

UNIVERSITY - NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

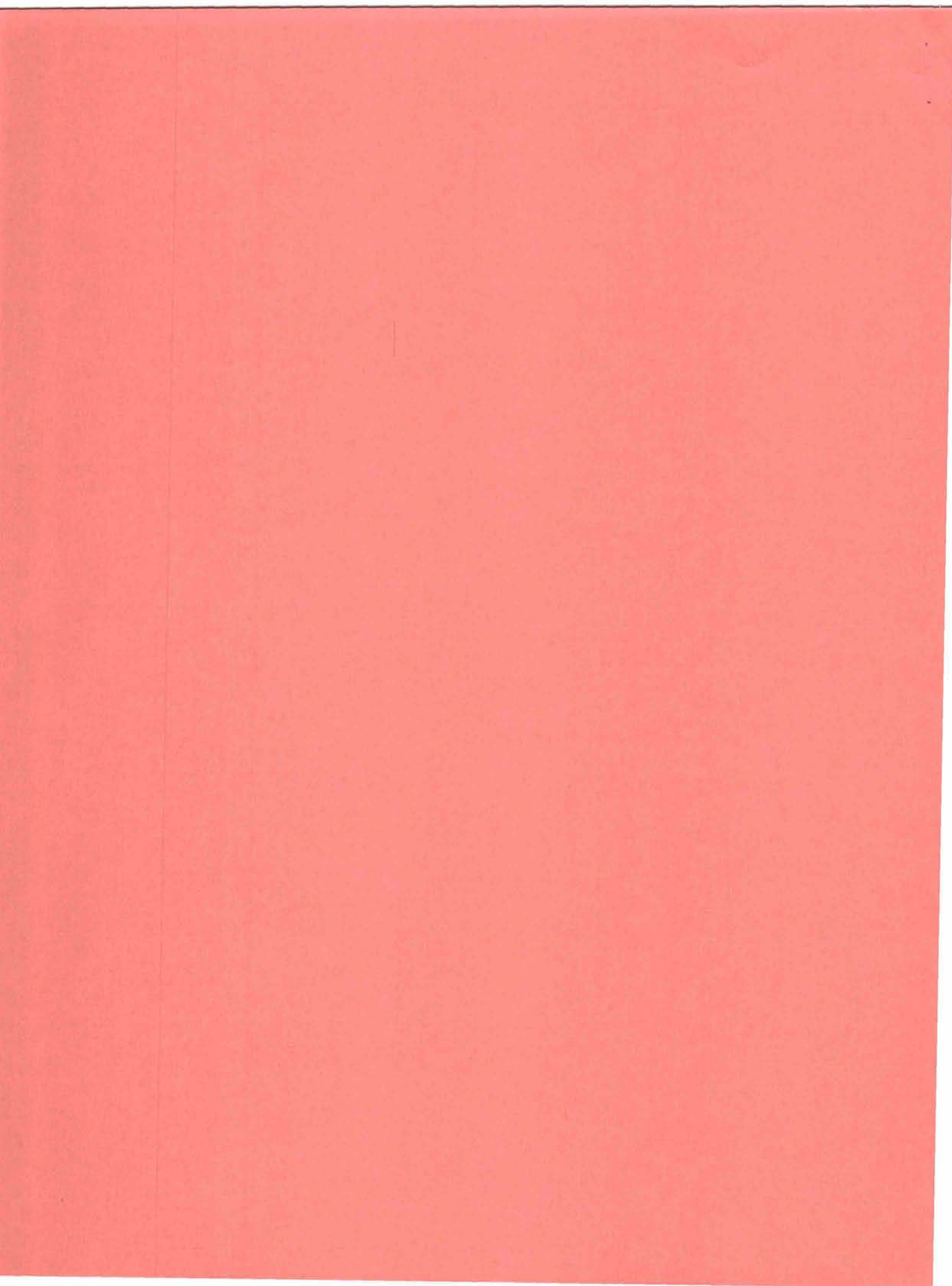
**UNOLS
FLEET IMPROVEMENT
COMMITTEE**

MEETING REPORT

January 12-13, 1995

**Knight Oceanographic Research Center
University of South Florida
St. Petersburg, FL**





MEETING REPORT
UNOLS
FLEET IMPROVEMENT COMMITTEE

KNIGHT OCEANOGRAPHIC RESEARCH CENTER
UNIVERSITY OF SOUTH FLORIDA
ST. PETERSBURG, FL

12-13 JANUARY 1995

The UNOLS Fleet Improvement Committee met in the conference room of the Knight Oceanographic Research Center at the University of South Florida in St. Petersburg, Florida on 12 and 13 January. The meeting was called to order by the Chair, Chris Mooers at 0830 hrs.

Meeting Participants:

FIC Members

Chris Mooers, Chair
Peter Betzer
Joe Coburn, RVOC Rep
Rich Findley, RVTEC Rep
Ken Johnson, UNOLS Chair
Tom Royer
Suzanne Strom
Don Wright

Participants

Jack Bash, UNOLS
Annette DeSilva, ONR

APPENDICES

- I.** FIC Agenda
- II.** Letters to the Chair on the Role of FIC
- III.** Letters to USCG
- IV.** PORTS Fact Sheets
- V.** Primer on small Research Vessels
- VI.** MARCO

GREETINGS AND MEETING LOGISTICS - Peter Betzer welcomed the Committee to St Petersburg and the University of South Florida (USF). Peter introduced the Committee to the new Knight Oceanographic Research Center and gave the Committee a brief history of its genesis. Peter then presented Abby Sallenger of the USGS whose offices are co-located in St Petersburg. Abby explained the close working relationship with USGS and USF due in a great part to Betzer's efforts. He indicated that USGS uses UNOLS ships for their science work on the east coast but suggested this is not the case on the west coast. Abby said that USGS has a \$36M oceanographic science budget with approximately one third of this designated for coastal work.

OPENING REMARKS FROM THE CHAIR - Chris Mooers welcomed the committee and thanked Peter for the fine meeting facility. He had each committee member introduce themselves and give a brief background. Chris then reviewed the agenda, *Appendix I*. Several items were added which included: reports from the federal agencies, status of the KNORR conversion, status of the RSMAS marine operations, and the scope of support possible from OCEANIC. Chris explained that the FIC was to develop a tasks list which would be presented to the UNOLS Council at their April meeting for approval.

Chris explained his philosophy on the responsibility of the FIC and that ships should be handled as "total systems". This viewpoint suggests the FIC should look at personnel and operational matters as well as the hulls and scientific equipment from the perspective of the chief scientists. Chris reported that four persons responded to his letter requesting direction for the FIC. He had an opportunity to visit with Don Heinrichs in this regard. Don also provided a letter as did Ken Johnson, Marty Mulhern and Joe Coburn. Copies of this correspondence are included as *Appendix II*.

Jack Bash reported that the UNOLS Fleet Improvement Plan, which was distributed to the committee members, was ready for the printer. The committee agreed that the plan should be published with the technical corrections provided.

APPROVAL OF MINUTES - The minutes of the 3 October 1994 FIC meeting were approved as written subject to editorial changes by past Chair, Marcus Langseth.

