

UNOLS FLEET IMPROVEMENT COMMITTEE MEETING

The National Science Foundation

Wednesday, October 13, 2010

Stafford II - Room 555

Arlington, VA 22230

Meeting Minutes

Executive Summary:

The UNOLS Fleet Improvement Committee (FIC) met on Wednesday, October 13, 2010 at the National Science Foundation (NSF) in Arlington, VA. Vessel design, acquisition efforts, and science mission requirements were discussed. Updates on new systems were provided including the load handling system for *Kilo Moana* and WHOI's Long-Coring System. User debriefs and a plan to evaluate R/V *Hugh R. Sharp's* new technologies was discussed. Jean McGovern provided an update on the Ocean Observatories Initiative (OOI) facility projections including their timeline and implementation plans. Al Devol provided an update on the University of Washington's plans for replacement of the R/V *Barnes*.

FIC Action Items (New and Continuing):

Design and Construction Efforts:

Ocean Class Research Vessel (OCRV):

- **Mission Equipment System (MES) List** – Navy requests FIC's input on the baseline MES for the OCRV. This is the list of equipment that is affordable – Can the community live with the baseline equipment? If additional funds are available, is the list of additional equipment adequate and the right priority?
- **Identify members for an Ocean Class Advisory Committee (OCAC).** The OCAC will work with the Navy to define the task and role of the OCAC. OCAC expertise in the following areas is desired: Biology, PhysO, MG&G, ChemO, and Acoustics.

Science Mission Requirements (SMRs) Update:

Ocean Class SMRs:

- Compare the Ocean Class SMRs to Phase I Industry Team RFP Performance Specs to see how designers and spec writers have interpreted the SMR. Use this to add more specific information to OC-SMRs, paving the way for Global Class SMRs
- The OCSMR document requires an updated to be consistent with the table values.

Regional Class SMRs - Clare will draft a memo to Bob to request what would be most helpful in terms of the RCRV SMR documents.

General SMR specifications and principles - FIC will review a preliminary list of specifications that apply to all SMRs and that can form a stand-alone document.

Polar Research Vessel (PRV) SMR Refresh Project – A PRV Committee has been formed and plans for an SMR refresh workshop and development are underway. FIC - Keep abreast.

Fleet Planning:

- **Projected Service Life End Dates** - Review projected end of service life dates for the existing fleet and work with NSF to make recommendations on new end dates, investments, and upgrades through to 2030.
- **UNOLS Vessel Ship Classes** – Review current UNOLS Vessel Classification and consider revisions as suggested by NSF.
- **R/V *Barnes* Replacement** – Stay abreast of UW efforts to replace R/V *Barnes*.

FIC Membership and Nominations - One operator position is open on FIC. Geophysics and a big ship user are desired.

UNOLS Outreach/Mentoring Initiatives:

- **Create a UNOLS mentoring program** that will introduce junior scientists to cruise planning and participation. Prepare a proposal for a mentoring program.

Fleet Improvement Plan (FIP):

- **Appendix on Ocean Acoustics** – David Bradley has volunteered to draft the Appendix.
- **FIP Recommendations** - Follow-up and work to implement the 10 FIP recommendations. Identify areas where additional assistance or resources are required.

Keep abreast of new technologies entering the UNOLS fleet:

- **RV *Hugh Sharp* Debriefs** -
 - Review the *Sharp* schedule for any changes and assignments - Clare
 - Continue FIC R/V *Hugh Sharp* debriefs
 - Debrief summaries should be sent to Clare and Annette
- **RV *Kilo Moana* Load handling system** – FIC will obtain feedback on the system performance and capabilities.
- **WHOI Long-Coring System** – Clare will contact the PIs for user feedback.

Ocean Observatory Initiative - Stay in contact with the OOI Office for the latest facility update.

Greening the Fleet: Construction, life cycle, and recycling: - Stay abreast of greening initiatives and the activities of the Council.

FIC Guest Speakers – Identify potential speakers on special topics of interest to FIC.

Appendices

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Meeting Summary:

Call the Meeting: Clare Reimers, FIC Chair, called the Fleet Improvement Committee (FIC) meeting to order and provided an opportunity for introductions. The meeting followed the agenda, *Appendix I*, and the meeting participant list is included as *Appendix II*.

