

UNOLS ANNUAL MEETING

Room 1235

National Science Foundation

4201 Wilson Boulevard

Arlington, VA

21 September 1999

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Tuesday 21 September 1999

INTRODUCTION – The UNOLS Annual meeting was held in Room 1235 of the National Science Foundation on 21 September 1999. Items of the agenda, *Appendix I*, were addressed in the order as reported below. Bob Knox, UNOLS Chair, called the meeting to order at 0830 and welcomed the gathering. The participants of the meeting are listed in *Appendix II*.

ACCEPTING MINUTES – The minutes from the 18 September 1998 Annual meeting were accepted as written

COMMITTEE REPORTS :

Research Vessel Operator's Committee (RVOC) – Paul Ljunggren, RVOC Chair, provided the report and gave an update on a variety of RVOC activities. Defibrillators were bought and supplied to the entire fleet. The Research Vessel Safety Standards (RVSS) have been updated and will soon be published. The RVOC Safety committee met at the University of Rhode Island to review the latest USCG and international regulations and how they might affect the UNOLS Fleet. RVOC was tasked by NSF to develop a van inventory. Joe Coburn is heading this activity. The annual 1999 RVOC meeting will be held on 2-4 November at HBOI. The agenda will include a presentation by Jamestown Marine Services on computerized maintenance systems, a discussion of the Academic Fleet Review and a presentation on the National Marine Fisheries Service's planned fishery research vessel.

DEep Submergence Science Committee (DESSC) – Patty Fryer, DESSC chair, provided the report. This year marked the first cruise which used both ROVs and the autonomous vehicle ABE. The Deep Submergence Group at WHOI is developing a next generation Jason which should be ready for service in 2001. It will be an upgrade to the current Jason. At the July DESSC meeting, plans were discussed for the DESCEND Workshop scheduled for 25-27 October. The first day of the workshop will be devoted to discussions on science directions. The second

day will discuss technology and identify facility needs for the future. Patty hopes to have a rough draft of the report ready by the December DESSC meeting.

Fleet Improvement Committee (FIC) – The FIC report was presented by Larry Atkinson. The FIC met with ONR and Lockheed/Martin representatives to discuss the AGOR 26 design. FIC is providing the user community input on the design. Science Mission Requirements (SMRs) have been developed for a replacement of ALPHA HELIX. Plans for the East Coast SMRs are tabled for now. The FIC will work with operators on replacement plans for their respective vessels. A major focus of the FIC has been development of "Biennial Review of the Fleet" document. An outline of the document is provided in *Appendix III*.

Ship Scheduling Committee (SSC) – Mike Prince, outgoing SSC Chair, presented the 2000 ship utilization totals (see *Appendix IV*) and reviewed the Ship Scheduling procedures which were altered this year. Under the new procedures, the full meeting of the SSC was held in July when most funding decisions had been made. The review committee met again in September to finalize the schedules. In 2000, NSF will be supporting 59% of the fleet usage. This is up from past years. Much of the NSF work is on large ships. Other agency totals (ONR and NOAA) are down. The intermediate east coast vessels appear to have light schedules in 2000. The funding level for NAVO work is not clear at this time. If funding is less than in past years, the lower priority NAVO programs might not be scheduled. The UNOLS system is ready to accommodate either funding scenario. The number of funded ROV programs in 2000 is high and some of this work may be shifted to 2001. Mike reviewed the cruise scenarios for each of the large ships. Approximately 80% of the ship time requests are now being submitted electronically by the community. Use of the electronic filing is very helpful.

Research Vessel Technical Enhancement Committee (RVTEC) – John Freitag, RVTEC Chair, reported on the committee's 1998 meeting. It was unique in that it was combined with the INMARTECH '98 Symposium, a joint meeting with the international community. The INMARTECH program included a variety of technical sessions. Informative discussions resulted from this joint meeting. The 1999 RVTEC meeting will be hosted by the University of Texas in Port Aransas, TX on 20-22 October. A discussion on the data storage format of NetCDF is planned. FIC formally requested that RVTEC apply a standard format and NetCDF was selected. The meeting will also include discussions on underway data processes, ARGO, and a SeaNet Update.

Other activities include updating the RVTEC homepage which has been handled by Tom Wilson. The RVTEC has also been involved in planning HEALY's science system testing. Many of the RVTEC members will be involved in development of the tests and participating in the test cruises.

Arctic Icebreaker Coordinating Committee (AICC) – Jim Swift, AICC Chair, provided the report. The AICC goal is to have HEALY's scheduling and operation modeled after UNOLS. HEALY has been launched and is expected to be delivered to the USCG in November. Warm water trials will be conducted in February 2000. The ship will be ready for full science operations in early 2001. A full report of the AICC activities is included as *Appendix V*.

Jim reported on a RAND study that is investigating the costs associated in making a nuclear submarine available for use by the science community. MENDELL RIVERS is a submarine scheduled for decommissioning and has eight to nine years of reactor life remaining. The Navy is considering making this ship available for science.

FEDERAL AGENCY AND CORE REPORTS:

Department of State (DOS) – Tom Cocke gave the DOS report. NSF, ONR and NOAA are providing support for a full time clearance specialist, Liz Maruschak. Liz has made a significant difference in assisting with the clearance process. However, about two-thirds of the requests that are submitted are received late. Requests are required to be at the DOS one month prior to the deadline for the request. As an example, in the case of a country which requires six months for clearance processing the request must be submitted seven months before cruise time. Late submissions place a strain on the DOS office. Post cruise obligations are the reports required by the coastal states that granted clearance. About one third of these reports are submitted to the DOS by PIs on time. This is actually an improvement from past years when only one fourth were submitted on time. Twenty-three reports remain outstanding for the past year.

Liz has devoted a lot of time on the DOS based ship tracking system. She has been redeveloping the system from FoxPro to ACCESS. This has greatly improved efficiency. Liz is looking for an ACCESS-2000 expert to look over her application. It is not clear whether or not the funding for Liz will continue into FY00.

There is no news concerning the ratification of the Law of the Sea Treaty.

