DRAFT

UNOLS FLEET IMPROVEMENT COMMITTEE MEETING
Wednesday, October 10, 2007 from 8:30AM - 5PM
The National Science Foundation
4201 Wilson Boulevard
Arlington, VA 22230

Executive Summary:

The UNOLS Fleet Improvement Committee (FIC) met on Wednesday, October 10, 2007 at the National Science Foundation (NSF) in Arlington, VA. The meeting included a variety of special reports. Bill Curry presented a report on the Woods Hole Oceanographic Institution (WHOI) long-coring system and Matt Hawkins provided information on new load handling systems. Mike Prince presented the results of the UNOLS ship scheduling model that he developed. Susan Banahan provided ocean observatory projections including their timeline and implementation plans.

A major focus of the meeting was review of the draft UNOLS Fleet Improvement Plan (FIP).

Action Items (New and Continuing Action Items):

Task Description	**Action/Status**
Global Class: Update with community input and reformat to using the template for Ocean/Regional Class	Mike Prince
KILO MOANA Actions:	
• Contact Brian Taylor to keep abreast of Handling System details.	Dave H.
• Draft EOS or other appropriate article	Dave and Brian Taylor
Design and Constructions Efforts - Stay engaged in ongoing design and construction efforts (Regional Class, Ocean Class, ARRV, *Langseth* Conversion, etc.)	FIC
Fleet Improvement Plan Update: • Update charts so that all vessels are retired (including local class) • Revise the ship days funded slide so that there is a differentiation between federally funded ship time and other funded (state/inst) ship time. • Complete drafts of all sections. Final draft should be available by the time of the next FIC/Council meeting.	 Annette Annette FIC & Office
Ocean Observatories – Stay in contact with OOI Office.	Dave Hebert

ADA Guidelines: • Incorporate FIC and ADA Committee Comments and finalize document.	Terry Whitledge
Science User Debriefs for R/V *Hugh Sharp* – Dave, working with Matt Hawkins, will draft user debrief questions that will evaluate the new technologies of the ship. • Conduct debrief interviews with *Sharp* users.	Dave Hebert FIC
Science User Debriefs for *Knorr*'s Long Coring Capability – Dave, working with WHOI will draft user debrief questions that will evaluate the operation of *Knorr*'s long core capability. It will also assess the impact on the general-purpose capability of the ship. • **Conduct debrief interviews with *Knorr* users.**	Dave Hebert FIC

Appendices

I	Meeting Agenda
II	Attendance List
III	Past FIC Action Items
IV	WHOI Long Coring System (3.3 MB)
V	Load Handling System Update
VI	ADA Guidelines for Research Vessels
VII	Fleet Renewal
VIII	Global Class SMRs
IX	Ocean Class Acquisition Status
X	Volunteering and Cruise Opportunities Web Page
XI	R/V Marcus G. Langseth Update (1 MB)
XII	Ocean Observatory Initiative Projections (2.8 MB)
XIII	Ship Scheduling Model
XIV	Fleet Improvement Plan

Call the Meeting: The UNOLS Fleet Improvement Committee (FIC) met on October 10, 2007 at the National Science Foundation (NSF) in Arlington, VA. 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***.

A motion was made and approved to accept the minutes of the March 2007 FIC Meeting <http://www.unols.org/meetings/2007/200703fic/200703ficmi.html> with the edits provided by Clare Reimers (Cochran/Hine).

Review FIC Action List from the March meeting – Dave Hebert reviewed the action items from the March 2007 meeting and provided the status of each item. The list is included as ***Appendix III***.

Opportunity for Agency Comments:

Office of Naval Research (ONR) - Bob Houtman gave the ONR report and said that they are still working on the ship time projections and day rates for 2008. ONR is operating on a continuing resolution. They expect to have $10M to support ship time in 2008.

National Science Foundation (NSF) - Linda Goad reported that NSF is also on a continuing resolution and they are working at last year's budget level. Their facility budget for 2008 is projecting a deficit of about $9M to fund the tentatively scheduled NSF cruises. It will be very challenging scheduling the 2008 fleet operations so that they are within the available budget. The resolution will continue through November 16th.

