Meeting Minutes

UNOLS FLEET IMPROVEMENT COMMITTEE MEETING

Wednesday, December 2, 2015

National Science Foundation
Stafford Place II, Room 595
4201 Wilson Blvd, Arlington, VA

Appendices:

I	Participant List
II	R/V *Neil Armstrong* and R/V *Sally Ride* Update
III	Fleet Projections
IV	Winch Requirements and Appendix B
V	UNOLS Green Ship Initiatives
VI	Telepresence Guidelines and Telepresence operations on *Endeavor*
VII	RCRV incorporation of new technologies
VIII	SMRs for future Global Class Ships
IX	FIC Membership Status

Call the Meeting: Clare Reimers, Fleet Improvement Committee (FIC) Chair, called the meeting to order. The agenda is available at https://www.unols.org/sites/default/files/201512ficag.pdf. Participants introduced themselves. The attendance list is provided as ***Appendix I***.

Opportunity for Agency and Guest Comments:

- Bob Houtman (NSF) reported that the National Science Foundation is on a continuing resolution until 12/11/15.
- Mike Prince reported that Tim Schnoor (ONR) sends his regards. Tim is currently on the R/V *Armstrong* transit cruise.

Ship Design, Construction, Acquisition, Refit, and Repair Activities:

Regional Class Research Vessel (RCRV) – Brian Midson (NSF) provided a report on the RCRV acquisition process.

- Oregon State University (OSU) is the project lead.
- The next couple of project reviews will examine the acquisition strategy for the vessel.
- They will also review the project execution plan (PEP).
- The final design review is scheduled for fall 2016.
- The goal is for Congress to authorize the construction funds.
- The National Science Board (NSB) has to then authorize the funds to OSU. This will hopefully take place in February 2017.
- Bob Houtman commented that NSF's internal review process will allow all levels of NSF to weigh in and better understand the project and costs. This level of review impacts the timeline, but it increases awareness. Any awards over $10m will have to go through the review process.
- The NSB has authorized up to 2 ships.
- Brian remarked that the first ship will be operated by OSU. The second ship will likely be competed once the funding level is known and that the ship will be constructed. This will likely happen in 2018.

Ocean Class Research Vessel (OCRV) – R/V *Neil Armstrong* and R/V *Sally Ride* - Mike Prince provided the report. His slides are included as ***Appendix II***.
Mike reviewed the R/V *Sally Ride* planned schedule leading up to science operations:

- Currently undergoing final outfitting, equipment commissioning and testing
- Builder's trials to start in January 2016
- Early March 2016– Acceptance Trials, Navy INSURV
- Late April 2016 Planned Delivery (Delivery date may be postponed if Mission Equipment Installation takes place at DCI in April – No major net effect on schedule)
- April – June: Fitting Out Availability and installation of Acoustic Systems & Mission Equipment. Actual Schedule and location of Mission Equipment Installation still to be determined.
- Summer 2016: Transit to San Diego, further outfitting, shakedown and science verification cruises
- Science Operations towards the end of the year 2016

R/V Armstrong's 2016-2016 schedule is included in Appendix II.

Discussion:

- Al Suchy – During the transit cruise for *Armstrong*, they have learned a lot about the ship. The ship just arrived at the shipyard and they are still working on the scope of items to address. There are so many things in the motion, that it is difficult to schedule the operation of the ship. Guarantee Deficiency Reports (GDR) are submitted by the chief engineer and there are about 47. Some GDR items have already been addressed. There are a few that will require additional attention and learning curves.
- Mike Prince – The ship's sea chest is just a little to high and the in-take comes out of the water.
- Clare Reimers asked that if there is a defect on the *Armstrong*, would it be corrected on the *Sally Ride* while under contract? Mike – yes.
- Mike Prince – There is an anchor banging problem on the *Armstrong*. There should have been shims installed to minimize the banging, but the shipyard didn't think they were necessary. They were.

Mike reviewed the types of Science Verification Cruise (SVC) activities planned for the *Armstrong*:

- Mooring
- Hydrography
- ROV w/ shipmounted USBL
- Biophysical inc. bioacoustics
- Geophysics
- Coring
- Laboratory function
- Ship's underway sensors
- Ship's underway data collection
- Communications ship to shore & data transfer
- Telepresence

Many members of the community have contributed to organizing the SVC. An ROV SVC may take place in 2017.