Mineral Management System (MMS) – no report

Naval Oceanographic Office (NAVO) – Paul Taylor gave the report for NAVO. Viewgraphs from this presentation are included as *Appendix VI*. The viewgraphs provide UNOLS and NAVOCEANO accomplishments for 1997-1999. The NAVO program was organized by Gordon Wilkes and Jim Trees. Jim Trees has retired from the Navy. Gordon has also retired, but is back as a contractor for NAVO. Use of UNOLS ships has been very beneficial to NAVO. The Navy survey ships are all forward deployed and rarely return to the United States. As a result, NAVO's survey needs in U.S. waters could not be met prior to utilization of the UNOLS ships. Paul provided a viewgraph showing the institutions that have conducted NAVO work. The positive attitude of the UNOLS operations is excellent. During the three years of operations, 12 different ships were used for a total of 1255 ship days. In the past three years all of the funds available for UNOLS use was spent by NAVO on UNOLS ships or in processing data collected from UNOLS ships. Because the funding level for CY2000 is unclear there are scenarios for funding at both the \$3M level and the \$7.5M level. If full funding is received, lower priority projects will be scheduled. NAVO is very pleased with the processed data that UNOLS has provided.

National Oceanic and Atmospheric Administration (NOAA) – CDR Beth White provided the NOAA report. She began the report by noting that line officers from NOAA OAR, NOS and NMFS are present. Beth introduced Tashiro Shozo from JAMSTEC who is visiting NOAA. Also introduced was Louisa Koch, Deputy Assistant Administrator of OAR.

R/V BROWN will be arriving in Hawaii this month (September) and will then depart for Seattle with arrival scheduled on 23 October. This will complete an around-the-world cruise that started on 14 January. Beth gave an overview of the programs that BROWN conducted over the past year.

Oceanographer of the Navy (OON) – Pat Dennis gave the report for the Oceanographer of the Navy. RADM Richard West is now aboard as the new Oceanographer of the Navy and is enthusiastic about his new assignment. Rick Spinrad is also onboard as the new Technical Director for the OON. Rick brings significant experience and a full knowledge of the UNOLS system. The Navy's survey fleet modernization plan is nearing completion. TAGS 64, BRUCE HEEZEN, will be delivered this winter and may make a trip to Rhode Island to honor the school that gave the ship its name. TAGS 65 has yet to be named.

Naval Research Laboratory (NRL) – Joan Gardener provided the report for NRL. For 2000 NRL is planning approximately \$1.3M of UNOLS ship time. Work is scheduled on REVELLE.

National Science Foundation (NSF) – The NSF report was given by Don Heinrichs. His viewgraphs are included as *Appendix VII*. Several staff changes were announced. Don will be retiring at the end of December. Recruitment for an Associate Program Director is underway. CDR Beth White, on loan from NOAA, is assisting at NSF on a part-time basis. She has been a great help to NSF. Holly Smith has joined OCFS/ODP as a science assistant.

The Ocean Sciences budget request for 2000 is an increase of 2.6% over 1999. The major emphases in the 2000 budget are for Information Technology (IT²) and Biocomplexity in the Environment (BE). Congress has not signed the budget at this time. The House mark is at FY99 level and the Senate mark is at the request level. The budget will need to go to conference and may go into a continuing resolution.

The Academic Fleet Review Report recommended the UNOLS system be retained. Technical support for share-use shipboard systems has been listed as a concern. The need for a long-range plan was recommended. Further discussion on this topic is planned later in the meeting.

Don reported on NSF program issues. The Government Performance and Results Act (GPRA) for facilities must be implemented. Annual performance goals must be developed for research facilities for FY99 and FY00. As a performance goal for operations, it is desired to keep facility operating time lost due to unscheduled downtime to less than 10%. Construction and upgrades should be kept within annual time schedules and expenditure plans, and not exceed 110% of estimates.

Facility templates for reporting GPRA are being developed for use starting early October. Each operator will provide information to the UNOLS Office who will compile statistics. The results will be merged at NSF. As an action, NSF and UNOLS operators need to agree on a single, consistent procedure to define and report "user units."

In other program issues, Don reported that proposal guidelines have been updated on the NSF website. On 15 October 1999, Fastlane will be a requirement for all proposals.

Don reported on NSF planning issues. They plan to articulate a broadly based vision for the future of ocean sciences and technology. They also plan to develop a robust plan for the modernization and composition of the academic research fleet that responds to realistic science and funding decisions.

Bob Knox made a presentation on behalf of UNOLS recognizing Don's many contributions and dedication to the academic fleet. Don was presented with a mariner's clock.

Office of Naval Research (ONR) – Sujata Millick provided the ONR report and began by presenting the ONR Organization Chart, see *Appendix VIII*. RADM Gaffney is the Chief of Naval Research, Dr Saalfeld is Technical Director, and Vice Chief of Naval Research is BGEN Timothy Donovan. There are six departments within ONR. Sujata reported that in effort parallel to the NSF Futures workshops, ONR has four focus areas and 16 corporate thrusts. The four focus areas are Battlespace Environments, Undersea Warfare/Anti-Submarine Warfare, Undersea Warfare/Mine Warfare, and Maritime Intelligence, Surveillance, Reconnaissance & Space Exploitation. The Navy's support for fleet facilities was presented. Total funding for Research Facilities in CY1999 is \$21,800 and is \$13,164 for CY2000. The total Navy ship time supported in these years is \$18,203 in CY1999 and \$11,662. The ship time use totals were broken down further by types of Navy support (ONR, NRL, NAVO, NOPP and other).

The AGOR 26 construction contract is close to being signed. The Phase I design effort is nearing completion. The design was presented at the Council meeting. FIC will review the AGOR 26 design in detail at their November meeting. MOANA WAVE was removed from service in June of this year. Its final disposition is still unclear. ONR has significant work off Asia in the near term. The Navy's LWAD program will be carried out in the Mediterranean next year.

Bob Knox introduced Rear Admiral Evelyn Fields, Director of the NOAA Corps.

Consortium for Oceanographic Research and Education (CORE)– Bob Winokur, Vice President of CORE, gave the report and began by reviewing various budget issues. Funding for NAVO's use of UNOLS vessels has been included as part of the NOPP budget at the \$7.5M level for the past several years. It appears that Congress has reduced this level to \$3M for FY00. There is an effort to put some of the NOPP money into other agency budgets. It is important that the UNOLS community make their representatives aware of the importance of this NOPP funding. It is unclear at this time if additional money will be added to the budget. The Senate and House budgets for NOAA differ dramatically and it is still a question as to how this will be reconciled.

