UNOLS FLEET IMPROVEMENT COMMITTEE MEETING
Monterey Bay Aquarium Research Institute and
Moss Landing Marine Laboratories
Moss Landing, CA
March 10-11, 2009

Meeting Minutes

Executive Summary:

The UNOLS Fleet Improvement Committee met at Monterey Bay Aquarium Research Institute (MBARI) and Moss Landing Marine Laboratories (MLML) on March 10-11, 2009. The first day of the meeting focused on the draft Fleet Improvement Plan, fleet acquisition efforts, the SMR update project, and new technologies and systems.

Day two of the meeting included a joint session with the UNOLS Council. Reports and updates on Fleet renewal activities were provided. Agency representatives reported on budget projections and facility acquisition efforts. The Fleet Improvement Plan was endorsed by the UNOLS Council with the addition of a recommendation to implement green technology to the fleet.

Appendices

I	Agenda
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III	FIC Action Item List (pdf)
IV	Alaska Region Research Vessel Update (pdf)
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X	Kilo Moana Handling System – Status (pdf)
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XII	Bubble-Sweep Down Study - PowerPoint (3.9 MB) with link to Video Clip (12.2 MB) Bubble-Sweep Down Study - pdf without Video Clip (2 MB)
XIII	Weatherbird II Update (1.7 MB pdf)

FIC Action Items – New and Continuing

- Keep abreast of new technologies entering the UNOLS fleet (e.g., the over-the-side handling system on the RV *Hugh Sharp* and RV *Kilo Moana,* WHOI Long-Coring System)
- Ocean Observatories - Stay in contact with OOI Office.

- Design and Construction Efforts - Stay engaged in ongoing design and construction efforts (Regional Class, ARRV, Ocean Class, etc.)
- Keep informed on projects related to improvement of the UNOLS fleet (e.g. fuel saving, Integrated Survey System, bubble sweep down mitigation)
- Continue SMR Update Project
- Fleet Improvement Plan Implementation – identify strategies for moving forward with

Meeting Report:

Day 1 – March 10th

Call the Meeting: The UNOLS Fleet Improvement Committee (FIC) met on March 10-11, 2009 at MBARI and MLML in Moss Landing, CA. Dave Hebert, FIC Chair, called the meeting to order at 0830 and provided an opportunity for introductions. The meeting agenda was followed in the order recorded in these minutes. The meeting agenda is included as ***Appendix I*** and the meeting participant list is ***Appendix II***.

Accept the minutes of the October 2008 FIC Meeting - Annette pointed out a typo: in the title change 2007 to 2008. The meeting minutes were accepted with the correction. (Cochran/Suchy)

Review FIC Action/Task List - Dave Hebert reviewed FIC's action item list. The list is contained in ***Appendix III***.

Opportunity for Agency Comments:

National Science Foundation (NSF) - Bob Houtman reported that it has been a busy time at NSF. NSF is slated to receive $3B from the Stimulus funding (ARRA). They are trying to put together a plan on how the funds will be spent for OMB. The plan must include jobs. It is a challenge putting this all together.

Office of Naval Research (ONR) – Tim Schnoor reported that the budget has been a challenge and funds are only available for operations. They cannot fund maintenance or upgrades. Hopefully these can be supported in 2010. The Navy isn't benefitting from the stimulus funding.

Fleet Improvement Plan (FIP) – The draft FIP document has been provided to the Council for review. Discussion:
- Maureen Conte – Should the plan be updated in terms of OOI? Dave said that there are Ship Time Requests for OOI. The OOI office is looking at various options. It would be very difficult to figure out now how OOI plans will evolve.
- Marc – He feels that we should move on and publish the FIP as is.
- Mike Prince – He endorses Marc's idea. This will be a living document.
- Tim Schnoor – In the recommendations, remove the line about "consideration given to geographic placement" in regard to the Ocean Class vessels.
- Jon Alberts – Some of the ship retirement dates are here now.

