

UNOLS Fleet Improvement Committee Meeting
Wednesday, September 25, 2002, 8:30 a.m.
National Science Foundation - Room 770
Arlington, VA

Meeting Summary Report

Appendices

- I. [Meeting Agenda](#)
- II. [Attendance List](#)
- III. [FIC Meeting Viewgraphs Presented by Larry Atkinson](#)
- IV. [Regional Class Workshop Summary](#)
- V. [R/V CAPE HENLOPEN Replacement – Status Report](#)
- VI. [Navy Common Hull Study – Status Report and Preliminary Findings](#)
- VII. [Alaska Region Research Vessel – Status Report](#)

Wednesday, September 25, 2002 - 8:30 am

Welcome and Introduction – Larry Atkinson, FIC Chair, opened the meeting and recapped FIC activities since the last meeting. This meeting will focus on Fleet Renewal issues. The meeting agenda items, [Appendix I](#), were addressed in the order as reported herewith. The meeting participants introduced themselves. The attendance list is provided as [Appendix II](#).

Appropriations and Funding for Fleet Renewal – Agency Status

National Science Foundation (NSF) - Jim Yoder reported on NSF Ocean Sciences activities. There are activities in the planning stages that will require major funding support. These include a new drill ship, observatory initiatives, and an ALVIN replacement. Although the Navy has indicated that they will not support design and construction of a human occupied submergence vehicle, NSF and NOAA still have an interest in this area. They have funded WHOI to study replacement options for ALVIN. They would like to be able to start replacement efforts in 2004. Plans to upgrade the seismic capability provided by EWING are being considered and NSF would like to see this effort begin in 2003 or 2004. NSF will need double-digit growth in order to meet all of these new initiatives. Planning for these initiatives must continue.

How can the community help? The NSF science budget increased because the science community got together and made a common plea for science and the science budget. They were successful. They need to continue to push broadly, and not for their own individual interests. The community needs to be able to explain the exciting science that is being conducted. This will help justify the new science budget.

Jim showed a few viewgraphs. NSF plans to play an active role in the FOFC Regional Class ship renewal plans.

- NSF is currently seriously considering and discussing options to implement the FOFC plan for regional class ships including: 1) joint funding with the Navy and 2) NSF funding only.
- If the latter, NSF will approach this project as they did for *Oceanus* and *Cape* Classes: “common” design for multiple ships, open competition for design, open competition for construction, and open competition for ship operators.

Jim outlined an approximate timetable if NSF is lead on construction Regional class ship.

- In 6-12 months: Call for concept designs (proposals requesting NSF funds to complete preliminary design studies).
- +12-18 months: NSF selects a Preliminary design
- +12-18 months: NSF selects contract design and prepares bid package
- Construction award after 1 October 2005

Construction cost and operation costs will be a constraint for NSF. They would like to limit the budget for each Regional vessel to \$25m and they think that a ship can be built for this amount that would meet the regional requirements. If the budget can be limited to \$25M, these ships could potentially be funded by a new proposed method for mid-size infrastructure. The source of the funds would be from the ocean science program division funds. Margaret Leinen had tried to formalize this method for mid-size infrastructure support, but it didn't get formalized for 2002. They still intend to set aside 5% of their program budget each year, which would translate to roughly \$12-13M per year. After two years there would be enough funds available to support construction of a Regional ship. They would like to start this process with 2003 funds.

NSF would like to use the CAPE HENLOPEN replacement as a cost model for future regional class vessels:

<u>CAPE HENLOPEN Replacement</u>	<u>Regional Class</u>
- Endurance: 19 days	FOFC: 30 days
- Range: 5800 km	FOFC: 15,000 km