UNOLS COUNCIL REPORT - Ken Johnson, UNOLS Chair, provided comments on UNOLS business that had transpired since the last FIC meeting. Ken reported that the ALVIN schedule for 1996 will be impacted by the KNORR's schedule and conversion dates. The plan is that KNORR return from the Indian Ocean via the Atlantic in early 1996, convert to a submersible handling ship and be ready when ALVIN comes out of its six month overhaul about mid-summer 1996. This will permit the initial shakedown operations in the Atlantic, close to WHOI. Delays in this plan will cause the first operations to be conducted in more remote areas of the Atlantic further south. Several proposed programs in the South Atlantic could be scheduled on KNORR in early 1996 which would seriously disrupt optimum scheduling. Joe Coburn added that a revised preliminary design for the KNORR conversion has been received, and WHOI is

preparing a proposal for supplemental funding. The proposal is expected to be tiered requesting funds for minimal needs in conversion, plus funds for desired needs.

Ken reported that the HURL group in Hawaii has converted a ship, KA'IMIKAI-O-KANOLOA, to handle the submersible PISCES V. The conversion and integration of the submersible would be complete in 1996 when shakedown cruises would then be conducted. In 1997 the ship and submersible are planning to work in the Hawaiian area then deploy to the Western Pacific in 1998.

In other submersible matters, Ken reported that the MOA for operation of ALVIN and the MEDEA-JASON would be renegotiated with NSF/ONR/NOAA during 1995.

AGENCY REPORTS - Annette DeSilva provided a report from the Office of Naval Research. Annette said that the position vacated by Keith Kaulum and presently filled by Annette has been advertised and applications received. The selection process should begin soon.

Annette further reported that ONR continues to refocus its mission to littoral waters. This is being reflected in their funding of future cruises. ONR has experienced a reorganization that integrates research, exploratory development, and advanced development into one department. This department is Ocean, Atmosphere, and Space Science & Technology and is headed by James DeCorpo.

The House proposed 1995 budget cut of \$900M for Department of Defense academic research announced earlier this year has been reduced to \$200M. The ONR share of this is approximately \$60M. ONR funded ship time for 1995 is in excess of 100 days over 1994. In 1996 and 1997, ONR is planning a Coastal Mixing and Optics (CM&O) program which is expected to require about 150 days of intermediate ship time. A short test program for this experiment will be funded in 1995. A CM&O cruise planning meeting is scheduled for later this month.

FLIP is under going an extensive maintenance period to ensure its safe operations for at least another five years. The maintenance includes structural repairs, electrical upgrades and habitability improvements.

The construction of AGOR 24 and 25 is going well. AGOR 24, ROGER REVELLE, is to be launched in April 1995 and delivered in June 1996. All modules have been integrated into the vessel. AGOR 25, ATLANTIS has 16 of its 24 modules under construction. Launching is planned for February 1996 and delivery in April 1997. Deficiencies that were identified in the AGOR 23 construction have been corrected in the AGOR 24 and 25 design.

UPDATE ON ARCTIC/POLAR RESEARCH VESSELS - Tom Royer brought the committee up to date on the polar research vessel efforts. Two studies are underway concerning science operations in the Arctic. The GAO study is about complete but not

yet published. It is understood that this study recommends purchase of an Arctic research vessel as apposed to lease. This is good news. This study also looked at the other assets in Arctic research. The Ocean Studies Board study is just getting underway led by Paul Stoffa. Questionnaires have been sent out and meetings are scheduled for this spring. This study will review the need for science platforms in the Arctic and will include the ARV, the USCG icebreaker and nuclear submarine work. An interim report from this study should be out in the late spring and the final report completed in the summer.

Tom referred to two letters to the USCG concerning their icebreaker HEALY (*Appendix III*). The first is Ken Johnson's letter and its response by Captain Al Summy. The second is the letter from Senator Frank Murkowski. Both raise questions about problems with the design and operational profile of this ship. Although the contract has been let, construction has not yet started. There seems to be growing sentiment within the Arctic community that this ship should not be built.

Tom reported that the University of Alaska is preparing a proposal to NSF that will continue with the ARV design study and keep their contract with The Glosten Associates open.

TOUR OF "PORTS" - The committee was able to see the Tampa Bay Physical Oceanographic Real-Time System or "PORTS" operation. Tampa Bay is instrumented to provide real-time data on the winds, tides, currents, etc. of the bay. This information is displayed at locations around the bay and can be accessed by ships' captains as they navigate the bay waters. There are plans to put this information on Internet to provide real-time information through this medium. Plans for additional instrumentation are also underway, including the West Florida Shelf. *Appendix IV* is a fact sheet on this system.

MARINE OPERATION AT RSMAS - Chris Mooers provided an update on the marine operations at the University of Miami Rosenstiel School of Marine & Atmospheric Science. In personnel changes, Otis Brown has been named interim dean while a national search is to be conducted. Ron Hutchinson has retired as Marine Manager and Dave Powell has been hired as Ron's replacement. ISELIN is in the shipyard at Atlantic Marine and will soon begin repairs. The ship is expected to be repaired to its pre-grounding condition. No operating schedule is planned for 1995. Future operations are under consideration. The RSMAS technical support group has been working with Harbor Branch and are supplying personnel and equipment for their ship operations. Joint marine operations with RSMAS and Harbor Branch are actively under discussion.

CALANUS had bottom plates replaced and is now back at the dock. Plans for replacement of CALANUS with a catamaran are well underway. Design specifications for building a new vessel are being reviewed. Optimistic plans call for an RFP by 1 March '95, a contract by 1 July and the new ship operating in 1996.

The port facilities at Dodge Island are available on a month-by-month basis. The port is under considerable pressure to provide more docking space for cruise and container ships. NOAA is under pressure to reduce their operations in Miami and could possibly see some if not all sea going operations move to Charleston, SC.

CHIEF SCIENTIST QUESTIONNAIRE - Chris Mooers presented to the committee a draft questionnaire that is to go out to those scientists who have used UNOLS ships in the past three years. The questionnaire covered such topics as the assessment reports, instrumentation needs, safety standards, and crew/technician support. Each question was reviewed by the committee and recommended changes were suggested. The consensus of the committee was that a questionnaire such as this was very useful and should be distributed under a joint cover letter from the FIC and UNOLS Chairmen. Jack Bash was to determine how many chief scientists have used UNOLS ships in the past three years.

The meeting was closed for the evening and the committee reconvened in the lobby of the Knight Oceanographic Research Center for a reception.

The meeting reconvened at 0800 hrs on 13 January 1995.

VAN STUDY - Jack Bash explained that the UNOLS Council tasked the RVTEC and RVOC to develop lists of characteristics for oceanographic vans. This information was to then be assembled by the FIC and a report written. Both RVTEC and RVOC addressed this issue at their fall meetings. Jack is to collect their efforts and coordinate with Suzanne Strom to integrate their work into a report.

PRIMER ON SMALL RESEARCH VESSELS - Chris reported on his meeting with Jack Bash and Bob Dinsmore at WHOI on 3 January to discuss the progress of the "Primer on Small Research Vessels". Bob had developed an outline and plan of action which is included as *Appendix V*. Jack presented a draft letter to organize an inventory of small research vessels using the Internet. The concept is similar to that used for the UNOLS fleet with the University of Delaware's OCEANIC acting as the server and the Wide World Web used to route the information around. The idea is that the country should be divided into areas that are consistent with existing consortia and that these units develop their "home page" and local inventory. It would all be accessed via OCEANIC. After much discussion the committee agreed to the concept and a revised letter would be drafted by Jack for Chris's signature.