Bob Houtman added that ONR's ship operations budget is also showing a deficit of about $2M for support of 2008 ship time.

Interagency Working Group on Facilities (IWG-F) – Bob Houtman reported that the IWG-F Fleet Status Report was approved by JSOST. The report was then sent to the Interagency Committee on Ocean Science and Resource Management (ICOSRMI). ICOSRMI provided some comments to the report and IWG-F has incorporated them. The Office of Management and Budget (OMB) would not allow the report to be called a renewal plan, and instead stated that it should be titled a "Fleet Status Report." OMB cautioned IWG-F to be very careful about not projecting any facility commitments beyond what have been already approved. In early October, the report was sent to Dan Walker at the Office of Science and Technology Policy (OSTP). Dan is confident that the final approval of the Status Report is imminent.

The status report is not ideally what IWG-F wanted to put forward as a plan, but it is still a good reference document that makes the connections between the science needs and what the fleet can provide. The report reaffirms the Regional and Ocean Class ships. The community should determine what facilities and capabilities are needed beyond those called out in the federal status report.

Because of the challenges IWG-F faced in finalizing their status report, future IWG-F proposed activities will be very clearly articulated to JSOST and approved by JSOST before any work begins. IWG-F has proposed a study on "What is the infrastructure required to support future science," which would be broader than just ships. It would address the entire infrastructure needed to support science objectives and be based on the Ocean Research Priorities Plan (ORPP). As a first step, the study proposes to inventory the facilities currently available. IWG-F project has been proposed to the JSOST and it is under consideration, but IWG-F has not been given permission to proceed yet.

WHOI Long-Coring System – Development and Testing – Bill Curry provided a presentation on WHOI's long coring system and the recent sea trials on R/V *Knorr*. His slides are included as

Appendix IV. A key element of the long core system is the use of synthetic ropes. The WHOI design copies the methodologies developed by the French. In developing the design, they had to consider the stability issues.

Bill provided an overview of the system. The current maximum core length is ~46 M. It has a tapered wall barrel assembly with a variable weight head of 3,000-27,500 pounds. There is an acoustic modem release mechanism. The system uses a hybrid rope that is 2" dia. 12 x 12 torque balanced. The rope has a breaking strength of 365,000 lbs and is 7.5 km long. The high breaking strength is higher than needed, but the rope stretch must be limited so that the piston would work properly. This rope has only a 2-meter stretch with 30,000 lbs at 5,000 meters. With a 15,000 lb weight the stretch is minimal. The rope's braided construction means that it can be repaired in the field. Bill showed pictures of the system.

The first issue that had to be address in the design of the coring system was ship stability. The coring system is very large and heavy. Glosten Associates conducted a study on whether or not cores could be taken from the starboard side of *Knorr*. They determined that in some cases cores from the starboard side would not be possible. So it was decided to take cores from the ship's stern.

Bill showed a movie clip of core deployment and retrieval. The coring process begins from the ship's starboard side, and then swings vertical at a stern pivot. There is a stern grapple that moves the core to center aft. A new, more capable a-frame was installed on Knorr to support the coring. A boom transfers the coring wire to the stern sheave. The coring process takes about 7 hours. The core goes down and up at about 60 ft per minute. An acoustic release allows the core to free-fall the last 10 feet before hitting the seafloor.

The system is portable in a shipping container.

Bill showed a picture of *Knorr* with the long core. The bulkhead was cut to accommodate the core length. The starboard rail is the core length limitation. The AGOR 23 and 24 bulkheads extend much further aft than on *Knorr* and *Melville*. Core length will be limited on AGOR 23/24. There is a central processing unit for the davit winches. Bill described the full long-coring process. At the Bermuda rise during the sea trial, a 38m core was collected.

Discussion:

- What is the weather limit? Bill – Not sure.
- Terry Whitledge – Is the process of clamping and bringing the core back to horizontal easy? Bill – There were some surprises, the core clamps were never where they expected them to be.
- Can you describe how the stern sheave attaches? Al Suchy – the stern sheave was structurally tied into the strength of the ship. The ship was refit and had to get certified to handle the extra load.
- Jim Cochran – Is the long-core system really portable? Bill Curry – The support ship would have to be modified/strengthened to support the system.