Review Upcoming FIC Membership Changes – Clare reported that Jim Cochran is completing his second term on FIC and a replacement will be needed. The FIC membership list is included as *Appendix III*. Al Hine and Jim Cochran said the FIC would benefit by a member with experience in Geophysics and who is a big ship user.

Discussion of need for speakers on special topics of interest to FIC at future meetings - Clare reported that she hoped to have a speaker, a noise expert, at the meeting. Is this something that the committee would like to see?

- Al Hine – This is critically important.
- The UNOLS Office can support speaker attendance on a case-by-case basis.

Agency Comments:

National Science Foundation (NSF) - Bob Houtman reported that this has been a very busy time. NSF is very appreciative of FIC's support. There are a lot of activities that will be reported later in the meeting. NSF is on a continuing resolution (CR) and doesn't know the amount of their 2011 budget. They are not permitted to start new projects.

Navy - Tim Schnoor reported that the Navy has a budget and it is approximately at the same level as last year. The Alvin Upgrade project continues to move forward. FLIP is going into dry-dock today.

National Oceanic and Atmospheric Administration (NOAA) - Ralph Rogers reported that he will now represent NOAA at UNOLS meeting. NOAA is also on a continuing resolution.

Fleet Renewal Activities:

Regional Class Research Vessel (RCRV) – Clare Reimers reported on the FIC response to the NSF's RCRV task. Her slides are included at *Appendix IV*. Clare reported that on March 25, 2010, FIC received the request for input on the RCRV design from NSF. FIC met via five web conferences from April to July to discuss 13 specific questions presented by NSF and compiled responses. The UNOLS Council was given an opportunity to comment on the FIC responses from August 12-29th. On August 30th FIC submitted their responses to NSF.

The major recommendations:

- Increase aft deck space by both shortening the deck house and increasing vessel length (10-ft to 20-ft)
- Re-review sea keeping and operational requirements before finalizing choices of propulsion drives and bow thruster early in refresh
- If the decision is to install Z-drives, consider spare parts pool
- Design measures are needed to reduce bow thruster noise and vibration
- Increase power to achieve 12 knots average cruising speed
- If time and funding allow, remove bulbous bow from design due to bubble sweep down risks
- Consider innovative hull lines to reduce fuel consumption
- Abandon *SHARP* style van mating
- Reconsider retractable centerboard (only if bulbous bow is removed)
- Add EM710 (75kHz) and parametric SBP
- Establish an achievable URN curve appropriate to mission requirements
- Design suitable incubator space and increase science storage space
- Keep a dedicated lounge and 16 science bunks
- Lab space must be adequate to accommodate a science party of 16 people

- Remove incinerator and develop waste management plan

Bob Houtman continued with the RCRV report with a summary of the RCRV project. His slides are included as *Appendix V*. NSF is investigating funding options for an ARR-V-like” process. Their solicitation for operation and construction has been drafted. The project will have two phases.

Phase I will entail a “Project Refresh” including a conceptual design review (CDR), preliminary design review (PDR) and a Final design review (FDR).

The optimal schedule is:

- Release Solicitation - Late 2010/Early 2011
- Begin Construction - Early 2014
- *Science Operations - Late 2016*

The problem is that NSF is working under a CR and the RCRV project can be seen as a new project, which can't start. NSF would like to follow the University-build model, like *Sikuliaq*. They would like to build up to three ships, but this would depend on the funding. If they only get funds for one ship, they will select one operator. If they have funds for three ships, there would be a lead builder University and the other two operators would be selected.

With every project there are risks. NSF slowed down the *Sikuliaq* project to make sure that they had the right team in place. They learned a lot from the ARR-V project and will implement the lessons learned.

Discussion:

- Al Hine – Is there an RFP out now? Bob Houtman – No, but they hope to have it out soon. There would probably be a 3-month response time.
- Al Hine – What did the University of Alaska Fairbanks (UAF) have to provide in support of the ARR-V project? Bob – NSF would not support improvements to the homeport facility and pier.
- Al Hine – Did UAF have to provide the Naval Architect? Bob – They had to put together the design/construction team.
- Maureen – There will be many proposals for operation of the RCRV, what will be the review process? Bob Houtman – It will be a standard review process.
- Bob – There will be three hulls with a geographic requirement – East, West, and Gulf.
- Al Suchy – We just went through the RCRV inquiry process. This opens up a whole area of uncertainty. Whose responsibility will it be to incorporate the recommendations from FIC's review of the areas of inquiry? Bob – NSF will try not to re-open every category of the inquiry review.
- Dan Schwartz – If the refresh of the project will be the responsibility of the proposer, this will need to be framed in the RFP. Bob – NSF won't be judging the vessel designs, they will be judging the team that will do the refresh.
- Annette – If there are one or two ships, does NSF have a geographic priority? Bob – Probably, but this has not been worked out yet.