Bob Winokur presented viewgraphs showing current NOPP Plans, see *Appendix IX*. For FY2000, agencies with NOPP budget submissions are ONR, NOAA and NASA. The total budget is approximately \$18M. There are three themes for NOPP 2000: Processes and Prediction, Sensing and Systems, and Sustainable Coasts and Coastal Presence. Bob discussed the CORE ocean observations initiative. This began in 1998 with a request to NORLC from Congressmen Saxton and Weldon for a U.S. plan. In July of this year CORE completed a paper titled, "A National Initiative to Observe the Oceans: A CORE Perspective." A new report on this topic is to be completed by the end of 1999. They hope to engage the broader community concerning how best to proceed with an ocean observing plan. Some of the issues that need to be resolved include management, integration of present and future systems, integration between coastal and open ocean systems, relationship to international programs, and identifying objectives, requirements and priorities. Bob provided a list of the ocean observations task team members. Membership includes both federal agency representatives and academia. Various examples illustrating the needs for observatories include:

- Ocean-atmospheric interactions and climate,
- Deep ocean and solid earth science,
- Ocean chemistry and the carbon cycle,
- The coastal zone, and
- Biological dimensions.

A list of the current NOPP representatives was provided and includes 12 agencies. Also presented was the list of the NORLC members.

NSF Academic Fleet Review – Don Heinrichs provided the report on the Academic Fleet Review. His viewgraphs are provided as *Appendix X*. Don gave the history of the review and explained why it had been initiated. The National Science Board (NSB) requires that all facilities be reviewed periodically. A review of the fleet had not been conducted in some time, and as a result, NSB requested the review. Ron Tipper and Ellen Kappel provided the administrative support for the review report. Don presented a viewgraph showing the Committee membership and their charge from the Assistant Director of Geosciences. The Committee included representation from industry, federal agencies, and the academic community. The members included Roland Schmitt, Chair; Earl Doyle, Steve Ramberg, Hugo Bezdek, Christopher D'Elia, Ellen Druffel, Larry Mayer, and Georges Weatherly. The Committee's charge was to:

- Review and evaluate the current Academic Research Fleet.
- Review and evaluate management structure, existing capabilities and services and possible changes.
- Recommend actions to improve the organization, management and cost effective operation of the fleet.

The Committee found that the UNOLS system should be retained with increased emphasis on science support and continuous quality improvement. Don showed figures from the fleet review report which provided the ship utilization totals for 1988 through 1999 for NSF as well as ship utilization for the entire fleet. The charts show a decline in the NSF use of the fleet in recent years. The review committee recommended that any extra facility funds available as a result of low utilization should be applied to fleet improvement.

Don reviewed the findings and recommendations of the fleet review:

Principal Findings:

- Current practices provide excellent access to the sea for U.S. researchers
- UNOLS services are meeting community needs and costs are comparable to other government and commercial operators.

Recommendations:

- The UNOLS system should be retained.

Programmatic findings:

- There is a potential for a near-term period of reduced use of UNOLS fleet by NSF grantees.
- There is need for a strong continuing program for technology introduction, improvement of existing capabilities, and a more systematic approach to maintenance and upgrades.
- There is a need to enhance quality control, training and safety procedures, and develop even higher standards for shared use facilities.

Recommendation:

- Launch a significant campaign to upgrade and strengthen the fleet to prepare for increasing technological sophistication and improve future productivity and quality of fleet operations.

Operational findings:

- Continue the practice of competing the management of the UNOLS Office.
- Needs for specialized capabilities are met in special circumstances from outside the UNOLS system.

Recommendations:

- Use a cooperative agreement for support of the UNOLS Office to ensure necessary management oversight.
- Consider a trial including some commercial ship operators as UNOLS non-member operators to provide unique fleet capabilities.

Planning findings:

- Ocean scientists must assess the future needs and opportunities of the field to establish priorities. A broad vision is essential to anticipate future fleet requirements.
- Federal agencies must improve long range planning for facilities with twenty to thirty year life spans, beyond the scope of NSF and UNOLS alone.

Recommendation:

- NSF must accelerate and expand efforts to articulate a broadly based vision for the future of ocean science and technology.
- Federal agencies sponsoring research in oceanography should develop a long range plan for modernization and composition of the oceanographic research fleet that reaches well into the 21st century.

A general discussion followed Don's presentation. The Council was concerned with the recommendation to charter commercial ships. Don explained that the recommendation did not include bare-boat charters for which there are often safety concerns as well as additional costs to provide a fully founded ship, bringing the total cost equal to or greater than UNOLS vessels. Chartering should be for special needs, those beyond the capability of the UNOLS Fleet. An example would be giant coring from the MARION DUFRESNE or a multi-channel seismic ship.

Don reviewed the initial and developing actions that NSF Ocean Sciences has taken in response to the Committee's recommendations. The initial actions include:

- Developing new cooperative agreements for ship operators, with increased emphasis on quality control and standards.
- Revising guidelines, reviews and management of shared-use instrumentation to improve technology (This was an area of considerable concern to the science community. Repeated comments related to shared-use equipment were received via the user survey.)
- Sponsoring workshops focused on emerging technology, specialized capabilities and improvements to basic systems. Don noted that plans were well underway for the DESCEND workshop in October as well as a Winch and Wire Symposium. Additionally, NSF has supported training proposals submitted by various operators and technician groups.
- Recompeting the UNOLS Office award as a cooperative agreement.

Developing actions include:

- Acceleration and expansion of science planning activities.
- Long-range planning for the modernization and composition of the fleet.
- Trial participation of commercial operators to provide unique capabilities.

NSF will be working with other federal agencies in developing a long-range strategic plan for fleet upgrades and replacement. Don presented a viewgraph showing the projected useful life of UNOLS ships. Long range planning will be an agenda item at the November FOFCC meeting.

Winch and Wire Symposium – Jack Bash reported that plans are underway for a Winch and Wire Symposium. The purpose of the symposium is to define future winch and wire requirements, assess the inventory in the fleet, and identify what is needed. A steering committee has met to plan the symposium. A questionnaire was developed and distributed to the community. Returns were about 10%. Six heroes have been identified to represent the four primary science disciplines, plus an operator and an ocean engineer. They are compiling summaries of the questionnaire results to present at the symposium. The symposium is tentatively planned to be held at Tulane Medical Center, New Orleans in early December. Speakers will be invited to address the specific topics. A result will be an update of the winch and wire handbook. Jack encouraged participation from the science and engineering user community.

