

FIC Meeting Report

**UNOLS Fleet Improvement Committee
National Science Foundation – Room 770
Arlington, VA
Wednesday, September 17, 2003**

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Executive summary: The UNOLS Fleet Improvement Committee (FIC) met at the National Science Foundation (NSF), Room 770, Arlington, VA on Wednesday, September 17, 2003. Larry Atkinson, FIC Chair, presided over the meeting. Implementation of Fleet renewal was a major focus discussion. Ship utilization trends and projections were reviewed. The FOFC Long Range Fleet Plan was discussed and the need to update the plan was recognized. Increasing ship demand, future observatory facility needs, and changing ship retirement dates need to be considered in the update.

JJMA presented the recommendations of their Phase II Regional Class Conceptual Development study. The study findings indicate that a monohull can be constructed that would meet the maximum desired SMRs and stay within budget (\$25M to \$28M). Considerable discussion focused on the ship acquisition strategies. FIC stressed the need for community review and feedback in any vessel design process. They recommend the formation of a Regional Ship Users Advisory Committee that would include science users, Naval architects, ship operators, and marine technicians.

KILO MOANA debrief interview responses were reviewed and FIC decided to continue the interviews into 2004. They will inform the University of Hawaii of the problems that have been identified so that corrective measures can be considered. FIC will continue to recommend that a ship motion analysis of KILO MOANA be supported.

Reports on ship design and mid-life refits were presented at the meeting. FIC will continue to review and provide feedback on design and construction efforts including replacement of CAPE HENLOPEN, the Alaska Region Regional Vessel, and the EWING replacement. FIC endorses LDEO's option for replacement of EWING with a commercially available modern, seismic vessel.

The close of the FIC meeting marked the end of Larry Atkinson's term as FIC Chair. FIC thanked Larry for his dedicated leadership through the past years. Dave Hebert will assume the position as new FIC Chair.

FIC Recommendations and Endorsements:

FOFC Long Range Fleet Plan - FIC recommends an update to the FOFC plan so that consideration of increasing ship demand, future observatory facility needs, and changing ship retirement dates are included.

Regional Class:

- FIC endorses the Integrated Product Team (IPT) plan (2-teams) as a reasonable acquisition approach
- FIC recommends the formation of a Regional Ship Users Advisory Committee (include science users, Naval architects, ship operators, and marine technicians - both intermediate and regional vessel users).
- FIC recommends community review and feedback opportunities to both of IPT designs prior to selection (Industries should be required to define how the community will be involved in the design review process).

KILO MOANA –FIC will again recommend that a ship motion analysis of KILO MOANA be supported.

EWING Replacement Option - FIC endorses LDEO’s option for replacement of EWING with a commercially available modern, seismic vessel.

FIC recommends that the UNOLS Post Cruise Assessment Subcommittee provide feedback to FIC in respect to shipboard capabilities and equipment improvements.

FIC Action items:

Task/Action Item	Assigned
<p>Regional Class – Send letter to NSF recommending:</p> <ul style="list-style-type: none"> • The formation of a Regional Ship Users Advisory Committee (RSUAC) - (include science users, Naval architects, ship operators, and marine technicians - both intermediate and regional vessel users). • That community feedback opportunities need to be clearly defined in the acquisition plan • That the UNOLS rep on the IPT Oversight committee also be a member of the RSUAC 	<p>Dave Hebert with FIC input - complete</p>
<p>Ocean Class – FIC should be engaged and provide feedback to the Navy/JJMA Phase II Ocean Class Concept Development task.</p>	<p>FIC</p>
<p>Encourage the Agencies to update the FOFC plan.</p>	<p>David Hebert</p>
<p>Update the FIC website and draft a FIC version of Figure 17 of the FOFC plan.</p>	<p>Annette and Dave</p>

KILO MOANA - Continue FIC Debrief Interviews	FIC
Send the University of Hawaii a list of items that need to be addressed: CTD operation problems, Noise, Over-the-side handling issues	Dave Hebert with FIC input
Recommend that a ship motion analysis of KILO MOANA be supported – send message to John Freitag	Dave Hebert – complete
Review KILO MOANA debrief interviews in respect to the monohull versus SWATH hull characteristics	FIC
Continue to review and provide feedback on design and construction efforts: <ul style="list-style-type: none"> – CAPE HENLOPEN replacement vessel – Alaska Region Regional Vessel 	FIC
Send letter of endorsement in support of the EWING Replacement plan. The letter should state that FIC is ready to work with LDEO to ensure that the conversion will meet the general needs of the oceanographic community as best as possible without compromising the seismic aspects.	Dave with input from FIC – complete
EWING Replacement - Review and provide feedback to draft Global, Seismic SMRs	FIC
Recommend that the UNOLS Post Cruise Assessment Subcommittee provide feedback to FIC in respect to shipboard capabilities and equipment improvement needs.	Dave Hebert
Ocean Observatories - Review UNOLS working group recommendations.	FIC