- What Core length could be obtained from *Revelle, Thompson*, and *Atlantis*? Bill - A core of about 120 feet.
- Bob Detrick – What is the possibility of transporting the coring system to the Ocean Class? Bill – The system is too large for the Ocean Class.
- Al Hine – What is the site survey requirements prior to coring? Bill Curry – Never core in a site that hasn't been surveyed. There should be echo sounding of the area; however, a separate survey cruise is not needed.
- Al Hine – How do you know that the core is vertical? Bill – you don't.
- Al Hine – Is there a shallow water depth limit? Bill – He estimates that it wouldn't be used in water that is 300m and shallower.
- Dave Checkley – What core speed is needed to penetrate? Bill – They have attached accelerometers to look at the speeds.
- Maureen – In the event that you damage you core, what happens? Bill – If the core is significantly bent, it cannot be retrieved with this system. However, the core has explosive bolts that would allow the core to be removed. This allows the expensive system to be retrieved.

New Load Handling Systems:

Status report on the acquisition of the new Load Handling System for *Kilo Moana* – Dave Hebert received a status report from the University of Hawaii (UH) prior to the meeting. The load handling system for *Kilo Moana* has not been delivered yet to UH from Caley Ocean Systems, Ltd. The system is still pending ABS approval. UH hopes to have the system in early 2008.

Experiences with the Load Handling System aboard *Hugh R. Sharp* – Matt Hawkins provided the report. His slides are contained as ***Appendix V*** and include images of the system installed on R/V *Sharp*.

The *Sharp* and *Kilo Moana* handling systems were built by Caley Ocean Systems, Ltd. in a simultaneous bid and contract processes, but under totally separate contracts. *Sharp*'s system was installed in May 2006 and has been in operation for a year and a half. Over that period, there has only been one system failure at depth. It was due to a bad connection and took about four hours to repair. Matt reported that he has just learned that ABS approval was received for *Kilo Moana*'s handling system.

Problems with *Sharp*'s handling system have been associated with manufacturing details by the vendor. The proof-of-concept designs have all been successful. Some improvements and testing are still needed.

Matt described features of *Sharp*'s handling system and showed various system components. The handling system is completely hands-free for deployments and recovery; making operations easier in rough weather. The operation of the handling system has been well accepted by the

crew and marine technicians. The technician controls the cast. The docking-head includes an owner-supplied "bumper" that is configured for the science package. The bumper can be easily changed or modified. For operations with the CTD rosette, it is important that there is adequate clearance between the "bumper" and top of the rosette. The clearance is ship specific and is in the 12" to 24" range.

The handling system includes a smart winch with a 75 HP electrical motor. It offers plenty of power and speed for routine operations. The system is quiet, fast, and smooth. The smart winch allows precise and easily adjustable (by operator) "Auto-Render." The winch uses a Programmable Logic Controller (PLC). This is important since all new ships will be PLC controlled. The system PLC is very reliable, flexible, and readily configurable. The PLC software upgrades are easily "up-loaded" with minimal skill and training. Local support and training is available and Chief Engineers and Lead Technicians must be prepared to learn the basics.

The geometry of the handling apparatus is ship specific. The *Sharp* installation is a side arrangement, where as the *Kilo Moana* installation will be an aft-deck arrangement.

Matt's slides include additional details about the handling systems:

- Docking head
- Control panel
- Operation
- Smart winch
- PLCs
- Level wind
- Drum
- Handling apparatus
- Auto-render
- Motion compensation

Some of the challenges that have been encountered and need additional attention include:

- The control cable connections need to be more robust
- cable capture details – jumping sheaves
- bushings (better materials are needed)
- False alarms
- Programming "bugs"/up-grades.

