Alaska Region Research Vessel
Design Review Meeting

June 13, 2002- Room 555

National Science Foundation
4201 Wilson Boulevard
Arlington, VA

Meeting Minutes

Appendices

Welcome and Introduction – The meeting was called to order at 0850. Terry Whitledge welcomed everyone to the meeting. Introductions were made around the room. Margaret Leinen and Vera Alexander then gave a few opening remarks. The meeting agenda is contained in Appendix I and the meeting participant list is contained in Appendix II.

Margaret explained the importance of this meeting and said that community input is very important. She said that they want to design a ship that is right for the region and they would like to complete this preliminary design and then include it as a proposal for an MRE. She said they are moving forward with an MRE for this vessel sometime after 2004 as it is too late for the 2004 budget. This long time line will not allow the community to have a lot of input into the design of the vessel. Margaret also stated that all levels of NSF are behind this effort.

Vera said that they are looking for input today but wants everyone to keep in mind that they are trying to design a multi-purpose vessel that does many things.

Vera then went on to say that they would like to distribute a draft document (White Paper) on scientific programs for the Alaska region. It defines the science need for the region, which is an enormous area. Topics included in the draft cover fisheries, large-scale processes, geological studies, and the role of Alaskan waters in the global process. There is much that is still not known. They would like to receive input prior to completing the final document. Vera said that there would be a sign up sheet at the back of the room for those that are interested in receiving a copy. It may also be made available on the Web. Vera stated that there are other non-federal interests in this area including other sponsors and the U AK

will not be the only users of this ship. There is much outside interest.

Terry Whitledge then gave an overview of the three areas of science research interest for the Alaska region and introduced the first speaker at today's meeting:

ARRV Science Missions in North Pacific/Alaskan Waters

Fisheries Research, Fisheries Biology, Population Dynamics, Fisheries Oceanography – Gary Stauffer, NOAA, APSC.

Gary gave a brief summary of his background. He is a fisheries biologist and works with the FOCI group at PMEL. He and his staff spend 800 days of ship time per year from the Bering Sea to the Southern California Bight estimating fish abundance in the area. They also do a number of standard fish surveys and have much experience at sea doing stock assessment and with oceanographers. Their primary research areas are the Bering Sea and the Gulf of Alaska. He said this area supports approximately 25M metric tons of standing fisheries stock which supports about 1 billion dollars a year in the fishing industry. Gary said that there is much pressure from constituents to conduct research that examines the productivity of these fisheries and the ecosystem dynamics that support that productivity. He said there is also interest in the interactions of physics with biology. Lastly, there is also great commercial interest in the area. Gary then identified the ocean current systems, the fluctuations in the biosphere, and a summary of short-term conditions in El Nino years including fish declines. He said that the scientific community does recognize there are decadal cycles.

Gary said there is a need for process studies to examine the links between environmental changes and changes in the biosphere. He said that ecosystem processes must be included as part of management schemes for the Marine Mammal Protection Act and the Endangered Species Act. He says there is a need to define bio-monitoring systems for long term to monitor physics and biology. There is also a need to Model climate change and biophysical responses. He said that Congress is demanding this through the Magnum Stevens Act. NOAA and their resource managers are required to incorporate management schemes.

He went on to say that the U AK is being challenged by the fishing industry and the leadership in Alaska to do a better job of doing research that is focused on the study of the ecosystem that supports the biology.

Four new funding sources have emerged and they emphasize expanding ecosystem management:

1) Understanding the role of Pollock in ecosystems. $1.5M to U AK

2) Stellar Science Research System – Understanding the role of the ecosystem and the decline of Stellar Sea Lions. Funded at $40M.

3) Gulf of Alaska Ecosystem Monitoring System (GEM) – Exxon Valdez funds for study, $5M per year.

4) North Pacific Marine Resource Program - $10M per year in primarily the Bering Sea and the Gulf of Alaska.

These new funding sources are in addition to the traditional funding programs such as: GLOBEC, FOCI, BASIS, COOP, etc.

