UNOLS Council Meeting

Committee Reports

September 21, 2000

DEep Submergence Science Committee
Arctic Icebreaker Coordianting Committee
Research Vessel Technical Enhancement Committee
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DEep Submergence Science Committee
Report to UNOLS Council

Patricia Fryer, DESSC Chair

The DEep Submergence Science Committee met in the Carriage House of Woods Hole Oceanographic Institution (WHOI) on May 24-25, 2000. Minutes of the meeting are available at <http://archive.unols.org/dessc.desmt005/desmi005.html>. A summary follows:

The DESSC heard the National Deep Submergence Facility (NDSF) Operator's report which included a summary of WHOI operations in 2000, and the announcement that a new pilot was hired this year.

The first day of the meeting was occupied principally with two major reports, the final report of the SEACLIFF engineering study and the report on the upgrades to the National Facility vehicles, science sensors and ATLANTIS.

The SEACLIFF engineering study was reported in detail. The study was to investigate methods for providing the National Facility manned submersible with improved scientific capability and to determine the best utilization of the assets made available with the decommissioning of SEA CLIFF. Five options were examined: (1) An improved ALVIN (2) SEA CLIFF - as is, (3) SEA CLIFF - modified for science, (4) 6000 m ALVIN, or (5) a new design for a 6000 m DSV. The pros and cons of each option were presented and the final recommendation is to build a new 6000 m DSV. The estimated cost would be approximately $15M. Design and construction of a new DSV would take approximately four years and a new sub would be ready before Alvin is scheduled for its next overhaul.

Upgrades to the National Facility Vehicles, Science Sensors, and ATLANTIS will include improved high resolution mapping and surveying, installation/service of seafloor observatories, and manipulation and sampling in a more "ALVIN-like" manner. Upgrades planned for each of the vehicles: Jason II, Argo II and DSL-120a were presented. The systems are being modeled to a fairly high degree to determine how their objectives are being met. WHOI is posting the upgrade design features on their webpage: <http://www.marine.whoi.edu/ships/rovs/upgrades.htm>.

ALVIN Overhaul Plans and Priorities – Dudley Foster reported on plans for ALVIN's overhaul, see *Appendix VI*. He indicated that there are science and system upgrades planned. Dudley reviewed the overhaul timeline. ATLANTIS will be offloaded from the ship on arrival at WHOI in December. The overhaul work will begin on January 2, 2001. The vehicle will be operational by July 1, 2001. There will be a website reporting on the overhaul progress: http://www.marine.whoi.edu/ships/alvin/alvin.htm

Prior to the DESSC meeting, the community was surveyed for input regarding overhaul priorities. Responses from the survey can be found at the URL: <http://archive.unols.org/committees/dessc/alvinup.htm>.

DESSC heard the report of the R/V ATLANTIS Shipyard Work list in 2001

Agency reports were presented by NSF and ONR.

The new DESSC Terms of Reference were reviewed and revisions were suggested. These revisions have been incorporated and circulated for DESSC review and endorsement.

Summaries of deep submergence activities at other facilities were presented (MBARI, MPL, Navy, and ROPOS).

DESSC discussed the status of the archiving of all deep submergence data in the WHOI archives.

DESSC is concerned that the annual meetings cater too strongly to the Geology & Geophysics community and neglect the biological community because of the tradition of having the annual meeting at AGU. DESSC recommends that every other year the DESSC meeting should coincide with The Ocean Sciences meeting so that more of the biology community can attend. For the time being, DESSC will tentatively plan to hold a meeting at the next AGU and at the Ocean Sciences conference in 2002.

DESSC discussed distribution of data in real time with regard to issues of ownership of data and public news versus use of the data for commercial purposes.

Scheduling of National Facilities assets for 2001 and beyond occupied the remainder of the first day of the meeting. ATLANTIS has a full schedule of 299 days. Joint operations are planned with THOMPSON in July. The ROV is very busy this year. The ALVIN overhaul will be conducted in the first part of 2001. ROV upgrades are planned at the end of 2001.

