
John Martin
George Keller, UNOLS Chair

UNOLS Office

William Barbee
Barbara Funke

Observers

Larry Clark, NSF
Tom Forhan, NSF
Don Heinrichs, NSF
Lisa Lynch, NSF
Bruce Malfait, NSF
Mike Reeve, NSF
Al Sutherland, NSF
Dick West, NSF
Keith Kaulum, ONR
Don Boesch, LUMCON
Steve Rablais, LUMCON
Paul Llunggren, RSMAS



Minutes for the July 14, 15, 1988 Advisory Council meeting were distributed to attendees, and, after review, were accepted by the Council.

Fleet Management

The UNOLS Advisory Council Subcommittee on Short-Term Fleet Needs and Management, Report and Recommendations, 8/10/88 (Appendix II) was discussed. The Subcommittee, Robert Knox, Chair, Robertson Dinsmore and Tom Johnson noted that there is and has been a chronic shortage of funds to operate the existing UNOLS fleet at full capacity. They estimated that the situation would continue through 1991 or until a better funding versus ship availability is achieved. They noted that potential programs such as those projected as part of ocean initiatives in Global Change could increase funding and ship demand to levels at or beyond present UNOLS fleet capacity. The Subcommittee's fundamental recommendation: **The agencies should urgently seek a substantial increment of ship operations funds, and should coordinate this with appropriate support of well-reviewed seagoing research proposals.**

Other recommendations were: a large number of lay-ups or retirements will be required in 1989 and should be planned for now; advanced planning for lay-ups and retirements in 1990 and 1991 should begin now; and, at least in the short term, the community should be skeptical about adding new capacity to the fleet.

The Advisory Council accepted the report and directed that it be distributed throughout UNOLS.

The status of proposals to provide ships or facilities for MCS, MG&G and general purpose oceanography was reviewed. At their July, 1988 meeting the Advisory Council had heard two presentations: from L-DGO, to acquire the Canadian Ship BERNIER for conversion to MCS, MG&G and general oceanography use; and from a consortium of the University of Texas, Texas A&M and University of Miami to establish a center for management and acquisition of MCS data using leased ships/facilities. Later, both presentations were followed by proposals to NSF. The two proposals were each reviewed by a review group assembled by UNOLS and again by a special NSF peer review panel. Both panels recommended against each of the proposals.

In early October L-DGO resubmitted a revised proposal for acquisition of the BERNIER. This proposal was reviewed by a different UNOLS review group and NSF peer review panel. This time, both review groups recommended for the proposal. (Note: The reports of each of the UNOLS review groups has been distributed throughout UNOLS.) NSF reviews preliminary to presentation to the National Science Board were favorable as well. (Subsequent to the meeting the proposal was

were, with minor suggestions, favorable. It was agreed that the Charter revision would be presented to UNOLS by George Keller, UNOLS Chair, with Art Maxwell announcing the Advisory Council's endorsement. Brief discussion was held on the transition process to be followed if the new Charter was adopted. It was agreed that upon adoption of the Charter, the sitting Advisory Council together with sitting Committee Chairs would constitute the UNOLS Council. Art Maxwell announced that, to avoid ambiguity, he would resign as Advisory Council Chair upon adoption of the new Charter, thus allowing the elected UNOLS Chair to assume the UNOLS Council Chair.

Donald Boesch, Executive Director, Louisiana Universities Marine Consortium, LUMCON, and Steve Rablais, Marine Superintendent, made presentations supporting the LUMCON application to become a UNOLS Member. Their application had earlier been distributed to the Advisory Council and to UNOLS Members. The Council questioned LUMCON's degree of independence from "the Louisiana Universities" and the effect on operations of the recent Louisiana State funding crisis. In response Dr. Boesch noted that LUMCON had workable and realistically independent arrangements with the universities. The funding crisis had resulted in noticeable strictures to LUMCON's state funding, but LUMCON was still able to carry out a worthwhile program and a healthy marine operations.

The Advisory Council recommended that UNOLS make LUMCON a Member. They also recommended that LUMCON's Research Vessel PELICAN be designated a UNOLS vessel.

Laboratory Grade Research Facilities at sea. In a letter from Eric Hartwig, ONR (Appendix IV) UNOLS had been asked to assess the scientific needs within the oceanographic community for laboratory-grade research facilities at sea. ONR had, especially over the last year, received expressions of interest in such a facility. (A preliminary workshop organized by Peter Wiebe in December, 1987, follow-up article in The Oceanography Report, EOS, an informal task group including Wiebe, Charles Miller, Bob Knox.)