- Vernon – If an institution doesn't have a ship to turn in, can they still submit a proposal. Bob – It is not NSF's intent to increase the size of the fleet. So another NSF ship would be retired.
- Hine – There are institutions that would want to be an operator but not a lead constructor.
- Bob – This is a good discussion. The input is important.
- Miles – At the time of the RFP will we know how many ships are planned? Bob – Yes.
- Pinkel – Can the proposers use the same Naval architect? Bob – Sure.
- Al Hine – There is certainly an economy in building 3 ships, but what happens if there are serious design problems? Bob – There are risks, but they can be corrected.
- Al Hine – What did NSF think about the FIC's response to the RCRV task. Bob – NSF found it very valuable. Everyone has a different perspective; it was helpful to see the FIC answers.

Ocean Class Research Vessel (OCRV) – Chris MacDonald provided an update on the status of the OCRV Project. His slides are included as *Appendix VI*.

The Phase I, Preliminary/Contract Design contract was awarded was on 27 Jan 2010. The first design reviews were on 27 Apr 2010 and 12 May 2010. The second design reviews were on 20/21 Jul 2010 and 4/5 Aug 2010. Contract award for Phase II: Detail Design and Construction, is expected in FY 2011, Q4. The ship deliveries are expected in FY 2014 and FY 2015.

ONR appointed Mike Prince as Research Facilities Assistant as an IPA on The OCRV project. He reports to Tim Schnoor at ONR and works with Chris MacDonald at PEO Ships. Mike will represent the interests of ONR and the broader UNOLS community during the Ocean Class AGOR design and construction process. He coordinates with the Operator representatives during design reviews and construction. Mike attends design reviews to be held once every three months at each Contractor's facility. He assists with review of data deliverables (drawings, plans, calculations) and provides input on Mission Equipment selections, schedules for installation, and post delivery test and trial schedule. Mike will also participate in the Phase II Detail Design and Construction.

FIC was asked to form an advisory committee to assist the Research Facilities Assistant (Mike). The selection of an advisory committee was postponed until after operator selections by ONR. Proposed committee members are now requested. Signed non-disclosure agreements and competition rules training is mandatory for all members.

Responsibilities of the OCAC will include providing input as needed on potential changes to specifications and assisting with the review of Phase I data deliverables (drawings, plans, calculations) as needed. The OCAC would also provide input on Science Mission Systems equipment selections and schedules for installation as needed.

Discussion:

- Rich Findley – He feels that there should be technical support represented on the OCAC.
- Tim Schnoor – We want to make sure that the FIC feels that they have the opportunity to respond.
- Mike Prince – SIO and WHOI are limited to 4 reps each.

- Al Hine – Will these ships be different? Mike – Both ships will be general purpose. They might be different in the type of science equipment. Other than that they will be the same.
- Clare – It isn't clear what type of OCAC should be formed. Perhaps it might be best to just have FIC consulted on an as need basis. Chris it would be helpful to have a small standing committee that they can go to.
- Annette – Could this small committee conduct business virtually? Mike and Chris – Yes, no meetings are planned.
- Al Suchy – An OCAC would be very useful. The Project team is continually asking for input.
- Miles – Does the group have to come from FIC? Mike – The members can be from FIC or from the outside, but they should be sea-going scientists.

Mike reviewed the Ocean Class AGOR UNOLS Operator rep responsibilities. The details are included in the slides. FIC will suggest members for the OCAC.

Mission Equipment System (MES) - Next Chris MacDonald presented the Ocean Class Mission Equipment System (MES) list. His slides are included as *Appendix VII*. This mission equipment will be Government furnished equipment. The baseline MES is what the Navy can afford to buy now. They are looking for FIC's input on the baseline system. The Acoustic Monitoring System is a system that can monitor the ship's noise. Will the community be able to carry out their research with the baseline equipment? If there are additional funds, is the list of additional equipment appropriate and the right priority? Chris explained that they are not considering the equipment that can be rolled on the ship at this time.