There are many NDSF requests for 2001 and they are distributed around the world. A map and listing of the requests can be accessed from the DESSC minutes (see URL above). ATLANTIS will be available for non-ALVIN work while ALVIN is in overhaul. Difficulties with the current schedule were discussed and suggestions for mitigation made. Regarding long range planning issues, the DESSC continues to be concerned that there is no easy way to alert the community regarding making long range planning efforts toward work in remote research areas of interest. It was recommended that the long-range map be posted on the DESSC website. A blast could be sent to the community letting them know that the map is available. This would allow the community to determine the areas of high interest and encourage collaborations.

The second day of the meeting started with a discussion of data sets and archiving. The discussion was complex and is reported more fully in the minutes, but the basic decision is to pursue the archiving issue in concert with various groups that are planning formal workshops on this matter or have already set up archiving standards. It was encouraging to hear that the WHOI archiving procedures was recommended by one such group. The DESSC will follow up on this in the coming year.

Much of the remainder of the meeting was devoted to a detailed discussion of the recommendations of the DESCEND Workshop. A separate report on DESCEND will be given at the UNOLS Council meeting. The Executive summary of the meeting was presented in the UNOLS News 17(2) pp. 8-11.

Report from the UNOLS Arctic Icebreaker Coordinating Committee to the UNOLS Council - September 2000

Since the last report to Council in June the principal AICC activities have been completing the cold water science systems testing on USCGC Healy, attending HEALY's commissioning ceremony in Seattle on 21 August, and holding an AICC meeting on board the ship on 22-23 August.

As noted before, Jack Bash and John Freitag from UNOLS had arranged a cadre of top-flight UNOLS technical specialists to evaluate each primary science system on the ship. The presence of these groups was effective and greatly valued.

Each of the four cold water science systems test legs during May-July 2000 had a focus. The tests emphasized both the "test memo" approach, where a science system was methodically checked out, and also the "science cruise" approach, where equipment was used in the mode expected on a typical research cruise. What made the testing exercise so valuable was the enthusiastic joint participation of the Coast Guard personnel who will be supporting the systems, technical experts from the UNOLS community, and seagoing scientists, including on various legs Kelly Falkner, Jim Swift, Terry Whitledge, Lisa Clough, Larry Lawver, and Garry Brass.

Leg 1 tests included science acoustic equipment (the SeaBeam 2112 swath mapping system, the 150 and 300 kHz ADCPs, and the Bathy2000 and Knudsen bathymetry systems), the XBT system, and the science data network. All of the tests were completed with the exception of testing in the ice. The ice had simply retreated too far north to reach within the allotted time frame. (The acoustics gear was, however, exercised during in the ice during legs 2-4.)

Based on examination of real time data, dramatic improvements in the ship's SeaBeam 2112 system were made since the warm water trials, largely due to recabling and to repositioning the vertical reference unit, and the system now appears to be functional. Potential users of SeaBeam on HEALY can expect to obtain good bathymetric data in moderate seas, at most headings and at reasonable speeds (up to 15 knots) in open waters, and surprisingly good data in ice-covered waters. They can expect to encounter similar data artifacts, reliability and capabilities that have been experienced by the science community on UNOLS vessels.

The 300 kHz ADCP is not presently acquiring water velocities below about 20 m. But the 150 kHz ADCP appears to operate as well as can be expected of a broad band instrument. The Bathy2000 bathymetry system is functional, and the system successfully tracked a pinger to 2000m in moderate seas. The Knudsen bathymetry system functioned well and is readily configured with straightforward controls. It produced clean 12 kHz bottom traces to 4000 m at speeds of 15 knots. The Sippican Mk12 XBT system was tested and worked without problems.

The Healy science data network functions well in many cases, though aspects of the system operation were identified for improvement. In addition, issues regarding maintaining the system, shoreside troubleshooting during missions, expertise on board, and keeping abreast of technological developments are being discussed. The Coast Guard is likely to migrate to the NOAA underway data software used by many UNOLS vessels.

On Leg 2 the uncontaminated seawater system received a careful going over. Seawater supply flow rate and temperature tests were completed at all locations. The thermosalinograph and fluorometer were working. Debugging and fixes improved performance and knowledge of the system. The intake clogs in the ice and adjustments are underway.

MOCNESS tows with the 0.680" conducting cable from the aft A-frame were an unqualified success, beginning with an open water tow, then progressing to a tow in light ice cover, and finally a tow in 80+% ice cover. The ship's bow simply pushed the ice aside. Little ice was ducted into the wake of the ship and so there was never adverse effect on the tow. The MOCNESS and winch systems and deck operations worked very well.