Some recommended changes include:

- Installing redundant sensors (proximity, load cell, etc.)
- Eliminate the need for the cable cutter – rely on Auto-Render
- Install a wire counter by US method (magnets)
- Smaller power/control panels (custom)
- Passive shock absorber for when near surface

Matt provided some advice regarding future systems. He cautioned not to allow vendors to drive the design based only on what they build or their view of what works, insist on what is desired.

Also, pre-qualify vendors based on experience with technologies requested and overall quality/references.

Discussion followed:

- Mike Prince – Does the system expand the weather window for operations? Matt – The handling system can operate safely within the limits of the ship.

- Matt – They are learning what should be required for system spares. Most handling system failures are relatively easy to fix at sea, but you have to have the right expertise at the sea.

- Sandy Shor – Why doesn't the system have a mechanical lock? Matt – The design is prefaced on a different philosophy – instrument specific.

- Sandy – What happens if the personal computer (PC) that controls the system goes down? Matt – If the PC shuts down, the handling system will also shut down. If needed the PC can be overridden and the system driven manually. They are thinking about buying a spare PC.

- Dave Checkley – Can this handling system be used with other instruments besides the CTD? As an example, can it be used with a Mocness? Matt – They haven't used the system for other instruments yet, but it is possible. They would need to make a saddle/bumper to allow the handling system to pick up the instrument.

- Jim Bauer raised the issue of sample contamination. When using the new handling system there is a lot more coupling between the handling system and the sampling instrumentation. There is concern about sample contamination from the handling system lubricants. Has anyone done a survey on the quality of samples? Matt – They haven't looked into this yet.

- Dan Rolland - Did *Sharp* have the same delays with ABS as *Kilo Moana*. Matt – Delaware decided to move forward with production of the system without waiting for ABS approval. Their handling system is built to ABS, but it is not classed. The only issue with ABS was with compression of the drum with wire. ABS does not have a standard for calculating this sort of loading on the drum.

American's with Disabilities Act (ADA) Guidelines – Terry Whitledge provided an update on the effort to establish ADA Guidelines for Research Vessels. His slides are included as ***Appendix VI***. The draft document is in the committee review process. Once their comments are received and considered, the report will be finalized and forwarded to the UNOLS Council.

Terry's slides include a summary of the committee membership, project background, tasks, and implementation considerations. Terry reviewed the ADA considerations for living conditions, working conditions, staterooms, common living areas, and weather decks. He described the background, goals and process they used to develop ADA guidelines. The details are all included his slides.

Design of a gangway or other lift system that would allow ADA accessibility for mobility impairments is one of the most challenging issues. Some of the solutions that have been suggested include a people-rated basket lift-system. Ships that go in and out of their own homeport could design a stern ramp system. Hatchways will also present accessibility challenges.

In addition to physical modifications to the ships, there is also the need to address the operational issues associated with ADA access. Operational guidelines are needed to address communications, pre-cruise planning, emergency procedures, etc. The RVOC Safety Committee has been asked to address the operational ADA procedures.

Terry commented that the ADA workshop held at WHOI was very useful. Al Suchy's help with the *Knorr* tour was very useful.

Terry encouraged the FIC to send any comments regarding the draft guidelines to Terry and Annette.

Break - There was a fire drill and all meeting participants were required to leave the building.

Fleet Renewal Activities – Dave Hebert opened the discussion on fleet renewal activities with some brief thoughts on innovative designs for future ships. His slides are included as ***Appendix VII*****.**

Global Science Mission Requirements (SMRs) Update – A community survey form on the Global SMRs has been available on the UNOLS website for months, but very little feedback has been received. The community response summary is provided as ***Appendix VIII***. The lack of response may be due to the fact that Global Class renewal plans are unknown at this time. Once these are known, there would be more response.

Annette explained that one of the reasons for updating the Global SMRs was to plan for the mid-life refits for *Thompson, Revelle*, and *Atlantis*. The Navy is now supporting the mid-life refit improvements incrementally, instead of during a major long-term shipyard period. Al Suchy commented that the Global ships are each heading in different directions in terms of improvements. *Knorr* was recently modified to allow support of the long-coring system. University of Washington is looking at modifications that could enhance *Thompson*'s ability to support ocean observing systems. Dan Schwartz added that ONR has been generous in support of their incremental refits and other improvements of the Global ships.