Gary said that there is much interest in studying the productivity of the oceans and examining the role of the ocean and fish productivity. There must be an expansion from a single species management to ecosystem management. Gary says that these types of programs bring a lot of money to the table. They will require safe, modern ships capable of studying biology and physics year-round in the area. Currently, there are two research vessels working in Alaska. The R/V ALPHA HELIX and R/V MILLER FREEMAN. Both ships are old but well maintained. The MILLER FREEMAN is the only vessel capable of making oceanographic and biological sampling at all levels. Both ships operate approximately

243 days a year. Both have a complete range of net sampling capabilities, normal CTD capabilities, marine mammal observations, and mooring capability. About half of the time is spent is doing acoustics work for abundance surveys.

All of this will be moved to the new FRV OSCAR DYSON. The vessel will be operated from Kodiak.

MILLER FREEMAN will then split its time with the west coast until the third FRV is delivered for work in the Pacific SW. Then FREEMAN will return full time to Alaska, but by then will be 40 years old.

He explained that the ARRV is envisioned for site-specific projects. There is anticipated to be demand from the GEM Program and the NPR Program. The ARRV must be capable for full ecosystem studies and must be able to study the full water column. It needs to support mooring capability, bottom trawl and midwater trawl capability, and have acoustic biomass survey capability. To some extent this is already being done on the on the HELIX and FREEMAN. The OSCAR DYSON and FREEMAN have no ice capability. OSCAR DYSON will have the quiet capabilities of the ISES standards and will be able to flirt with the ice edge. Gary says there is need for much more research on the ecosystem at the ice edge and under the ice. The capability of the ARRV to continue transects into the ice is extremely important. As of now, they can work up to the ice edge and then they have to wait until the ice recedes before continuing. Past studies have shown that Pollock spawning and early development takes place under the ice but they have not been able to sample this directly.

Gary stated that portable trawling capability on the ARRV is a good idea. Trawl net reels can be used for storing trawls and for deploying moorings. The Stern ramp is critical for doing the trawling, but needs to be squared off, hopefully with a better design than the current one. The Centerboard greatly enhances the acoustic survey capabilities of the vessel and is an important feature. The OSCAR and the ARRV both need to have complete multiple disciplinary capabilities.

Physical Oceanography, Biology and Mooring Observatories – Bob Pickart, WHOI

Bob said that he has not previously sailed in Alaska, but will do so in the next couple of months as part of the SBI project on HEALY. He has worked on the east coast and most of his research is focused in the sub-Polar Atlantic. He would like to discuss scientific justification for UNOLS High Latitude Research Vessels and the ice constraints on the operating area. Bob says that the ice edge is down to the northern half of the Bering Sea in winter, and to the Chukchi Sea and sometimes into the Beaufort Sea in the summer. Bob said that there are very important areas that lie in the ice: Primary fish production and whale habitat.

Bob stated that Russia does not recognize the ice classification of the Alpha Helix and that they will not allow the ALPHA HELIX to travel in ice for fear that it will become stuck in the ice and need to be rescued. Bob said it is important to have an ice classification that is internationally recognized. ALPHA HELIX will not normally go to the Beaufort Sea yet there is a desire to work there with a vessel that has less chance of being beset in ice. It would be better to work from a fully capable vessel that works well in open water, but can get itself through or out of ice when needed.

Another problem of late fall operations is that of vessel icing. There needs to be a vessel that can steam into seas in cold weather with less icing.

Bob also discussed sea keeping and weather limitations. He stated that the weather is harsh year round. In the winter one out of three days the wind is over twenty knots. PI's that use the HELIX in the bad seasons, typically ask for 40% more ship time than needed to cover weather days. There needs to be a longer operating year and the new vessel will provide more working days. There is a need for DP, good station keeping and sea keeping capabilities in harsh weather for closely spaced sampling regimes.

In reference to science capabilities, the HELIX can only handle 12 CTD bottles, so there needs to be a larger volume hydrographic sampling of at least 24 CTD bottles. There also needs to be safer and more sophisticated mooring operations, space for vans (there is no van capability on HELIX- therefore cannot study iron), a temperature controlled lab, need to be able to run salinometers (HELIX will not run a salinometer onboard), storage space for multi-leg cruises, especially for work in remote areas. Effective acoustic sampling and simultaneous fisheries work. ADCP and other acoustically acquired data rely on a ship that is stable and does not interfere acoustically with the sampling equipment, thus a quiet ship is needed.

