Meeting Minutes

Arctic Icebreaker Coordinating Committee (AICC) Meeting
April 18 & 19, 2006
National Science Foundation
Stafford I Room 770 and Room 120
4201 Wilson Boulevard
Arlington, VA 22230

Executive Summary

The UNOLS Arctic Icebreaker Coordinating Committee (AICC) held a meeting at the National Science Foundation in Arlington, VA on April 18 and 19, 2006. In addition to members of the committee, representatives of the U.S. Coast Guard, the National Science Foundation, the Arctic Research Commission, and the National Ice Center participated in the meeting. It was intended for this meeting to be held in conjunction with the Antarctic Research Vessel Operations Committee (ARVOC), however their meeting was cancelled due to an emergency on board one of their vessels. Discussions centered on recent and planned operations aboard the U.S. Coast Guard Cutter *Healy,* with the committee providing recommendations regarding the scientific outfitting and operation of the vessel. Other items of discussion included ice data support and International Polar Year (IPY) activities as well as planned or needed upgrades to *Healy's* science support infrastructure. Action items and the minutes of the meeting follow below.

Action Items

Debrief questions - remove question number seventeen (17)	*Edwards & Prince*
Determine the science needs for multibeam mapping sonar upgrades and do the structural checks during the next dry-dock period.	*AICC and USCG PACAREA*
Meet with Liz Tirpak to request that the State Department adjust their procedures for research clearances and port clearances off Barrow and the Arctic coast of Alaska so that BASC is notified when foreign research vessels and icebreakers are working In the North Slope area.	*Prince*
Provide a list with priorities of equipment needs for upcoming projects.	*AICC*
Provide list of recommendations from debriefs.	*AICC - Edwards*

Recommendations
No new recommendations were made during this meeting.

Appendices

I. Agenda
II. Attendees

Report – USCG-Electronic Systems Support Unit – Seattle Office

Proceedings of the meeting

Day one – April 18, 2006

Welcome and Introductions

Margo Edwards, AICC Chair, called the meeting to order at 0830. Introductions were made around the room. A list of participants is included as appendix II.

Congratulations were given to Simon Stephenson, NSF/OPP for his recent promotion to Arctic Sciences Section Head. Simon welcomed everyone to the meeting and re-emphasized the importance of AICC.

Accept the minutes of the December 2005 AICC Meeting

A Motion was made and approved to accept the minutes of the December 2005 AICC minutes.

Review of Action Items from December Meeting (Appendix III)

- Final recommendations from the cruise debriefs were circulated to Dale Chayes. The recommendations were then circulated to the committee for discussion during this meeting. AICC will use the debriefs as a form of input to the National Ice Center (NIC)
- Change TeraScan in the debrief form to include other data (ice and weather)
- A recommendation will be made to Simon regarding lab layouts.
- The State Dept. sent email notification that there was no need for discussion with Russia regarding the Lawver cruise. A brief discussion took place with regard to getting the word out in an EOS article. The consensus, including that of NSF's, was that it is still important to make this information more broadly known. It is even more important in Canadian waters because there is a formal permitting process. EOS has an international readership and this article would alert foreign icebreaker users to the requirements.
- Recommendation about contacting TDRS - Dale contacted them, but the system is no longer viable. Efforts to commercialize TDRS did not pay off. Improved high latitude communications for science is a long-term issue. This is a continuing issue on Dale's agenda.

UNOLS and Agency Reports

UNOLS/NSF OCE report (Appendix IV).

Mike Prince presented information on current fleet renewal activities, scheduling and utilization and other issues before UNOLS such as the plans to develop safety standards for human occupied vehicles (HOV) and to develop guidelines for addressing the Americans with Disabilities Act (ADA) requirements in new research vessel design.

NSF/OPP/Arctic - Simon Stephenson

The IPY Solicitation is finally out. The research emphasis areas are: ice sheet history and dynamics; biological adaptations at the cellular and genomic level to life in extreme cold and prolonged darkness; and the arctic observing network. Each proposal to be considered for IPY needs to have an education

component in it. The educational emphasis areas for this solicitation are: formal science education experiences for K-12 teachers and undergraduate or graduate students, informal science education for the broader public, and coordination and communication for IPY education projects. In addition, plans for handling, distributing and archiving data must be addressed. The panels for this solicitation will not be until August, so this will affect the timing for 2007 scheduling. A synopsis of the solicitation and links to the full text are at: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=13615

The budget for FY07 looks better after two years of tough budgets. This is the first time that the President's request has included a significant increase for OPP. IPY is included (at about $60M) and full funding for transfer to the Coast Guard for polar icebreaker maintenance and operations (around $57M), which is about what is being spent. IPY projects will likely include the observing network and the Study of Environmental Arctic Change (SEARCH) projects. There was no new money in FY06, but there is in FY07.

For scheduling, it is not really known what will be needed until the October time frame, but there is a commitment to do scheduling in September. The plan will be to put together a straw man schedule to do budgeting with, which will probably be the high end cost estimate.