Regional Class Workshop – Niall Slowey reported on the Regional Class Workshop and reviewed key elements of the draft SMRs. His viewgraphs are included in [Appendix IV](#). The workshop was held on 15-16 August in Salt Lake City. According to the FOFC plan, the first Regional Class vessel is planned for the Gulf of Mexico in 2005. The second and third Regional vessels are planned for the Atlantic and Pacific in 2010. These vessels must meet present science needs and future needs for 20-30 years. 27 participants representing science users, agency reps and ship operators attended the workshop. There was broad representation both geographically and by discipline. Niall reviewed the meeting agenda. Most of the workshop was spent developing and refining the SMR parameters. Utilization trends and characteristics of existing vessels were reviewed. The group divided to assess the various regional differences and corresponding requirements. Niall provided an overview of the some of the Regional Class general requirements for accommodations, operational characteristics, over-the-side and weight handling, science working spaces, science and shipboard systems, and maintainability.

Niall showed a map of the country demonstrating that the coastline lengths are similar for three regions, Atlantic, Pacific and Gulf of Mexico. However, there are regional differences in the three areas, including environmental conditions. Niall pointed out that compared to the other regions, the Gulf of Mexico region does not have the abundance of vessels with smaller and larger ship capabilities. For the Gulf region there is a different priority placed on size-related operating cost (i.e. 500 gross tons) versus scientific capabilities. It was commented that by adding a Regional ship to the Gulf it would compete with the existing regional vessels in the area.

There is also concern that the designs of the Ocean Class vessels appear to be calling for larger vessels, where as the Regional Class vessel designs are for smaller ships. This could potentially result in a size gap between the two classes. Discussion on the “gap” issue followed.

Research Vessel CAPE HENLOPEN (RVCH) Replacement Vessel Status – Matt Hawkins provided the status of the RVCH replacement effort. His viewgraphs are included as [Appendix V](#). They are currently in the Preliminary Design Phase and plan to have the specifications and drawings ready for bid by early 2003. The shipyard should be selected by mid 2003 for the final design phase. They plan to start cutting steel in 2004 with delivery and sea trials in 2005.

Model testing of the design is planned and has been funded by ONR. The results will be shared with UNOLS and the Fleet Renewal Process. The tank tests are scheduled for 4-5 November at the Vienna Model basin. The focus will be on the normal issues: hull resistance, lateral stability, zigzag maneuvers, etc. Noise issues (propeller cavitation, angle of Z-drive cavitation inception, and cavitation of hull appendages). They have an underwater-radiated noise goal of “below ICES curve at 8 knots.”

A design review meeting was held on September 18th and numerous arrangement improvements were made. The focus of the meeting was primarily on details/arrangement of the labs and aft deck, and van connection with a full-scale mock-up. The design details and progress are posted on the University of Delaware website at: <www.ocean.udel.edu>, “Ships and Facilities.” Matt showed pictures of the mock-up facility.

Matt explained that they made the decision to design the ship so that it is <500GT international and 300 gross tons domestic (GRT) for regulatory and manning reasons. It results in greater flexibility and lower operating costs. There are no inspections or costs associated with the inspections. The vessel will be ABS classed and will be built to “sub-chapter U” (inspected) standards in virtually all respects. The range for the vessel is designed to 3000 nm. Matt pointed out that the range requirement of 8100nm being designated for the Regional Class vessels would drive the size of the ship. They plan to have the ship comply with GMDSS.

A question was asked if there would be a SOLAS requirement? Matt replied that SOLAS is needed if operations are planned in international waters. This will impact the ship’s weight. SOLAS needs to be investigated further.

The cost of the ship is being estimated at \$10-12M. This includes everything; design costs (\$1M), outfitting, etc. This design represents the largest ship that can be built and stay below 500 GT. The design is very scalable. It provides the specifications for a very capable, quiet ship that will be simple to operate. The ship in many respects will be more capable than the CAPE HATTERAS. It will have dynamic positioning, be more maneuverable, carry two 20’-vans, and have a more flexible design. It was suggested that this design be compared to the Regional Class SMRs to determine how many of the requirements could be met.