Shakedown cruises for the Armstrong include and involve:

- Multibeam Oversight Committee
- ADCP Performance (Jules Hummon)
- Winch & wire deployments with CTD
- Ship networking and data logging and integration
- Ship meteorological, underway seawater, and hull-mounted sensor function

Mike showed images of the R/V *Armstrong* underway (see Appendix II). They quickly encountered rough seas. The crew of the ship is mostly the crew from the R/V *Knorr*. They are an exceptional crew and work well together.

R/V *Barnes* Replacement Plans:

- Clare Reimers reported that Doug Russell gave a nice presentation at the CERF conference on the R/V *Barnes* replacement design and plans.
- Rick Keil added that the University of Washington (UW) is trying to raise funds for construction.
- Clare Reimers – The ship is 50 years old. UW provided funds for a very nice ship design. There is 3-D rendering of the design. The UNOLS community is behind the vessel replacement plans.

Mid-Life Refit Plans for *Thompson, Revelle*, and *Atlantis*:

- Mike Prince reported that work is progressing on the detail design for the mid-life refit for *Thompson*. The ship will get new generator sets. The mid-life is fully funded and soon they will start purchasing equipment. The ship will go into the yard mid- 2016 and take approximately a year for completion. UW got an exemption from Sales Tax and this is helping the upgrade funds go further.
- Sandy Shor – Are there plans for a mid-life refit for R/V Kilo Moana? Mike Prince – referred Sandy to Tim Schnoor.
- What is the funding status for Atlantis and Revelle mid-life refits? Mike Prince - The Revelle would be scheduled for a mid-life first, but funds still need to be secured.
- Annette DeSilva – Will the mid-life efforts be similar across all three ships? Mike Prince – They should, but there are some differences in opinion among the operators that will need to be worked out.

Engine Control, Caley Systems, and any other refit activities on R/V *Kilo Moana* – Sandy Shor reported that the vessel modifications for the control system are planned for after the move of the ship facility (about 10 piers away) in May 2016. The Naval Architects involved with the mods are the same as those on the *Thompson* refit project. U. Hawaii has the funds in place and the work will be done in Hawaii.

The Caley system is currently operational. The Caley docking head does not work very well. No major problems except wire twisting. The docking head is for the CTD. They are not using the docking head.

Polar Ice Breaker Status and discussion on UNOLS Role in future designs – Tim McGovern reported that in late November NSF POLAR posted a Request for Information (RFI) for new polar vessel operations. The new ships will likely mirror the vessels currently in use. However, NSF is interested in more support in terms of operations and making them more efficient. They might be able to partner with other polar operations to maximize efficiencies.
Operations of the new vessels must by affordable, as no major increases in funding are planned. The minimum vessel requirements would be comparable to R/V *Palmer*. Operationally the requirements are more like the Polar Research Vessel (PRV) requirements. The RFI closes at the end of January.

The RFI will give NSF a better idea of what is affordable. Then they would put together an RFP with Lockheed Martin. Lockheed Martin will be the program office for the acquisition effort. NSF is starting the process early and would like to have everything in place by 2022. In the past the process was started too late to allow enough time for broad response commercially. There will be a posting of frequently asked questions. This is not limited to US companies.

Another topic that has come up is NSF's relation with US Coast Guard (USCG) for work on the design of their heavy ice breaker. The President stated that there will be new ice breakers. While NSF has been at the table with USCG, no science capability has been included in the design of the new ice breakers. The USCG has indicated that any type of unique capabilities (such as a science capability) would require that agency making the recommendation, to pay for it.

Discussion:

- Chris Measures asked if NSF would consider leasing a ship could go to both poles? Tim McGovern replied that it is unlikely. The ship has had a healthy schedule in the last couple years, but it included ship time from NOAA and OCE.
- Chris Measures – Operations on *Healy* are not optimal for science. The USCG has a system that has priorities in areas other than science.

Break

R/V *Langseth* & MLSOC/FIC Liaison Report – Shor Shor reported that earlier in the fall there was Marine Seismic Technologies Workshop. Sandy was tasked to draft the recommendations. There is a lot of discussion on how to move forward with marine seismics. Nathan Bangs is close to completing the workshop report. The intention is to distribute it before the MLSOC meeting in December.