**KEYNOTE ADDRESS
BY
DR. PETER BREWER**

Dr. Peter Brewer, Senior Scientist at Monterey Bay Aquarium Research Institute (MBARI) provided the keynote address. His view graphs are included as *Appendix XI*. Peter Co-chairs with Ted Moore (University of Michigan)

the working group to integrate the findings of the four disciplinary NSF *Futures* workshops. NSF's OCE department selected the synthesis group which includes 24 members from 17 different academic institutions. Peter reviewed the charge; "The objective of this activity is to develop a clear and compelling description of the most important and promising opportunities for discovery and new understanding in the ocean sciences over the next decade." An e-mail survey was conducted which reached approximately 10,000 scientists. In response, 120 detailed responses were received. These were clustered into four areas: coastal processes, climate/ocean interactions, ecosystem research, crustal processes and flows.

Peter continued by giving an overview of the various FUTURES workshops and also provided general comments from all four reports. The four workshops were titled: APROPOS (physical), FOCUS (chemistry), OEUVRE (biology), and FUMAGES (MG&G) Approximately 40 people attended each workshop. The workshop reports are very different from each other. They have not been published in hardcopy, but are posted on the web: www.joss.ucar.edu/joss_psg/project/oce_workshop. Satellites were barely mentioned in the reports. Time domain was a very strong common theme. Large-scale surveys were barely mentioned. There was strong interest in perturbation experiments, non-equilibrium/non-steady state, and land-sea boundary. Monitoring /observatories were of passive interest. Computing power, the drill ship and submersible/ROV were all assumed. Once the four disciplinary workshops synthesized, implementation will begin.

In developing a synthesis report, the working group had to decide what a decadal report should look like. They decided to select existing reports that have been admired and effective to use as examples. They looked at two NAS Committee Reports, the 1982 "Field Report" - Astronomy and Astrophysics for the 1980's and the 1985 "Pimental Report" - Opportunities in Chemistry. The "Field Report" appears to be a close model in that their approach was similar. Peter reviewed an early suggestion for the report outline, but it was determined that this model would be difficult to follow.

The committee selected interdisciplinary themes and identified key people to address each theme. The themes included: the role of ocean in climate change, the ocean beneath the sea floor, coastal ocean perturbations and processes, turbulent mixing and bio-chemical physical interactions, non equilibrium system dynamics, dynamics of the ocean lithosphere, ocean prediction, and the ocean carbon cycle. The committee has not been working in isolation; they have been calling on outside help.

Peter reviewed the draft report outline. It includes a preface, executive summary, introduction, new frontiers in ocean science, new approaches and cross cutting issues and resources and partnerships. The new frontiers section will address the working group themes. Peter gave examples of what would not be considered by the report: design and timing of NASA ocean missions, the fate of navy acoustic systems, extra-terrestrial oceans, future use of Navy operational submarines, and design and support of purely operational submarines. It was recognized that this is a NSF paper and although there are many other important issues, the report needs to focus on the NSF objectives.

DESCEND Workshop Plans – Patty Fryer provided a report on the status of the DESCEND workshop plans, see *Appendix XII*. She reviewed the website and listed the steering committee members. The workshop is planned for October 25-27, 1999 at the National Science Foundation. People who are not able to attend are welcome to provide input by submitting an abstract. To date 90 people have registered for the meeting. Patty reviewed the meeting agenda. Day one is devoted to science discussions and Day two is devoted to technology discussions. The third day will be a wrap up session. Report writing will be conducted at the meeting and it is hoped that a draft report will be ready by the December DESSC meeting.

SeaNet Update – Ellen Kappel gave an update on SeaNet. A full report on the status of SeaNet was included in the last issue of "*UNOLS News*." SeaNet use has been low. The SeaNet group is looking for funds to cost share the expense of its use with the users. To help introduce the system to the community, SeaNet plans to contact the PIs listed on upcoming ship schedules with SeaNet installations to see if they would be willing to try out the system. SeaNet will help pay for the communication costs during these projects. SeaNet plans to request a no-cost extension for their grant. They will try to have a system demonstration at the fall AGU meeting.

Charlie Flagg noted that this is an important issue and could have important applications for shipboard modeling. Recently there was a multi-ship program on Georges Bank where communications was difficult. The SeaNet system has the potential to provide an important communications capability.

UNOLS Membership Votes:

UNOLS Charter Revision – A revision to paragraphs 3.a. and 5.a. of the UNOLS Charter were proposed, see

Appendix XIII. The proposed revision would allow membership by both consortia and individual memberships, but voting will be by either the member institution or by consortia member, not both. A motion was made and passed to accept the proposed revisions to the UNOLS Charter.

Application for Membership: Southern California Marine Institute (SCMI) - An application for membership was submitted by SCMI, see *Appendix XIV*. A motion was made and passed to approve SCMI for UNOLS membership.

Application for Membership: New Jersey Marine Sciences Consortium (NJMSC) - An application for membership was submitted by NJMSC, see *Appendix XV*. A motion was made and passed to approve NJMSC for UNOLS membership.

United States Coast Guard Agency Report – Jon Berkson provided the USCG report which included a HEALY update, a POLAR Class update and the status of the USCG/NSF MOA. Sea trials on HEALY were conducted on 23-30 August in the Gulf of Mexico. Final delivery of the ship is expected in early November 1999. Planning for ice and science trials is on track with a four-phase schedule starting in mid-January 2000.

POLAR SEA is expected to be available for Science of Opportunity work in the mid-June to late July 2000 time frame. POLAR STAR is in a shipyard undergoing major repairs to the centerline shaft. Shaft alignment problems forced the cancellation of a planned summer Science of Opportunity cruise in 1999.

In May, the Coast Guard and NSF signed a revised MOA for use of Coast Guard icebreakers for Arctic and Antarctic projects supported by the NSF. The full details of the Coast Guard report are included as *Appendix XVI*.

Issues before UNOLS - Bob Knox reported on the issues before UNOLS.

Future UNOLS Fleet Evolution – Bob indicated that this will be a major planning focus in upcoming years as many of the UNOLS intermediate and small vessels will approach the end of their useful life in the next ten years. Peter Brewer addressed a few of the research directions to be expected in the future. His report will be useful in identifying the needed capabilities of future platforms.

Revised Research Vessel Safety Standards (RVSS) – The RVSS have been updated and will be distributed. It is important to keep them up-to-date with respect to ISM codes.

UNOLS Office Transfer – The UNOLS Office will transfer to Moss Landing Marine Lab on May 1, 2000. Mike Prince will be the new Executive Secretary.

Moorings as a Facility – A meeting is planned at the conclusion of the Annual Meeting to address the issue of moorings as a facility.