Bob Houtman recommended that the Global Ship SMRs be updated with the feedback already received and with the new format that was used for the Ocean and Regional Class SMRs. Clare added that the SMRs should also address special needs such as long-coring and observatory support. Dave Hebert stated that the special needs should be addressed as appendices to the SMRs.

Mike Prince offered to take this on as a low priority action item. He will rewrite the Global SMRs in the new format with the feedback received.

Ocean Class SMRs and Acquisition Process – Bob Houtman presented information on the acquisition process for Ocean Class AGORS. His slide is included as ***Appendix IX***. There will be three organizations within the Navy working to move this project forward. They are NAVSEA - PMS 325, the Oceanographer of the Navy, and the Chief of Naval Research. The Navy expects that UNOLS will be involved in the process at various stages.

The total budget for the two Ocean Class ships is $185M. ONR is currently finalizing the documents necessary to initiate the acquisition program in FY08.

According to notional plans, FY08 efforts will be focused on preliminary work to validate construction cost estimates and contract preparation. They hope to award the Phase I design contract in FY09. Phase II award for detail design and the construction contract for the first ship would follow in FY11. Award for the second ship construction contract would be in FY12. Delivery of both ships could be in FY14 if all goes as planned.

At some point in the timeline, ONR would solicit for and select operators for the two ships. The criteria and pre-requisites for the selection have not been determined. The good news is that within the Navy everyone is committed to the two Ocean Class ships, the bad news is that every year they will be required to justify the significance of these ships. The Navy Research Advisory Committee (NRAC) study supported two Ocean Class ships and was signed off by the Secretary of the Navy. The study had a lot of visibility and the Navy is trying to keep the momentum going. If the budget request is approved during the Program Objectives Memorandum (POM) process for FY2010, the dollars for ship construction will be locked in for the FY11 budget.

Discussion:

- Al Suchy – A long coring capability for the Ocean Class should be considered and if possible, the ship's design configuration should allow flexibility so that the system could be installed. If science interest grows, we should revisit this. The things to keep in mind are: deck strength, deck area, stability, etc. Perhaps the 150' core-length capability might not be feasible, but a shorter length core would work (a core length less than 100' is considered a regular core).

- Annette – did the long-core modifications impact the general purpose nature of *Knorr*? Al – he feels that the modifications enhanced the capability of *Knorr*. The aft deck of *Knorr* was replaced and strengthened, allowing heavier loads. Overall, this was a good addition.

R/V *Marcus Langseth* Update - Jim Cochran provided an update on the conversion of R/V *Langseth*, certification status, and plans for sea trials. His slides are contained in ***Appendix XI***.

The Coast Guard is in process of issuing a Certificate of Occupancy for the vessel. The required crew size is still being determined, but will probably be 20. This will result in 35 science and technician bunks. ABS carried out an audit in early October and issued the Safety Management

Certificate. The last remaining ABS issue appears to be the physical stability of the Mammal Observation Tower in heavy weather. A possible solution is under discussion. Dynamic Positioning (DP) tests were carried out and the ship was able to maintain station in 15 knot winds and moderate seas. The multibeam acceptance tests still need to be scheduled. It would require a multi-day trip in order to get to deep water.

Significant progress has been made on major issues. The seismic system is ready to take out and test. Labs and other work areas are basically in good shape. There are a number of smaller jobs and cosmetic issues that need to be addressed. Images of the Starboard Main Deck, the Main Lab, and the Back Aft were presented (see slides).

New UNOLS Web Page – Volunteering and Cruise Opportunities - Annette DeSilva reported that the new web page for announcing cruise opportunities was introduced in late July. So far, responses have been received from six individuals who are interested in participating on cruises. Information about these volunteers is included in ***Appendix X***. Unfortunately, there haven't been any response from PIs who have space available on their cruises. We will include an article about the site in an upcoming UNOLS newsletter.