SMR Discussion (continued) – The discussion on SMRs continued. The issues that require additional attention were addressed ([Appendix III](#)):

- Identify areas where consensus could not be reached
- Regulatory Concerns (<500 GT)
- The “Gap”
- Geographic Differences

The SMR areas that are lacking consensus include:

- Size
- Number of non-crew berths
- Endurance and range
- Equipment handling
- Lab types and sizes
- Storage and science load.

Many of these areas will have a direct impact on the ship’s size.

The discussion returned to the issue of the Regional Class vessel size. Can a ship that is designed to be less than 500GT meet the Regional SMRs? Can a \$25M ship meet the needs of the SMRs? How much is save by constructing a class design? What is lost in capability? Are there significant trade-offs? These are questions that should be

explored further.

The FIC agreed on the following steps:

- Publish the Ocean Class SMR as currently drafted.
- Publish the draft Regional Class SMRs. Add a question for the reviewer to indicate the geographic region that he/she is interested in (East, West, Gulf).
- Draft a short summary/table as and introduction for each of the SMR documents.
- Post the SMRs on the UNOLS website and announce to the community that they are available for input.

It was also recommended that FIC encourage the agencies to move forward with the Regional and Ocean Class conceptual design process.

LUNCH Break

Navy's Scalable, Common Hull Study – Dan Roland (JJMA, Inc) provided a progress report on the status and preliminary findings of the Navy's Common Hull Study. His slides are included as [Appendix VI](#). The purpose of the study was to minimize acquisition costs and maximize technology leverage for new Navy oceanographic ships by examining the feasibility of a common (or similar) hull platform for future AGOR and T-AGS ships.

Four new classes of Navy oceanographic ships were considered in the study:

- 1) OCEAN Class AGOR
- 2) T-AGS 66 (Stretched T-AGS 63 with AUV moon pool)
- 3) T-AGS (X) - Battle space characterization ship
- 4) REGIONAL Class AGOR

The study tasks included:

- 1) Compile desired capabilities for each class.
- 2) Perform ROM studies for each class for various hull forms.
- 3) Identify areas of commonality and attempt to find common or similar hull forms.
- 4) Develop construction and operating cost estimates.

The current status of the project is:

- 1) The IPTs have completed draft desired capabilities for each ship class
- 2) ROM designs have been completed for each class, including monohull, SWATH, SLICE, trimaran, catamaran, and HSV variants.
- 3) Work in progress: Construction cost estimate, refinement of ROM designs, development of recommendations, and final report.

Dan reviewed the desired capabilities that are required for each of the four classes and the ROM for each class. He showed the monohull variants and arrangements for the Ocean Class, T-AGS 66 and T-AGS (X). This is based on the AGOR 23/24 Class design. The SWATH variants and layouts were also presented. The Ocean Class SWATH layout is slightly smaller than the KILO MOANA design.

A series of charts were displayed:

- Speed vs. power for Ocean Class hulls
- Speed vs. power for Ocean Class hulls (SWATH and Monohull)
- Fuel requirement for Ocean Class

Dan showed a chart of the predicted sea keeping performance for recent oceanographic ships

- . All of the monohulls are limited to Sea State 5 (SS5). The SWATHS can get into SS6 for almost all headings. For ocean class monohulls, the best heading will be SS5 and all headings will be SS4. This is for a roll equal to 5 degrees and pitch equal to 3 degrees.

Dan provided a table that shows the ability of six different hull configurations to meet ship requirements for the Ocean Class, T-AGS 66, and T-AGS (X). The table is color-coded:

GREEN

- Can meet full requirement with little difficulty

YELLOW

- Meeting full requirement may be challenging

RED

- Meeting full requirement will be very difficult

The Ocean Class monohull is not expected to be able to meet the requirement for SS6. The Ocean Class SWATH can meet SS6, but there will be some challenging design problems. These issues include its endurance capability, payload, and multibeam performance. The SWATH cannot meet the draft requirement.

It was recommended that as we proceed to the concept design phase both the SWATH and monohull designs be considered so that tradeoffs can be evaluated.