Discussion:

- Miles – What about flow through systems?
- Rob Pinkel – None of the acoustic equipment worked well on the *Revelle* until anti-cavitation was solved. Chris – there has been a lot of consideration given to noise and cavitation. There has to be a lot of attention paid to make sure that the ship can support the acoustic systems.
- Clare – Is there anything we need to know about the ship design? Mike – The FIC can look at the performance specs if needed.
- Maureen Conte – Some of these underway systems are getting complicated. And some of the systems mentioned by Miles will need special attention to make sure that they can be accommodated. Mike – If FIC or the advisory committee could come up with a list of these systems it would be helpful.
- Mike - Navy would like the FIC input by Nov 15th.

Break

RV *Sikuliaq* – Dan Schwartz reported that he recently visited the *Sikuliaq* mock-up and he shared photos from his visit (*Appendix VIII*). The images show the bridge arrangement. The mock-up has been very useful in getting feedback from the operators.

Mike Prince said that the contractor who built the mock-up would also do the joiner work on the ship. The vendors will also have access to the mock-up. The only way that the OCRV will get mock-ups is if the builder includes it in their bid.

Dan Schwartz – There is a similar mock-up for the labs and ADA stateroom.

The ADA layout and features for *Sikuliaq* are included in **Appendix IX**. Dan reported that Dave Glover and possibly Paul Johnson will visit the mock up.

R/V Langseth FIC liaison report – Clare Reimers provided the liaison report. Her slides are included as **Appendix X**. The role of FIC liaison is to encourage MLSOC to focus on improving general ship operations not just seismics.

R/V Langseth operations and capabilities update - Sean Higgins, Director - Office of Marine Operations, Lamont-Doherty Earth Observatory (LDEO), provided the update. Sean also proved the status of the NSF-funded winch replacement plan. All of the details of Sean's report are included in **Appendix XI**.

His slides include an overview of 2010 Activities. Shipyard and Maintenance from January to April 2010 in Portland, Oregon included:

- Dry-dock for hull painting and required tail shaft repairs.
- Installation of 18 new transmit array elements on Kongsberg EM122 MB system (warranty repair) and all 16 receive array elements (damaged in shipyard).
- Major Aft-Peak Tank Repair
- Ariel Seismic Compressor Overhaul

The 2010 science related projects included:

- Refurbishment of Uncontaminated Seawater System Piping
- Replacement of Knudsen SBP with new 3260 unit
- Gravimeter repair and calibration
- Installation of new lab computer racks
- Successful Sea Trials/Patch Test of Repaired Kongsberg EM 122 MB System off Honolulu
- The Source Sub-Arrays were completely dismantled and rebuilt from the ground up.
- A MicroSV and SBE38 Temp Probe were installed in the Sonar Pod
- SO/IT Office in the Main Lab was renovated.
- Streamers Cables 1, 2, & 3 were removed from the vessel to allow for re-termination of Armored Tow Leaders (Lead-Ins)
- DigiCourse 5011 Cable Levelers were upgraded to work with new DigiCourse DMU that were purchased in 2009
- AG Airlock Control System was installed on the SourceSub-Array for controlling of air leaks on the strings.

LDEO is currently reviewing a draft agreement to obtain all remaining Syntak seismic equipment from Western-Geco for cost of shipping. This is about 40km of streamer sections along with a lot of other needed equipment and electronics.

Pending upgrades include an ADCP installation.

Sean provided an overview of the Shatsky Rise Cruise with PIs, Korenaga and Sager:

- MCS profiling was conducted with no major issues, yielding high-quality reflection data for TAMU Massif.
- Successful Deployment of all WHOI OBS
- EM 122 MB System performed very well.
- Two Medical Diversions delayed the cruise 16 days and the cruise was extended by 7 days.

In 2011, six cruises are planned beginning in April for a total of ~250 days. The areas include:

- Costa Rica 3-D (Bangs- NSF)
- Gulf of Alaska (USGS- ECS)
- Alaska Margin (Shillington- NSF)
- Bering Sea (USGS-ECS)
- Chukchi Sea (Coakley- NSF-OPP,)
- Line Islands (Gaherty- NSF)

Clare asked about the marine mammal observations. Sean – Originally the observers were hired by LDEO, but there wasn't full time work. So they let them all go and now they contract out. It is a less expensive option. RPS is the contractor. It is a lot easier now.