Appendices List

- I. [Meeting Agenda](#)
- II. [Participant List](#)
- III. [UNOLS Utilization Trends and Projections](#)
- IV. [NSF Report](#)
- V. [JJMA Regional Class Concept Development Task Review](#) (1.7 MB)
- VI. [UNOLS Ocean Observatory Working Group Report](#)
- VII. [EWING Refit/Replacement Report](#) (7.1 MB)
- VIII. [Alaska Region Research Vessel Status Report](#) – to download the PowerPoint slides along with video clips go to <http://www.mlml.calstate.edu/unols/fic/arrv/arrv.html>
- IX. [CAPE HENLOPEN Replacement Vessel](#) – Status Report
- X. [PELICAN Mid-Life Refit Report](#)
- XI. [KILO MOANA Debrief Summary](#)
- XII. [FIC Draft Report to Council](#) – 9/18/03

A message from outgoing FIC Chair Larry Atkinson:

This meeting marks the change in FIC chairs. It has been an exciting time. In the past few years the FOFC has created a rational ship replacement plan (and now needs

revision), SMRs have been developed, demand for research ship use of large vessels is exceeding supply, plans for many new ocean activities related to observatories are reaching fruition, and funding for new ships is as yet uncertain. We have had many successes and it is clear that there are many challenges ahead of you.

FIC activities generally fall into the following categories:

- *Interpret trends in ship use and present to community*
- *Publicly advocate the ship replacement plan*
- *Develop and update Science Mission Requirements*
- *Represent the user community during ship design.*

In the coming years these activities will remain but new ones will evolve. In the next five years ships will be designed and construction will begin. How this will happen is unknown but it will assuredly have many surprises and present many challenges for those of us who offer our time to the academic research fleet.

I wish you well in the coming years.

Welcome and Introduction – The UNOLS Fleet Improvement Committee met at the National Science Foundation (NSF), Room 770, Arlington, VA on Wednesday, September 17, 2003. Larry Atkinson, FIC Chair, opened the FIC meeting at 0830. Agenda items were followed in the order as reported in this report. Meeting participants introduced themselves. The agenda and meeting participants are included as [Appendix I](#) and [Appendix II](#).

Accept Minutes - A motion was made and approved to accept the minutes from the [January 28-29, 2003 FIC Meeting](#).

Fleet Renewal:

Larry introduced the Fleet Renewal discussion. He explained that the goal of this part of the meeting is to assess the status of the renewal process, new information that is available, and what actions should be taken.

The FOFC Plan – Larry briefly reviewed the FOFC Long-Range Plan and commented that the need for an update is approaching. He reviewed Figure 17 and pointed out that in the next decade many ships will be going off line and need replacement.

Ship Utilization Trends and Projections– Annette DeSilva reviewed a series of charts showing ship use trends. Her slides are included as [Appendix III](#).

The first chart showed fleet utilization and projected use for 1993 to 2005. Use has steadily increased over these years. In 2003 there were a number of programs that needed to be deferred to 2004 for a total of 373 days. The reasons for deferring ship time to 2004 included:

- Ship Availability - Ships were booked for other projects or the specific type of ship needed was not located close enough to schedule (134 days).
- External reasons – Forces outside the control of schedulers or PIs such as permits, clearances, civil unrest and changes in the availability of funds (180 days).
- Instrumentation Availability – Scheduling conflict or unavailability of major instrumentation including ROVs, MCS, OBS, etc. ALVIN is included with ship availability unless ALVIN was out of service while ATLANTIS was available (17 days).
- Principal Investigator – Delay or deferral at the request of the PI or because the PI or user equipment was unavailable for the proposed cruise period (42 days).

In 2004, deferred programs will require 289 days to be moved to 2005. The reasons for deferring ship time to 2005 include:

- Ship availability - 214 days.
- Instrumentation availability –40 days.
- Principal Investigator –35 days.

Additionally, there were seven programs that requested large vessels, but were scheduled on UNOLS intermediate vessels (204 days). There is one other program (78 days) that has not been scheduled yet on a UNOLS vessel.

Next, Annette showed utilization broken down by class. The Global/Large ship utilization has been very high. The Intermediate/Ocean Class utilization has been lower than full utilization over the past years. Regional and Local ship utilization trends show increasing demand.

There was discussion on the trends and utilization. The question was asked how would the increasing ship time be supported. If congress adds money to NSF's budget the ship time can be supported. However, it is more likely that NSF would not get an increased budget, in which case, support for ship time may need to come out for science budgets.

Agency Reports

National Science Foundation (NSF) - Jim Yoder provided the NSF report. His viewgraphs are included as [Appendix IV](#). Jim began by reporting that the Board has approved a resolution for including a funding request for the ARRV as part of the Major Research Equipment and Facilities Construction (MREFC) account in a FY2005 or future budget request by the National Science Foundation." He thanked Mike Reeve, Holly and Dolly for all the work that went into preparing the ARRV proposal for the Board. Margaret Leinen was very supportive. Hopefully it will be included in the FY2005 budget.

OCE is discussing design and acquisition strategies for three to four Regional Class ships based on the UNOLS SMRs and JJMA report. One strategy under discussion is the Integrated Product Team (IPT) approach. This could be implemented with:

- An MOU between NSF and another federal entity with shipbuilding expertise;
- Formation of a government team (incl. UNOLS rep.);
- Issue an RFP for Phase I design/build;
- Selection of two competitors;
- Evaluate competing designs and then down-select to one and execute a firm fixed price contract for Phase II;
- Add the lead ship operator to the IPT;
- Complete the detail design and then build.
- Following lead ship construction, execute option for more ships; add second ship operator to team for second ship build, and so on.
- NSF would conduct separate competition for 3-4 operators with selection in time to join Phase II process.