COASTAL ZONE RESEARCH VESSELS - Don Wright agreed to take the Coastal Report and the draft Science Mission Requirements (SMR) prepared by Peter Betzer and develop an expanded SMR for coastal zone research vessels. It was agreed to further specialize the SMR into a set of SMRs to cover large, intermediate, and small vessels at the next FIC meeting. Don said that he should have the draft ready for the summer meeting. They will then be provided to the regional consortia, or equivalent,

for review and comment. Don then introduced the effort by the Middle Atlantic Research Consortium for Oceanography (MARCO) and relinquished the floor to Larry Atkinson.

MIDDLE ATLANTIC RESEARCH CONSORTIUM FOR OCEANOGRAPHY (MARCO) - Larry Atkinson of ODU was invited to the FIC meeting to provide the committee with a presentation on MARCO. A copy of this presentation is provided as **APPENDIX VI**. MARCO, composed of nine institutions, was organized to support the acquisition of a coastal research vessel for the Mid-Atlantic Region. They are developing a proposal for funds to hold a workshop to develop mission requirements and retain a naval architect for a conceptual design. When the proposal is completed Larry said that it would be presented to the FIC for its comment and endorsement. The timetable for this effort is to complete the proposal, workshop and design study during 1995.

OTHER BUSINESS - Annette DeSilva reported that a replacement of the now defunct coordinating organization called the Subcommittee on Federal Oceanographic Fleet Coordination (SFOFC) is under consideration in Washington by its ex-members.

Joe Coburn reported that WHOI has been working with the Naval Underseas Weapons Center in Newport, RI for the possible acquisition of the 88' Navy SWATH vessel KAIMALINO. This ship, if acquired, would not be brought into the UNOLS fleet but would be used by WHOI and other institutions in the Northeast. The SWATH would be used for equipment testing and be available for episodic events.

Seward, Alaska was chosen as the site for the summer meeting. A date in July would be considered.

FIC AGENDA FOR NEXT THREE YEARS - The remainder of the meeting was spent in considerable discussion on the action items that the FIC would be addressing in the next three years. The letters with recommendations for FIC from Don Heinrichs, Ken Johnson, Joe Coburn and Marty Mulhern were all reviewed. It was decided to divide the agenda items into three priority categories immediate: mid-range and long term. An outline of these agenda items follows:

A. IMMEDIATE

1. Coastal Zone Research Vessel (CZRV) activity.
 - a. Scientific Mission Requirements
 - b. Primer on Small Research Vessels
 - c. Inventory of Small Research Vessels
 - d. Analysis: Assets, Capabilities, and Requirements
 - (1) Synthesis of Williamsburg Workshop Report
 - (2) Regional SMRs (types A, B, and C)
 - (3) Regional Inventory of Assets and Capabilities

(4) Regional Science Plans and Requirements

(5) Analysis of Assets/Capabilities Versus
Plans/Requirements

(ACTION: Completed - 1996)

2. Quantitative Analysis of Recent (3 to 10 year) R/V use by Ocean Region
3. Customer Satisfaction Survey Questionnaire
(ACTION: Chris Mooers to revise, circulate to FIC for comment, and present to FIC Council at April meeting; aim for results by July FIC meeting.)
4. Chief scientists' responsibility for safety orientation, etc.
(ACTION: Ad hoc subcommittee of Suzanne Strom, Chair, Peter Betzer, Joe Coburn, and Rich Findley to develop a point paper by July FIC meeting.)

B. MID-RANGE

1. Evaluation of NSF Inspection (ABSTECH) process. Does it need more teeth?
(ACTION: Jack Bash discuss with Dick West and invite him to meet with FIC.)
2. Arctic Research Vessel oversight activity
3. Development of a long range science plan (especially for Class I/II vessels) in coordination with post-SFOFC activity.
4. Nuclear Submarine report and follow-up action
(ACTION: Chris Mooers to call Garry Brass regarding moving forward.)
5. Use of UNOLS vessels as continuous data collection platforms (IMET/ ADCP/MULTIBEAM/etc.)
(ACTION: Chris Mooers to contact Mel Briscoe, OES/NOS.)

C. LONG TERM

1. Specialized Facility Oversight (FLIP/AUV/etc)
2. Involvement in mid-life reviews for NEW HORIZON, CAPE HATTERAS, POINT SUR
3. Fleet Improvement Plan update by summer 1997
4. FIC oversight on new vessel acquisition (MARCO CZRV/ RSMAS Catamaran/SOEST SWATH plus University of Hawaii and University of Miami.)
(ACTION: Ken Johnson to write letters.)
5. Joint effort with DESSC on ALVIN replacement.

The meeting was adjourned at 1530 hrs.

APPENDIX I

Draft Agenda

UNOLS FLEET IMPROVEMENT COMMITTEE

**12 and 13 January 1995
Department of Marine Sciences
University of South Florida
St. Petersburg, Florida**

1. Greetings and meeting logistics; collegial introductions
2. Approval of minutes of last meeting and agenda
3. UNOLS Council report (Ken Johnson)
4. Update on Arctic/Polar Research Vessels (Tom Royer)
5. Update on nuclear research submarine (Mark Langseth will be requested to provide written comments)
6. Science Mission Requirements for a coastal research vessel (Pete Betzer)
7. Coastal zone research vessel(s) (CZRVs) (Chris Mooers)
8. UNOLS Fleet scientific functional standards (general discussion)
 - a. write-up for van study
 - b. desired functionality
 - c. chief scientist reports (status of handling them; feedback; etc.)
 - d. possibility of scientific inspections
9. Future activities of FIC
 - a. future demands for R/Vs, especially large R/Vs (Eric Fixing will be at sea and will be requested to provide written comments)
 - b. other (?)
10. Other business

APPENDIX II

UNIVERSITY-NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

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

408 755 8657 tel
408 753 2826 fax
johnson@mlml.calstate.edu

December 27, 1994

Professor Chris Mooers
Rosensteil School of Marine and Atmospheric Science
University of Miami
4600 Rickenbacker Causeway
Miami, FL 33149-1098

Dear Chris,

Sorry for the delay in getting back to you regarding my views on the important issues that the Fleet Improvement Committee should be considering in the next few years. I have outlined some of my thoughts below. Of course, we are also depending upon the expertise of the FIC to identify issues that may be of interest, as well. I see three major issues for the FIC to consider: coastal vessels, initial consideration of a replacement or modernization of specialized facilities such as the DSV Alvin or FLIP, and fleet distribution.

At the top of the agenda will be coastal vessels. As you are aware, there has been considerable discussion concerning coastal vessels, particularly along the east coast. The Ridgely Warfield has been retired and the Cape Hatteras and Cape Henlopen are our two principal coastal vessels in the region. The MARCO consortium has made several presentations regarding their desire to build a large, coastal research vessel capable of supporting more than 20 scientists for research in shallow waters of the Mid-Atlantic Bight region. There is, of course, a simultaneous problem in terms of financial support for our intermediate vessels, particularly given the impending addition of two new Thompson class vessels to the fleet. These competing needs will raise a number of questions such as build large, build small, or convert/adapt existing intermediates for coastal work.