Next Sean reviewed the Glosten Winch Study for the *Langseth*. The major goal is to improve the overall capabilities of vessel for both general purpose and seismic work. Sean showed photos of the deck areas of the *Langseth* (see Appendix). Possible winch locations were presented. Glosten's preliminary report can be provided to FIC. FIC's input will be appreciated as this effort progresses. For 2011, LDEO is looking at the main deck upgrades that can be accommodated. This would be the first phase. During second or third phase they would look at what can be done in the aft end. LDEO would like FIC's input on the activities that can be done from the aft end. The Glosten report will include the mission scenarios that were developed originally.

Discussion:

- Al Suchy- Has the aft boom ever been used? Sean – They have never carried out a general purpose cruises.
- Sean explained that the deck can get a lot of water at times. There is a U-Tube video of deck operations and water coming over-the-side.
- Al Hine – Why are would they do general-purpose operations? – Sean – The general-purpose capability makes the vessel more flexible.
- Hine – Can this ship do OOI support? Sean –They would like the ship to be capable for OOI support, but modifications would be needed.
- Linda Goad – NSF has been working with LDEO extensively. LDEO is preparing a strategic plan. The goal is to have the ship ready by 2015. Columbia realizes this and that is what they are trying to plan out.

Break

Projected Service Life End Dates - FIC has been tasked to work with NSF to review all projected end of service life dates for the existing fleet and make recommendations on new end dates, investments, and upgrades through to 2020. The projected service life end dates that are currently on file are provided in *Appendix XII*.

Bob Houtman reviewed NSF's new approach to their inspection program and provided an example of the report that was generated for Point Sur. His slides are included as *Appendix XIII*. Bob explained that during the ship inspection, they look at the hull condition as well as the technical condition of the vessel to determine obsolescence.

Mike Prince – Will they use the same process for institutionally owned ships? Bob Houtman – He doesn't know, but it could be useful. FIC's input would be helpful

Bob – This process has also been useful in going to the Director with requests for funds for upgrades and replacements. They have more educated feedback.

R/V Barnes Replacement – Doug Russell provided a report on the University of Washington's (UW) plans regarding replacement options for the R/V *Clifford A Barnes (CAB)*. His slides are included as *Appendix XIV*.

A CAB replacement committee has been established. They have established requirements for a replacement vessel through meetings and a survey of regular CAB users. A Conceptual Design contract was issued to Jensen Maritime. The conceptual design has been through two iterations incorporating committee feedback. There will be an effort to make the ship Green.

The Preliminary Rough Order of Magnitude of the cost is \$7.1M - \$9.5M and includes Design Engineering, Shipyard Engineering, Construction Supervision, Delivery Costs, Construction, and a 5% Contingency.

The next steps are to survey potential customers to identify need / desire to use such a vessel with more capability, more capacity, and more flexibility.

They will need to identify potential sources of funds for construction. The State of Washington is in tough shape, so this might be difficult.

Doug showed a 3-D model of the vessel.

Lunch Break

Local Vessels – Should vessels under 100-ft be designated as UNOLS Vessels? - Annette reviewed stats on the utilization of the Local Class ships. Her slides are included as *Appendix XV*. These ships have an important support role in both coastal research programs as well as education. They are often used for class labs. The Fleet Improvement Plan includes a recommendation that states and institutions should consider ways for replacing these vessels as they approach their service life end dates.

Discussion:

- Al Hine – Having the Local ships as part of the UNOLS is important.
- Clare – Have any small vessels been denied access to UNOLS? Mike Prince – Not that we recall. But if they are not utilized, the owner often takes them out of service.
- In considering the addition of Local vessels to the Fleet, they will be considered on a case-by-case basis.

Polar Research Vessel (PRV) SMR Refresh Project – Alex Isern (NSF/OPP) reported on a new task for UNOLS to conduct a PRV SMR Refresh. The SMRs were originally developed in 2006. Alex's slides are included as *Appendix XVI*. The Directorate has agreed that it would be useful to coordinate more closely with UNOLS. The UNOLS model for facility operation might be a better fit.

Nathaniel B Palmer's charter ends in 2012. NSF will put out an RFP for a vessel with similar capabilities for a 5-year lease with an option for additional years.