Lunch Break

Ocean Observatory Projections -Status report on timeline and implementation plans - Sue Banahan, from the Joint Oceanographic Institution's (JOI) Ocean Observatory Initiative (OOI) Office, reported on the status of the OOI plans and projections. Her slides are included as ***Appendix XII***. Sue explained that CORE and JOI are merging to form the Consortium for Ocean Leadership (COL).

The NSF/MREFC capital investment for OOI is $331M over five years. The operation and maintenance (O&M) funding to support OOI would ramp up during installation until 2014 and then level off at a cap of $50M annually. The design lifetime for the OOI infrastructure is 25 years.

Sue provided a brief OOI project history. A successful Conceptual Design Review was completed in August 2006. Funds for OOI were then included in the FY 2007 Presidential budget and also included in the NSF FY 2008 request to Congress. The Preliminary Design Review is scheduled for December 2007. Pending a successful design review, the recommendation to fund OOI installation will be sent to the National Science Board in spring 2008 to get the MRE funds released with a projected start date of July 2008.

JOI is performing a National Environmental Policy Act (NEPA) Programmatic Environmental Assessment on behalf of NSF. The OOI team is in place and includes:

- JOI (soon to be Consortium for Ocean Leadership): System Integrator
- NSF Advisors
- UC San Diego: Cyberinfrastructure (CI) Implementing Organization (IO)
- University of Washington: Regional-Scale IO
- Woods Hole Oceanographic Institution (with OSU and Scripps): Coastal and Global-Scale IO

A slide showing the NSF projected funding by year for OOI, along with the budget amounts by OOI project component was presented.

A brief overview of each OOI component was provided. The number of Global scale nodes (GSN) have been reduced to four and will include nodes in the Southern Ocean, Station Papa, Irminger Sea, and the Mid-Atlantic. The Regional-scale nodes (RSN) in the NE Pacific have also been reduced and the nodes lost due to inflation include the mid-plate node and the node that connects to Canada Neptune. Coastal-scale assets are planned in the Mid-Atlantic Bight shelf-break and the NE Pacific continental margin. Each observatory scale incorporates mobile assets; such as gliders and AUVs. Cyberinfrastructure will be developed to allow adaptive sampling, collaborative experimentation and analyses.

Each Observatory scale was explained in more detail with accompanying graphics (see slides):

- Regional Scale Nodes - The RSN observatory is a cabled plate-scale observatory in the northeastern Pacific. This observatory would instrument the Juan de Fuca plate in a star design with 5 primary nodes; 3 expansion nodes; and 1 or 2 Endurance lines. The advantages to Star Design is that less cable required, there is higher bandwidth per node, higher power per node, simpler node design, three repeater-less segments, and higher availability during maintenance and repairs. Two Landing Stations are planned, which would also require less cable and fewer cable crossings.
- Endurance Array - Plans for the Endurance Array include an Oregon Line and a Washington Line. The Oregon Line will originate from Newport, Oregon and include surface moorings at threes sites and subsurface profiler moorings at all sites. The Oregon Line will connect to the RSN observatory via an extension line. The Washington Line will extend from Grays Harbor off central Washington and will include one surface mooring and two subsurface profiler moorings (contingent on cost).
- Global Scale Nodes – Two different types of Global Site observatories were presented, one for high latitude locations and one that is an Extended Draft Platform. The high latitude site includes a surface mooring that provides a platform for meteorology and air-sea flux sampling, power generation, and satellite communications. A subsurface mooring is also planned with a surface-piercing upper profiler, inductively linked lower profiler, and acoustic modem. Cable and a seafloor junction box can be added. Flanking moorings with fixed sensors; gliders are planned. The systems could be launched, maintained, and recovered by UNOLS vessels.

  The initial location for the extended draft platform is the Mid-Atlantic. An $8M industry contribution for this site is possible. The platform would provide deck space 10 m above sea surface, 10 kW diesel generation, and an EO cable that could deliver greater than 500 W to seafloor experiments. An offshore supply vessel and a small tug would be required for transport and installation. UNOLS vessels could support instrumentation.
- Pioneer Array - The Pioneer array will be initially located in the Middle Atlantic Bight/Outer Continental Shelf and will consist of four electro-magnetic/sub-surface profiling mooring pairs plus four subsurface profiling moorings. AUVs will enable autonomous sampling. At

least six to 12 gliders are envisioned for sampling far-field variability. The array will have near-real time communications and wind/solar/wave power.