Jim explained that the UNOLS representative to the IPT government team would be a full time obligation. Although, the timeline for this process is behind the timeline called out by the FOFC report for the first ship, the overall project would catch-up with the FOFC plan by the time of the third ship construction.

Jim reviewed the status of the EWING Midlife refit plan. A EWING Midlife Refit workshop was held in October 2002 and the community recommended that “Only a replacement vessel can provide all the desired capabilities for improved 2-D MCS, an effective 3-D MCS and substantially improved general-purpose capabilities.” OCE is discussing replacement vessel options with Lamont as an alternative to an EWING refit. For the replacement vessel option, total cost, cost in relation to refit, and a financing plan are key considerations.

Lastly Jim discussed, ALVIN replacement plans. The agencies are supporting an NRC committee study to examine future facility needs in deep submergence science. Their report is expected in October. OCE will carefully consider the report recommendations and discuss them internally before making a recommendation. OCE has not determined the process for replacing ALVIN, should that option be chosen. The process will likely require NSF and NSB approval. Funds are available beginning in FY04 should NSF decide to support ALVIN replacement. There are issues of how other agencies would contribute to the funding support. The cost to purchase a new ALVIN is estimated at approximately \$20M.

Office of Naval Research (ONR) – Captain Houtman provided the report for ONR. The agency is preparing their POM for FY06. Admiral Cohen continues to be committed to Fleet renewal and continues to discuss how funding can be obtained. ONR continues to be committed to the Ocean Class design effort. They plan to proceed with a Phase II effort with JJMA. The Phase II study will be very similar to the study performed for the Regional Class vessels. The Statement of Work for the study is being drafted and ONR will fund the effort. They are very interested in having maximum participation by FIC.

FIC Action – Interface with JJMA and provide feedback to the Ocean Class Phase II effort.

Captain Houtman commented that the lease versus buy options for new ships has not been totally resolved and they are still looking at this.

Tim Cowles asked how far the Ocean Class Phase II effort would extend into the design process. Captain Houtman replied that they would like the study to identify the optimum, hull form for the Ocean Class. He re-emphasized that UNOLS is welcome to contribute to the Phase II effort.

Annette asked if the Navy has received any input from Congress regarding their report on Academic Fleet renewal. They have not.

National Oceanic and Atmospheric Administration (NOAA) – Beth White provided the agency report for NOAA. There have been many ship conversions and replacements in the NOAA fleet. A Navy yard torpedo test craft was converted to replace the FARRELL. The ship has been renamed the NANCY FOSTER and supports coastal research along the US Atlantic and Gulf coasts. The NOAA vessel, FAIRWEATHER, has been in use as a hotel ship in Seattle, but is now undergoing a conversion to support survey work off Alaska. Funds have been received for conversion of a Navy FAGOS vessel. Work will begin on its conversion later this month (September 2003). Although no operating funds are currently identified, plans call for the ship to work off Hawaii in coral reef studies and support of the program “Embracing the Seas.” Another FAGOS vessel was transferred from the Navy to replace the McARTHUR. The ship has been renamed the McARTHUR II and will operate from Seattle, WA as in oceanographic research and assessments. The Navy’s TAGS vessel, LITTLEHALES, was transferred to NOAA to serve as a hydrographic survey vessel. It has been renamed the THOMAS JEFFERSON and is home-ported in Norfolk, VA. The conversion cost on average is \$6M per ship.

In new construction, the NOAA Fisheries Research Vessel (FRV), OSCAR DIASON, will come on line in early 2005 and will operate off Alaska. The ship will be launched in October 2003. The second new FRV is scheduled to be operational in 2006 and will replace the ALBATROSS in New England. Time will be needed for calibration. A contest for school children will be held to name the vessel.

Lastly Beth reported that a coastal SWATH vessel is planned for the Northeast. Design bids for the vessel should be announced soon.

Tim Cowles asked if NOAA’s internal report on fleet replacement will it be distributed outside of NOAA. Beth indicated that it probably would be released. The report has been sent to the Department of Commerce for review. The report will probably need to consider additional items including the latest budget information.

Tim also asked about the status of the third FRV. John Hotelling replied that FRV3 is an option in the budget mark up. The contract with Halter Shipyard included construction of

four FRVs (as options). Currently, the plans for construction of the third vessel are on hold while budget decisions are being made. The option for the third ship expires in January 2004, but the fourth option extends into 2005. Terry Whitledge asked if there is a process to update the scientific outfitting for the future FRVs so that it is not outdated by the time the vessels are built. John replied that acquisition of the FRV computer systems is not part of the shipyard contract and will be handled by NOAA. This should avoid problems associated with out-dated equipment. NOAA is also doing a full-scale science mock-up for each FRV to identify any regional needs. The ships for each region will not be carbon copies of each other.