Some of the acoustic performance considerations that were addressed by the study include:

- Bubble Sweepdown:
 - SWATH AGOR 26 has no apparent bubble problems because of hull shape and deep draft.
 - Recent Monohulls (T-AGS 60/63, AGOR 24) have bubble interference with sonar performance.
 - New Design AGOR and T-AGS monohull will require careful hull design and/or sonar wing or bubble diverting fence to maximize sonar performance.
- Machinery Sonar Self Noise
 - Desire for improvement in OCEAN Class over AGOR 23/24 Class.
 - May require more extensive/better resilient mounting, greater sonar-machinery separation, quieter machinery, damping tile.
- Propeller Self Noise
 - Need well-designed, quiet propellers to maximize sonar performance.
 - SWATH especially sensitive to propeller noise because of cross hull path.

Dan wrapped up with some observations and conclusions from the study:

- Minor commonality of desired capabilities exists among the AGORs and T-AGS
- Significant differences in capabilities exist.
 - Speed - Max, Sustained, and Survey
 - Number of Accommodations
 - Working Deck/Lab Areas (T-AGS is 2:1 over OCEAN)
 - Habitability Requirements (T-AGS Requires MSC)
 - Moon Pool
 - Helicopter Landing Capability
 - Mission Electronics and Communications Systems
- The T-AGS (X) platform is 50% longer and 2.5x displacement of the OCEAN platform.

A common hull platform for OCEAN Class and T-AGS 66, T-AGS (X) is not feasible

The primary design drivers include:

- Sea keeping
- Speed
- Number Of Accommodations
- Labs/Working Deck
- Endurance
- Science Payload
- One Degree Multibeam
- Mission Storage Volume

The monohull and SWATH appear to be most promising choices for the Ocean Class vessels; however, there are pros and cons for each.

Design and Construction Efforts in Progress:

KILO MOANA: Chris Measures gave an overview of KILO MOANA. He showed a video of the ship as it arrived in Hawaii. The video showed the deployment of a sparbuoy, demonstrating the freeboard issue. There is a problem with the CTD arrangement related to the height of the Appleton crane and the feed. There are plans to correct the problem with the possible installation of a squirt boom. Chris showed video footage from inside the vessel. There were views of the open galley, mess area, exercise room and labs. Problems with the underway seawater have been reported; it is in the 12Khz path. Chris showed the multibeam system lab and computer lab. These are working well. They plan to run multibeam continuously while underway. Heat in the engine room is still a major issue.

The ship was delivered on June 24th. The University of Hawaii personnel worked hard to get the ship ready for science operations in just 90 days.

Post Cruise Debrief questions – Prior to the meeting, Terry Whitledge and Dave Hebert compiled a list of questions to get specific feedback from PIs who will use KILO MOANA. They are included in [Appendix III](#). It was recommended that the following questions be added to the list:

- Was the computer network system adequate?
 - Ease of hook-up
 - Initial start-up
 - Adequate access points across various labs, meeting rooms, staterooms and other areas.
- What is the habitability of the lounge, staterooms, mess deck, and fitness room?
- Are there any noise and vibration feedback concerns?

The debrief questionnaire will be revised to include these new questions. FIC will provide the questions to the PI prior to the actual debrief. The FIC members will contact the PI by phone approximately a month following the cruise to conduct the debrief. The issue of motion evaluation for KILO MOANA was discussed. Data is being collected on KILO MOANA. This is providing a resource, but not an evaluation. FIC recommended that the agencies support a proposal by WHOI, SIO, and U. Hawaii to evaluate the ship motion for monohull and SWATHs. The evaluation should consider Sea State conditions vs. ship motion and its impact on science operations. Wave slaps on the hull should also be analyzed. The type of sea conditions should also be recorded.

Alaska Regional Research Vessel (ARRV) - Terry Whitledge reviewed the status of the ARRV preliminary design process. His viewgraphs are included as [Appendix VII](#). A design review meeting was recently held. The latest design modifications include:

- Removed the helicopter facility – It appeared they would not be used enough. It would be nice, but they could probably use charters, even for refueling.
- Rearranged the boats
- Relocated the mess / galley
- Reduced the stateroom size – This allowed for more single staterooms and additional bunks 24 to 27.
- Segregated crew / scientists staterooms.