NSF would like to have input from the UNOLS subcommittee conducting the PRV SMR refresh by early June so that it can be considered by an on-going NSB study. A focus of the refresh will be for UNOLS to clearly articulate the science drivers for the vessels.

Alex reviewed the RPV Committee charge and timeline. As part of the refresh, a community workshop will be held in February 2011. A call for nominations to serve on the Committee will be announced next week. Clare, Robin Muench, Vernon Asper, and Bruce Corliss will be selection committee.

Fleet Improvement Plan (FIP): Clare Reimers reviewed progress toward implementing the recommendations of the FIP. The slides are included as *Appendix XVII*.

The efforts that are underway were highlighted and included:

Recommendations: Personnel strategies must be developed to improve staffing and retention of experienced technical support personnel and crew.

- Alice Doyle hired as UNOLS Technical Services Manager. She has been working on and instituting a fleet wide Technician pool/exchange.
- UNOLS and MATE program have instituted a 6-month internship program that will be starting with WHOI and Duke to train future marine technicians.

Recommendations: UNOLS should take a leadership role in promoting a green research fleet

- UNOLS 2010 Priority to explore "greening the Fleet."
- ONR's July request for input on greening of the Ocean Class AGOR design
- Follow-up phone conference with the "green naval architect" Tom Wylie
- Mike Prince working on Green Assessment of the Ocean Class Specification
- Plans are underway to propose a UNOLS Green Workshop in 2011

Recommendations: Some of the current ships should have their service life extended to meet near term science requirements

- NSF ship inspections are carefully assessing the condition of ships to revise retirement dates and SLEP decisions with more accurate data.
- Projected service life end dates and geographic locations of current UNOLS fleet should ensure OOI ship demands are met
- FIC/UNOLS continues to keep up with OOI projections of ship use
- Planning and acquisition efforts for new deep submergence assets should continue
- Final Design Review for the *Alvin* Upgrade Project completed in Sept 2010.
- AUV *Sentry* added to the National Deep Submergence Facility in 2010.

Recommendation: UNOLS should encourage the timely replacement of Local vessels and Coastal/Regional vessels by institutions, state governments, and regional partnerships

- R/V *Barnes* replacement planning - UW
- Middlebury vessel- for Lake Champlain

FIP Appendix on Ocean Acoustics - Clare reported that Dave Bradley has volunteered to draft the Appendix.

New Technologies and System Evaluations:

Load Handling Systems – Sandy Shor provided an update on the performance and capabilities of the *Kilo Moana* handling system. His slides are included as *Appendix XVIII* and summarized below in a written report provided by Sandy:

“The Caley CTD Winch-Crane System was purchased with an award from ONR which included funding for two CTD winch-crane systems, one for the University of Delaware’s R/V *Sharp* and the other for the *Kilo Moana*. The two systems are similar; however, the *Kilo Moana*’s is more complex due to the requirement to have a much greater depth range and meet the weight restrictions of *Kilo Moana*’s SWATH design. The contract was awarded in May 2005 and was to be completed by December 2005; however, there were significant delays, primarily with the ABS approvals and, to some extent, contractor inefficiencies/priorities.

The new system was installed during *Kilo Moana*’s 2009-2010 shipyard in Portland, Oregon. Caley sent a commissioning team to Portland where they conducted dockside tests and participated in three days of sea trials. The Caley system successfully passed the sea trials. The ship sailed to Hawaii where there was an additional at-sea day for training in the use of the system. Prior to heading for Guam to commence research cruises, an additional day of testing was conducted and a full-depth CTD cast was performed.

On March 17, the R/V *Kilo Moana* suffered a CTD winch casualty. At the time the ship was conducting the William Chadwick (*Jason*) cruise off Guam. During CTD operations, the Caley CTD Winch–Crane System shut down. When the operator hit the reset button, there was a power surge of unknown origin on the ship’s electrical system that resulted in a total loss of ship’s electrical power. Ship’s power was restored in about 15 minutes. The CTD was recovered and

ships systems were returned to normal status with the exception of the CTD winch and the bow thruster. An analysis of what caused the power surge and what was needed to repair the casualty began immediately.