NOPP Status and Outlook - The NOPP outlook was provided earlier in the meeting during the CORE report.

NOAA Fisheries Needs – Bob Knox gave a brief background and status on the NOAA/NMFS AMLR program. This program is primarily for fisheries research in Antarctica. NOAA solicited the academic community for the AMLR ship support. WHOI and SIO submitted a joint proposal. Both KNORR and MELVILLE can be outfitted for fisheries work. NOAA indicated that the proposal was good, but the cost was too high. As a result, NOAA sent a request for proposals out commercially. WHOI and SIO again responded, however, were disqualified because the commercial solicitation indicated that the proposal must include a liquidated damages clause. WHOI and federal agencies cannot legally comply with this requirement. The future status of AMLR with respect to UNOLS ships is unclear at this time.

UNOLS/NOAA-OAR MOU – The MOU is at NOAA awaiting signature.

UNOLS/NOAA-NMFS MOU – An MOU has been drafted and endorsed by UNOLS. It is now at NOAA for comment.

Integrated Ocean Observation Plan – Bob Knox reported that he will give a paper on the role of research vessels in the long-term ocean observing system for climate at the OceanObs99 Conference, to be held in Saint Raphael, France October 18-22, 1999. Research ships will be needed to sustain certain kinds of global observations, such as, actual sampling at sea, deploying autonomous instruments, or maintaining moored stations. Support of global observations will need to be factored into fleet renewal plans.

BLUE FIN Replacement Plans – Plans for replacement of BLUE FIN have been stalled while financial matters are resolved. There is no new status at this time.

CALANUS Replacement Plans – Construction of the replacement for CALANUS are well underway. This ship is a catamaran design. It is scheduled to begin operations in early 2000.

Additions to the UNOLS Fleet – R/V BLUE HERON operated by Univ. of Minn., DULUTH was accepted into the UNOLS Fleet.

Retirements from the UNOLS Fleet – MOANA WAVE operated by the University of Hawaii was retired from the UNOLS Fleet in June.

Alaskan SMRs and Future Plans – In 1999, the Science Mission Requirements for an Alaskan vessel were endorsed by the UNOLS Council and forwarded to the University of Alaska. The Council encouraged U.Alaska to continue ALPHA HELIX replacement efforts. The question was raised of whether or not it would be feasible for U.Alaska and NOAA/NMFS to collaborate in an effort to acquire an Alaskan vessel. NMFS has indicated that they need at least one fisheries research vessel fully dedicated to fisheries work. As a result, NOAA's new FRV planned for the Alaska region would not be available for general oceanographic work by academia. However, if Alaska were to build a vessel with a fisheries capability, the NMFS would likely have a half-year of fisheries work for that vessel.

White Paper on Ship Scheduling – Jack Bash reported that the white paper providing instructions on the UNOLS ship scheduling procedures is in its final editing process and should be on the street within the month.

UNOLS Future Public Outreach Plans – In outreach activities, Jack reported that he chaired a session at MTS on SWATHS. MBARI and WHOI presented papers. Glosten provided input to both of these papers. The UNOLS Office will have a booth at the fall AGU conference. Jack is the MTS book review editor and he welcomes volunteers willing to conduct a review.

UNOLS Brochure – Vicky Cullen of WHOI is working on an update to the UNOLS Brochure. She hopes to have the document finalized by the end of the year. It will be distributed to the UNOLS Members. It is a very popular publication.

SEA CLIFF Engineering Study Status – Dick Pittenger reported that as part of the SEA CLIFF engineering study visits have been made to Russia and France to examine their submersible technologies. A visit to JAMSTEC is also planned. WHOI has been investigating high strength metals. A report is planned for the fall DESSC meeting (after briefing the funding agencies).

UNOLS Website Upgrades – Updates to the UNOLS website continue. The ship time request form is working well. Work on the ship scheduling form continues. Plans for transferring the website to MLML are under consideration.

UNOLS Appointments to Committees: Bob Knox announced new appointments to the UNOLS Committees.

- Executive Committee – Bob Knox (Chair), Tom Royer, Patty Fryer, Paul Ljunggren
- DESSC – DESSC is in the nominating process to find replacement for expiring terms.
- FIC – Dave Hebert, Mark Brzezinski
- SSC – Joe Ustach (Chair), Dan Schwartz (Vice Chair)

UNOLS Council Farewells – Bob Knox extended his thanks on behalf of the UNOLS Community to Clare Reimers for her service on the UNOLS Council.

Council Election Results – The UNOLS Nominating Committee of Tom Shipley (Chair), Larry Atkinson and Barbara Prezelin assembled a slate of candidates for the UNOLS Council positions. The slate and CVs for each candidate are included as *Appendix XVII*. The election was held in accordance with the UNOLS Charter as readopted February 1999. There were no nominations from the floor. Voting was conducted by ballot of the UNOLS member representatives present at the meeting. The election results were as follows:

- At-Large Representative (3-year term): Denis Wiesenburg (Univ. of Southern Mississippi)
- Operator Representative (3-year term - second term): Dennis Hansell (Bermuda Biological Station for Research)

UNOLS Membership Lists - *Appendix XVIII* includes lists of UNOLS Member Institutions, the Council and Committees, Operators, and Schedulers.

The Annual Meeting adjourned at 2:30 pm

**UNIVERSITY-NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM ANNOUNCEMENT
UNOLS ANNUAL MEETING**

Tuesday - September 21, 1999 - 8:30 a.m.

National Science Foundation, Room 1235 4201 Wilson Boulevard, Arlington, VA

This meeting is open to all investigators, users, operators and sponsors of university oceanographic facilities. It is a public forum for discussing the utilization and scheduling of research vessels and other facilities as well as their support and future planning.

Robert Knox, Chairman

John F. Bash, Executive Secretary

University-National Oceanographic Laboratory System

The University-National Oceanographic Laboratory System is a planning mechanism for oceanographic facilities. It is a joint effort of the academic community and the Federal funding agencies, principally the NSF, ONR, NOAA, USCG, MMS, and USGS.

UNOLS provides for community-wide cooperation and review of the utilization of facilities and opportunities for access to those facilities. It assesses the match of programs to the needs of academic programs and makes recommendations of priorities for replacing or improving the numbers and mix of facilities.

UNOLS serves as a focus for new ideas and requirements for specialized facilities.