- Bob Houtman – During the ship inspections, they will look at the physical condition to determine how much life is left in these vessels. They will use this information to make long term plans regarding demands on the fleet and the use. They need to know how much money it will take to keep the ships running. This will be an open process.

It was suggested to make the following changes:

- Any ship with retirement dates in 2008 and 2009 change to 2010
- Change "retire" to "projected end of service life"
- Page 54 – "remove geographic placement"
- Change projections to match 2010
- Add an asterisk for ships nearing retirement dates to say that the conditions of these ships are being evaluated.

Fleet Design and Acquisition Efforts:

Alaska Region Research Vessel (ARRV) – Marc Willis provided a status report on the ARRV. His slides are included as ***Appendix IV***. The complete ARRV design package is available on the ARRV website http://www.sfos.uaf.edu/arrv/. The ARRV schedule was accelerated to qualify for ARRA stimulus funding.

Discussion:

- Dave Checkley – What is the timeline. Bob Houtman – ARRV sea trials are planned in 2013 and the ship will enter service in 2014.
- Vernon Asper – Is there a buy American clause in the ARRA and will this impact the project? Bob Houtman – Yes. They are working to comply with all constraints.
- Al Suchy – The design review panel made some recommendations regarding the ship's stability. Marc – The stability issues are being addressed. The panel recommended anti-roll tanks. The tanks had been considered early in the process, but removed. Now they are being suggested again. The ship design is being revisited with a vessel of greater length and anti-roll tanks. There are a lot of unknowns.

Ocean Class –Tim Schnoor (ONR) and Chris MacDonald (PEOShips) provided the status report on the Ocean Class AGOR project to build two vessels. Their slides are included in ***Appendix V*** and include the:

- History/Status of Acquisition Efforts
- History of Specification Development
- Acquisition Schedule
- Proposed UNOLS "At-Large" Representation
- Proposed Operator Representation

The Ocean Class AGOR Phase I/II Solicitation will be release in March 2009 and proposals are due in June 2009. The contract awards are expected in August 2009 and the first design reviews would follow in November 2009. If all proceeds on schedule, the ships would enter service in FY2014.

Tim reported that it is ONR's intention to fund one person who could represent UNOLS interests in the design and construction process. They are reasonably confident that it would occur. Hopefully by the first design review this would be in place. They would not fund an alternate representative.

Chris said that the Navy wants one voice from the community. He doesn't want to be in the position of deciding which to go with. He understands the need for an advisory group and thinks that it can be an option. The group wouldn't be formed until after the operators are selected.

Discussion:

- Dave Hebert explained the importance of a UNOLS advisory group for the Ocean Class. Individuals with expertise in the various research disciplines are needed for advice.
- Annette – Would ONR like any input regarding a UNOLS Rep? Tim – At this time, input is not needed.
- Chris – The first design reviews are planned for October 2009 and the Rep should be in place at that time.
- Houtman – Will the Navy RFP for ship design/build teams be for one ship with an option for a second? Chris – the RFP will be for two ships. Tim – The bid process will also be for two operators. So the operators will be known when we try to form the advisory groups.
- Tim – They do not have a date for the RFP for operators, but it will likely be by summer 2009. The operator institutions would not be represented on the advisory groups.

Regional Class Designs – Bob Houtman reviewed the NSF Phase I designs for the Regional Class ships. His slides are contained in ***Appendix VI*****.** He started off by saying that NSF has not given up on the Regional Class acquisition. However, **c**ontracts are being closed out with NAVSEA and the NSF/NAVSEA MOU is being terminated.

NSF will move the program forward. Both RCRV designs are complete. In the Spring/Summer 2009, NSF will convene design selection committee to provide a down-select recommendation to NSF. Members include some original RCRV Technical Advisors from Phase I (UNOLS ship operators, technical support, scientists) plus ship design/construction experts ~10 total. In the fall 2009, NSF will make a final design decision.

NSF will develop a solicitation for "Construction and Operation of the RCRV" following the ARRV process model. If construction funds are identified, the following schedule is planned:

- 2010 Release Solicitation/Review Proposals
- 2011 Shipyard Selection
- 2012 Construction
- 2015 Operations

They don't expect the RCRV project to be a MRE-FC project which is a separate funding line. They expect that the RCRV will have to come out of GEO and OCE mid-size infrastructure funds.