- Integrated Observatory Architecture - The observatory components will be linked by a common instrument, infrastructure, and information-management system, or "cyberinfrastructure." The cyberinfrastructure will allow users to remotely control their instruments and perform in situ experiments.

A chart showing the design and construction timeline for each observatory component was provided. Lastly the OOI estimated days at sea projection through 2015 was provided. Most of the ship needs required for support of the Coastal Arrays in the Pacific and Atlantic can be met with UNOLS Intermediate, Regional, and Regional/Coastal Class ships. The facility projections for GSN and RSN observatories call for Global Class vessels. Servicing of observatories will be highly dependent on ROVs. ROVs are included in the operation plans for the Mid-Atlantic Global observatory, the RSN, and the Oregon Endurance Array. For details about the estimated projected days at sea, refer to the last slide in ***Appendix XII***.

Discussion followed regarding the OOI operation and maintenance costs that have been capped at $50M (today's dollars with no inflation factors). O&M would be supported by NSF. Through 2012, the OOI budget is covered by the MRE account. The O&M budget does not include any funds needed to support additional science that might result out of the observations. There is a contingency built into the $50M budget that could be used to support special servicing needs. After 2012, the annual O&M budget of $50M would be supported from NSF's facilities budget.

UNOLS Ship Scheduling Model results - Mike Prince reported that he had been asked to model the 2006 schedules onto a future fleet. His slides are included as ***Appendix XIII***.

In creating the model his assumptions were that all scheduled cruises from a previous year will be available for scheduling in a future year. The fleet composition for 2017 was selected and was based on FIC and agency renewal plans. Cruises were scheduled on the type of vessel requested except where a compromise was accepted in the original schedule.

Using fast track, Mike scheduled the 2006 projects onto ships that would be operating in 2017. One exception was that he included *Sproul* and *Pelican* in the 2017 fleet, which doesn't match the FIC Fleet Improvement Plan. The model keeps cruises on the same 2006 ship and time frame as much as possible. Cruises in 2006 that were originally scheduled on ships that are "retired" in 2017 were rescheduled on the remaining ships, using the ship time request as a guide when moving dates or ships.

In 2006 the fleet consisted of 23 active ships. The model fleet of 2017 includes 19 active ships. Since R/V *Langseth* was not yet in service in 2006, it was not scheduled in 2017. Also, since the ARRV was not available in 2006, there were no requests for its use. The 2017 model schedules some of the global ship work on the ARRV.

The 2006 total operating days is 3,998 days. 2006 was chosen for the model because it was a year the low fleet utilization. If the 2006 ship time couldn't be scheduled onto the 2017 fleet, it would be even more difficult to schedule a year with a higher level of ship time. When the 2006

ship time was scheduled on the 2017 fleet, the ship day total is 4024 days. There are more days in 2017 as compared to 2006 because more transit days would be needed (because there were be fewer ships).

In 2017, there are 195 days of unscheduled work in the Atlantic. The unscheduled work included multi-ship operations and requests for work in remote areas that could not be accommodated because of fewer ships available. It also included days requested for the HBOI submersible. These could not be carried out because the submersible support ship, *Seward Johnson* was retired by 2017. Some vessels in 2017 could accommodate additional days and perhaps support some of the OOI ship time. The initial model results indicated that much of the ship time in 2006 could be accommodated on the smaller future fleet, but the schedules would not be efficient and some work would be stranded. There would be less operational flexibility and more transit days would be needed. Multi-ship programs would be difficult to carry-out. Accommodating demand during peak seasons would also be very difficult.

Some next steps that have been suggested for the model include:
- Refine first cut model to more accurately match project fleet composition for 2017.
- Add in *Langseth* cruises, OOI cruises, and Alaska Region cruises to see how they could be scheduled.
- Create cost models for each variant.
- Recreate the model using different years.