Maintenance of specialized facilities such as Alvin or FLIP is a direct concern to UNOLS. Oversight of the Alvin operation is a direct concern to the Deep Submergence Science Committee of UNOLS. Informally, they have been giving some thought to the future replacement of Alvin, and I believe that it is mentioned in their recent Global Abyss report. At the point that we begin seriously discussing Alvin replacement, it will become a FIC concern, perhaps through a joint FIC/DESSC subcommittee. Such a joint subcommittee is now operating to plan the conversion of the RV Knorr to become a deep submergence support ship, replacing the Atlantis II which is scheduled for retirement. FLIP is also in need of modernization. Scripps had arranged for FLIP to undergo an upgrade of its facilities a few years ago. The modernization was put on hold by the Navy because of budgetary problems. It may be worthwhile for FIC to consider if this is an important need for the oceanographic community.



One of the recommendations of the new Fleet Improvement Plan, which is still at the publisher, is that UNOLS periodically consider the geographic distribution of the fleet. I am thinking that this process could be best approached in a quantitative manner, if possible. To this end, it would be a worthwhile process for the FIC to analyze the geographic distribution of research cruises to assess how close the match is between the areas of research interest and the UNOLS fleet. One thing I have been advised to avoid is a wholesale discussion of fleet redistribution. In addition there are many other continuing areas of FIC interest. Over the past few years, design of an Arctic Research Vessel has been one of the prime FIC concerns. The ARV preliminary design study that was recently published by UNOLS represents the conclusion of much of this work. I think that this process will slow down somewhat until plans for vessel construction are firmed up. At that time, FIC will have an active advisory role in the final vessel design and discussions regarding modifications during construction. A subcommittee of FIC for the Arctic Research Vessel had been established to consult on the original design process and I suggest that this group be continued if the ARV goes forward. I have also suggested to the US Coast Guard that UNOLS could provide additional design input on their proposed research ice breaker.

I just received a proposal from SIO for a mid-life refit on New Horizon. FIC had been fairly involved in the mid-life refits of the Oceanus class vessels. The Scripps proposal is relatively modest, however, involving mostly upgrades to existing ship systems and it may not require much FIC input. Mid-life refits on the Cape Hatteras and Pt. Sur are also coming up and will probably be the subject of FIC review.

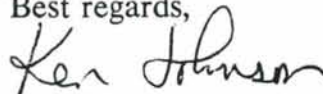
At the fall UNOLS Council meeting, the University of Hawaii announced that they are seeking funding to construct a replacement for the Moana Wave, perhaps as a large SWATH vessel. If they proceed with this project, then I believe it would be to the benefit of UH to have FIC involved.

Finally, there are several projects that have been proposed, but which have never really gotten underway. The FIC has been attempting for several years to create a compendium of the small (<70') research vessels around the US. I think that such a compendium could be of service both as a model for operators and as a key listing for users interested in local operations far from their home base.

In addition, FIC started to look into issues of habitability on research vessels. My own view on this is that an even more important is the question of ensuring crew stability and a high level of training. Research operations put a unique stress on a ship and an RV requires a crew that are experienced in a variety of areas from handling equipment over the side to interfacing with new users at frequent intervals. The experience of the crew is one of the unique assets of the UNOLS fleet. I'm not sure how to approach the issue. If you have any thoughts, I'd appreciate your input.

This ought to give you some food for thought. If you have any questions, please don't hesitate to call, write or e-mail.

Best regards,



Kenneth S. Johnson
UNOLS Chair

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JAN 9 1995

UNOLS OFFICE

NATIONAL SCIENCE FOUNDATION
4201 WILSON BOULEVARD
ARLINGTON, VIRGINIA 22230

DIVISION OF OCEAN SCIENCES
Oceanographic Centers and Facilities Section

January 3, 1995

Dr. Christopher N. K. Mooers
FIC Chair
RSMAS, MSC 132
4600 Rickenbacker Company
Miami, FL 33149-1098

Dear Chris:

Welcome to UNOLS and the Fleet Improvement Committee chair. You request my thoughts on the roles and priorities for FIC over the next three years. I will not attempt to define a full three agenda but list several significant issues for UNOLS.

First, and probably the easiest item, the FIC and UNOLS Council must complete the existing "UNOLS Fleet Improvement Plan Update: 1994". The draft report has been in "final editing" for a full year now.

Second, I believe FIC needs to develop a proposed agenda and time schedule for the next year or two. This agenda should be presented to the UNOLS Council, and concurrently the agency sponsors, for review, agreement and modification (if needed). The Council is the executive body of UNOLS and must be involved in priority setting. Your request for input on roles and priorities suggests that you are ahead of this process and well underway to define the FIC mission and goals for the upcoming year.

My comments on the identified issues are:

- Large research vessels (future demand?).

It is unclear to me the role proposed for FIC vs UNOLS Council. The continuing evolution of science programs, science funding, agency plans and resources and the impacts on UNOLS institution operations certainly must be addressed by UNOLS. How and who is the issue.

- Nuclear research submarine.

Many loose ends on this issue. First agenda item is to figure out players and role of FIC. Much of past activity has been outside of UNOLS. Role of DESSC vs FIC?

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- UNOLS fleet scientific functional standards.

I am not sure what is planned or meant here. Minimum science outfitting? Distributed resources? Support and databases? Regional equipment centers? I will plan to get sense of issues at January meeting.

- Arctic Research Vessel.

I will update FIC on NSF planning and status of acquisition request at January meeting. In short, however, the major action at present is with the Ocean Studies Board/Polar Research Board at NAS. They have been asked to put together an impartial review/recommendation on the ARV in terms of decadal science, other facilities and agency programs. UNOLS is expected to "testify" as part of the progress. For longer term, when the ARV acquisition proceeds it is my intention to have an active "UNOLS" oversight committee during construction and a "DESSC- type" longterm science oversight committee when operations start.

- Coastal zone research vessels (CZRV).

I believe this is a central working issue for FIC. All past fleet improvement/improvement/replacement plans skirt the issues of CZRV capabilities. It is the area where multiple issues, turfs and players coalesce. UNOLS institutions are only one of the suppliers of ship resources, needs and definitions of "coastal zone" are subject to multiple interpretations, and no single lead agency/sponsor is visible. A well-reasoned balanced approach to CZRV facilities needs should be a FIC Priority.

I agree with the main points of your letter.

- Science mission requirements need to be developed.
- CZRV requirements nationally cannot be met by a single design ship.
- Existing ships and their capabilities should be part of the analysis.
- National directions of coastal ocean research need to be understood as input to planning.

I strongly believe that a "spectrum" of capabilities are needed for coastal ocean research. The debates/planning for coastal ships tend to polarize into single-class solutions. A strong contribution FIC can make is to quantify the spectrum, identify present capabilities, and then focus on gaps in capabilities. (Easier said than done!).

With respect to other broad issues, I believe there will be significant restructuring/change in the overall support for the UNOLS fleet over the next few years. The Navy /ONR role has been declining and their "littoral" focus will engender additional change. NOAA is examining a number of options for their future operations. The "minor players" re UNOLS seem to be dropping out of the picture. NSF is unlikely to have rates of growth for ship operations/field programs similar to last 4-5 years. I do not have specific agenda items yet since key parameters not known. I expect several items will become more fully developed during the coming year and lead to requests for UNOLS input.