The engineers and OTG marine technicians found that the Caley winch had two main problems: the Variable Frequency Drive (VFD) that controls the winch was damaged, and the winch motor was shorted out. The VFD was sent to the US manufacturer for repair, which was done, and was returned to the Marine Center. The second problem was the motor, which was manufactured in Italy. Replacement is about \$20K and 8-12 weeks lead-time. We contacted a company in San Leandro, CA that has handled several difficult motor/generator repairs for us. We shipped the motor to them from Guam, and they were able to successfully repair the motor. It's important to note that water was found inside the winch motor windings, but when or how the water came to be there is unknown. While these repairs were underway, further damage was discovered to the crane pedestal wiring, as seen on these photos. The damage to the cabling likely occurred during the emergency recovery of the CTD, when the Caley Crane had to be swung inboard over the a-frame. Though the reach of the crane should have allowed for this type of movement, the degree of damaged that resulted clearly indicated we had a problem with the freedom of movement of the wire.

So there were a number of issues we needed to resolve, even after the damage parts were repaired. The KM's engineers and OTG's marine technicians worked very closely together to prioritize the list of items that needed to be accomplished before attempting to run the system again. These included adding some form of access platform around the crane, which would allow the engineers to pull maintenance on the system without the use of ladders or bosun's chairs. A mechanical braking system was also added to the winch; something everyone had agreed was a big priority. We have also begun to systematically replace all the proximity sensors on the winch and crane with a more robust, environmentally resistant model that appears to be working quite well.

One of the biggest jobs we had to tackle was the replacement of all the wiring on the crane pedestal. In the early design phase, we had wanted a slip ring installed instead of cabling, but this was cost prohibitive. Instead, Caley came up with stainless trough that the cabling would slide in, but the installation and overall set-up was sub par at best, which the damage to the cabling clearly showed. When this method of cabling proved to be inadequate for even the most minimal of operations, we began looking for alternatives. The engineers located a company called Igus, which specializes in "energy chains." We were unable to locate a company in Hawaii who would install the new cabling system, so the task fell onto the KM's engineers and OTG marine techs. The engineers handled the majority of the physical installation, while OTG techs handled the majority of the electrical connections and wiring. The level of coordination and teamwork these two groups exhibited was remarkable. Without each group working together, we would have had a tough time getting the system operational so quickly.

Following the installation of the new energy chain and additional repairs, we successfully field-tested the system by running continuous 3600m CTD casts for a period of 12 hours. The winch motor temperatures were monitored throughout the testing period, and all were within reason. No alarms or electrical issues arose, and the group consensus is that we are operational. We had a

minor setback last week when one of the electric motor control valves began to act erratically, preventing us from being able to slew the crane for a period of time. As a precautionary measure, we installed a Dynacon CTD winch on the main deck of the KM for the current cruise, which has requested to conduct a couple CTD casts. On October 10th the Caley system was used successfully to conduct a CTD cast to 250m, with another cast planned for October 12.

Spare parts are being ordered as quickly as possible, but we have found it extremely difficult to get responses from many of the European vendors. The crew, technicians, and engineers are getting up to speed on troubleshooting issues as they arise, as well as getting familiar with the operation of the combined system. Overall it is a marked improvement over the Dynacon/Appleton Crane system the KM was initially delivered with. We are working on setting up the winch data feeds, allowing us to monitor and record tension, rate, and wire out information at rates that are in compliance with the new RVSS Appendix A. In late December or early January, we plan to have power experts come back out to the ship so that they can monitor the vessel's electrical systems as we attempt to run the Caley system with motion compensation and auto-rendering on. We also anticipate having our CTD ready to interface appropriately with the Caley docking head, and will be sharing those design plans with frequent users of the vessel.

We appreciate the initial and continued financial support of this project from the Office of Naval Research and the National Science Foundation. I would also like to extend my thanks for the significant repair efforts put out by the UH Marine Center, the Engineers and crew of the R/V *Kilo Moana*, and the shipboard technicians of the Ocean Technology Group. Through their combined efforts, they have seen to it that the system was repaired and upgraded as quickly as possible. I think we can all agree that it's been a tough year for everyone."

WHOI Long-Coring System - Clare Reimers explained that she sent a memo to WHOI and NSF with concerns regarding the long-core system. Bill Curry reviewed the operator's response to each of Clare's concerns. His detailed response is included as *Appendix XIX*.

Ocean Observatory Initiative (OOI) Projections – Jean McGovern provided a status report on OOI implementation plans. Her slides are included as *Appendix XX*.