In summary, the initial conclusions of the model are:
- Some work could not be scheduled due to fewer ships in the area (multi-ship ops) and remote locations (med work).
- Some work was not scheduled due to specialized equipment (HBOI Submersible)
- Work to be scheduled reflected fleet of 2006 and did not take into account requests that would exist for ARRV, *Langseth* and Ocean Class vessels.
- Generally larger ships were used without taking into account the possibility of combining projects on the larger ship. The larger more capable ships would be used this way to take advantage of their larger bunk space and lab space.

Fleet Improvement Plan (FIP) Discussion – The remainder of the meeting was devoted to discussion on the draft Fleet Improvement Plan (FIP). Annette DeSilva presented slides on the status of the draft document and charts that provide fleet projections. The slides are included as ***Appendix XIV***.

Since the March FIC meeting Sections I, II, and II of the FIP were edited. Acronym use was reviewed for consistency. Charts were updated as needed. Areas requiring further attention were identified and included the following sections.

The Executive Summary should be drafted last and should summarize the findings and recommendations. It should be brief and perhaps a stand-alone document.

Areas of Section II, Future Science Initiatives that require further attention include:
- II.C. Biological Oceanography – needs to be updated. Text for the insert is also needed.

- II.G. Ocean Observatories – The facility needs should be updated. The acronym, "IDOE" must be spelled out (International Decade of Ocean Exploration)
- II.H. Summary – Text is needed along with a summary table.

In Section III, Facility Composition and Trends, figures were added and updated to help describe UNOLS, the organization, and scheduling process, fleet listing, and service life chart. Fleet statistics and trends were all updated. In describing trends, the term "utilization" was replaced with "funded ship time."

The outline for Section IV, "Future Fleet Utilization Projections and Future Requirements" was discussed. This section has not yet been drafted, but charts that might be included in the section were presented (see slides).

The dates for new ships coming into service were reviewed. These dates should be as accurate as possible since they are the basis for future Fleet capacity. It was recommended that the ARRV should have 2011 as the year it enters service. Figure 17 from the 2001 FOFC plan was revised to reflect current fleet renewal plans.

UNOLS Vessel Retirement Dates were reviewed and there was discussion about whether or not we should show the Coastal/Regional and Local vessels being replaced. All agreed that we should not show them as being replaced unless there is a specific plan to replace the ship by a state or institution. Without a specific plan for replacement, projections would show a reduction in capacity and capability. The smaller ship capability would only be maintained with institutional or state investment, because the Federal Government has made it clear that they will not. Bob Houtman echoed his agreement with this recommendation that projections should only include vessels for which there are specific replacement plans.

It was suggested that the results from Mike's scheduling model could be incorporated into Section IV of the draft FIP to illustrate future facility needs and potential shortfalls.

A series of charts showing various fleet trends and projections were presented and are included in ***Appendix XIV***. Clare suggested that the ship days funded slide show a differentiation between federally funded ship time and other funded (state/inst) ship time.

Discussion:

- Dave Checkley – In addition to facility projections for observatories, there will be growing facility needs for studies on ecosystems and global climate change.

- Maureen Conte – It is important to reference the Pew and Ocean Commission reports in the draft FIP.

- Bob Detrick – In addition to the number of ships that will be needed in the future, it is important to consider the types of ships that will be needed. Can the future fleet accommodate and support emerging technologies?

Dave Hebert reviewed proposed revisions to the Section IV outline (see slides). The Committee agreed that the section on "other facility projections" should be removed. This report addresses future UNOLS facilities. Other facilities are needed, but are not considered by this report. Jim Cochran said that the FIP should articulate what can be done with the existing federal fleet plans and also articulate what would be left behind, and then define the composition of ships that would be needed to meet the science that is projected.

FIC recommended that the FIP be updated every 5 years.

Clare recommended that we work to complete the FIP draft by the time of the next meeting.

Recognition - Dave Hebert thanked Terry Whitledge for his many years of dedicated support to UNOLS and the Fleet Improvement Committee.

Adjourn – The meeting adjourned at 4:19 pm.

FIC members visited the Proteus at the Gangplank Marina in Washington DC following the meeting.