UNOLS does not replace direct contact between the investigator and institution's operating facilities. It does, however, serve as a backup and clearinghouse for information and coordination that might not otherwise be available to the researcher and his/her laboratory.

UNOLS is composed of institutions and laboratories which use and/or operate sea-going facilities and maintain an academic program in the marine sciences. It comprises several standing committees dealing with ship scheduling, marine operations, their regulations and logistics, technical support, Arctic icebreaker coordination, fleet improvement and replacement, and national facilities. Member institutions' representatives are individuals whose role is to provide oceanographic facility services or use those facilities. Membership does not ensure Federal funding.

8/18/99

Appendix I

UNOLS ANNUAL MEETING

8:30 A.M., Tuesday, 21 September 1999

National Science Foundation, Room 1235 4201 Wilson Boulevard Arlington, VA

Introduction and Welcome: Robert Knox, UNOLS Chair will call the meeting to order and report on 1998-1999 activities, current issues and issues continuing into 2000.

Accept Minutes of the 1998 Annual Meeting.

COMMITTEE REPORTS

Research Vessel Operators' Committee (RVOC) - Paul Ljunggren, Chair, will review the activities of RVOC for 1998-1999 and plans for the 2-4 November Annual RVOC meeting at HBOI.

DEep Submergence Science Committee (DESSC) - Patty Fryer, Chair, will report on the DESSC activities, 1998/99 ATLANTIS/ALVIN/ROV operations, and equipment/instrumentation upgrades and improvements for

the National Deep Submergence Facility. She will report on deep submergence operations planned for 2000 and beyond.

Fleet Improvement Committee (FIC) - Larry Atkinson, Chair, will report on the FIC activities in 1998/99 and plans for the upcoming year including a status report on "The UNOLS Biennial Review of Sea Going Oceanographic Facilities."

Ship Scheduling Committee (SSC) – Mike Prince, Chair, will review the recommendations of the September Ship Scheduling Review meeting. He will summarize the UNOLS ship operation plans for 2000. He will also recap the outcome of the revised scheduling process that was tried in 1999.

Research Vessel Technical Enhancement Committee (RVTEC) - John Freitag, Chair, will report on RVTEC activities in 1998/1999 and plans for the RVTEC Annual Meeting scheduled for 20-22 October.

Arctic Icebreaker Coordinating Committee (AICC) - Jim Swift, Chair, will report on the activities of the AICC in 1998/99 including the status of science modifications and testing for USCG Icebreaker HEALY. He will also review Science of Opportunity operations planned for the future.

FEDERAL AGENCY and CORE REPORTS

Federal Agency Reports - Information from Federal Agencies (DOS, MMS, NAVO, NOAA, NOO, NRL, NSF, ONR, USCG and USGS) on 1999 activities and forecasts for 2000 and beyond.

Consortium for Oceanographic Research and Education – A report on CORE activities of interest to UNOLS will be provided.

12:00 - 1:00 pm Lunch Break 12:00 -1:00 pm

KEYNOTE ADDRESS – DR. PETER BREWER

Dr. Peter Brewer, Senior Scientist at Monterey Bay Aquarium Research Institute, will discuss his activities as Co-Chair of the working group to integrate the findings of the four disciplinary Futures workshops. The product of their efforts will be a succinct and integrated description of research topics that have the most potential for significant impact on the understanding of the ocean system and which feasibly can be tackled during the next decade or so.

NSF Academic Research Fleet Review – Don Heinrichs of NSF will review the recommendations of the Academic Fleet Review Committee as well as future implications of the results.

Winch and Wire Symposium – Jack Bash will report on plans for the Winch and Wire Symposium presently scheduled for December.

DESCEND Workshop Plans – Patty Fryer will report on plans for the DEveloping Submergence SCience into the Next Decade, "DESCEND" workshop. The workshop is scheduled for October 25-27, 1999.

SeaNet Update – A report on the installation and use of SeaNet on selected UNOLS vessels will be provided.

Issues Before UNOLS: Various issues of interest to UNOLS Members have arisen during the year. The UNOLS Chair will introduce these issues for discussion:

- Future UNOLS Fleet Evolution
- Revised Research Vessel Safety Standards
- UNOLS Office Transfer
- Moorings as a Facility
- NOPP - Status and Outlook
- NOAA's Fishery Needs
- UNOLS/NOAA-OAR MOU – Two-year Review
- UNOLS/NOAA-NMFS MOU Draft Status
- An Integrated Ocean Observation Plan
- New Ship Construction - Replacement plans for BLUE FIN and CALANUS

- Fleet Additions/Retirements (BLUE HERON was added, MOANA WAVE retired)
- Alaskan SMRs and Future Plans
- White Paper on Ship Scheduling
- UNOLS Future Public Outreach Plans
- UNOLS Brochure
- SEA CLIFF Engineering Study Status
- UNOLS Website Upgrades
- UNOLS Dues Accounting

UNOLS Members may wish to raise additional issues.

UNOLS Membership Votes: The following issues require a membership vote for approval:

- UNOLS Charter Revision - Clare Reimers will review proposed revisions to the UNOLS Charter. A membership vote is required for adoption of the proposed revisions. Enclosed is a copy of the proposed revised Charter (*enclosure 1*).
- Application for UNOLS Membership - Southern California Marine Institute has applied for membership as a UNOLS institution. A copy of the application is included in *enclosure 2*.
- Application for UNOLS Membership - The New Jersey Marine Sciences Consortium has applied for membership as a UNOLS institution. A copy of the application is included in *enclosure 3*.

UNOLS Elections: Elections for the following UNOLS Council positions will be held (the slate of nominees is attached as [enclosure 4](#)):

- UNOLS Council Member, (3-year term) At-large, affiliated with any Member Institution.
- UNOLS Council Member, (3-year term) Operator representative, from among designated UNOLS Operator Institutions.

UNOLS Appointments to Committees: The UNOLS Chair will announce new appointments to the Executive Committee, AICC, DESSC, FIC, RVOC, RVTEC, and SSC in accordance with the UNOLS Charter.