I am prepared to expand on my comments at the January FIC meeting and will see you there.

Sincerely

A handwritten signature in black ink, appearing to read "Donald F. Heinrichs". The signature is written in a cursive style with a large initial "D".

Donald F. Heinrichs
Head

cc: J. Bash, UNOLS office ✓
K. Johnson, UNOLS Chair

From: jacoburn@cliff.who.edu
Date: Mon, 05 Dec 94 13:54:21 est
To: cmooers@rsmas.miami.edu
Subject: FIC activities

Chris, in belated response to your 11/3/94 letter:

As illustrated in Table 1 of the workshop report, some of the regional requirements for a CZRV are quite different and might seem to require different vessels from region to region. It may be that different SMR's could be developed for the individual regions.

As far as the broader role and activities of the FIC, I am a liason, ad hoc, member coordinating with the operators of UNOLS ships, and provide some naval architecture inputs to the FIC. I hesitate to provide broader opinions but I thought there was considerable concern about the following:

Chief Scientist responsibilities (and liabilities) especially with regard to safety.

The UNOLS Arctic Research Vessel vis-a-vis the Coast Guard's new icebreaker and its likely capabilities, role and funding.

The question of overall fleet size in view of projected (who's projecting at all now?) funding for research. The east coast intermediate class seems to be a current striking example of "overcapitalization". It was suggested that the study completed by Bob Knox a few years ago should be revisited.

There were general safety concerns about a few institutions for which operations were so sparse there was little or no continuity of key crewmembers. This was seen as both a safety and efficiency issue. This could be a very sensitive issue for those institutions trying to hang on to a marine operation.

Regards,

Joe Coburn

Date: Wed, 11 Jan 95 16:17:36 EST
From: <mmulhern@banyan.doc.gov> (NC3 443 8007 Rckwall 610)
To: cmooers@rsmas.miami.edu
Subject: Potential FIC Roles and Priorities

Dear Chris,

Thanks for the opportunity to comment about potential roles and priorities for FIC during the next several years. It seems to me that FIC has played an extremely valuable role for the community in several ways. One of the most valuable roles has been to focus the broad needs of the community into something it is possible to "work with" for development of fleet/vessel plans. This is perhaps best reflected in FIC's development of clear-cut statements of scientific mission requirements for various types of oceanographic ships. From my viewpoint, this has been done with a remarkable mix of common sense and professional knowledge of the programs and platforms. A second major thrust has been to consider detailed concepts for particular vessels, e.g. the arctic research vessel and the AGOR 23 class. The third is the overall planning function regarding fleet mix and the update Fleet Plans. All of these functions are important to continue.

You asked for thoughts about the coastal issues. The Williamsburg workshop was a giant step toward a focus for the coastal issues. The "scientific mission requirements" that were developed might be a good starting point for the FIC to work it's magic once again, to refine the Williamsburg SMR's, and to give consideration to what a vessel that would meet those requirements would be like. As I remember, consensus in Williamsburg was that the coastal requirements needed to reflect the regional geography and operating environment. I agree, but some coastal areas (e.g. the west coast and Alaska) can almost certainly be served by simply modifying equipment on existing vessels, whereas other regions may in fact have requirements not met by traditional designs. It is likely capital funds may be limited in the future, and to modify existing assets should be explored to the fullest.

The diversity of coastal programs is daunting. As I remember, the Williamsburg "requirements" reflect that diversity. One approach could be to consider whether multiple existing vessels could economically work in tandem to meet requirements for some regions, rather than building new vessels that meet all requirements.

On another subject, until recently there was limited data available regarding operation of SWATH vessels for research purposes. Now with a variety of platforms in service, including the JAMSTEC vessel, the U.S. Navy T-AGOS ship, smaller research vessels, and platforms in various other types of service, it might be useful for FIC to evaluate the applications to which the SWATH vessels seem most suited. For example, there are many concerns about fuel consumption and operating costs for SWATH vessels in long-range service. What are the economic/mission trade-offs, and how are technical issues such as varying loading configurations to be handled?

Beyond that, I'd only add that I expect that as federal

budgets continue to tighten and inevitable changes occur, it is likely that critical issues will arise during the next several years. There is no way to know for sure, but it is probable FIC will find more rather than less new issues developing during the near term. A fairly conservative stance with respect to taking on new things may be a good idea.

Welcome to FIC and congratulations again on your appointment. I have thoroughly enjoyed working with the Committee and look forward to continuing. I regret I'll not be able to be in St. Petersburg, but hope these comments will be useful to you.

Regards,

Marty Mulhern

APPENDIX III

File

December 2, 1994

Captain Alan Summy
Commandant (G-N10)
United States Coast Guard
2155 Second St. SW, Rm. 1202A
Washington, DC 20593

Dear Captain Summy:

We very much appreciated the opportunity to meet with you after the UNOLS Annual Meeting and to discuss with you the options for closer coordination of the USCG polar operations with users of the UNOLS fleet. It is the desire of the UNOLS Council to bring to the science community a level of access to the Arctic that they now have at lower latitudes on board vessels of the UNOLS fleet. One of the keys to this access will be the new generation of ice breaking research vessels planned by the USCG and by UNOLS.

UNOLS vessels enjoy their great success because of our efforts to involve the community in the entire process from ship design to maintenance, operations and scheduling. For example, the design of the UNOLS Arctic Research Vessel has changed radically from its first inception, in response to community input at national meetings and through extensive mail review and committee work by scientists, marine architects and ship operators. As a result of such involvement, the science community strongly supports the operations of the UNOLS fleet and strives to ensure that funds are available for their efficient operation. Without this support, we would not see the strength of the UNOLS research fleet that is in operation today.

The offer by Garry Brass to sponsor a workshop at the American Geophysical Union Spring Meeting in Baltimore will be an extremely important step, therefore. UNOLS' hopes that we can both support Garry as fully as possible in his undertaking. It is a key to cementing the foundations of users that will be needed to justify operation of the Healy.

As we prepare for this meeting, it will be necessary for us to address a number of concerns in the science community regarding the status of the Healy. Unless we can mitigate these questions, the Healy will not receive the same support found for UNOLS vessels.

Currently, USCG operations in the Arctic are not perceived to be readily accessible to the science community without extraordinary efforts by individual scientists. The lack of planned Arctic science operations on the Polar class ice breakers in the near future is some evidence of this. This concern seems to arise because communications between the USCG and the academic community are not as strong as those with UNOLS, which resides within the academic community. At the Baltimore meeting, we must address this concern and provide a viable framework for Healy operations that will be "transparent" to the scientist.

Another vital concern regards the Healy mission and design. UNOLS has been told that the Healy was to have multiple missions including ice navigation, Arctic search and

rescue and scientific research. It would serve both polar regions. Recently, we heard that it's only mission is science and that it will only operate in the Arctic. However, at the Research Vessel Operators Committee meeting, we heard that the Healy would operate in both the Arctic and Antarctic. Commitment to Arctic only, science operations will ensure that the ship's schedule will meet the science requirements rather than Coast Guard operations requirements. Again, the mission must be clearly articulated at Baltimore in order to bring the community on board.