It was agreed that in UNOLS, the Advisory Council should assess the scientific need of the community for lab grade facilities. **Bob Knox agreed to develop a letter proposal for ONR that would include canvassing the community and, by workshop or other means, determine the scope and character of the perceived community need.** If the needs are determined to be of sufficient importance it might be appropriate for the Fleet Improvement Committee to work on an acceptable technical/technological response.

NSF BUDGET ESTIMATES
September 1988
(Millions of Dollars)

	1986	1987	1988	1989*
OCEAN SCIENCES DIVISION	119.5	133.7	135.3	146.5
Oceanographic Facilities Detail				
Operations				
Ship Operations	24.0	26.0	25.8	
ALVIN, Aircraft	1.6	1.8	1.8	
Marine Techs	2.5	3.1	3.1	
	<u>28.1</u>	<u>30.9</u>	<u>30.7</u>	<u>32.1</u>
Acquisition & Development				
Science Instrumentation	1.6	1.8	1.6	} 6.7
Shipboard Equipment	1.4	1.7	1.5	
Technology Development	1.7	2.4	2.6	
AMS Center	--	--	--	1.8
UNOLS, Ship Const.,	0.9	0.4	0.8	0.7
Misc.	<u>\$5.6</u>	<u>6.3</u>	<u>6.5</u>	<u>9.2</u>
TOTAL (OFS)	\$33.7	37.2	37.2	41.3

*1989 Request and Appropriation

NSF
OCEAN SCIENCES DIVISION
(Millions of Dollars)

	1987	1988	1989*
OSRS	66.56	67.42	73.11
OCFS	37.18	37.26	41.31
ODP	<u>30.00</u>	<u>30.70</u>	<u>32.10</u>
TOTAL	133.74	135.38	146.52
Percent increase		--8.2%--	

- Global Geosciences Increment
- Accelerator Mass Spectrometry Facility
- Start Biotechnology
- Double Undergraduate Activities
- Consider Innovative Ways to (acquire) New R/Vs
- Ocean Engineering/Technology

***Request & Appropriation**

26, 1988, prior to receipt of bids, and could change when bids are opened.)

At the end of October there was possibility that the THOMAS G. THOMPSON would go to a foreign country after retirement from the UNOLS fleet. If so, additional costs would accrue to ONR.

Mr. Kaulum reported that ONR, with the Office of the Oceanographer and NavSea were starting the procurement process for AGOR-24. \$40 million would be budgeted for design and construction. The procurement would be combined with two TAGS-Ocean ships and two others (five ship procurement). Procurement would be based on a newly-formulated Circular of Requirements (which might be as for AGOR-23). ONR would discuss with NSF the need for AGOR-24 if the BERNIER were acquired. (Note: The status of the AGOR-24 procurement reported herein was as it appeared on October 26, 1988. The situation may have been altered drastically since then.)

Radioactive Substances Aboard UNOLS Ships. In Tom Malone's absence, Bill Barbee reported on the status of the effort to develop standards and procedures for the transfer and use of radioactive substances on UNOLS ships. Based on Advisory Council consideration at their July, 1988 meeting, Tom had a form for the committee of Institution Radiation Safety Officers to devise such standards. They were to have a meeting in early 1989.

Clearances for Research in Foreign Waters. Lee Stevens, JOI, Inc., had earlier made a tentative and preliminary proposal to the Council for an office or center to maintain an information base on foreign clearances, expedite the clearance process and, where possible, act as an advocate. **The Council had deferred consideration.** Mr. Stevens had made the same tentative proposal to RVOC, and that Council had endorsed it. The Advisory Council discussed their own position, in light of the RVOC endorsement together with concerns raised by some UNOLS institutions. **The sense of Council discussion was that they still deferred consideration of a center for foreign clearances, and that they were not soliciting a proposal for such a purpose.**

Ship Scheduling. The final UNOLS ship scheduling meeting for 1989 was scheduled to be held the following day (October 27). Summaries of 1989 UNOLS ship operations costs and days' operation were presented indicating that institutions had done a good job in reaching operational levels consistent with agency funding forecasts made in July, 1988 (but not as close to October, 1988 forecasts). (Note: UNOLS ship operations, costs and schedules together with October, 1988 funding forecasts are fully discussed in Report of Joint Meeting, East Coast and West Coast Ship Scheduling Groups, October 27, 1988 which has already been distributed.)