The CTD tests were successful, with a small number of minor problems identified. Steady 30 knot winds did not deter over-the-side operations, with HEALY riding with very little undue motion. In-ice CTD operations did not differ in any significant manner from open water operations. A problem with the outboard sheave for the 0.322" wire was identified and the unit will be modified or replaced for the first field year.

Leg 3 focused on deployment and recovery of an anchor-last scientific mooring in open water, deployment and recovery of an anchor-first a scientific mooring in heavy ice cover, and continued testing of the ship's underway systems, winch control systems, communications, and CCTV. The mooring tests were meant to mimic the complete sequence of events that would occur during real deployments and recoveries, as if they were separated by months in time; they were a complete success. The UNOLS team

led on the first mooring and for the second the ship's company carried out much of the work. The coordination between the bridge, deck crew, MSTs, and science party was very good throughout. The deployments and recoveries were videotaped, with copies made for the ship for training and to assist community evaluation.

Other tests continued. HEALY's biochemistry laboratory is specified to have tight temperature control so that instruments and analyses sensitive to laboratory temperature can be carried out to specification. Several days of logging biochemistry laboratory temperature at 15-minute intervals demonstrated the inability of the installed controller to meet the specifications for this space. Modifications have been recommended so that specifications can be met.

During a test cast to continue scientific evaluation of the winch control system, the ship's company carried out a successful dredge haul in approximately 900 meters of water in a long lead in the ice field, bringing up rocks, mud, and several bottom dwelling organisms.

Testing of the environmental control systems in the climate control chambers continued, imitating use cycles with a schedule of door openings, and with placement of a small heater in one chamber to mimic the thermal load of a person and equipment.

On Leg 4, although there were a few miscellaneous tests to retire, such as those for the science hoist and deck communications system, and a few ongoing tests, such as the climate control chambers and continued evaluation of the science data network and winch control systems, the focus was on evaluating HEALY's coring and dredging capabilities. All parties agreed that HEALY's coring capabilities in open water over the aft A-frame were amply proven during warm water testing, so the emphasis on Leg 4 was on coring over the starboard, and in ice. Associated with this was use of the SeaBeam and 3.5 kHz sub-bottom profiler to survey prospective sites

The first core, with 40 feet of pipe, was launched and recovered without incident, having plunged in to the core head. The entire operation was capably led by the UNOLS groups, who worked out procedures and instructed the Coast Guard personnel. Next a 60 foot core was launched. This operation was led by the Coast Guard personnel, with the academic technical specialists coaching. This went well, triggering and pull-out were excellent, and the corer brought back a nearly full barrel of mud. As the team prepared to do a second 60-foot core, to the surprise and dismay of all it was learned that the fine control the trawl winch requires to work safely with the massive core head was no longer available. Fixes were attempted, to no avail. This problem demonstrated clearly that changes were needed in the winch control system, and there was an immediate effort to guarantee that an improved system will be ready for the 2001 field year. An 80 foot coring rig was prepared, moved to the vertical and then hoisted back up onto the platform. This uncovered a few minor issues with cranes and handling, but these were easily solved. Thus HEALY was proven ready to carry out up to 80 foot cores, the maximum length currently feasible. All coring operations were videotaped.

Enriching the test cruises were teachers from NSF's TEAA program, arranged through the efforts of Kelly Falkner. The AICC could not have been more impressed with the teachers. Their enthusiasm, energy, and unique perspective helped to bring everyone on board together. More than that, they brought the ice trials and science systems tests to the public - to anyone with an internet connection - with accuracy, breadth, humor, and insight. The AICC urges that anyone wishing a closer look at the tests and trials examine their web sites:

http://tea.rice.edu/tea_kolbfrontpage.html
http://tea.rice.edu/tea_klinkhammerfrontpage.html
http://tea.rice.edu/tea_rosenbergfrontpage.html
http://tea.rice.edu/tea_hindmanfrontpage.html
http://tea.rice.edu/tea_schauerfrontpage.html

While the list of suggested modifications, fixes, and new acquisitions for Healy is long, these belie a longer list of successes. Matters are basically business as usual for a new ship, and the ship will clearly be ready for science support in 2001. Every person who has been aboard comes away impressed with the

professionalism, support, interest, and friendliness of the entire ship's company. The AICC will be preparing a report to supplement the test memos. The report will be ready for the public in early 2001, for example as a pdf file on the UNOLS web site.