NSF is still on a continuing resolution and don't know their 2009 and 2010 budgets.

Discussion:

- Marcia – Does NSF own the ship designs? Bob Houtman – Yes. In the down-select process, it would be just for the design. There are no plans to use the original teams.
- Annette – Would the solicitation be for one ship with options for additional vessels? Bob Houtman – Yes.
- Dave Checkley – Will funds be available in OCE? Bob – It is difficult to tell.
- The model would be for one institution to manage the construction for all options.
- Dave Hebert – Will the mid-size infrastructure budget increase? Bob – The budget is about $15M - $20M per year. However, there are other competing projects. As OOI ramps up it will require funding for operations from OCE. They would have to save up.

Mid-morning Break

SMR Update Project - Dave Hebert provided an update and gave some background on the project. His slides are contained in ***Appendix VII*****.** The project tasking is also available at <http://www.unols.org/committees/fic/smr/update08/index.html>. The webpage also includes:

- Project Documents
- Project Statement
- Reference Materials
- A form for submitting feedback

The status of the project is:

- Ocean Class SMR Table of Values and Priorities was been drafted by Mike Prince: http://www.unols.org/committees/fic/smr/update08/OCSMR_Summary_Table_091608.pdf
- FIC reviewed SMR table during their August phone meeting
- Conducted community survey of Ocean Class SMR table http://www.unols.org/forms/_OCSMR_FeedbackForm.asp – Late Summer/Fall 2008
- FIC Review of Community Feedback – Early 2009

At this meeting FIC will address the SMR elements that lack community consensus.

Mike Prince followed with a review of the community response received to date. 169 responses were received. The SMRs should be an attempt for the scientists to define what they needed.

Discussion:

- Mike –Maureen Conte – She and many of the community members did not understand what they were being asked.
- Jim Cochran – There is no consensus on many of the items.
- Mike reviewed the OCSMR spreadsheet.
- Discussion on science party size:
    - Chris McDonald – If you have more bunk sizes, you have to increase everything – life boats, ship stores, etc. If you could identify serge capability it would be useful.
    - Marc Willis – He would not recommend serge capacity. The space has to be accommodated for. He really feels that ships are not going to sail half empty.

    - Mike agrees - These bunks will be used for training and opportunities.
    - Marc – He is in favor of smaller single berths for the crew.
    - Maureen Conte –In the future there will be fewer Global ships. There are more and more students going to sea. We need space.
    - Rich Findley – Single berths for marine techs should be considered. We should request up to three single staterooms for marine techs.
    - Chris – They are very constrained by funds for the OCRVs
    - Chris – the ADA is stateroom on main deck. This is a double, but one bunk is for ADA.
- Maintain between 70° - 75°F (20° - 24° C). Meet the requirements for 80% of the anticipated environmental conditions. Change this to operate all the time in a wider range.
- We may need to articulate this further to address lab spaces. The narrow temp range might be needed in the lab spaces and would have to account the head loads as well.
- Chris – He has a table that includes the temp ranges for different spaces, as well as the humidity.

Lunch

SMR Update Project – We wrapped up the morning discussion on the SMR table review. Mike Prince will finalize the table with the comments received.

Presentation on the ISS-2000 Integrated Survey System – Pam Clark (JJMA/Alion) gave a presentation on the ISS-2000 software package that is used for surveying and integrates inputs from the sonar systems, dynamic positioning system, and data acquisition systems, all with a graphic user interface (GUI). SAIC's Newport office developed this. They develop the software for the hydrographic surveys for NOAA. Pam's slides are included as ***Appendix VIII*****.**

ISS-2000 is a real time data acquisition system. An integrated survey system is not stated in the UNOLS SMRs. They would like to suggest including ISS-2000 for data format providing a uniform data collection and system on the new Ocean CLASS AGOR.