UNIVERSITY - NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM



AGENDA
Advisory Council Meeting
October 26, 8:30 a.m.
Conference Room 2
American Institute of Architects
1735 New York Avenue
Washington, D.C.

Call the Meeting - Art Maxwell

Accept Minutes of July 14, 15, 1988 meeting - Just distributed.

Council Action Items:

Fleet Management.

1. R. Knox's report on Short-Term Fleet Needs and Management should be considered for final endorsement. A copy is attached. The report has been transmitted to funding agencies but has not been distributed to UNOLS members.
2. Ship/facilities for MCS, G&G, General Purpose. After presentations to Council in July, proposals were submitted to NSF for acquisition of BERNIER and for an MCS facility center based on leasing ship(s). UNOLS provided a preliminary assessment on both (see report attached). An NSF review panel reached similar conclusions, and both proposals were declined. L-DGO resubmitted BERNIER proposal, and UNOLS again reviewed (12 Oct.). No decision yet announced on new proposal. Advisory Council discussion with UNOLS Chair.
3. Working Group formed to follow up on RVOC lay-up paper: Bob Dinsmore, Chair, Jack Bash, Tom Malone, George Shor, Dinsmore report on progress.
4. NSF and ONR will, at the UNOLS meeting, announce that they've reached an agreement on joint fleet management. Agency representatives will discuss with the Council.

UNOLS Charter Revision - A draft revision was distributed throughout UNOLS on September 7, and will be presented for adoption at the UNOLS meeting October 28. Development of the draft is chronicled in George Keller's letter. To date, few comments have been received, all in favor. Council may discuss tactics for presenting the draft to UNOLS members, considerations for organizational transition, if adopted.

Stable Research Platform - Eric Hartwig, ONR has asked UNOLS to examine the needs and requirements for a laboratory-grade facility for research at sea. George Keller has talked with FIC about some aspects of such an examination, but some aspects of a study may be more appropriately addressed elsewhere in UNOLS.

Application for Member Status - LUMCON has requested they be considered for Member Status (material attached). Advisory Council should review and form recommendation.

Preview Agenda for October 28 UNOLS Meeting - Annual meeting agenda and Slate of Nominations are attached. Council discussion as necessary. Background on several issues (drug testing, MMS policy on EEZ research).

Remarks from Federal Funding Agencies - Information from federal funding agencies (NSF, ONR, DOE, MMS, NOAA and USGS, as desired) on forecasts for fiscal 88, 89 (and beyond) ship and science support. Status of NSF/DPP's RV with ice breaking capability, AGOR-24, progress on AGOR-23, other issues.

Radioactive Substances Aboard UNOLS Ships - Tom Malone has formed a working group to draft UNOLS standards and procedures on shipboard use of radioactive substances. (Tom Malone will not be able to attend.)

Information Reports - Information reports may be heard on: Ship clearances, ship scheduling (meeting not until October 27), ALVIN program, Fleet Improvement Committee, Cruise Assessments and Vessel Inspection, UNOLS News, RVOC meeting.

Calendar of UNOLS and Advisory Council meetings, 1989.

In general:

UNOLS Meeting	October 7, 1989
Advisory Council	Feb.-March, 1989
	July, 1989
	October 7-2 1989

Set the dates.

Other Business - As appropriate.



UNIVERSITY - NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

UNOLS ADVISORY COUNCIL SUBCOMMITTEE ON SHORT-TERM FLEET NEEDS AND MANAGEMENT

REPORT AND RECOMMENDATIONS - 8/10/88

I. INTRODUCTION

This subcommittee (R. Knox (chairman), R. Dinsmore, T. Johnson) was established at the March 1988 meeting of the Advisory Council in Fort Pierce, Florida. Verbal instructions at that time were to consider the short term (1989, 90 and 91) balance of ship availability and funding, taking into account retirement or extended overhaul of some ships, and possible acquisition or full activation of others during the time period. Subsequent statements of the charge to the subcommittee were given in a letter from D. Heinrichs on May 26, 1988 (attached) and in Knox/Heinrichs phone conversations and Telemail exchanges. The subcommittee thus understood its business to be:

1. Take stock of the likely funding for UNOLS ships during 1989, 90 and 91.
2. Gauge the degree of match between this funding and the capacity of the fleet, accounting for changes in the fleet due to retirements, overhauls, and new arrivals.
3. Give advice on how to cope with any mismatch.
4. Treat any inputs about increases in research demand for ship time as interesting but irrelevant; the driving factors are projected funding and fleet capacity.