The AICC stood ready to provide advice to NSF and the Coast Guard during HEALY's scheduling process, which is now nearly completed for 2001. The AICC plans to contact PIs (after they have been notified through official channels) to help them reach key Coast Guard personnel, to help them assess their logistics, personnel, and work plan needs, and to provide feedback to NSF and the Coast Guard about the panoply of logistic considerations that are much clearer to the AICC now that testing is completed.

Healy's commissioning ceremony was August 21st in Seattle. The AICC was there, and held a meeting on board in the science conference room on 22-23 August.

The AICC will assist and advise the Coast Guard regarding scientific equipment and technical support requirements for the 2001 field season, which will include the first "paid science" cruises for the vessel. Due to the yard demands of the post-shakedown warranty period, the ship will not be free until spring, but then is expected to have a busy Arctic science support schedule through late 2001. Future years look busy!

The outlook is positive for NSF's Arctic marine science programs, including both that Healy funding will not eat into science funding at NSF and that OPP Arctic science funding looks healthy. The deadline for OPP Arctic proposals is now 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.

The Coast Guard plans to continue permitting science participation on a "not to interfere" basis on shakedown cruises in the western Arctic. These "Science Of Opportunity" (SOO) cruises have been a popular venue for informal data collection, pre-proposal investigations, and instrument tests. The AICC reviews SOO requests for logistical feasibility and compatibility.

Regarding Arctic science proposal submissions, ship costs for use of Healy (and the Polar-class icebreakers) are no longer contained in NSF proposal budgets, but ship use requirements must be clear in accompanying documentation, (for example the "831" form or NSF/OPP's logistical support form for Arctic research).

The AICC is working with UNOLS to maintain a web site containing a rolling five year plan for US Arctic icebreaker use, beginning with conceptual plans and then updated to show proposal submission and status, and, for the lucky few, scheduling. Judging from the large number of ship time requests already generated there is substantial community interest in Arctic icebreaker use.

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

Report submitted by J. Swift

Committee report from RVTEC to UNOLS Council
21 September 2000

The 2000 RVTEC meeting is scheduled to be held at the Lamont-Doherty Earth Observatory on the 18th, 19th and 20th of October. This year we are planning some changes in the traditional meeting format pursued in past years. It has been suggested that we offer some hands on sessions in various areas of interest to seagoing marine technicians. The idea of such sessions is to open discussion of various

procedures and techniques used on various UNOLS vessels which may not be familiar to the rest of the community. The intent is to invite analysis of these techniques in the hopes of promoting interchange of new techniques and analysis of those procedures which could be improved. Plans are underway for sessions involving SeaNetTM protocol, Salinometer techniques and proper termination of electrical conducting deep sea wires.

There are also plans to conduct a discussion session on Data collection and logging and a working group on adaptation of the NOAA SCS logging system. Last year the group initiated a new sub-committee on technician training.

The major effort of RVTEC during the year was the Science testing project carried out in cooperation with the AICC on the new Coast Guard Icebreaker HEALY. Beginning early in the year, a team comprised of RVTEC Engineers and Technicians from a variety of UNOLS institutions participated in the evaluation of the various science instrumentation and data systems included with the HEALY procurement. The Warm Water portion of the testing off Puerto Rico was populated with technical support personnel from University of Washington, Lamont-Doherty, Woods Hole, University of Rhode Island, Oregon State University and University of Hawaii. Continuing later in the year in the Ice trial portion of the testing we added University of Miami, Scripps, University of Texas to the list. Overall this testing team added a new dimension to the more normal pattern of testing carried out on these vessels and the effort is widely considered to have been successful. The end result of this exercise has been extensive discussions with the Coast Guard on improvements to the science capabilities, many of which are presently being implemented in the Post Shakedown Shipyard Availability, prior to the ship going on line in science operations.

This year saw a broadening of systems and technician interchange between institutions, a goal which will have long term benefits both to the UNOLS fleet and the scientific community. The RVTEC community is fostering much wider communication between the tech support groups at UNOLS operator institutions and disseminating the pool on knowledge to the benefit of all.