Some of the workshop findings included:

- NSF has approximately $10M annually for support of seismic operations.
- Over the last several years, operations support has required approximately $13M. This includes environmental permitting ($1M). NSF's $10M would support less that 100 days of seismic ship time annually.
- Some of the operational models that were considered by ruled out include:
  - Modifications to Langseth to support other science. This means that *Langseth* will primarily support seismic cruises /mapping. They can do other things if other ships are unavailable.
  - Conversion of any Ocean Class ships to support seismic ops. They cannot do the long streamers that *Langseth* can support. These ships do not have the space or weight capacity. The condition was that the conversion could not interfere with their general-purpose capability.
  - Industry ships are tied up and not willing to reactivate. The commercial ships that are operational, are double the cost of *Langseth*. The concept of industry partnerships doesn't seem to be moving forward.

Discussion:

- There has been a suggestion of a new ownership model, but nothing has been resolved. If NSF owns the ship, it has to go through section 7 reviews. Sean commented that many countries are adopting more stringent permitting requirements.
- Sandy Shore – There was a suggestion of implementing a regional model for *Langseth* scheduling. Jim Holik – This should help in terms of international collaborations because it would provide a longer timeline for planning.

- Jim Holik – The December MLSOC meeting will focus on governance. Bob Houtman will be there and will provide guidance on how to move forward. This will change the role of MLSOC. The MLSOC can provide recommendations for regional operations. Since some may see this group as conflicted, they can work through the UNOLS Council.
- Rick Murray:
  - The community feedback, is that LDEO has done a terrific job at providing seismic support and terrific data has resulted. There is a good partnership between NSF and LDEO. NSF has about $10M annually, but there is a budget gap that needs to be filled.
  - Modifications to *Langseth* to support the long core system are off the table
  - Significant changes are needed and will be implemented in FY2017. This will be when the new governance for *Langseth*'s operations will go into effect.
- Sean Higgins – An IODP model could be considered. This has been one of the best years operationally for science aboard the *Langseth*. Sean listed all of the accomplishments. They installed the new streamer.

Review Fleet Projected Service Life End Dates and Trends – Clare Reimers presented the Fleet service life end dates. The dates are based on NSF's inspection memos and are contingent on successful completion of inspections.

Next Clare showed a series of charts:

- Vessel retirements outpace renewal
- Number of ships in service by class by year
- Average age of the fleet by year.

In conclusion Clare stated that local/coastal and global classes are where future renewal efforts are needed.

Post-cruise feedback on *Sikuliaq, Armstrong* and *Ride* – *Sikuliaq* user debriefs were conducted by FIC members. The *Sikuliaq* users were provided with the debrief questions in advance.

Some of the problems that were identified by the debrief reports included:

- Underwater sea chest location
- Anchor banging
- Leaking on the ports
- Ship Rolling
- DP system

There was a comment on a debrief report that the ship isn't a Global vessel, but in fact it is.

There was a discussion on debrief process:

- This review is more in-depth and provides more information than what is provided on the Post Cruise Assessment Reports (PCARs).
- Bob Houtman – The results of the debriefs should reported back to UAF ship operator. NSF is aware of the problems.
- The PIs who participate in the debriefs should be informed on how their information is being used.
  - Let them know what is being addressed
  - What areas are still problematic
  - What areas work well.

- FIC might want a summary from Jules Hummon on the ADCP issues.
- Bob Houtman – FIC could prepare a summary report from the debriefs and provide it to Murray Stein (UAF) for reply. Murray's reply could then be sent this to the *Sikuliaq* PIs

Clare Reimers offered to conduct the first 2016 *Sikuliaq* debrief with Mitch Lyle.

Lunch Break

Post-cruise feedback on *Sikuliaq, Armstrong* and *Ride (*discussion continued*)* – The Committee continued the debrief discussion and focused on the R/V *Armstrong* debrief process. The draft debrief questions were reviewed and the following suggestions were made:

- Provide the debrief question document in advance of the cruise.
- The operator should distribute it to chief scientists.
- The opening paragraph of the document should be revised. (change Clare to Jim Swift)
- Clare – with all the sensor systems that we are installing on ships – how many are being used? This would be interesting to track. It could result in savings.
- Question 6 should be reworded. Are we interested in radiated noise from the ship, or are we interested in the airborne noise? There could be mention of the bulbous forebody to reduce bubble sweepdown and ask about its effectiveness. Split this into two parts
  - underwater radiated noise
  - airborne noise for habitability
- Add a question about sea keeping / roll
- Should we share the chief scientist debrief reports with the marine sups and ask that they be discussed with the captain?