These guidelines were reaffirmed in discussion of the draft report at the July 1988 meeting of the Advisory Council in Woods Hole.

II. METHOD OF CALCULATION

Our method is to calculate the future as changes from the 1988 situation. This has the virtues that the 1988 data on available funds and on operating days funded are reasonably closely known at this time, and that by definition the available funds cover the funded operating days. From this initial condition future changes in expected funding and in fleet capacity for ship days can readily be projected. It must be borne in mind that the 1988 situation includes substantial unfunded fleet capacity (GYRE, OSPREY, MOORE), and this exacerbates the funding shortfall as explained below. Throughout the discussion we estimate funding, fleet capacity, and shortfall solely with respect to NSF and ONR, for these are the only sources for which we have any ability to forecast future budgets. Ship funding from other sources is a welcome, but imponderable, means by which the resultant shortfall could be reduced.



4. Continue to use numbers from D. Heinrichs Telemail of 6/8/88 despite the fact that operator proposals/requests in the current year total \$1,553K more, per W. Barbee tabulation of 7/5/88.
5. D. Heinrichs Telemail of 6/30/88, with range of possible 1989 reductions of the "deficit" incurred in 1988.
6. Knox conversation with Kaulum at SIO, 6/8/88.
7. Corresponds to erasing the remaining "deficit" fully in this year.
8. Corresponds to carrying remaining "deficit" forward without any change.

Thus 1989 poses a severe funding reduction, between \$4,230,000 and \$7,720,000. The large spread between the best and worst cases is due primarily to the differing estimates of ONR funding, and secondarily to the range of guesses as to how far NSF will seek to "repay" the "deficit" incurred in 1988. In 1990 and 1991 the funding levels recover, but remain significantly below the 1988 totals.

IV. FLEET CAPACITY DATA

In 1988, the "base year" for this discussion, most ships were fairly fully utilized, as shown in source 1. Three important exceptions were MOORE and OSPREY, which were out of service, and GYRE which operated but not with significant ONR or NSF funding. We calculate the financial size of this unfunded (by NSF and ONR) capacity as follows. We have obtained estimates from the respective operators of the day rates or range of day rates that would apply now if the ships were in reasonably full utilization. For MOORE this is the ship-only cost, not the ship-plus-MCS cost. We have then applied this day rate to a "full" schedule, defined as the cutoff number of days for layup consideration under the RVOC formula. For GYRE and MOORE this is 200 days (Class III); for OSPREY it is 216 days (Class II). The result is:

	"Full Year" Operating Cost	
	Low	High
GYRE	1,113	same
OSPREY	1,728	2,160
MOORE	1,400	same
Total	4,241	4,673

1988 Best Case

Funding	34,170
Fleet capacity (equals funded capacity plus unfunded capacity, 34,170 + 4,241	38,411
Difference	-4,241

1989 Worst Case

Funding	26,086
Fleet capacity = 38,479 - 4,373 =	34,106
Difference	-8,020

1989 Best Case

Funding	29,940
Fleet capacity = 38,411 - 4,373 =	34,038
Difference	-4,098

1990 Worst Case

Funding	31,740
Fleet capacity = 38,479 - 2,886 =	35,593
Difference	-3,853

1990 Best Case

Funding	33,500
Fleet capacity = 38,411 - 2,886 =	35,525
Difference	-2,025

1991 Worst Case

Funding	31,740
Fleet capacity = 38,479 + 600 =	39,079
Difference	-7,339

VIII. RECOMMENDATIONS

The fundamental recommendation is implicit in the preceding section: THE AGENCIES SHOULD URGENTLY SEEK A SUBSTANTIAL INCREMENT OF SHIP OPERATIONS FUNDS, AND SHOULD COORDINATE THIS WITH APPROPRIATE SUPPORT OF WELL-REVIEWED SEAGOING RESEARCH PROPOSALS. This is not simply another forgettable "we want more" recommendation. Cutbacks in operating funds in the current year have already affected some PI's, and we also find instances of ships being asked to take on jobs which may be beyond their capability unless weather and sea conditions are extraordinarily favorable (use of intermediate ships in the Greenland Sea). The fleet is being stretched hard; the case for relief is there. However, in the absence of such an increase in funds, the following recommendations become inescapable:

1. The immediate 1989 situation will demand large numbers of layups or retirements. Clearly, retirements are preferable, since they cut costs more efficiently than layups. Efforts to identify and plan 1989 retirements and layups must start right away.