Another major concern among the UNOLS membership had been confusion regarding the status of the Healy and the CASPRR regulations. It was welcome information to hear that the vessel will comply with these regulations. However, we have also heard at earlier meetings that it will not comply with CASPRR. As you can see, the science community is unclear as to this ship's proposed operations and its design. The Baltimore meeting will be essential to clarifying these issues and securing community support.

A final concern among the science community is the cost of operating ships. There is a continual tradeoff between dollars for operating ships and for performing scientific research. The expense of operations in support of science is, therefore, of direct concern to UNOLS. If the Healy is to be operated only as a research vessel, then it seems that the manning requirement could be reduced and that the labs and other features in the UNOLS ARV preliminary design could be incorporated into the design of Healy. Further, there is a strong perception in the science community that accessibility to the Antarctic has been largely met by the Nathaniel Palmer and the Polar Duke. Questions have been raised as to the efficiency of operating vessels which have a bipolar mission, except in unusual circumstances. Has NSF committed to supporting a third vessel in the Antarctic? Currently, our greatest unmet need is in the Arctic.

The UNOLS ARV's only mission is research in the Arctic and its design has been optimized for this mission. It will be able to operate independently in the first year ice for up to 270 days per year. However, to operate in the multiple year Arctic ice pack it will require the escort of a more powerful ice breaker. It was because of this need that we expected to turn to the Coast Guard for ice escort. Does the Coast Guard expect to provide this assistance?

We are pleased to see that the Coast Guard has increased its communication and cooperation with the science community in the past few years. However, the bottom line is that ships of the academic UNOLS fleet are still much more accessible and "user-friendly" than the Coast Guard vessels.

Although this letter voices some of the concerns of the academic oceanographic community we stand ready to cooperate and assist the Coast Guard in planning their Arctic operations for science over the next several decades. We look forward to hearing further about the Coast Guard's plans to support science in the Arctic Region.

Sincerely yours,

Kenneth S. Johnson
Chair, UNOLS

CC Mr. Jack Bash, UNOLS Office
Dr. Garry Brass, Arctic Research Commission

U.S. Department
of Transportation

United States
Coast Guard



Commandant
U.S. Coast Guard

2100 Second Street, SW
Washington, DC 20593-0001
Staff Symbol: G-NIO
Phone: (202) 267-1452

16150

DEC 20 1994

Dr. Kenneth S. Johnson
Chairman, University-National
Oceanographic Laboratory System
P.O. Box 450
Moss Landing, CA 95039-0450

Dear Dr. Johnson:

Your continued interest in the development, construction and operation of USCGC HEALY is appreciated. I would like to address your concerns about the new icebreaker stated in your letter of December 2, 1994.

The *primary* mission for HEALY will be to provide an effective platform to support scientific research in the Arctic. The ship will deploy to meet the needs of the science community as coordinated and funded by the National Science Foundation. The ship's design will facilitate open ocean transits to Antarctica should bi-polar operations be required. However, the existing POLAR Class icebreakers can meet all Antarctic icebreaking requirements in the foreseeable future.

The Coast Guard has operated two or more icebreakers in multi-unit operations on several occasions. When the WIND Class icebreakers were in service, tandem operations were commonplace. The improved capabilities of the POLAR Class icebreakers reduced the requirement and expense of two ship operations for icebreaking. If the proposed ARV is built, the Coast Guard could provide an ice escort if the mission requirements and NSF funding justified two or more ships. HEALY is designed to operate independently in the Arctic as both an icebreaker and a research platform and the need for two ship operations will be minimized.

HEALY will operate in all Arctic waters. HEALY's robust design will ensure safe, unrestricted operation with minimal impact on the polar environment. The ship builder, Avondale Industries Incorporated, and the contract supervisor, the U.S. Navy, have determined that HEALY will meet or exceed existing CASPRR requirements and if deemed appropriate, HEALY can be altered to meet future revisions. CASPRR is only one set of regulations concerning Arctic vessels. More important are the international standards being developed by Arctic rim countries through the Harmonization of Arctic Shipping Regulations working group. Adoption of these standards by the International Maritime Organization (IMO) would consolidate and clarify icebreaker design requirements. The Coast Guard has represented U.S. interests in international harmonization efforts for several years.

Although designed to support science, HEALY will be a Coast Guard cutter. As such the ship is a national asset and must be able to execute traditional Coast Guard missions, such as search and rescue and the enforcement of laws and treaties, should the need arise during polar operations. Manning levels aboard HEALY will be unusually low for a cutter and as small and efficient as possible. The crew composition is being developed to allow 24-hour science support including communications, flight operations and deck work (rigging, coring and casting). Staffing levels will be maintained which allow training and overlapping duties when personnel reassignments occur but will be kept small to maximize embarked scientific parties.

HEALY will be significantly different than previous Coast Guard icebreakers. The ship will have a greater science capability and will operate more efficiently than the preceding POLAR Class icebreakers. The success of the polar icebreaking program, as demonstrated in AOS 94, illustrates the Coast Guard's commitment to supporting scientific research in the Arctic. I hope this information clarifies some of your questions about the Coast Guard's next polar icebreaker. As HEALY is built, outfitted and prepared for operations I will ensure that the science community is kept informed and involved with substantial developments.

Sincerely,



ALAN SUMMY

Captain, U.S. Coast Guard
Chief, Ice Operations Division
By direction of the Commandant

Copy: Mr. Jack Bash, UNOLS Office
Dr. Garry Brass, Arctic Research Commission

FRANK H. MURKOWSKI
ALASKA

COMMITTEES:

VETERANS' AFFAIRS (RANKING)
ENERGY AND NATURAL RESOURCES
FOREIGN RELATIONS
INDIAN AFFAIRS

United States Senate

WASHINGTON, DC 20510-0202
(202) 224-6665

222 WEST 7TH AVENUE, BOX 1
ANCHORAGE, AK 99513-7570
(907) 271-3735

101 12TH AVENUE, BOX 7
FAIRBANKS, AK 99701-6278
(907) 456-0233

P.O. BOX 21847
JUNEAU, AK 99802-1847
(907) 586-7400

130 TRADING BAY ROAD, SUITE 250
KENAI, AK 99611-7716
(907) 283-5808

109 MAIN STREET
KETCHIKAN, AK 99901-6489
(907) 226-6880

November 22, 1994

Admiral Robert E. Kramek
Commandant
United States Coast Guard
2100 Second Street, S.W.
Washington, D.C. 20593

Dear Admiral Kramek:

I am writing in reference to the Coast Guard's new polar icebreaker, the *USCGC HEALY (WAGB 20)*. Although my staff recently met with the program manager and other Coast Guard officials about the program, there remained a number of questions that I wanted to pose to you in writing, as well as some follow up questions arising as a result of the meeting.

The past performance of Coast Guard icebreakers in the Arctic has not always been a source of national pride. In 1991, *POLAR STAR* broke down during a scientific mission. When public attention was focused on the fate of trapped whales near Barrow, Alaska, it was a Russian icebreaker that came to the rescue. Even during the most recent scientific cruise this past summer, *POLAR SEA* broke one propeller and damaged another, forcing drastic modifications in the scientific mission. In this instance, the Russian icebreaker *YAMAL* rendered assistance.