New Technologies and System Evaluations:

SIO ROV Update - Woody Sutherland reported that SIO purchased an ROV and just as they were getting comfortable operating at 1000 meters, the PIs now want to go to 2000 meters. The plan is to start ROV science operations mid 2016. This is a fly-away system and takes a minimum of 2-4 people to operate. The vehicle is equipped with cameras, a 200 lb science payload, and a manipulator. Once the system is demonstrated, it will be ready to support funded programs that are in the queue.

Hawaii ROV Update - Scott Ferguson provided the update. The ROV has demonstrated a lot of capabilities, but they have a fundamental problem of only four hours of bottom time because of a leak. The ROV is being sent back to the factory. It will be upgraded by DOER and returned next year. This is a 6000 m system. The ROV system is large and requires 3 vans for shipping. The ROV is intended to support the Aloha observatory. It might also support state work and can take on NSF work.

Launch and recovery systems (LARS) systems throughout the fleet-how well are they working? – Mike Prince reported that the LARS on the *Armstrong* and *Ride* are expected to work well. They were built on previous designs.

- *Revelle* system – Bruce Appelgate reported that they are making the system work. The over-boarding feature works, but there are level-wind issues. Motion compensation doesn't work the way it should. Incrementally they are finding solutions. They have a huge test coming up. They are replacing one of the winches. All of the LARS technical representatives will be on the ship for assist. After replacing the winch, a CLIVAR cruise is scheduled.

- Jim Holik asked if we should we get rid of the Caley system? Scott Ferguson – Perhaps, but not the winch. The HOTS team likes the winch.
- Joe Mackes – The Navy has put a lot of money studying the LARS issues over the past two years. He encouraged the operators to contact NAVSEA with feedback. The Navy rep is Kelly Cooper. She is the one who did the study.
- Clare Reimers – FIC has invited guest speakers in the past. Perhaps this would be a good future topic.
- Jim Holik – It seems as if the winches need to be a bit more robust. They can't tolerate much variation in wire diameters.

Winch Requirements and Appendix B – At the last FIC meeting, there was interest in hearing more about winch requirements and compliance with Appendix B. Annette DeSilva provided a report and details are included as ***Appendix IV***.

Appendix B to the updated Research Vessel Safety Standards address "*UNOLS Overboard Handling Systems Design Standards and Criteria for the Design and Operation of Overboard Handling Systems*." The objective of Appendix B is to provide a unified code of practice for the design and operation of overboard handling systems used onboard vessels in the UNOLS Fleet. It is not intended to supersede existing regulations. It is intended only to better define acceptable design limits, procedures, documentation, and capabilities for overboard handling systems used specifically for modern oceanographic research.

For existing overboard handling systems and components, testing in lieu of engineering analysis is allowed. New systems require complete engineering analysis and documentation verifying structural integrity and limits. There is a waiver process. The RVOC Safety Committee has a process whereby operators can request a waiver of compliance in cases where it is not possible or is cost prohibitive to meet all requirements. Waivers are reviewed by the R/V Safety committee and includes experts.

Overboard Handling System (OHS) and components already in existence, or those completed before the applicable date above, are to be brought into compliance with these standards by 07/15/2016.

Green Ship Initiatives – Annette DeSilva reported that there will be a UNOLS Green Boats and Blue Ports III Workshop on April 5-6, 2016 at URI/GSO. Details about the workshop are included in ***Appendix V***.

Telepresence Guidelines and Telepresence operations on *Endeavor* – A UNOLS Ship/Shore Communications Subcommittee was formed with the goal "to help the federal funding agencies develop a viable plan for the US Academic fleet's ship/shore communications that will help the ships meet the growing demands of internet connectivity for general communications and telepresence." They have worked to:

- Define/quantify day to day bandwidth needs
- Give guidance on infrastructure and models for Telepresence
- Create ideas/plans on how to meet the above

Dwight Coleman and Alice Doyle have been the leads on this effort. Annette DeSilva presented the slides that were prepared by Dwight. The slides are included as ***Appendix VI***.