FOFC Activities - Beth continued with a report on FOFC activities. FOFC is considering an update of the FOFC plan that would address an integrated agency fleet plan, as well as, buy versus lease options for new construction. Whenever the agencies plan for new facilities, they must consider the most economic means for acquiring the facilities and lease versus purchase options must be studied. A message was sent to the FOFC representatives regarding such a study and the replies were supportive of hiring a service to look at this area. Tim Cowles pointed out that UNOLS sent a note to FOFC stating that other factors need to be considered when evaluating leasing options.

At the last FOFC meeting the concept of an Integrated Fleet Plan was discussed. Some agencies indicated that their facilities could not be effectively integrated into such a plan. Others indicated that some level of integration might be appropriate. There is a need to demonstrate to Congress that the agencies are working together and are cognitive of each other's needs. The integrated plan effort might be overtaken by the Senate mark directing the agencies to develop FOFC implementation plan. If indeed the agencies were directed to develop the implementation plan, NSF would be tasked to write the report with input from the other agencies.

Presently there is no timeline for updating the FOFC plan and the report's Figure 17. This issue will be addressed at the next FOFC meeting.

JJMA Regional Class Concept Development Task Review - Dan Rolland of JJMA provided a review of their Phase II Regional Class Concept Development effort. His viewgraphs are included as [Appendix V](#).

Dan presented an overview of the task:

- 1) Acquisition Process - Analyze possible acquisition approaches
- 2) Refinement of Concept Design - What can be built for \$25M and how will it meet the SMRs?
- 3) Tonnage Analysis - Analyze tonnage of concept designs and regulatory impacts
- 4) Technology Investigation - Investigate innovative technologies to reduce manning, life cycle costs.
- 5) Ship Specification Development - Develop specification and other design documentation to support the next phase.

Two concept designs were developed by JJMA and analyzed:

- Minimum (threshold) ship that meets the minimum SMRs
- Desired (objective) ship that meets the desired SMRs

Dan presented a table showing the concept variant designs versus the Regional Class SMRs. The “desired” SMR ship design met all desired SMRs. The “minimum” ship variant can meet the minimum SMR value with the exception of storage space.

Dan reviewed the seakeeping table of operability. It is predicted that a monohull that meets the desired SMR ship design could meet the seakeeping criteria spectrum for both short and long crested seas.

Dan showed a chart of percent time operability versus wave height for long and short crested seas. The “desired” monohull and SWATH variants exceed operability criteria for short crested waves. The SWATH also exceeds operability for long-crested waves in SS6 (the monohull does not).

The seakeeping speed polar diagrams were presented. The models briefly predict that:

- At SS4 all speeds and directions are met with roll stabilization tanks for both the desired and minimum SMR designs.
- At SS5 with roll stabilization tanks the designs exceed the motion criteria during head seas transit for the monohull. The SWATH exceeds the motion criteria in aft seas.
- At SS6 with roll stabilization tanks there will be some operability in beam seas with the desired monohull SMR ship design, but little operability in other seas. The SWATH was fairly operable.

The program cost estimates for the desired and minimum SMR ships were presented. The estimated lead ship costs are:

- Desired SMR Monohull = \$25M - \$28M (within budget)
- Minimum SMR Monohull = \$23M - \$26M
- Desired SMR SWATH = \$30M - \$37M
- Minimum SMR SWATH = \$27M - \$33M

The desired SMR monohull is within the budget cap and does not require design trade-off decisions. Also, reducing to the minimum SMR ship achieves relatively minor savings at the expense of significantly reducing capability. JJMA also indicates that there can be economy with a multiple ship contact (multiple equipment purchases and non recurring costs).

Fuel cost analyses and operating costs were estimated for each variant. The ship day rate for the desired SMR monohull and SWATH variants were \$13,389 and \$14,287, respectively. It was commented that the day rates are comparable to current intermediate vessel rates.

The goals of a successful acquisition program are to:

- Satisfy NSF requirements for oversight and program management
- Remain below cost ceiling

- Maximize mission capability
 - Maximize funds applied directly to the ship
 - Optimize the design
- Achieve early and effective community input
 - Ensure resulting ship meets needs
 - Minimize costly change orders

Dan presented the various acquisition strategies that are being considered:

- Conventional Approaches:
 - Contract Design
 - Circular of requirements
- Integrated Product Team (IPT) with 1 Team Approach (Similar to AGOR 26)
- IPT with 2 Team Approach

The IPT would include Government, industry and a UNOLS representative. The industry representatives include the shipyard and the designers.

The pros and cons of the various acquisition strategies were identified by JJMA. These included:

Contract design approach:

Pros:

- Community opportunity for input at design reviews
- Design defined in detail
- Greatest control over design process

Cons:

- No shipbuilder input to design process or cost estimate
- Limits innovation by yard and designer
- Risk of exceeding budget ceiling because of unknown costs
- Design budget increases with iterations and changes

Integrated Product Team approach:

Pros:

- Shipbuilder involvement early in process helps avoid surprises
- Design to cost cap lowers risk of exceeding budget ceiling
- Community has real time input to design process through representatives on IPTs
- Reduce costly change orders during construction
- Ensure ship meets research needs
- Allows more innovation by shipbuilder and design agent
- Competition throughout process encourages technical innovation and cost savings

Cons:

- Multiple teams can increase initial design cost
- Some control over design process ceded to community representatives and IPTs
- Need effective communication between community and representatives
- Mitigate with team design reviews with larger community audience

JJMA also performed a tonnage analysis for a design that would be <300 Domestic tons. To stay below 300 Domestic tons some SMRs cannot be met. The ship length is estimated at 132 LWL, which is shorter than the desired SMR length. The ship would still be over the International tonnage limit.