Calendar for UNOLS Meetings:

MEETING	LOCATION	DATES
Scheduling Review	Arlington, VA	9 September 1999
UNOLS Council	Arlington, VA	20 September 1999
UNOLS Annual	Arlington, VA	21 September 1999
RVTEC	Port Aransas, TX	20-22 October 1999
DESCEND Workshop	Arlington, VA	25-27 October 1999
RVOC	Fort Pierce, FL	2-4 November 1999
FIC	Moss Landing, CA	Fall, 1999
Winch & Wire Symposium	Arlington, VA	Tentatively 1-2 December 1999
DESSC	San Francisco, CA	12 December 1999
AICC	TBA	TBA

Adjournment

2000 Utilization

		Class	Updated	NSF	Navy	NAVO	NOAA	Inst	Other	Total	Funded	% Funded
Atlantis	WHOI	1	09/02/1999	262			19		22	303	227	75%
Ewing	LDEO	1	08/29/1999	253					7	260	253	97%
Knorr	WHOI	1	09/02/1999	265	57					322	170	53%
Melville	SIO	1	09/06/1999	244			18	4		266	221	83%
Revelle	SIO	1	08/31/1999	206	107					313	304	97%
Thompson	UW	1	08/22/1999	81	20	50	10	66	28	255	169	66%
Endeavor	URI	3	08/30/1999	98	85	20	26			229	164	72%
Gyre	TAMU	3	09/02/1999	10	55			14	67	146	79	54%
Horizon	SIO	3	09/02/1999	54		30	23	38		145	92	63%
Johnson	HBOI	3	09/07/1999	168	4		86		1	259	172	66%
Link	HBOI	3	09/07/1999	53	72				45	170	124	73%
Oceanus	WHOI	3	09/06/1999	110	91		6		5	212	136	64%
Wecoma	OSU	3	09/12/1999	140	21		39			200	192	96%
Alpha Helix	U of Alaska	4	09/02/1999	95	0	0	21	1	29	146	78	53%
Hatteras	Duke	4	08/05/1999	103	17	30	31	10	9	200	83	42%
Henlopen	U of Del	4	08/26/1999	147	37				4	188	174	93%
Pt Sur	MLML	4	09/12/1999	42	56			15	54	167	90	54%
Sproul	SIO	4	08/30/1999	49	33			12	15	109	77	71%
Weatherbird	BBS	4	08/22/1999	130						130	130	100%
Barnes	UW	5	09/07/1999	36	5		10	13	10	74	32	43%
Blue Fin	Skidaway	5	09/07/1999	79	8		25		5	117	91	78%
Calanus	Miami	5	09/02/1999	45	26	35	61	6		173	136	79%
Laurentian	U. Mich	5	07/06/1999	232						232	232	100%
Longhorn	U of T	5	09/06/1999	20		30		28		78	78	100%
Pelican	LUMCON	5	09/02/1999	80	21	60	50	2	27	240	122	51%
Sea Diver	HBOI	5	09/07/1999	26	62					88	88	100%
Uracca	STRI	5	09/02/1999	15				105		120	15	13%
Totals				3043	777	255	425	314	328	5142	3729	73%
% of Total				59%	15%	5%	8%	6%	6%			
							Navy Total					

 Chart Ship Costs 1999 vs 2000

Appendix 5

Report from the UNOLS Arctic Icebreaker Coordinating Committee to the UNOLS Annual Meeting - September 1999

The UNOLS Arctic Icebreaker Coordinating Committee (AICC) provides scientific oversight of Arctic marine science support on US vessels, with primary focus on USCGC Polar Star, USCGC Polar Sea, and the new USCGC HEALY. In the past year the AICC held meetings 18-20 November 1998 at NSF headquarters in Arlington, VA, and 24-25 March 1999 in New Orleans. Interim business has been handled via a lively email correspondence, and AICC representatives have attended other meetings related to AICC business.

Although the history of the AICC's interactions with the Coast Guard is not long, the principal accomplishment of the AICC is the much-improved dialogue with the Coast Guard regarding icebreaker construction and support of Arctic marine science. This close working relationship is immediately obvious to anyone attending an AICC/Coast Guard function. The Coast Guard deserves a large measure of credit, and the AICC has noted to the Coast Guard especially that the appointment and retention of excellent leaders such as Capt. Johnson (head of HEALY construction oversight), Capt. Garrett (first Commanding Officer of the HEALY), and Comdr. Dupree (Chief of Icebreaker operations) is exactly the type of move that has brought about this relationship. The AICC has urged the Coast Guard to continue placing such capable, "science friendly" officers in positions of responsibility at sea and ashore in the icebreaker program.

The AICC has asked the Coast Guard to model its relationships with user-scientists upon those carried out by UNOLS large ship operators. The AICC has been discussing with the Coast Guard various means to help ensure close ties with the UNOLS technical and scientific communities. Discussions continue in a positive atmosphere, though without a specific plan or proposal as yet. The AICC notes as a positive step that Coast Guard Marine Science Technicians now participate on short UNOLS cruises as part of their training.

HEALY delivery has been delayed until late 1999, mostly due to the complexity of the vessel, its "first of type" status, and a severe shortage of skilled shipyard labor in Louisiana. There have been no reports to the AICC of the sort of major problems that might bring construction or testing to a halt. The delays are, however, causing a rescheduling of the post delivery trials. Reports received from the HEALY construction team indicate that USCGC HEALY is now in the midst of builder's trials, including running in the Gulf of Mexico near the Mississippi delta. Both successes and problems have been noted in these reports, which have generally had a positive tone. An updated evaluation of status is expected by late October. The AICC has noted the potential for problems with the Healy's science winch systems, low overhead clearance in the main lab, blockages for moving large objects on the main deck to and from the science hoist, and need for additional science network connections and cable ports, among other items. The Coast Guard has begun work in making or scheduling most of the needed modifications, and is keeping an eye open to the potential problem areas.

The Coast Guard's warm water trials should take place ca. January/February 2000, after which the ship will likely make a public relations visit to Baltimore. The AICC plans to assist by providing posters for labs and persons to explain Arctic research projects. The ship will conduct ice trials in the eastern Arctic in winter/spring 2000 and will not transit to its homeport (Seattle) until after completion of both ice and science trials. Present plans call for the Healy's availability for agency-funded Arctic marine science support - the vessel's primary mission - beginning spring 2001. HEALY crew training is well underway. Crew familiarization of the ship is receiving a high priority.

John Freitag (UNOLS RVTEC) continues to coordinate the oceanographic community's participation in the Healy's science systems testing and has kept the AICC up to date. The basic outline of this program includes: (a) Warm water Phase I testing of SeaBeam, ADCP, data network, CTD, Bathy 2000, coring and winch systems and hull and machinery acoustic noise tests; (b) Transit Phase II includes little or no science system testing; (c) Level Ice trial, Phase III is almost exclusively a programmed sequence of ice breaking, with little science systems testing per se except for bathymetry and the data network, though teachers and or wildlife observers might be appropriate for his phase; (d) Science Systems Testing, Phase IV consists of four, one week legs moving to progressively more intense and complex tests of all major science systems in a high arctic environment, and may also include teachers. AICC members will be at sea on the vessel during the test cruises. The AICC will develop a process by which test evaluation reports are developed and routed through the system and see to the release of public data after the science systems testing program.