Layup criteria should include soft schedules and the potential to accomplish useful repairs and upgrades during the layup period. Retirement criteria should include the condition of the ship, prospects for rising maintenance and repair costs, the recent record of soft schedules or underutilization, and duplication of capability by other more effective ships

2. Advance work on layups and retirements for 1990 and 1991 also should be started now, using the same criteria as in #1. The sooner such planning begins, the more orderly and less painful will be the inevitable retrenchment.
3. We should be skeptical about adding new capacity. Any new capacity proposed should replace existing ships, not add to fleet operating costs. It would be best if inclusion of any new ships were linked to retirement of more than equal capacity.
4. Because the total mismatch picture is so bleak, considerations of regional or size distribution of ships and changes thereof are really luxuries. Any opportunity to reduce the fleet will be needed, and whether that opportunity comes in a particular size or region is beside the point. Scientific programs will have to adjust to the size and regional distribution that exists and/or will have to wait for availability of preferred ships.

MEMORANDUM OF AGREEMENT
JOINT RESEARCH SHIP POLICY
FOR
THE NATIONAL SCIENCE FOUNDATION
AND
OFFICE OF THE NAVAL RESEARCH

The Office of Naval Research (ONR) and National Science Foundation (NSF), "the Agencies", have as a joint objective the goal of providing a safe and efficient academic research fleet for the conduct of oceanographic research. In keeping with this objective, the following items of policy are set forward:

1. THE RESEARCH FLEET:

For the purposes of this policy statement, the "Academic Research Fleet" will continue to be defined to include UNOLS ships plus other vessels as established by the agencies' science and mission requirements. Small craft will not be included in this definition.

2. SHIP SCHEDULING:

The University-National Oceanographic Laboratory System (UNOLS) Scheduling Committee will continue to be the primary scheduling mechanism for the research fleet. The Agencies are pleased with the past performance of UNOLS and have no desire to change the present ship scheduling system.

Each of the agencies will review the proposed schedules of their ships for practicality and feasibility before implementation. The number of sailing days per year, ship location at the end of a year, and optimum vessel utilization will be considered before the schedules are implemented.

3. TRANSIT COSTS:

Transit costs will be considered a part of cruise legs. Normally, the ship time will be apportioned between the two science legs that incorporate the transit on a simple proportional basis keyed to the length of the two legs. It is not the intention of this policy to preclude the flexibility necessary for implementing actual schedules and ship routing once transit time assessments have been made.

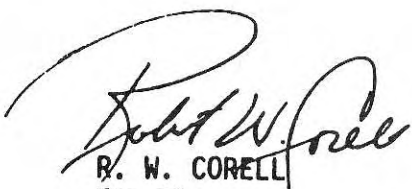
4. MAINTENANCE:

The Agencies agree that primary responsibility for maintenance, replacement, and upgrading or modification of their ships must remain with the agency owning the vessel. This includes lead responsibility for maintenance and modification efforts conducted during yard and lay-up periods.

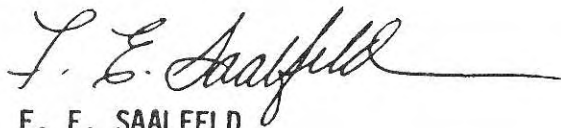
9. CANCELLATION:

This agreement may be cancelled at any time by mutual consent of the parties concerned. This agreement may also be cancelled by either party upon giving at least 90 days written notice to the other party.

Should matters of concern arise, the initial points of contact for policy coordination and decisions will be the Head, Oceanographic Centers and Facilities Section of the National Science Foundation and the Director, Ocean Engineering Division or their successors.



R. W. CORELL
for the
National Science Foundation
dated: Oct. 17, 1988



F. E. SAALFELD
for the
Office of Naval Research
dated:



DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL RESEARCH
ARLINGTON, VIRGINIA 22217-5000

IN REPLY REFER TO

RECEIVED

AUG 15 1988

5000
Ser 1121/63
10 August 1988

RESEARCH
OFFICE

Dr. George Keller
Chairman, UNOLS
Oregon State University
Corvallis, OR 97331

Dear George:

As oceanographic sciences have matured, both the extent and the complexity of at-sea experimentation have greatly increased. These have placed more rigorous requirements on the capabilities of our at-sea research facilities. To meet these requirements, ONR has relied upon the advice of UNOLS to significantly improve our surface ship and submersible capabilities for the decades ahead. We are seeking to task UNOLS in the coming year to examine the needs and the requirements for a laboratory grade facility at sea. In the past, these needs have been met, for example, with facilities such as the aging FLIP and the recently destroyed ONR Tower off San Diego. Interest is being expressed by components of the oceanographic community for future capabilities of this kind to permit various observations and methods not well-suited to other types of platforms or systems. Indeed, this interest is evident in the recent evaluation of a repossessed oil platform for conversion to a Deep Ocean Relocatable Island (DORI) for oceanographic research use (report by Blue Sea Corp. for MPL, June 1988).