Bob discussed general issues in the context of the sub Polar Atlantic region, based on his own experience, but is applicable to the Alaska Region as well:

Climate change research in the high latitudes. There are large ongoing and proposed programs and there will be more and more research on this topic. UNOLS is somewhat under equipped to conduct this research. A current project is relying on a Swedish vessel to work in the ice and a US vessel in open water, but this limits our ability to be a leader in this field. The U.S. needs proper platforms for all types of work.

There also needs to be an ability to work in the Arctic and Sub Arctic regions that are critical to climate change research. Climate change research is by definition, multi-disciplinary and fieldwork must be done near the ice and near land-fast ice, pack ice, the marginal ice zone and regions of remotely formed ice such as icebergs. Doing research from a vessel that is not ice capable and limited in range can cause compromises in the science plan in order to proceed safely.

The new platforms should have greater endurance so they do not need to refuel as often. Fuel capacity limits cause a vessel to return to port and then have to negotiate ice to be able to return to port. More endurance and ice capability prevents more problems when working in these high latitudes in remote regions.

Water mass transformation. There are only a few spots in the world where you have sinking water mass transformation. The strongest heat flux is right at the ice edge, but you can't get there on a vessel that is not ice-strengthened.

Winter time weather. Optimizing the vessel to work in heavy weather including being able to launch and recover equipment. Especially being able to recover deployed equipment when the weather picks up while doing a station. The ship needs to be designed with safe, hands off deployment capability. Ice capability also allows hiding out in the ice during storms.

Multibeam mapping – Bernard Coakley, UAF Department of Geology and Geophysics

Bernie presented the ARRV as a capable ship and said that it complements the existing icebreakers that concentrate on certain areas. Bernie said he has experience with the Shuttle Imaging Spectrometer Experiment (SISEX), and that his work relies on access to a safe and reliable platform. He went on to say that the ARRV could support instruments commonly used at lower latitudes. He also mentioned that geophysical capabilities are not common on icebreakers.

The ARRV could support a variety of studies that are without a tool at present:

- The study of seafloor peri-glacial features. The Aleutian chain is structurally very complex and needs more extensive mapping. The ARRV could support GPS studies in the Aleutian Islands.

- Studies on the magnitude of moment release events (earthquakes) in the Aleutian subduction zone – not

much is known about these phenomena.

- Studies of gas hydrates, which are important to climate studies and for assessing energy resources. Hydrates are important in the gulf coast where they vent to the sea floor and there are allegedly thousands located in the Bering Sea.

- Drilling: the last drilling in the region was in 1974. The lack of site survey data is restricting the ability to conduct drilling. The ARRV could do these site surveys.

The ARRV will have instruments for Geology and Geophysics:

Permanent, hull mounted instruments include:

Swath mapping system – images bathymetry and backscatter

High and/or low frequency systems

Chirp Sub bottom profilers for shallow < than 100 meters high-resolution stratigraphy

Temporary instruments for particular include:

MCS – deeper penetration

Sidescan – higher resolution

Gravimeters

Magnitometers

The consensus is that there are many other things that this vessel could do.

BREAK

Design Overview – Dick Pittenger-Chair, WHOI and Terry Whitledge, U AK

Dick introduced what they would cover and indicated they would like this to be interactive. To ask questions.

Terry gave a short synopsis of the UNOLS SMR process and included viewgraphs in the presentation.

He explained that the process for developing SMR's begins with the UNOLS Fleet Improvement Committee. FIC then presents it to UNOLS Council and from there information is posted to the UNOLS Website, Information is presented at Town Hall meetings and via publications to the Ocean Community and to FIC

The History of the ARRV SMR was then summarized:

9/1998 SMR's were developed by the Fleet Improvement Committee

1/1999 The SMR was titled: "An Alaska Regional Research Vessel to Replace R/V ALPHA HELIX – Scientific Mission Requirements for an intermediate, ice-strengthened, general purpose, and fisheries oceanography research vessel"

4/00 A Memo of cooperation between WHOI and U AK

7/00 Concept design started

3/2001 Revisions were made to the SMR primarily for endurance.