The outlook is positive for NSF's Arctic marine science programs, including both that HEALY funding will not eat into traditional ocean science funding at NSF and that OPP Arctic science funding looks healthy. The deadline for OPP Arctic proposals will be the same as for other ocean science programs at NSF. NSF agrees that expeditionary planning will be important for developing cohesive programs. The Arctic Section is working on the question of how to handle equipment upgrades and new equipment needs and has hired an Arctic Research Support and Logistic Manager. It is possible that OPP may adopt practices similar to those in Ocean Sciences, where technical support is shifting over from the research budgets to the technician support budgets.

Regarding proposal submissions, NSF has confirmed that ship costs for use of HEALY need not be explicitly contained in NSF proposal budgets, so long as ship use requirements are clear in accompanying documentation, (for example the "831" form or NSF/OPP's coming logistical support form for Arctic research). A ship-time request form is available from <http://gso.uri.edu/unols/unols.html>.

The AICC is encouraged by recent Coast Guard attitudes about and conduct of its icebreaker Arctic marine science support. Considering (1) that the AICC's stated goal is that science users of the Coast Guard icebreakers be provided an overall cruise support experience similar to that provided by the large UNOLS operators, (2) that very high personnel turnover rates are normal to the Coast Guard [the Coast Guard is looking into this and taking some action in the icebreaker program], and (3) that a large measure of UNOLS' success rests upon the experience and expertise of the officers, crew, technicians, and support personnel, the clear challenge ahead for the AICC will be to bring together these elements successfully and with the continued enthusiasm and participation of all parties.

The AICC has been modeled after UNOLS DESSC ('the ALVIN committee') for expeditionary planning. The Committee's responsibility is to pull together a critical mass to give direction for scientists in writing proposals but in no way be meant to influence agency funding decisions. To advance expeditionary planning and to keep the community at large informed the AICC plans to continue its involvement with the UNOLS booth at AGU and will conduct a town meeting at the AGU Fall meetings. Participation in some form will also be necessary at ASLO in San Antonio and at the NSF OAI meeting in October. A primary goal of this process will be to prepare and update a 5-year "rolling" plan for Arctic marine science use of the Coast Guard icebreakers.

A community census in late 1998 uncovered strong interest from potential science users. With the first HEALY support for the Western Arctic Shelf-Basin Interactions project in 2002, the AICC has advised NSF, the Coast Guard, and the community that assessment of scientific interest in use of HEALY during 2001, based upon that census, indicates a likelihood of work in the eastern Arctic, for example including the Nansen-Gakkel Ridge, during mid-late summer 2001. Additional marine science programs in the western or eastern Arctic are also logistically feasible earlier that year.

The Coast Guard plans to continue alternating the polar class ships with six months of a year in the yard and a year operating. The Coast Guard's mission for breaking into Thule remains. Presently the Canadians have been picking up the mission but this may not always be possible.

The AICC completed its 1999 Science of Opportunity (SOO) review and reported to the Coast Guard and scientists. The cruise was cancelled, however, due to vessel availability issues. The 2000 SOO cruise announcement is due to be published in September 1999. The AICC is charged with assessing SOO proposals for logistic and overall compatibility with the SOO mission. No decisions are made by the AICC with regard to participation, and AICC comments are specifically not to be used to leverage agency support for any proposal. The AICC continues to caution the community that science support is not necessarily the chief mission of SOO cruises, and the AICC reminds all that the Coast Guard will continue to accept ship-time requests for funded Arctic science missions on the Polar-class vessels and the HEALY.

The AICC has been briefed by Dr. Bernie Coakley of Tulane University regarding his recent experience with Arctic bathymetric and sub-bottom surveys. In ice-covered waters it is most effective to use a submarine. With heavy emphasis on central Arctic marine geology and geophysics expected for future HEALY proposals, joint submarine/HEALY ventures could provide a substantial science benefit. NSF has funded a study to develop capital and operating costs for a SSN operating for science. A steering committee has met to provide the contractor, Rand Corporation, study direction. At least two AICC members are on this steering committee.

The next AICC meeting will probably be held in January 2000, most likely at NSF.

The AICC can be reached by writing to the Chair (jswift@ucsd.edu) or to the UNOLS Office (unols@gsosun1.gso.uri.edu).

Appendix XIII

Proposed UNOLS Charter Revisions

3. Membership

a. Membership in UNOLS is open to those institutions which use, or operate and use, sea-going facilities and maintain an academic program in marine science. ~~Membership shall be by institution.~~ It is intended that UNOLS institutions make substantial contributions to the national oceanographic program. Both individual institutions and consortia of such institutions may be members of UNOLS for purposes of attending UNOLS meetings, receiving

UNOLS information, and other non-voting UNOLS activities. However, on any matter requiring a vote of the UNOLS membership either the member consortium may cast a ballot or individual member institution(s) within the consortium may cast ballot(s), but not both. In the event that any consortium and one or more of its constituent institutions disagree as to the voting option to be exercised in any matter, only the ballots of individual institutions within that consortium will be accepted on that matter. The choice of individual or consortium voting may be exercised independently on each voting matter and by each consortium and its constituent institutions. In the remainder of this charter the word "institution" means "individual member institution or member consortium" except where otherwise noted.

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5. Procedures

a. Voting. Election of UNOLS Officers and UNOLS Council members will be on the basis of one vote for each UNOLS institution represented. On issues coming before the membership for vote, each UNOLS institution will also exercise one vote. Except as otherwise specified (e.g., for involuntary termination of membership), matters voted on will be decided by a simple majority of UNOLS institutions casting votes in person or by proxy. Voting by the membership will ordinarily take place at UNOLS meetings. Two-thirds of the UNOLS operator institutions must be represented to establish a quorum. Because of the option for consortia or their member institutions to vote as in section 3a., the number that constitutes a quorum may be different for different votes. In extraordinary circumstances, matters may be submitted for vote by the membership at times other than UNOLS meetings. These matters will be submitted by mail or electronic mail, and will be governed by the same rules for decision and quorum as apply at meetings.