JJMA conducted a technology investigation to identify ship systems where life cycle costs are high and some improvement would be welcome. They looked at: propulsion, mission systems, handling systems, and auxiliary systems.

The FIC discussed the acquisition strategy and voiced concern over the need for community input in the design process. It is not clear in the IPT approach when and how the community will have an opportunity for input. Dan replied that input could be through the UNOLS representative to the team, in addition to regular design reviews. Larry commented that during the KILO MOANA design process there was little if any opportunity for community input.

The question was asked if during the IPT approach would both teams participate in design reviews? In other words, would they see each other's design? It is unlikely, since they would be dealing with proprietary information. There was a question on who would own the ship design, would it be the IPT? Dan replied that the contract could be structured so that this isn't the case. The proprietary issue raised additional concerns on how the community could be involved without compromising confidentiality. How could the UNOLS representative get community input without revealing design specifications?

There were additional questions regarding the selection process for both the IPT and the operator. The team selection would be based on experience and qualifications.

The discussion ended with UNOLS reemphasizing their concern regarding community input to the process.

Reports on assessment of future needs – There are a variety of studies have been underway over the last year that will address future facility needs. These include:

- "Enabling Ocean Research in the 21st Century: Implementation of a Network of Ocean Observatories" NAS Report (in press 2003)
- UNOLS Observatory Working group
- Ocean.US regional observatories

UNOLS Working Group on Ocean Observatory Facility Needs – Annette DeSilva reported on the status of the working group's efforts and presented the working group viewgraphs that were provided prior to the meeting. Viewgraphs are included as [Appendix VI](#). The working group was formed early in the year by the UNOLS Council. The group membership and full task statement is included in Appendix VI. The group was asked to identify facility support needs for ocean observatories in terms of both ships and submergence vehicles. They studied:

- Deep ocean seafloor observatories

- Deck handling and mooring deployment/recovery needs
- ROV and AUV requirements
- Mapping requirements
- Coastal observatory requirements (including aircraft)
- Vessel characteristics, possible improvements, and recommendations for new vessel designs.

They met once in February. Since that time they have been gathering information and drafting their report.

The group has been reviewing the recent studies to determine UNOLS ship/vehicle time requirements. Installation, operation, and maintenance requirements have been extensively documented in DEOS global buoy feasibility and implementation reports, NEPTUNE feasibility and O&M reports, and NRC OOI Implementation reports. The NRC OOI estimates are:

- Global buoy component: 20 ship-months/year (10 with ROV)
- Regional cabled observatory: 4-8 ship-months/year (with ROV)
- Coastal observatories: 6 ship-months/year

The working group emphasizes that access to ROVs must become routine for observatory maintenance and science.

Annette showed a map of the moored-buoy observatories locations. Many of the locations are in high latitudes where high sea states can be expected. Ships that can operate in these conditions will be needed. Some buoys are moored in water that is at depths of up to 3000 m. The deep-water observatories will require:

- A heavy lift capability for cable servicing (20,000 lbf or more) – equipment and specially trained personnel.
- Large open deck space
- More sophisticated, redundant DP capability
- The ability to operate in higher sea states
- Routine access to ROVs for all observatories operations.

Some modification to the Global Class ships should be considered to improve their utility for observatory operations. UNOLS should also consider the acquisition or long-term lease of a heavy lift vessel.

Annette showed drawings of the various buoy configurations, as well as, the spar buoy design. The spar buoy is very large, approximately 40m long with a diesel generator. These will be difficult to service and fuel. Installation and buoy maintenance will not be feasible with the largest UNOLS vessels. Servicing is required on an annual basis. Installation and instrumentation maintenance will require an ROV.

Slides demonstrating two baseline repair scenarios for seafloor observatories were shown. Both options require ROVs. The Minimal handling equipment that will be required to support seafloor observatories include an aft chute, 20000 lb Safe Working Load (SWL) winch and 2 capstans (10000 lb each for handling soft line) with stoppers applied on deck. Generic equipment that will be required included capstans/tuggers,

grappling gear, hard/soft stoppers, cable splicing gear (several transportainers), and deck space.

Various improvements to UNOLS vessels should be considered. These include:

- Shrouded Z-drive nozzles to protect props from cables
- Slight increase in fuel capacity
- Improvement in low speed/DP efficiency
- Install redundant DP systems to improve reliability during critical operations
- Remove part (or all) of the hangar on the Global class ships to increase deck space
- Remove all of superstructure aft of hydro lab to really increase deck space (requires naval architect study)
- Increase A-frame SWL through ship modification to spread the load
- Consider installation of stronger A-frame/heavier winch combinations to increase load-handling ability to 20,000 lb static.

The working group stresses the major safety issues regarding ocean observatory operations. These operations will require specially trained crew with expertise in heavy lifting work.