5/01 Concept design final report for ARRV (available on CD or publication)

11/01 Preliminary design for model testing for ARRV started

6/2002 ARRV preliminary design review meeting was held at NSF

8/02 Draft preliminary design and model testing final report for ARRV

The ARRV Design Criteria is:

Intermediate (Ocean) size Class (>200')

Ice Strengthened

General Purpose Oceanography

Fisheries Oceanography

From the FOFC report review Terry said it was clear people wanted a very stable working platform in rough seas, to have good station keeping and maneuverability, to be able to accommodate large number of scientists, to have long endurance for remote study areas and be conducive to interdisciplinary research. These were the driving features.

The Science Objectives of the ARRV are:

Oceanography

Fisheries research

Coastal marine studies

Marine mammal and bird studies

Sea ice, water, and atmospheric interactions

Ocean engineering

Marine biology

Student training

There are many compromises and tradeoffs that must be considered.

Preliminary Design Presentation - Dirk Kristensen, The Glosten Associates, Inc.

Dirk presented a PowerPoint presentation of the description of the concept design:

Design Team

SMRs with the greatest impact on design

Preliminary design features, model testing, etc.

Preliminary design, which shows a concentration on space arrangements, but not detail and basic hull form and performance.

Project Team

Design oversight Committee from UAK and WHOI

Broader Advisory Committee including Suzanne Strom

The Glosten Associates, inc.

AKAC inc. - Ice Technology

Terry Brockett - Propeller design

VTT/MARC - Model Test

NCE - Acoustic consultants

Summary SMR Requirements

Size – LOA < 220 feet, Draft < 18 ft,

Science Requirements

Lab spaces/areas - 2000 Sq. ft. – 4 Labs (Wet, Computer, etc.) Baltic Room, Vans.

Science accommodations – 24 Berths

Science deadweight - 100 tons variable load, 8000 cu ft science storage

Permanently installed science equipment - frames, cranes, traction winches, gantry, etc.

Radiated noise criteria - ISES standard as a goal, as quiet as possible

Dimensional Constraints

Intermediate size ship, length of 220 ft.

Performance requirements

Open Water requirements (perform science in SS5, highly maneuverable)

Ice Operations requirements (2.5 feet of level ice and transit 7 ft ridges)

Regulatory Requirements

Structural requirements – ABS class A1 primary driver

Safety requirements, Subchapter U, SOLAS and GMDSS

Pollution requirements (CASPR – Double hull under pollutants)

Habitability requirements (Noise, ADA and OSHA)

Design Drivers – Elements that have the biggest input

Endurance

Performance

Dimensional constraints

Basic Vessel Characteristics

Dimensions:

LOA 226

LWL 200

Beam 52

Depth 28

Freeboard 10

Showed outboard profile, 4 deck, house forward

Plan view, reamers result in four foot bump out of hull at bow.

Science capacities – All have been met or exceeded

Science berths 24 – There is a handicap room/Chief Sci. rooms are single all others are doubles

Science labs all on main deck and equal 2,000 ft.

Deck Working Area 2700 sq ft

Science storage 8000 sq ft

Science deadweight 100 lt

A good comparison of the aft working deck was made between the ARRV vs. WECOMA and ALPHA HELIX.

Consumables capacities

Fuel -148,000 gal

Potable water - 6,000

SW Ballast counting double hulls - 200,000 gals

Provisions - 60 days

Holding Capacity for 24 hours

The science outfit consists of

Winches, frames, cranes, transducers, controls spaces

Winches, Hydro and CTD winch in forward winch room, traction winch in an aft winch room, and alternate portable, removable fisheries winches. Installed science winches are on the 1st platform deck out of the weather. Stern ramp could be closed off when not doing fisheries.

Frames: Stern A – Frame clearance 15 ft, strong enough for .680 and 9/16 wire, same for side frame. Note: A Frame is structurally designed to handle the >1" trawl wires and is therefore stronger than normal. Baltic room gantry frame would have an over-the-side reach of 12 ft. Examples were shown of the door being the crane support.