Pam provided some background on the ISS usage for NAVOCEANO and NOAA (see slides). The ISS & SABER use on UNOLS ships has included *R/V Kilo Moana and R/V Roger Revelle.*

ISS-2000 provides:

- Single monitoring workstation for multiple oceanographic equipment
- Real time navigation monitoring and editing
- Real time data analysis
- Data archiving to processing computers and/or NAS

ISS-2000 consists of a 4U rack mounted computer and dual monitors. The ISS-2000 computer is built with a timing card for timing synchronization. The computer uses multiple port expansion digi-boards for serial interfaces. ISS-2000 uses a VLAN for setting up isolated IP networks to minimize data traffic.

The operator can control many of the equipment settings from ISS-2000 software through Parameter Control interfaces. It does not increase the number of operators required and provides a single control interface for different equipment. Once the network is established data archiving can be set to "auto-Data Archiving" to archive files during data acquisition.

Some additional features of the ISS include:

- ISS-2000 is designed to automatically alarm the operator when the system is exceeding the operator set parameters, allowing the operator to monitor the integrated system in real time.
- The ISS Navigation Display allows the operator to view the data in real time while monitoring the survey progress and navigation information.
- Multibeam data can be viewed in real time to verify data quality.
- ISS-2000 can handle positioning of towed arrays using proven algorithms.
- ISS-2000 collects swath bathymetry and beam amplitude imagery data in GSF Format. GSF is designed to efficiently store and exchange information produced by geophysical measurement systems before it has been processed into either vector or raster form. Generic Sensor Format (GSF) is a standard file format for bathymetry data and widely used in the maritime community (US and the UK).

The ISS-2000 GSF supported equipment is listed in Pam's slides.

Discussion:

- Dave Checkley – What is the cost of the system? Pam – There is an initial cost for the installation package. $75k and then there is annual upgrade costs of $5k.
- Dave Checkley - Is the source code open? Can you adapt it as you like? He would like to tailor the system for his own use. Pam – The vendor would want to do that.

Ocean Observatories Initiative (OOI) Projections -Status report on Final Design Review and Implementation plans - Dave Hebert reviewed the OOI status as provided by the OOI Office (see ***Appendix IX***). Sue Banahan wrote to say that OOI is waiting for guidance from NSF and for now the projections that were presented to FIC in October 2008 still stand.

The OOI Final Design Review (FDR) was held in November 2008. OOI is pending NSB approval with construction to start in summer 2010. During the interim period, OOI will carryout demonstration projects, reduce risks, and prepare for acquisitions.
The OOI project components include:

- 3 Global scale nodes in Southern Ocean, Station Papa, and Irminger Sea
- 5 Regional scale nodes in NE Pacific, cabled plate-scale observatory
- Coastal scale assets in the Mid-Atlantic Bight shelf-break (Pioneer Array) and NE Pacific continental slope (Endurance line)
- Each scale incorporates mobile assets
- Cyberinfrastructure to enable adaptive sampling, custom observatory view, collaborative analysis
- Interfaces for education and public engagement

Discussion:

- Marcia McNutt – At the Ocean Leadership meeting they were told that this OOI plan (as presented in the slides) was totally changed and that it was public. Is that the case? There are huge changes for the Regional Scale Node (RSN).
- Bob Houtman - This is a clearly a topic that has the interest from a lot of groups. NSF's number one objective is that OOI does not miss a funding opportunity in 2010. If OOI does not get approved by the NSB during their spring 2009 Board meeting, and OOI is not deemed for ready for construction, the chances for OOI implementation are greatly diminished. Since FDR in October 2008, NSF (through the Director) has reviewed the OOI design and has developed a variant.
- Marcia – Has this happen to other NSF programs? Houtman – This has occurred at various levels but typically over longer time frames.
- Bob – The variant brings the project better in alignment with the project focal points. The Director of NSF has phoned the NSB chair to let them know that the project has a modified scope and direction. Tom Killeen has been involved. They are looking at a 4th global node off Argentina. They are adding a line off of Washington. There is a reduction in the number of RSN nodes. The variant retains the mid-plate observatory, but without sensors. Two nodes are removed.
- Bob – This direction was taken in Jan/Feb. NSF has convened a blue ribbon panel to look at the variant design (two weeks ago).
- Marcia – She hopes that this group looks at the operation and maintenance (O&M) costs. They have removed the items that were cheaper to maintain and inserted the items that are most expensive.
- Bob – It is pre-decisional at this point, but it is a scope that is being considered. It is a different approach. O&M estimates are being developed. They don't want O&M to have an unlimited budget. In terms of construction dollars the new plan is less expensive, but in terms of operations, it is higher.