ONR would task UNOLS to evaluate the future needs for a facility to enable unique, laboratory grade experimentation at sea and to establish the general capabilities such a platform ought to possess. We would be happy to assist UNOLS in assembling a list of panel members to serve on this important project. Please advise me as to the timing of the project and an approximate date that we could expect a report on the findings.

Sincerely,

ERIC O. HARTWIG
Director
Ocean Sciences Directorate

Copy to:
Robert Corell (NSF)
Don Heinrichs (NSF)
UNOLS Office
CNO OP-096T
ONR Codes 11, 11D, 10

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
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Corvallis, OR 97331-2140
(503) 754-3437

August 19, 1988

Dr. Worth Nowlin
Department of Oceanography
Texas A&M University
College Station, TX 77843

RECEIVED
AUG 22 1988
UNOLS OFFICE

Dear Worth:


From the enclosed you will see that Eric Hartwig is tasking UNOLS to look at science mission requirements for an at sea quality laboratory, be it floating or fixed to the sea floor. I spoke to Eric today, and he is prompted to look into the needs for such a facility by comments coming from some individuals in the community. He mentioned a Stable Research Platform workshop that was held in the past year. I am not sure if this was Peter Wiebe's get-together at the AGU last year in San Francisco, or what Fred Spiess and others pulled together at Scripps.

In any event, Eric is interested in learning of the community's long term needs for such a facility. First step would be to define the mission requirements and perhaps then think about the type of facility that could meet these needs.

This request best fits the mission of the FIC, and I am hopeful that you will agree that your committee would be the appropriate body to address this matter.

Give me a call when you have a minute.

Regards


George H. Keller
Chairman

enc.

cc: W. Barbee ✓
A. Maxwell

CRUISE ASSESSMENTS - JAN-JUN 88

APPENDIX V

10/24/88

	TOT. CRUISES	REPORTS ON HAND	FULLY SUCCESS.	CRUISES REPORT. PROBLEMS	CRUISES W/UNRESOLVED PROBS	PROBLEM AREAS (Underline means repeated probs)
ATLANTIS II	10	7	5	2	1	ALVIN batteries; Temp. Probe
MELVILLE		1	1	1	0	Food
KNORR		3	3	2	0	Wire, Air Conditioning, Medical
CONRAD		4	2	2	1	Array loss; Acoustics
THOMPSON		2	1	2	2	Scheduling; ADCP
WASHINGTON		1	1	1	0	Winch
MOANA WAVE		2	2	1	1	Satnav, Magnetometer, 3.5, Winch Control
OCEANUS		4	3	2	0	Mooring Control; SAIL; ADCP
ENDEAVOR		9	6	4	3	CTD; Salinometer; Tensiometer; J. Frame Safety
WECOMA		6	6	2	2	<u>Crane</u> ; Personnel Coord, FAX
ISELIN		6	6	0	0	(None)
NEW HORIZON		5	4	3	0	Winch; ADCP; MOCNESS
GYRE		0				
FRED MOORE		0				
POINT SUR		8	7	2	1	Winch; needs capstan
CAPE HATTERAS		4	3	2	2	<u>Rosette</u> ; acoustics
ALPHA HELIX		1	1	1	1	Winch; ATS
CAPE HENLOPEN		10	9	4	0	Vibration, Generator, Short Turnaround
R.G. SPROUL		8	5	2	2	Noise; Fumes; Winch
R. WARFIELD		20	20	1	0	Rosette
LAURENTIAN		0				
CALANUS		14	10	6	5	<u>Anchoring</u> , Loran, Vibration, Clearances
BARNES		0				
BLUE FIN		14	14	0	1	(None)
Tot		129	109	40	22	
PELICAN		12	7	6	2	Uncontam. S/W; Rosette; Odors; Loran Winches; main engine