Cranes: Working deck cranes that can reach anywhere on aft deck, two knuckle boom cranes (20,000 lb). A fore deck crane for stores and over-the-side science work. Portable cranes could be bolted down. Ask about deploying clean samplers forward.

Transducers: Centerboard forward (midships) and pressurized transducer well aft. Centerboard can be fully retracted to work on transducers while in the water. About 15 ft of space for transducers on centerboard.

Control spaces: Aft control station with winch, crane, frame and ship controls. Bird and mammal observation locations on flying bridge and in enclosed bridge wings. Also enclosed masthead observation area that could be used for ice navigation.

Support outfit

Boats, 22 ft inflatable, 22 ft heavy work boat that could be used in ice. Rescue boat also installed.

Helo support facility for hovering support pad

Heated decks, circulating warm water from waste heat or auxiliary boilers. Baltic room and part of the main deck

Performance

Speed max: 14 kts, cruising 12 kts, 2.5 ft of level endurance and 45 days endurance with 4,750 hp.

The preliminary hull geometry is a compromise between open water and ice operations. Reamers give better turning and icebreaking capability. Azipod advantages, better maneuverability, ice clearing ability, improved ridge extraction, full thrust through 360 degrees, reduced noise inside the vessel, still evaluating radiated noise, mechanical simplicity and construction simplicity.

Tom Royer asked if there was any ability to put personnel on the ice from the forward part of the ship?

Answer: The cranes could be used with man baskets.

A question was asked about the 2.5-foot level ice capability? Answer: A1 is a range and 2.5 ft is at the lower end. Compromise needed to limit the size of machinery and fuel capacity.

A question was asked about the plan to draw ambient temperature seawater for incubators and flow through in ice? Answer: Uncontaminated seawater is a problem. There is no good solution at present. The HEALY bowthruster intake is not working out. Check out the PALMER.

Al Sutherland asked about the possible effects of wave slap on the Baltic doors. Answer: They will look at this further in the model test data. They discussed other designs that have been effective that should be examined (The HUDSEN has used the hinged system and it works well). There are concerns about the Baltic door design and the potential structural problems if the strength member is part of the door. A gantry that is a separate structural member would be safer. Question: Also, could something be designed to close the door once the CTD is deployed? Or make the hole smaller? Answer: These questions will have to be looked into.

Question asked about amenities for crew and scientists especially in the event of 45 day cruises. Answer: It is still spartan although there is a sauna and a gym, but not much beyond that. Suggestion: What about a lounge?

Gary Brass asked whether or not the communications infrastructure was planned yet. Answer: We are not at that point yet. An item to know is that they will be including state of the art capabilities.

Tom Royer asked about whether or not ballast tanks could be double duty so that fuel capacity could be increased. Answer: Displacement is displacement and this could be considered if you were willing to accept deeper draft for some missions. An 18' Draft is a limitation.

There was then discussion about the need to include 1000-meter capability for nets. Gary Stauffer commented that it might be possible to consider a 500-meter depth capability because most work would be in that range. Even though NMFS would like the ARRV and FRV to be interchangeable, you could compromise on the size and weight of the fisheries trawl winches and still cover most missions. The net reel would have to stay the same size and would serve mooring deployments and the size nets needed for certain ground fishes.

Garry Brass asked about coring and dredging capabilities. Dick Pittenger answered that there has been an evaluation that shows that the proposed long coring system could fit on this vessel. (A person indicated that piston coring is important and that there should be the ability to deploy and recover a 20-meter core over the side safely.)

Ned Cokelet talked about mooring recovery. There is a need to be able to send a release signal from centerboard. Also there is a need to be able to safely and effectively grapple for the mooring. The problems are that the amount of clear rail on the starboard side and the amount of stuff located on that side that would interfere.

Annette DeSilva asked if there would be ROV/AUV capability. Answer: It shouldn't be a problem. There is plenty of deck space and the ability to launch JASON and ROPOS should be there. The azipods keep ice clear from the aft deck and it would be a good spot for AUV launching.