Terry showed slides of the outboard profile, 02 deck, and 01 deck. He showed a stateroom comparison. The latest modifications include identifying the moon pool locations and arranging the long coring capability. The long core arrangement will be capable of an 80-ft core.

They are working on the design noise investigation. The ABB data received has been received as well as the Schottel Z-drive noise estimate. Neither option meets ICES

(preliminary) criteria. Further investigation is required for a comparative evaluation. They plan to get noise data from REVELLE for evaluation. If noise issues are going to be a problem with the ARRV's Azipod, other options will be considered.

Terry reviewed the basic ARRV characteristics including dimensions and capacities.

Dimensions:

Length, Overall	226'-0"
Length, Waterline	200'-0"
Beam, Maximum	52'-0"
Depth, Hull	28'-0"
Draft, Design Waterline	18'-0"
Freeboard, Main Deck	10'-0"

Capacities - Science

Science Berths	27
Science Labs	2,000 ft. ²
Deck Working Area	2,700 ft. ²
Science Storage Volume	8,000 ft. ³
Science Storage Load	100 LT

Terry showed the preliminary hull geometry and performance characteristics:

Speed, Max	14 kts
Speed, Cruising	12 kts
Level Ice	2.5 ft
Endurance	45 days (this is a design driver)
Installed Power	5,750 hp

The model test results have been good and in some cases better than expected. The draft resistance and propulsion report has been received. They expect the sea keeping report at the end of September. The final ice test report has been received. The noise evaluation and open water sea keeping report are the only two outstanding items. They hope to get final report out by end of year.

Fleet Renewal Discussion – revisited – Larry continued the discussion on Fleet Renewal and FIC's responsibilities. He showed additional slides that are contained in [Appendix III](#). The committee needs to stay focused to keep the process moving. A short summary and table of SMR parameters needs to be added to each of the SMR documents. An EOS article advertising the availability of the SMRs and need for input should be considered. We need to move forward quickly with the Regional Class SMRs as NSF has indicated that they would like to move forward with a call for concept design proposals. Tim Pfeiffer added that the Navy would also like to have the Ocean Class SMRs available to proceed with the design phase as funds become available.

The timetables for design and construction of the Ocean Class and Regional Class vessels were reviewed. The tables clearly show that the process must proceed in order to be able to bring ships into the fleet according to the plan laid out be the FOFC plan. Pete Kilroy commented that the design process could be shortened to be able to meet the FOF plan. The FIC acknowledged this, but emphasized that the design and development phase should not be shortened at the expense of community input. Community input is essential.

There was additional discussion on the acquisition process. It was suggested that it would be beneficial to generate a "family of designs" for each class of vessels. These designs would likely have similar characteristics, but there would be some unique features from ship to ship.

Matt Hawkins remarked that he will contact the architect involved in the CAPE HENLOPEN replacement effort to determine what would be involved to scale-up that design to the regional vessel size.

FIC Membership – Bill Smethie's second term on the FIC is ending. First terms for Dave Hebert and Mark Brzezinski end on 9/02. Both are eligible for second terms. Dave has agreed to stay on, but Mark has decided to step down. Additionally, there is one other position on FIC that needs to be filled. A call for nominations was included in the UNOLS Newsletter with a deadline of 1 November. The call provides the qualities that are needed to maintain a geographic and disciplinary balance on the FIC. The UNOLS Office has a list of individuals who have expressed an interest to serve on the committee in the past. FIC suggested others who would make good candidates. The UNOLS Office will collect all names and circulate them to the FIC in November for selection. We will do this via e-mail.

Wrap-Up – Larry will summarize the FIC meeting activities and recommendations for the report to Council tomorrow.

The meeting was adjourned at 4:30 pm.