The slides include details about recommendations for a 3-year plan for bandwidth management. The slides also provide details about telepresence guidance for scientists and ship operators. The guidance document provides:

- Descriptions of each level of Telepresence
- Real examples of each level of Telepresence
- Proposal Preparation and Pre-cruise Planning
- Implementation at Sea
- Guidance for the Science Party
- Guidance for the R/V Operators and Marine Technicians
- Community Resources and Contacts

Images from *Endeavor*'s telepresence installation and cruise activities in included in the slides.

Discussion:

- Sandy – The Telepresence operators should contact science program officers and inform them about the system.
- Rick Murray – It is critical that there be a concerted effort to reach out to the broad community. The community must be well informed about the capabilities, or it will not fair well in proposal reviews.
- Greg Cutter – Telepresence could be included as part of a future Chief Scientist Training Workshop (CSTW). The CSTW can be expanded by offering Telepresence to those who did not get accepted for the at-sea experience.
- Scott Ferguson – Telepresence can be offered to individuals who cannot participate physically in cruises. Annette – On a recent Endeavor cruise, the Chief Scientist could not go to sea due to pregnancy, but she was able to participate via Telepresence.

RCRV incorporation of new technologies – Clare Reimers provided the report on the RCRV. Her slides are included as ***Appendix VII*** and include details about the project timeline, design features, layout, and datapresence. The datapresence schematic was provided. It will be used with KU band and Fleet Broadband (FBB) as backup.

Al Suchy commented that there are about 80 systems on the FBB network. He recommended that ships be built with adequate clear space for antennas. Al also strongly recommended that noise experts (such as Tim Gates) be consulted early in the ship design/construction process.

Break

Science Mission Requirements: Clare Reimers initiated a discussion on SMRs for future Global Class Ships. To stimulate the discussion, Clare presented a set of slides that are included as ***Appendix VIII***.

Her suggestions include:

- Start with a clean slate
- Identify the principle design characteristics
- Identify the mission characteristics
- Next define the detailed specifications

To begin the process, Clare recommends that the FIC develop a list of mission scenarios envisioned for future Global class ships. Then from the mission scenarios and considerations of regulations and cost, establish design and mission characteristics.

Discussion/Brainstorming – The FIC identified some scenarios of operations that the Global Ships might

support in the future:

- Geotraces-like cruises – interdisciplinary
- Ocean food-web dynamics (fisheries, big nets, acoustic)
- More capacity for airborne systems
  - Launch and recovery systems
  - Tracking systems and communications
  - Antennae placement
  - Small flight deck
- Large global scale projects that can accommodate 40 cruise participants
- Van placement considerations (drains, piping, etc)
- CLIVAR-like programs:
  - Synthetic wires
  - 60 day endurance
  - ROVs, AUVs
  - Van space
  - 40-person science team
  - etc.

- Woody Sutherland – There were good SMRs for the PRV from a few years ago. These could be revisited.
- Mike Prince – The previous SMRs included ranges for parameters. This was useful.
- Woody Sutherland – Look into the Australian vessel, *Investigator.* It can accommodate up to 40 scientists, is 303 feet LOA, and costs ~$40M for science and operations annually.
- Greg Cutter – The vessel needs high sea-keeping capabilities for work in remote areas during harsh conditions.

Next Steps:

- Form subcommittee to draft mission scenarios
- Gather UNOLS Community input
- Review iteratively
- Engage federal agencies
- In parallel FIC should develop a proposed acquisition process and timeline.

There is the issue of construction funding. NSF and ONR have stated that they are done with ship building. Bob Houtman commented that it is too early for the agencies to start thinking about the Global Ship acquisition. Funding is needed for the RCRV construction. Funds for the Global mid-life refits are still needed.

A FIC Global subcommittee was formed and includes Greg Cutter, Jim Swift, and Clare Reimers.

Collect lessons learned from recent vessel construction projects:

- Mike Prince will try to put one together for the *Armstrong* and *Ride*.
- Marc Willis put one together for *Sikuliaq*. Some of his reflections are included in a presentations at: https://www.unols.org/sites/default/files/201003ficap07.pdf

FIC Membership Status – The FIC membership terms are listed in ***Appendix IX***.

- Joan Bernhard and Greg Cutter both agreed to serve a second term on the Committee.

- Mile Sundermeyer and David Bradley are completing their 2nd term. Both were thanked for their contributions to the Committee. A call for nominations will be announced to fill these positions.
- This is Clare Reimer's last meeting as FIC Chair. The committee expressed their appreciation for Clare's many accomplishments while serving on the committee.

Adjourn Meeting