Question: Will biomapper launch and recovery be possible? Answer: Yes. Bubble sweep down and radiated hull noise looks like it will be good for swath mapping. Acoustic centerboard will handle others but will not be deployable in ice.

LUNCH

1305 Dick Pittenger restarted the meeting.

Model Test results and preliminary performance results – Justin Morgan, The Glosten Associates, Inc.

Justin displayed viewgraphs showing test result status and showed a video of the ice testing

Ice Tests - Quantitative results conservative achieved goals. The 2.5-foot limit is due to power, not hull structure, which means that the vessel can follow HEALY into thicker ice.

Icebreaking wedge is narrow in order to optimize the open water speed. There is a three-foot clearance between the propeller tip and the hull so that only occasional ice goes into the propeller. In going astern, the propellers actually mill the ice giving better performance through ridges.

Turning circles are tighter than for vessels without azipods and are tighter going astern.

Resistance Program - Towed model gives full-scale resistance estimate

The propulsion results achieved 14knots with some margin. About 10 higher on bollard thrust than predicted.

Bow wave at 14 knots is pretty large and they are pushing a lot of water. This is on the steep part of the resistance curve.

Showed video of resistance testing that showed the bow wave and stern wake

Sea keeping tests used the 20:1 model. They received good results and it validates the ship motion program. Accelerations, relative motion, added resistance in waves and response amplitude values.

Sea kindly, dry low relative motions on working deck, smp predictions validated, will work in sea state five.

Performance benchmarks are that this vessel will be better than OCEANUS and will be comparable to the KNORR.

Maneuvering, azimithing thrusters make for a very maneuverable vessel.

Bruce Patterson asked about maneuvering tests in stern and quartering seas. Answer: They were done, but they don't have the results yet.

A question was asked on operating hours and failures. Answer: No, information has been hard to get. There have been a couple of well-documented failures that have been corrected.

Wrap up – Dirk H. Kristensen

Dirk showed the design spiral. He said they have completed the concept design and are 95% through the preliminary design. The contract design is to be completed by October of 2003.

Acquisition program.

Acquisition cost: Base shipyard contract was $41.2M and add-ons brought the total up to $57M.

Annual operating costs 4.2 – 5 million.

BREAK

A panel discussion with a question and answer session followed the break.

Dirk Kristensen: This vessel has some very unique features that were driven by the SMRs. They are pleased with the way the design is proceeding. Sea keeping is good, safety features are strong, and the compromise between open water and ice operations is good for a vessel of this size. Double hulls are a first for a UNOLS vessel.

The trade offs for noise reduction are a result of maneuverability and ice operations requirements.

Radiated noise from the azimuthing propellers is as great as the standard allows by them.

Question: Are there plans to put the vessel in a Navy range to assess the noise output of the vessel? Answer: It is a good idea.

Tom Royer asked about the need for the helicopter. If there is no support for the helicopter then why have the pad? The space could be used for incubators. Answer: There has been much debate on this. The pad now on the vessel is not large enough to land the most common personnel-carrying helicopter.

Question asked about the mission profile that gives you thirty-day cruise endurance. The endurance will vary based on what is being done. Swath mapping at 12 knots for the entire cruise would probably reduce the endurance.

Dick Pittenger explained on why WHOI got involved in this design effort. He said there are quite a few scientists at WHOI that are frustrated by not being able to gain access to the sub polar regions. WHOI has two ships that nearing retirement. There is a need for a vessel that can work in nasty weather and in icy conditions. Dick said that they want a ship that can handle large seas and winds and can operate up to the ice edge without getting caught in the ice.

Tom Royer said that he hopes that the icing problem is not solved just with “baseball bats” but with a heating system for the decks and superstructure. Dirk said that they are including heating system weight estimates in the design and are investigating options for heating the superstructure, especially up forward, as well as decks. The FRV has a system for de-icing that should be looked at. The GLIB will also have a system for the forward working deck.

Annette DeSilva asked about whether or not the ARRV would be a complete template for the Atlantic version. Answer: For the most part yes, they would probably want more speed and perhaps a little less endurance. They would want to do one more design iteration.