As another option, the acquisition or lease of a heavy lift vessel should be considered. Applications for such a vessel include:

- Cabled observatory maintenance and modification
- Cable reuse (H2O as prototype)
- Large buoy installation and maintenance
- Long coring operations

The submarine telecommunications marketplace collapsed in 2001 just as major cable ship deliveries took place. As a result, cable maintenance vessels can be purchased for approximately 10% of construction cost. This is a short-term opportunity that will not last. Some of the advantages of acquiring a commercial vessel include:

- Emerging observatory ops become feasible without compromising safety
- Substantial improvement in ability to operate in high sea state (e.g., ROV ops in SS7 are routine vs. SS4 limit on large UNOLS vessels)
- High latitude operations become feasible (important to global buoy plan)
- Concentration of heavy lift ops on one vessel with trained crew will reduce UNOLS-wide personnel risk.

A slide of a typical cable repair ship was presented. The ship is approximately 100m in length. It is equipped with a large cable drum, a heavy-duty a-frame, aft chute, and open deck space.

Routine access to ROVs will be required for all observatory operations. One additional vehicle will be required when the OOI is implemented (2-3 years from now). One more vehicle will be required when OOI facilities are fully operational (5-7 years from now). Commercial ROVs are not suitable for most science operations but may be usable for routine maintenance tasks.

Mapping requirements for observatories were studied and available assets appear to be adequate.

Coastal observatory needs are also being studied and preliminary findings indicate the need for:

- Better access to vessels for observatory research
- Ten Local or Regional vessels distributed on the east and west coast
- Need for coordination of multiple vessel operations
- Need for rapid response capability
- Long duration glider-type AUVs will be a key observation platform
- Aircraft facility needs.

Lessons Learned from previous R/V Construction – Annette reported that the UNOLS website includes a page for the community to provide input on lessons learned from previous research vessel construction efforts. The site was announced to the ship operators and some input has been received. The survey and input can be viewed at <<http://www.mlml.calstate.edu/unols/fic/smr/whatwelearned.html>>. As future design and construction efforts get underway, UNOLS encourages the designers to consider this information.

Lunch Break

Design and Construction Efforts in Progress:

EWING Mid-Life Refit/Replacement Plans - Al Walsh of Lamont–Doherty Earth Observatory (LDEO) provided a report on plans for EWING’s mid-life refit/replacement. His viewgraphs are included as [Appendix VII](#). Draft SMRs for a Global Seismic Vessel are posted on the UNOLS website for input. LDEO sent FIC an EWING mid-life refit/replacement information package prior to the meeting. LDEO would appreciate FIC input as soon as possible.

MAURICE EWING was built in 1983 and converted in 1989-1990. It is 237 feet in length and accommodations include 29 Science Berths. To plan for the EWING mid-life refit needs, the following questions were considered:

- How might EWING be upgraded to best address the scientific needs of the community?
- What additional capabilities should the ship have?
- What are the tradeoffs between optimizing seismic capabilities and general-purpose capabilities?

The following scientific needs have been identified:

- Exploration of the fourth dimension (time) through in situ measurements of active processes
- Characterizing and modeling nonlinear geosystems (e.g. climate, seismogenesis sediment dynamics)
- Determining the central role of fluids (water and magma) as agents for geochemical cycling among the solid earth, hydrosphere and atmosphere

- Exploring the role of biological activity on geological processes
- Investigating the long-term variability of geological processes
- Abrupt climate change

To address these science needs, the community will need:

- Ocean Observatory Systems
- High Resolution bathymetry/side-scan and advanced seafloor imaging and sampling
- 2D and 3D Multi-channel seismics and large arrays of OBS/OBH
- Broadband seismic instruments
- Repeat seismic surveys, seafloor geodetic instruments
- Time series measurements of ocean currents and properties
- Hard rock and water sampling capabilities; heat flow measurements
- High resolution sub-bottom profiling
- Long sediment cores and large volume shallow cores
- Active archives of MGG data; centralized searchable online metadata catalog

AI reviewed the process that has been used to plan for the refit of EWING. LDEO solicited input from community via EOS advertising, direct mailing; and requests in community newsletters. They established a new internal advisory committee along with a community-wide steering committee. An extensive set of ‘Technical Option Papers’ has been produced. A workshop was held in October 2002 and LDEO has produced a workshop report.

Key statements of the EWING Mid-life workshop summary and conclusions included:

- “A refit of EWING cannot improve 2-D MCS and provide an effective multiple streamer capability (for 3D) and substantially improve general-purpose operations.
- Quality of present EWING MCS operations would be substantially improved through increased repeatability of the sound source.
- In the refit of EWING, use of a linear airgun array forces serious compromises in OBS and general-purpose operations.
- In the refit of EWING, without a linear airgun array, there are excellent options for new lab and deck layouts.”

The workshop recommended that if the goal is to tow multiple long streamers, improve source repeatability using linear gun arrays, and improve the vessel’s general purpose/OBS capabilities, then EWING cannot satisfy these needs, and the possibility of securing a used industry vessel should be studied. In response, LDEO has formulated a set of three options for discussion:

- Maximize EWING general-purpose capabilities, and enhance conventional MCS.
- Outfit EWING with linear gun array
- Acquire a replacement vessel.

A refit of EWING will offer substantially improved general-purpose capabilities, a multi streamer high res system and modest improvements in the single streamer seismic

operations. Replacing the EWING with a used industry vessel would greatly enhance the US Academia's capability to collect MCS and OBS seismic data.