Kilo Moana Update – Dave Hebert summarized a status report on the acquisition of the new Load Handling System for *Kilo Moana.* Sandy Shor (University of Hawaii) provided images and a video of the system. U.Hawaii hopes to have the system installed in November. Caley has advised them that they expect to be ready for Factory Acceptance Tests in late March 2009. Hawaii is organizing travel to send a few of their folks over to observe the tests. Assuming that they go well, the system will be shipped to Hawaii and it'll arrive early summer. They have scheduled time to install it at the first opportunity, which begins in late November.

Discussion:
- Al Suchy – What has been the cause of the delivery delay? Marc – There were a few issues with working with Caley. Also, ABS wasn't familiar with the SWATH vessel. There were disagreements between the ABS Houston and London offices.
- Mike Prince mentioned that NERC experienced many problems with their Caley system on the *Discovery*.
- Maureen Conte expressed the concern over the trace metal issues associated with the handling system. Why go this way? Mike Prince – It opens the weather window and allows hands-free operations.

WHOI Long-Coring System – Dave Hebert summarized user feedback from the *Knorr* cruise on Jan 12 – Feb 23, 2009. Steve D-Hondt was the Chief Scientist and his comments along with images are included in ***Appendix XI***.

All scientific objectives of the expedition were met, through a combination of long cores (piston and gravity), short gravity cores, and very short multi-cores. The long piston coring capability enabled them to identify the deepest penetration of oxygen ever observed in marine sediment. One or two long piston cores were recovered at 8 of 11 sites. The longest of these was 41 m. The long-coring system was successfully used as a long gravity corer (at sites 3 and 4). Cores with lengths of 18m and 21m were recovered in this manner.

There was failure of one or more piston-coring attempts at 5 of 11 sites. In most cases, this was because the piston corer's electronic release mechanism did not work. In two cases, it was because the trigger system failed. In one case, it was because the drum used for the coring rope failed. The consequences of the failures are detailed in the slides. They had to recover the core line by hand and required all hands on deck to support the operation. Core quality issues with new piston-coring system are described in detail in the slides.

Dave concluded by saying that this was a learning experience. There needs to be better management of the support people; they were working 24 hours/day at times.

The next long-core cruise is in a month.

Break

Bubble-Sweep down Study and Mitigation for Improved ADCP Data Quality – Dave Hebert provided a report on a bubble-sweep down study that was conducted by Bob Fratantoni (URI), Thomas Rossby (URI), Charles Flagg (Stony Brook University), and Stephan Grilli (URI). Dave's slides are included as ***Appendix XII***.

An ADCP system was installed on the ferry, M/F *Norröna*, in January 2006 in Hamburg, Germany. The instrument was functioning properly, but the data was spotty and poor. As the ferry entered open seas, the acoustic backscatter amplitude became erratic and of poor quality.

Candidates for the source of the problem included:

- Internal machinery-generated vibration
- Propeller noise
- Electronic interference due to the long length of cable that necessarily ran along-side some of the ship's power cables
- Bubble Sweepdown

A CritterCam was used to assess the problem. The camera records one minute of video every four hours. Permanent magnets attach the camera to the hull.