It is my hope that we can avoid these embarrassments in the future and rebuild our international reputation by providing the nation with a capable vessel that performs as intended. In that spirit, I raise the following issues:

Issue #1—Hull Design. I have previously expressed concern about *HEALY's* hull design to your predecessors. If our goal is to build a modern, capable polar icebreaker, I do not understand why we are using 1930's technology. During the recent meeting with my staff, the program manager said that modern designs exhibited poor seakeeping characteristics. While it is a fact that some modern designs such as Sweden's *ODEN* do have poor seakeeping characteristics in the open ocean, newer hull designs such as *FENNICA* and that proposed for the Arctic Research Vessel (ARV) have performed superbly in model icebreaking and seakeeping tests. In fact, I understand that technicians at the HSVA test facility in Hamburg called the ARV design the best icebreaking design they had ever tested. Meanwhile, I understand that *HEALY's* design has recently and repeatedly failed model icebreaking tests. Not only was the *HEALY* model unable to break ice at the required level, a substantial amount of ice ran through the propellers during the model test. Given the history of shaft and propeller problems in *POLAR* class ice breakers, isn't this a serious design flaw?

November 22, 1994

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In addition, it is noteworthy that at an *Icetech* international meeting of technical experts last summer, the audience was virtually unanimous in their opposition to the design selected by the Coast Guard for HEALY.

Nevertheless, the Coast Guard has determined that it will proceed with HEALY's hull design. I understand that the Coast Guard will even absolve the shipbuilder from any liability should HEALY fail to meet its icebreaking specifications. In my view, this is a prescription for disaster. We are at risk of asking the taxpayer to spend in excess of \$300 million for an icebreaker that cannot break ice. Please provide me with an explanation of the decision to proceed with a design that has failed its icebreaking tests. In your explanation, I would appreciate a justification for the use of a design that international experts agree is outmoded and outdated.

Issue #2—CASPPR. I have heard from several individuals who are concerned that HEALY will not meet Canadian Arctic Shipping Pollution Prevention Regulations (CASPPR). The HEALY program manager assured my staff that HEALY would meet current CASPPR, but that the Coast Guard would not seek certification due to State Department guidance. It is my understanding that clearance to conduct research in foreign waters is the responsibility of the Chief Scientist of the cruise. In processing clearance requests for the Canadian Arctic, Canadian authorities will, no doubt, require evidence of compliance with CASPPR. Please provide me with the basis for your assurance that the Canadians will not deny scientists aboard HEALY permission to conduct their research in Canadian waters.

Issue #3—Swath Mapping System. The Coast Guard is not planning to have a swath mapping system aboard HEALY, reportedly due to the high costs of such a system, although they will retain the flexibility to install one in the future. I understand that the National Science Foundation has installed a swath mapping system aboard PALMER for a total cost of \$1.8 million. When my staff raised this issue and the reasonable cost of the NSF installation, the program manager pointed out that PALMER's installation didn't perform well. After making further inquiries, we learned that there were indeed problems with the PALMER installation—but that they were due to software problems and the fact that a supplier did not deliver a part to specifications. These corrections will be made at no charge to the government. If there is merit in having a swath mapping system aboard HEALY, doesn't it make sense to incorporate it in the design rather than subjecting the taxpayer to the additional costs of retrofitting at some future point?

Issue #4—Science Mission Requirements. HEALY design does not meet the minimum science requirements specified in the University-National Oceanographic Laboratory System (UNOLS) science mission requirements for an Arctic Research Vessel, even though it will cost more than twice as much as the proposed Arctic

November 22, 1994
Page 3

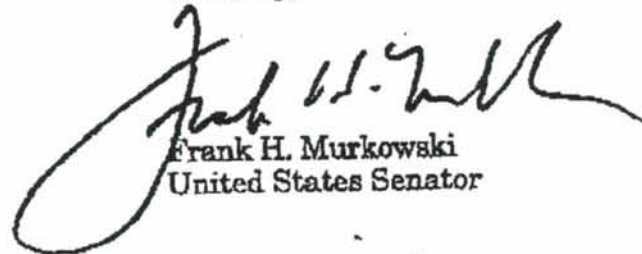
Research Vessel. Some have suggested that we cannot afford both the ARV and HEALY. If that is indeed the case, it is particularly important that HEALY meet the science requirements established by the research community. Will any effort be made to assure that HEALY meets these requirements?

Issue #5—Crew size and costs. The proposed ARV can perform its mission with a crew of 27. The POLAR class has a crew size of 140, while HEALY has a crew size that has been "downsized" to 80. In discussions with my staff, Coast Guard representatives said that one advantage of the large crew was to facilitate 24-hour scientific operations. I have since learned that large UNOLS vessels (e.g. RV THOMPSON, with a crew of 21) routinely conduct 24 hour operations and that the ARV can accomplish the same with its small crew. Have we done the very best we can do in keeping the crew size and associated costs as small and manageable as possible?

Issue #6—Responsiveness to the scientific "customer." The Coast Guard has made tremendous improvements over the past several years in being responsive to its scientific "customers." Despite the mechanical shortcomings of POLAR SEA during the 1994 Arctic cruise, I received outstanding reports of the performance and cooperation of the Captain and crew in achieving the scientific mission. This is a tremendous change from the past, and I wanted to express my thanks and appreciation for the efforts made on behalf of the scientific users of polar icebreakers.

I appreciate your attention to the issues raised above, and I will look forward to your detailed, written response.

Sincerely,



Frank H. Murkowski
United States Senator

APPENDIX IV

TAMPA BAY PHYSICAL OCEANOGRAPHIC REAL-TIME SYSTEM "PORTS"

FACT SHEET

- Physical Oceanographic Real-Time System (PORTS) is an information acquisition and dissemination technology developed by the National Ocean Service (NOS). The first permanent, fully-integrated, operational PORTS was deployed in Tampa Bay during 1990 and 1991. The system is managed, operated and maintained by the Greater Tampa Bay Marine Advisory Council - PORTS under a cooperative agreement with NOS.
- The Tampa Bay PORTS includes the integration of real-time current, water level, wind and water temperature at multiple locations with a data dissemination system that includes telephone voice response as well as modem dial-up.
- The Tampa Bay PORTS (Figure 1) consists of two acoustic doppler profilers with water temperature sensors, a "nowcast" of currents at a third location. Four water level gages with anemometers, a fifth anemometer, packet radio transmission, a data acquisition system, and an information dissemination system (IDS).
- The traditional prediction tables that are published annually by the National Oceanic and Atmospheric Administration (NOAA) provide information about the astronomical tides and currents, and do not include the effects of wind, river flow and other meteorological forces. Nontidal forces in Tampa Bay sometimes result in deviations from the times of published predictions of up to 100 minutes. Real-time measurements, enriched by nowcasts, were identified as critical requirements for safe navigation in Tampa Bay and in other ports and harbors.
- The Tampa Bay PORTS uses the voice data response system technology in an integrated and easy to use system of real-time information dissemination. The telephone numbers are (813) 822-5836 and (813) 822-0022. Data can also be received via modem dial-up as screen text (Figure 2) on (813) 822-5931. Communications software should be set at 2400 baud (1200 and 300 baud are also supported), 8 data bits, 1 stop bit no parity and full duplex. Simply follow the prompt for PORTS log-on. The Tampa Bay PORTS data are broadcast over NOAA Weather Radio hourly by the National Weather Service and are available on a priority basis to the NOAA HAZMAT Division for trajectory modeling in support of the U.S. Coast Guard.
- PORTS is a public information system that provides real-time information to the general public as it provides essential information for safe and cost effective navigation, search and rescue, hazardous material and oil spill prevention and response, and scientific research. PORTS also provides NOAA's Global Ocean Observing System with coastal ocean measurement and dissemination component (see Figure 3).
- For further information, contact Lee Chapin, Tampa Bay PORTS Manager at the University of South Florida Department of Marine Science, 140 Seventh Ave. South, St. Petersburg, FL. 33701, (813) 893-9137, FAX (813) 893-9189, Mobile (813) 356-5205