AI reviewed the capabilities of a potential replacement vessel. The ship would have 4 streamers x 6 km (8 km) with separation up to 200m. There would be four linear gun arrays (Dual Source) with separation +/-50m. The ship's dynamic positioning capability would include a twin screw with bow tunnel thruster and would include a forward azimuthing thruster. The ship's over-the-side capability would match or exceed EWING's for over-the-side handling. Lab area far exceeds EWING's and there is more open deck than on EWING. There would be a five-van/container capacity without effecting other operations.

AI constructed a scale model of the replacement vessel and displayed it at the meeting. The estimated cost for acquisition and conversion of a replacement vessel is approximately \$20M, which includes cost for re-flagging issues. The owners of the ship are also offering the seismic equipment. The potential replacement vessel is a 1991 hull form.

Alaska Region Research Vessel (ARRV) – Terry Whitledge reviewed the status and future plans in the ARRV design effort. Terry's viewgraphs are included in [Appendix VIII](#). He reviewed the key changes in the design, deck equipment issues, handicap access issues, security systems, broadband communications, and the science equipment list.

A key change in the design was the decision to use a ZDrive propulsion system instead of azipods. The propulsion evaluation of the azipods revealed that the system exceeded the noise criteria. Z-drives will improve underwater radiated noise characteristics over all frequency bands. The vessel will potentially be able to meet ICES noise goals up to 11 kts except in the very low frequency bands. The ship's length had to be increased by 10 feet to accommodate the zdrives. This will allow for an added fuel capacity resulting in increased endurance. It appears that there will be no impact on resistance or sea keeping characteristics.

Another key change in the design is with the arrangements. These include:

- Move bridge as far aft as possible for aft deck visibility
- Added a hydro boom control room (01 deck) with visibility to the Baltic room and the exterior of the vessel
- Relocate service lift to Baltic Room for interior access
- Rearrange galley/mess area
- Rearrange/relocate EOS
- Added mammal observation area on forward 03 deck
- Reduced the size of the science office
- Added a science workshop on the main deck
- Add main deck camber (outboard of trawlway)

Terry reviewed deck equipment issues regarding the motion compensated hydro-boom arrangement. Both the Dynacon and Markey proposed arrangements for a motion-compensated hydro-boom involve dedicated deck space in the Baltic room that would reduce the utility of the space. Both Dynacon and Markey noted that operating the motion-compensated boom within the confines of the Baltic room and through the existing Baltic room side port pose significant design constraints. Dolly remarked that they plan to fund a study on handling systems. Handling systems present fleet wide issues. The study is expected to take a year.

Handicap access issues have been addressed. Current handicap access arrangements include one handicap stateroom provided on the 01 deck. A personnel lift, handicap accessible, is provided for access to all deck levels with the exception of the bridge. All passageways are a minimum 4-ft width to accommodate handicap access. Additionally, portable/dropping door coamings will be provided on the exterior entry door on the main deck.

Security issues and their impact on the ARRV design have not been assessed at this time.

Terry discussed the equipment and science outfitting. The current list of equipment includes an Inmarsat B satellite communication system. Inmarsat B works to 70 degrees North.

CAPE HENLOPEN Replacement Vessel (CHRV) Plans– Matt Hawkins provided a written report prior to the meeting. It is included as [Appendix IX](#). Annette summarized the report. On August 29th four shipyard proposals were received for the construction of the CHRV. The total cost was slightly higher than expected, but the proposals were competitive and pricing was relatively tight. The University of Delaware is in a 90-day shipyard evaluation process and cannot discuss precise cost details at this time. Matt has been instructed by the UDel Leadership to proceed toward yard selection and contract negotiation. Contract signing is currently projected for November.

CAPE HATTERAS Midlife Refit –Annette provided a brief summary of the CAPE HATTERAS mid-life refit effort. The shipyard work has been completed and the ship has returned to homeport. The remaining mid-life work items will be completed dockside.

PELICAN Midlife Refit – Steve Rabalais reported on the PELICAN mid-life refit effort. His slides are included as [Appendix X](#). The PELICAN began its refit at Conrad Shipyard on November 4, 2002. Seven months later on 31 May 2003 sea trials were completed and science operations resumed. Support for the refit included \$1.8M from the State of Louisiana, \$260K from LUMCON, and \$370K from NSF for a total cost of \$2,430,000.

Some of the major mid-life items include:

- 280 sq. ft. of open back deck.
- 25 tons of deck load compared to 15 tones before refit

- 2,496 cu. ft. storage space
- 8 linear ft. of dry lab.
- Upper deck science lounge.
- Two additional science berths (total science capacity = 16).
- Completely new interior.
- Major overhauls on main and generator diesel engines.
- New main engine gears.
- All new bilge, ballast, fire fighting, domestic/portable water (including new MSD), seawater, fuel, and MIDAS piping including pumps, valves, strainers, and manifolds.
- All new electrical systems
- New main trawl/coring winch and new deck crane.

Steve showed pictures of PELICAN.

Afternoon Break - Special Note: During the break the FIC joined the Ship Scheduling meeting that was in progress. Tim Cowles addressed both groups and took the opportunity to thank Larry Atkinson for his many dedicated hours of service with UNOLS. Larry was presented with a plaque.