Jean's slides describe the:

- OOI Subsystems
- Surface Mooring
- Pioneer Array
- Network design
- Regional Scale Node
- Endurance Array
- Global Array
- Operational Domains
- Project team
- Installation schedule

Some of the OOI highlights and features include:

- OOI will include over 800 different instruments.

- For the Regional Node, UW has made an \$89M award to a contractor. This was a major accomplishment this year.
- The Pioneer Array will utilize AUV and gliders. The AUV docking station will be a challenging endeavor to achieve.
- An OOI Operations and Maintenance review meeting was held in August.
- The MRE structure that OOI falls under is new to the community and the reporting demands are high.
- OOI must be environmentally compliant and there have been public hearings. Many permits are required.

Al Hine – Is the Regional Scale Node the only cabled array? Jean – Yes.

The OOI facility projections are included as *Appendix XXI*.

Hugh R. Sharp User Debriefs – Allan Devol provided a summary of debrief interviews from the Sharp users. He presented a spreadsheet that compiles the user responses to the debrief questions. The spreadsheet is included as *Appendix XXII*: <http://www.unols.org/meetings/2010/201010fic/201010ficap22.pdf>.

Maureen Conte made a motion to continue the *Sharp* user debriefs and revise the questions as needed. All agreed.

The 2011 schedule for Sharp is summarized and included as *Appendix XXIII*. Clare said that the 2011 FIC debrief assignments can be addressed after the meeting by email.

Ideas for FIC-organized regional UNOLS Chief Scientist Training workshops – Clare Reimers led a discussion on ideas for Chief Scientist training workshop. Her slides are included as *Appendix XXIV*.

Workshops of about four days each are envisioned and the organizers would include members of the UNOLS Fleet Improvement Committee and RVTEC.

Two principal concerns of UNOLS today are (1) young investigators, especially those from non-operating laboratories, need opportunities to learn how to gain access to ship time and what ships offer for specific types of research, (2) running a successful research cruise requires leadership and communication skills and knowledge of Chief Scientist responsibilities. These are best taught by example. The UNOLS Chief Scientist Training Workshop (CSTW) will serve as a forum for teaching young scientists how to effectively plan for, acquire, utilize and report on time at sea for academic research and education.

The proposal for a CSTW would be to hold it at Oregon State University's Hatfield Marine Science Center in Newport, OR. Up to 14 workshop participants and four instructors (two Senior Scientists and two Marine Technicians) will participate and the training would take place aboard the *R/V Wecoma*. A teaching lab and/or the HMSC library seminar room will be used for some training sessions.

Participants will apply ahead of time. Preference will be for junior faculty, postdocs, and PhD students from UNOLS institutions who can describe a future need for UNOLS facilities and whose present research can take advantage of the training cruise. Participant costs will be fully supported.

Clare reviewed the program format (see slides). The training would provide an introduction to UNOLS, the ship time request system, and the ship scheduling process. Pre-cruise planning and staging would be covered. There will be two days at sea and a cruise plan that was developed by the instructors will be executed. Post-cruise obligations, offloading, clean up, and reporting will be covered. Each participant will submit a Post Cruise Assessment Report.

A Participant questionnaire will be developed for post-training evaluation. The UNOLS office will track if participants submit ship time requests and serve as chief scientists for real.

Discussion:

- Miles – Each person could have a 6-hour watch.
- A Hine – Create scenarios that are very challenging.
- Al Suchy – This is a very good idea. There are different levels of being a Chief Scientist. It can be a very challenging responsibility on Global ships.
- Clare – The training could be considered a pilot program.
- Al Hine – Real problems have to be presented and the trainees will have to work their way through them.

UNOLS Vessel Ship Classes – Annette DeSilva reported that NSF has requested that FIC review the current UNOLS Vessel Classification and consider revisions as presented at Ocean Leadership Meeting. The current classifications along with the suggested revisions are included in *Appendix XXV*. This task has been suggested for consideration during 2011.

The Appendix also includes descriptions of the A-frame upgrades on *Wecoma* and *Endeavor*

Fleet Planning: - Science Mission Requirements (SMRs):

- Clare will draft a memo to Bob Houtman to determine the information that would be most helpful in terms of the RCRV SMR documents?
- Al Suchy – There are some areas that still are challenges. Information from lessons learned would help identify the areas that need more attention in the SMRs.
- Miles – It would be helpful if FIC could see the specifications that were developed for the RCRV and OCRV.

The meeting adjourned at 4:40 pm.