Submitted,

John S. Freitag
RVTEC Chair

RVOC Annual Report
UNOLS Council/Annual Meeting
21, 22 September 2000

Submitted by Paul Ljunggren, RVOC Chair

The 1999 RVOC Meeting was hosted by Harbor Branch Oceanographic Institution on 4-6 November in Ft. Pierce, FL. The meeting was attended by approximately 60 representatives from UNOLS institutions, representatives of federal agencies, as well as representatives from the SACLANT Undersea Research Center, Southampton Oceanographic Centre, Netherlands Institute for Sea Research. In addition to presentations from the various operating institutions regarding operational issues, the following topics were presented:

- Insurance and Liability.
- Academic Fleet Review and Quality
- The new fisheries research vessel, FRV 40 for NMFS
- SeaNet
- Computerized Shipboard Maintenance Systems
- Current and potential ozone technology applications on board ships

Following the RVOC meeting there was a dialogue via email with the NSF related to the Cooperative

Agreement used to fund vessel operations. A draft of a revised cooperative agreement had been sent out prior to the RVOC Meeting. The use of Cooperative Agreements for funding vessel operations was implemented for 1997. Use of the Cooperative Agreement results in increased reporting requirements for operators and thus greater accountability. As a result of the dialogue the NSF has taken steps to clarify several of the issues identified during this discussion, while retaining the established reporting requirements.

The new RVOC Safety Standards (revised July 1999) were printed and copies distributed. An index has been added.

In Shipboard Scientific Support Equipment Proposal 2000 two groups of items were funded for acquisition as a group purchase to achieve a volume discount. The first resulted in the purchase of 78 immersion suits for five institutions (LDEO, UMich, OSU, URI, UofAK) . The second involved five institutions (UDEL, SIO, UW, OSU, UT) requesting six portable lab vans.

Of the six vans two were general purpose, three radioisotope, and one was for electronics. NSF requested that standard specifications be developed to allow all vans to be contracted for from one contractor. Matt Hawkins UDEL has been working specifically with the four other institutions requesting vans and the community in general to develop these specifications. Draft specifications have been distributed and can be found on the UNOLS website http://archive.unols.org/rvoc/vanspec.html. Technical and regulatory issues are being addressed. A discussion of these van specifications and related issues is planned for the 2000 RVOC Meeting.

Marine Superintendents operating vessels from seven UNOLS institutions met in Baltimore MD on 22-23 March 2000 to discuss future plans for the upgrade and/or replacement of the regional vessels that they operate. Representatives from the UNOLS Fleet Improvement Committee, National Science Foundation, Office of Naval Research, and the UNOLS Office were also present. Topics discussed during this meeting included:

- Impact of Code of Federal Regulations (CFR) and other regulations on regional research vessels. Focus was on tonnage laws and crewing requirements.
- Revision of the 1988 Science Mission Requirements (SMR) for regional research vessels.
- Scope of proposed midlife work to enhance the SMR capabilities of regional research vessels.
- Funding support for midlife work.
- Overview, by individual operators, of proposed midlife refit work for their regional research vessels.
- Three to five year plan for proposed midlife work on regional research vessels.

A work group consisting of two representatives from RVOC and two from RVTEC was established. This group has been working to establish a uniform standard for the maximum workload allowed on UNOLS standard wire/cable. This group consists of Tom Althouse (SIO), Marc Willis (OSU), Rich Findley (RSMAS) and Theo Moniz (WHOI).

All sections of the Small R/V Compendium have been received and reviewed. This collaborative effort covers topics which includes regulatory issues, design & construction, stability, safety, outfitting, insurance and hull forms. The Small Vessel R/V Compendium will be made available on the UNOLS website.

This years RVOC meeting will be hosted by Oregon State University in Newport, Oregon. The meeting is scheduled for 24-26 October. On the meeting agenda are three workshops discussing:

- Areas of concern identified by the UNOLS Quality Control Committee
- Personnel Recruiting and Retention
- ISM and the implementation of a safety management system for R/V's

Both the Chair and Vice Chair of RVOC will have completed two terms in their current positions and a new Chairman and Vice Chairman will be elected at the 2000 RVOC meeting.