KILO MOANA Debriefs – The KILO MOANA debrief responses and process was discussed. The status of various design issues was discussed. It appears that the vessel's newly installed moonpool is not going to be used at all for CTD operations. The clearance between the CTD and monohull frame is too tight, presenting potential damage to the system. The DP system is being replaced. The ADCP is still not available. Sontek has one last chance to provide a system and if that fails RDI will be contacted. FIC still recognizes the need to evaluate the motion of the ship. John Freitag will be contacted to discuss support of a study.

The KILO MOANA debrief responses for 2002 and 2003 were provided to FIC members prior to the meeting, along with post cruise assessments for this period. These are included in [Appendix XI](#) and summarized below.

Eight debriefs were conducted and the results compiled. In general, the sea states experienced were relatively calm. A variety of operations were conducted and included CTD deployments, zooplankton tows, optical casts, underway sampling through the ship's clean water system, productivity array, sediment trap array, multibeam mapping, XBT, XCTD, mooring recovery, GoFlo deployments, and multi-core operations.

Many responses made note of the ship's high freeboard and the difficulty in conducting over-the-side and CTD operations. However, it was also noted that the operator is adapting procedures to the constraints of the ship. The users liked the stability of the ship. The deck space is good and lab space unprecedented. Some users would like to have vans on the upper deck but deck strength and the ship's carrying capacity may limit this option. Freezer space on the ship was considered inadequate and more chests and upright freezers/fridge space is needed for longer cruises.

Some users commented that it was difficult to get around the ship and an elevator is needed. Positive pressure problems in accommodations make opening doors difficult. Drainage of water from sinks in labs is a problem and appears to be related to the ship's trim. The inability to recover surface mooring with large discus buoys other than by using a small boat limits the sea state that this operation can occur in. The visibility of some rear deck areas from the bridge need to be improved, and the use of cameras would help.

High freeboard, and consequently the steep gangplank make science gear loading by hand too difficult. A cargo conveyor belt is needed.

Communications with the bridge, winch and crane operators could be improved with the addition of an aft control station is necessary.

In general, users liked the cabins, but the aft cabins near the winch are too noisy. There needs to be better sound insulation between cabins.

Users liked the computer network and commented that it is the best in terms of number of terminals. The flat screens throughout the ship are incredibly valuable. Having a central large hard drive with access from any room on the ship kept vital information within reach at all times. The only suggested improvement was to add a wireless network.

When it was rough, the waves slapping on the deck make significant vibrations. If this continued for 20 days, it would get annoying.

The FIC decided to continue the debrief process. Annette will send the 2004 schedule to the FIC so that assignments can be made.

Other business and review of action items – The remainder of the meeting was spent preparing a report for the UNOLS Council meeting that would summaries FIC recommendations and planned activities. The slides that were prepared for the Council meeting are included as [Appendix XII](#).

In summary FIC recommendation and activities include:

FOFC Long Range Fleet Plan - FIC encourages the Agencies to update the FOFC plan so that consideration of increasing ship demand, future observatory facility needs, and changing ship retirement dates are included. Dave Hebert will draft a letter to FOFC. FIC will update the FIC website and draft a FIC version of Figure 17 of the FOFC plan.

Regional Class – FIC endorses that Integrated Product Team (IPT) plan (2-teams) as a reasonable acquisition approach; however, the opportunities for community feedback need to be clearly defined in the process. FIC recommends the formation of a Regional Ship Users Advisory Committee (include science users, Naval architects, ship operators, and marine technicians - both intermediate and regional vessel users). FIC recommends community review and feedback opportunities to both of the team designs prior to

selection (Industries should be required to define how the community will be involved in the design review process).

KILO MOANA – FIC will continue FIC debrief interviews. As an action item they will send the University of Hawaii a list of items that need to be addressed including: CTD operation problems, noise issues and over-the-side handling issues. Additionally, FIC will review the debrief interview responses in respect to the monohull versus SWATH hull characteristics. This information will be useful in supporting future hull form decisions. FIC will again recommend that a ship motion analysis of KILO MOANA be supported.

Ship Design and Construction - FIC will continue to review and provide feedback on design and construction efforts including the replacement of CAPE HENLOPEN, the Alaska Region Regional Vessel, and the EWING Replacement. FIC will send NSF a letter of endorsement in support LDEO's option for replacement of EWING with a commercially available modern, seismic vessel.

New Ship Design Efforts – FIC will keep abreast of new ship design efforts and ensure that new issues/regulations are considered in future design efforts including homeland security, handicap access, noise, and broadband communications. FIC recommends that the UNOLS Post Cruise Assessment Subcommittee provide feedback to FIC in respect to shipboard capabilities and equipment improvements.

Ocean Observatories – FIC will review the UNOLS Ocean Observatory working group recommendations and encourage community feedback to the working group's draft report. They will work to ensure that new vessel designs consider ocean observatory facility support. Future Fleet plans must include consideration of emerging observatory facility needs.

Farewell to Larry Atkinson – The close of the meeting marked the end of Larry Atkinson's term as FIC Chair. FIC thanks him for his dedicated leadership through the past years. Dave Hebert will assume the position as the new FIC Chair.

The meeting adjourned at 1700.