Tampa Bay PORTS
(Physical Oceanographic Real-Time System)
National Oceanic and Atmospheric Administration
National Ocean Service
at 2:50 pm EDT May 28, 1992

TIDES

Port of Tampa	2.0 feet, Falling
Port Manatee	1.3 feet, Falling
St. Petersburg	1.7 feet, Falling
Old Port Tampa	1.9 feet, Falling

CURRENTS

Sunshine Skyway	1.8 knots, ebb
Port Manatee	1.3 knots, ebb
Old Port Tampa	1.1 knots, ebb

WINDS

Sunshine Skyway	8 knots from SW, gusts to 9
Port of Tampa	9 knots from S, gusts to 13
Port Manatee	9 knots from WSW, gusts to 11
St. Petersburg	6 knots from SW, gusts to 10
Old Port Tampa	10 knots from S, gusts to 12

BOTTOM WATER TEMP

Sunshine Skyway	80° F
Old Port Tampa	80° F

To receive a written description of PORTS, please contact Lee Chapin of the Univ. South Florida at 813-893-9137, or Reid Nichols of NOAA at 301-713-2812.

The PORTS system has hung up the line to make it available to others.

This is an example of the Tampa Bay PORTS screen as it would appear to anyone connecting to the system via modem. The screen is updated every 6 minutes.

LEGEND

TIDES

Port of Tampa	Southernmost cell of the CSX Rockport Bulk Terminal loading platform
Port Manatee	Steel sheetpile bulkhead southwest of the Banacal Terminal at Port Manatee
St. Petersburg	Elevated pier at the U.S. Coast Guard Base in St. Petersburg
Old Port Tampa	Public fishing pier at Picnic Island Park

CURRENTS

Sunshine Skyway	Directly under and between the piers of the center span of the Sunshine Skyway bridge
Port Manatee	(Nowcast) Entrance to the Port Manatee channel
Old Port Tampa	Northwest corner of the end of Cut K channel

WINDS

Sunshine Skyway	3 nautical miles northeast of the Sunshine Skyway bridge, on the C Cut Lower Range tower
Port of Tampa	Top of a light pole on southernmost cell of the CSX Rockport Bulk Terminal loading platform
Port Manatee	Top of a light pole southwest of the Banacal Terminal at Port Manatee
St. Petersburg	Above elevated pier at the U.S. Coast Guard Base at St. Petersburg
Old Port Tampa	Top of a light pole on the public fishing pier at Picnic Island Park

APPENDIX V

Prospectus

COMPENDIUM OF SMALL RESEARCH VESSELS

The usual concept design study is not so feasible for a small research vessel as for larger vessels. Due to the wide variety of needs and applications, the vast differences between ship capabilities even for small differences in size, and because most small research vessels are usually conversions or adaptations, a "new design" is not especially meaningful. Instead of a concept design addressing one type and size vessel, it is proposed to compile a broader report addressing many areas of small R/V design issues. If properly done, it should be a good reference for labs considering or planning a new vessel.

It is envisioned that the report would comprise sections including (but not limited to) the following areas. For each section, an expert author would be invited to contribute (with the assistance of the editor).

1. Introduction

2. Requirements and Capabilities by Size Category

- Below 65 ft.
- 65-85 ft.
- 85-105 ft.

(The sizes shown above have been selected based on the experience that vessels of these categories usually have capabilities, requirements - and costs - usually limited to that range.)

3. Regulatory

Discussion of USCG, ABS and other statutory effects on the size, design and outfitting.

4. Safety

Follows on to 3 above, but expands on UNOLS Safety standards and other safety aspects which affect a design (and operation).

5. Stability and Seakeeping

A user friendly section on stability. Defines the terms and principles used. Same with dynamics of seakeeping - maneuverability, dynamic positioning, etc.

6. **Construction**
The advantages/disadvantages of steel, aluminum, fiberglass for size ranges.
Information on construction and terminology.
7. **Conversion vs. New Construction**
Pros and cons, costs, etc.
8. **Outfitting and Equipment**
Sections on winches, electronics, communications, optimum equipment for
size ranges, costs.
9. **New Design Technology**
 - SWATH's
 - Catamarans
 - OtherDiscussion of possibilities for small R/V's; selected designs.
10. **Selected New Designs with Discussions**
11. **Inventory of Small Vessels with Discussion and Instructions for
Maintaining Inventory on World-Wide Web (WWW).**

COMPENDIUM OF SMALL RESEARCH VESSELS

<u>Subject</u>	<u>Contributors</u>
Requirements & Capabilities	Dinsmore, Jack Bash, Jim Griffin, ?) John Valois (Marine Bio- logical Laboratory)
Regulatory	George Ireland (Ireland Assoc)
Safety	Sam Applegarth, ABSTECH Newell Garden (Chairman, ABYC Safety Committee)
Stability & Seakeeping	Gene Allmendinger (UNH), Dana Yoerger (WHOI)
Construction	Redney Lay John Daidola (Rosenblatt)
Outfitting & Equipment	Dinsmore; Bill Hahn (URI) Bruce Cornwall (SBI)
SWATH Vessels	Dinsmore
Catamarans	John Van Leer

APPENDIX VI

MARCO (Middle Atlantic Research Consortium for Oceanography)

Bermuda Biological Station

College of William and Mary

Duke University

Old Dominion University

Rutgers, the State University of New Jersey

State University of New York, Stony Brook

University of Delaware

University of Maryland System

University of North Carolina System

MARCO - Previous Proposal

- **Informally formed in 1991**
- **Submitted NSF proposal in 1994.**
- **Title: "Mission Requirements and Concept Design for a Coastal Research Vessel"**
- **Develop Scientific Mission Requirements**
- **Contract Naval Architect for conceptual design**
- **Costs: \$85,000**

MARCO - Present ad hoc Committee

- **Larry Atkinson, Old Dominion University**
- **Dick Barber, Duke University**
- **Malcom Bowman, SUNY, Stony Brook**
- **Rich Garvine, University of Delaware**
- **Tom Malone, U. Md. CEES**
- **Rose Petrecca, Rutgers University**
- **Don Wright, William & Mary, VIMS**

MARCO - Science Mission Workshop

- **15 - 25 Attendees**
- **Scientists, Operators, Architects**
- **Two Day meeting**

Goals: Review Designs

Federal mission requirements

Finalize Science mission requirements

Hard Constraints

Appoint Steering Committee and set goals

MARCO - Steering Committee

- **Draft Request for Proposal for Concept Design**
- **Review and approve funding of successful bid**
- **Oversee work of selected architect**
- **Coordinate acceptance, approval and dissemination of concept design**