The CritterCam results:

- Best results come from videos taken during daylight hours

- Bubble clouds are produced in the turbulent bow wave as the ferry pitches up and down the clouds approach lens at fairly regular intervals
- Using the height of the fairing (21 cm) as reference, one can estimate the thickness of the clouds seen in the video as roughly 30 cm thick

A video of the critter cam was presented. Strategies for mitigating the problems were explored. Computational Fluid Dynamics was performed to address the following questions:

- Can the shape of the fairing be improved to reduce the stagnation pressure at the leading edge of the fairing?
- Can the addition of rails placed ahead of the fairing produce significant upwelling to bring bubble-free waters from depth up to the face of the transducer?

The results of the strategies explored, along with images are provided in the slides. The data is better than it originally was, but it still could use some improvement. Another bubble movie would be useful.

***Hugh R. Sharp* User Debriefs** – Dave lead a discussion on the debrief questions for the *Hugh R. Sharp*. A draft set of standard user debrief questions was prepared by Jim Bauer.

Discussion:

- Maureen Conte – The debrief questions should specifically address the features that are new to the ship and ask about the effectiveness of these features.
- Mike Prince – We want to look specifically at the features of the ship that are new or unique and that we might want to employ in the future:
    - Load handling system
    - Retractable keel
    - Noise and vibration reduction methods
    - Flexible van design
    - Was it a worthwhile design decision to keep the ship below the inspection level?
    - ADA features.
- Mike, Annette, and Jim Bauer will re-examine the debrief questions with these suggestions in mind and redistribute the revision to the FIC.
- Marc Willis – He isn't in favor of the debrief interviews unless we are going to use the data.
- Maureen Conte – She thinks it is important to understand the new features of the ship.

FIC Membership Changes and Nominations in 2009 – Dave Hebert reviewed the FIC Membership changes. Clare Reimer's second term ended in January 2009. Al Devol replaced Clare.

Maureen Conte and Al Hine's first terms will end this year and they are both are eligible for a second term. David Hebert (FIC Chair), Toby Garfield, and Jim Bauer's second term will end in September. The Office will send out a call for nominations. FIC members interested in the Chair position should contact Annette.

Other business and Additional Reports:

Reduced Fuel Consumption by Improved Directional Stability on Z-Drive Ships – Tim Schnoor reported that the cost for Carderock to conduct a study on reduced fuel consumption by improved directional stability on Z-Drive ships was too high to move forward. The Navy would like to see the fuel cost saving estimate for their survey ships.

Weatherbird II* Improvements** – Al Hine sent a set of slides that were presented at the meeting. See ***Appendix XIV. The slides provide the ship status and improvements that have been implemented on *Weatherbird II*. The ship dedication was held at the USF College of Marine Science Pier and the first cruise is scheduled for March 20, 2009. The vessel is owned by the University of South Florida and operated by the Florida Institute of Oceanography representing 11 state universities, RSMAS, Mote Marine Lab, and state labs. The slides include images of the various lab spaces and decks.

Ocean Class Science Mission Requirements (SMRs) Revisited - Discussion:

- Marcia – She wonders if the OCRV SMRs should state that it is "critical" for 40 days endurance. Chris McDonald – The endurance may not have a huge impact on the vessel design.
- Chris - 11 knots cruising speed is being considered for this vessel.
- Pam Clark– The towing requirements were driving the horse power requirements which in turn resulted in 11 knots cruising speed.
- Al Suchy – The science party requests increases in ship speed to pick up lost days; it happens all of the time. With these SMRs, we won't have the ability to do this. The ships have to go flank speed often. If you are going into the world's ocean you need to have speed.
- Marcia – The scientists need to plan their cruises with contingencies.
- Question - Why is the ship's draft included in the SMR document? Reply - Scientists want to work in areas where the ports have water depth constraints.
- Chris – The OCRV design has a 17 ft maximum depth.
- FIC was asked to review the rest of the SMR items and provide feedback.

Adjourn Day 1 at 5:00 pm.

Day 2 – Wednesday, March 11th: Moss Landing Marine Laboratories – Seminar Room

Day 2 was a joint session between the FIC and Council. The minutes for the joint session are included with the Council minutes and are available at http://www.unols.org/meetings/2009/200903cnc/200903cncmi.html.

The FIC meeting adjourned at noon on March 11, 2009.