Mike Prince asked about how this design process can be leveraged for other Ocean Class vessels. Dick Pittenger pointed out that the CASPR requirements, double hulls, long endurance and ice breaking drive a lot of the design that you would not want for vessels operating in more temperate climates. The process of design is a good paradigm.

Terry Whitledge talked about the potential for collaboration with researchers in Russian waters. This would allow looking at the entire Bering Sea and water transport into the Arctic. There are a lot of issues that can be addressed with the ARRV. Terry said that U AK has just signed two cooperative agreements for work in the Bering Sea. (Transport of waters into the Arctic Ocean, microbial product questions – there are a lot of interesting questions that have not been addressed because of the lack of a Platform.)

Open discussion centered on how water is shipped on board at workstations. Concerns are that it might be like WECOMA, where water pours in where you do CTD operations. The mess deck is high and forward, and is uncomfortable. It might not be a good place to hide in bad weather. Low and forward are not good on Palmer because of noise, but is fine on HEALY. Low and aft might be ok. The MILLER FREEMAN has their mess near the centerboard and this is very comfortable. Peter Wiebe said that on PALMER the mess is low and up front and a person can’t hear her/himself speak. Up high might not be bad.

Question: Could a moon pool be incorporated into the design in order to accommodate drilling operations? MG & G has much interest in drilling in the Arctic. ANSWER: The moon pool might be possible but it would detract from fuel capacity. A small moon pool could probably be accommodated. Dale pointed out that this class of vessel would probably not want to or need to drill in ice, but could drill

from the stern or side in open water.

Discussed was the idea of having dual-purpose tanks, ballast and fuel. There was also discussion about whether or not that is still allowed or feasible.

Tom Royer pointed out that the ALPHA HELIX planned retirement date was 1990 and it is now a high priority to replace it. Dick Pittenger pointed out that the NOAA ships are old and need to be replaced. He said there is a big price tag when you have to do this all at once. The age of the UNOLS ships are of major concern.

Gary Stauffer asked about the crew complement for supporting trawling and other complex operations. NMFS uses a crew of six to support trawling. Fishing gear requires shore side support as well. Gary stated that NFMS in Seattle has one of the larger net sheds and facilities to support net repairs and maintenance.

Peter Wiebe asked whether electric drives were a problem in sub zero weather. Answer: They shouldn't be a problem. They are probably better than hydraulic.

Peter also asked about vans in the area where the net reel is located. They could not both be there. One of the other four van locations is on the fore deck.

There was discussion about the port facilities both in Seward and Dutch Harbor. Tom Smith said there is a proposal from UAF for $1.4M to upgrade facilities in Seward. He said they are already using Dutch Harbor, as are others such as NOAA, LDEO, USCG and Hawaii. Dolly Dieter said there is more of a problem mobilizing from Dutch Harbor and that this will need to be addressed. The logistics for working in the Bering Sea will need more port time. HEALY will be operating from there more and more. She said they are getting very good at supporting Projects.

Annette asked about what was needed for calibration of the ARRV with the FRV. This means that they would compare calibrations and accuracy on ADCP's, Acoustics and other systems.

Gary Stauffer suggested 3 frequencies: 38, 120 and 200 kHz frequency transducers. These are the standard Simrad systems.

Terry Whitledge asked if there were any comments from the Agency representatives?

Mike Prince said that the paradigm for the project seems to have worked and that community input is still needed and is important. Mike informed the group of two upcoming SMR Workshops for Regional and Ocean Class Vessels.

Mike Reeve said that he appreciated the fact that this meeting was held in D.C.

Tom Pyle mentioned that the cost to OPP would be comparable to what they pay the Coast Guard for HEALY and this would have an impact on the use of the vessel. He said that there is at least one program within OPP that, if funded, would be a user of this vessel. Daily rate was based on 275-day schedule, which means approximately $18K per day assuming 20% more for tech support.

Steve Eittreim discussed the potential need for use of this vessel by USGS.

Discussion about what the process would be for spending the construction money once it is appropriated. A clear outline of this process is needed with the decision-making steps that are necessary. One for NSF and one for ONR.

Terry Whitledge thanked the UNOLS Office.

The meeting was adjourned at 1600.