Ship Scheduling Committee Report
September 14, 2000

By Joe Ustach, SSC Chair

With the final Scheduling Review slated for September 20, this report is a preliminary analysis of schedules, letters of intent, and talks with schedulers. The overall outlook for 2001 is not as gloomy as it appeared in June. The total number of days requested stands at 5,471. This total does not include one of the small ships that has not yet submitted a letter of intent or a schedule, but it does include HEALY's 93 days, which were not included in the 2000 total. This is almost a 3.9% increase over the total days requested for 2000 (5,268). NAVO has helped lessen the gloom with its proposed $5 million ship operations budget, around $2 million more than in 2000. In all, Navy requests are up by 210 days from 2000. NSF also has increased in total requested days by 660. The 'Other' category has fallen by 662.5 days, to almost negate the NSF increase. However, this category traditionally increases as time goes on and vessels, especially the smaller ones, pick up more cruises.

The large ships show a 229 day increase in days requested (136 without HEALY). All of the large ships, except HEALY, BROWN, and ATLANTIS show greater than 90% of NSF's optimal operating days (300). There is a problem in the west coast with scheduling all the work requested. Much depends upon the LWAD Korean schedule. I hope this will be worked out at the Sept. 20 meeting.

The intermediate ships show little increase in days from 2000. The total requested in 2000 was 1007 and for 2001 the number is 1072. All vessels except GYRE and EDWIN LINK show greater than 74% of NSF's optimal operating days (275). GYRE has a history of increasing the number of days on her schedule as time progresses. LINK is looking at a lay-up for 2001.

The regional/coastal vessels also show a small increase in total requested days for 2000. The number of days requested in 2001 is 1482 and in 2000, it was 1408. All vessels in this category have greater than 50% of NSF's optimal operating days (180) scheduled. This class of ships also has a history of increasing the number of days scheduled as time progresses.

In the final class, the small ships, there is a decline of 165.5 days from 2000. Much of this decline is due to URRACA not submitting a schedule, as yet. Except for URRACA and BARNES, all of these ships have greater than 75% of NSF's optimal operating days (110) scheduled for 2001. These ships, too, historically show an increase in ship days as the year moves on.

Fleet Improvement Committee
Report to the UNOLS Council
September 2000

The Fleet Improvement Committee (FIC) is actively trying to provide information about the state of the fleet to the community at large. To that end they have improved the web site containing FIC activities <http://archive.unols.org/committees/fic/>, they have published a 'Letter to the Community' in EOS (July 25, 2000, 81(30):334) and they are planning a letter in Sea Technology.

The letter in EOS was meant to focus people's attention on the immediate need for fleet planning. To do that FIC highlighted a figure showing what the future fleet would look like if no replacements occur. With in 5-10 years we will have less ship days available than we predict will be needed. The EOS letter refers to the UNOLS web site <archive.unols.org/committees/fic/planning/fltplan.htm> for additional documentation on the fleet and its utilization. This site is being upgraded to include more information on trends in the fleet. The online information now includes plots of the following:

- Historical use of the fleet ship size
- Historical number of bunks used on ships
- Projections of the fleet composition with assumptions about retirement schedules

Also, because of the renewed interest in ship construction, all UNOLS Science Mission Requirements (SMRs) have been posted on-line. The SMRs on-line include the following:

- Large High-endurance, General-purpose Oceanographic Research Ship
- Large Medium-endurance, General-purpose Oceanographic Research Ship
- Large High-performance, General-purpose Oceanographic Research Ship, Small Waterplane Area Twin Hull (SWATH)
- Intermediate General-purpose Oceanographic Research Ship
- Intermediate General-purpose Oceanographic Research Ship, Small Waterplane Area Twin Hull (SWATH)
- Intermediate Ice-Capable General-purpose Oceanographic Research Ship
- Small General-purpose Oceanographic Research Ship
- Small General-purpose Oceanographic Research Ship, Small Waterplane Area Twin Hull (SWATH)
- Manned Spar Buoy (FLIP)
- Intermediate, Ice-Strengthened, General Purpose, and Fisheries Oceanography R/V

In other activities, several members of FIC participated in a workshop at Oregon State University in August. The purpose of the workshop was to address how future science needs might change requirements of the fleet. The increased use of AUV's for example may require ships to have sophisticated AUV deployment and recovery systems. Interestingly all perceived developments in the field require very high bandwidth communications 24 hours a day.

FIC's next meeting is scheduled for September 20, 2000. The agenda for the meeting is posted at http://archive.unols.org/meetings/2000/200009fic/200009ficag.htm.