The Arctic Science Summit Week (ASSW) gets together to discuss plans for the next year. The Alfred Wegener Institute (AWI) in Germany has agreed to host a website to consolidate information about ship requests and available ships for IPY projects. Simon will want to transfer data from the UNOLS requests to the AWI site and then ask PI's to enter missing data. This site is intended to increase collaborations. The Germans may have more work that they want to fund than they have available ships for. They may end up being net consumers of ship-time. There is already interest in what the *HEALY* schedule will be.

FY08 is a continuation of IPY, but they still need to ask for the money. It is not necessarily true that they will get IPY money, but there is an indication from the director that IPY will be a two-year program. Justification for increases is educating the nation's science and engineering capability. They will be tying their request for increases to education and understanding the environment. Cyberinfrastructure will be an area of focus in FY08. There is an office of Cyberinfrastructure

(OCI, website - http://www.nsf.gov/dir/index.jsp?org=OCI)

Pablo and Carin asked questions about bandwidth or increasing the window of opportunity for connectivity to/from *HEALY*. Simon said that this would need to be proposal (science) driven. If data requirements or outreach requirements are stated in proposals, then funding for increasing bandwidth or length of access time could be funded. There was some discussion about whether or not the capability should be provided routinely or by specific request. AICC should make recommendations for the longer-term requirements.

Dale, Richard and Dave reported that two hour per day access would not be available unless a source for incremental funding can be found. The PI's need to be informed and their needs determined. This can be solved by putting the support for connectivity in Dale's budget if NSF approves.

NOAA Arctic Research Program - Kathy Crane

Kathy reported on the status of the budget for FY06, NOAA was cut substantially in particular OE and Arctic. The FY07 request for IPY didn't even make it out of Congress and was not included in the NOAA budget. They have some continuation funding for a NOAA mapping program around the Chukchi plateau for LOS sea-floor mapping. Rob Reves-Sohn has been funded by NSF for proof of concept and instrumentation testing and some additional NOAA funding will enable a look at venting pockmarks on the Chukchi Plateau. NOAA has a solicitation out for proposals for the Russian/American Long- Term Census of the Environment. Russian proposals are due next week. The NOAA component is dependent on budget appropriations. In FY08, they will try again for IPY funding.

In 2008, if they are successful with funding, they will continue with their mooring programs in the Bering

Straits. They hope to have a bigger role in IPY in the 2008. They are working with an international group for collaborative work in the western Pacific.

New developments: The Russian Duma are taking under consideration the cancellation of transit fees for the Northern Sea Route during the IPY.

Jeremy Potter, NOAA/OE – Jeremy stated that the announcement for IPY in 2007 is being scaled back. OE will get a slight increase in FY07, but not enough to cover the request for *Healy* time, which has been withdrawn.

Margo asked if NOAA, NSF and Coast Guard are paying attention to changes in how Canada is approaching territorial jurisdiction in the Arctic. Jeremy said that they are paying attention, but it is not clear what is happening.

Coast Guard report - PACAREA - CDR McFarland & LCDR Greg Stanclik

The emergency dry-dock for *Healy* was cancelled and the repairs to the bow- thruster will have to be included in the scheduled dry-dock. A thirteen-week maintenance period is needed, including holidays. If the ship returns on 30 October, they will have 18 weeks total, 13 weeks maintenance, with 9 weeks on dock. Would like to get the ship on dock before Thanksgiving. This will leave five weeks for shakedown and cruise preparations. This will be the second regularly scheduled dry-dock, plus two post availability dry-docks and one emergency dry-dock. April 2nd, 2007 is the planned date of availability for science.

USCG HQ - Jonathan Berkson

Jon reported that the Commandant is looking for guidance from the NAS study. The Commandant is pleased with the 1990 presidential determination for Polar requirements. After the NAS study, they would seek a National Security Council action and a new Presidential determination that may re-state the 1990 determination. The Commandant is also in favor of returning the budget for icebreakers to the Coast Guard.

2006 cruises - Dave Forcucci, USCG

Dave reported that pre-cruise meetings were held in Seattle in January for three of the cruises. The Mayer mapping cruise did not require a pre-cruise meeting, because it is a repeat of recent operational procedures that the ship is familiar with.. They held a two leg shakedown cruise that went well with an offshore science system shakedown.

They have added SIO Ocean Data Facility support of the Healy's CTD and TSG (hydrographic) systems. SIO will send two technicians on Jackie Grebmeier's cruise, but will not need to send anyone on the other cruises. Helo contract has been awarded to Maritime Helicopters (www.maritimehelicopters.com/). There will not be any embarked helicopter support for the Mayer or Reves-Sohn cruises. The Lovvorn (Grebmeier) cruise and the Lawver cruise will have helicopter support. There will also be support for logistics from Barrow.

Dale asked about future support from Coast Guard aviation. Capt. Russell replied that the Polar Operations Division of the Coast Guard (POP-DIV) has been disbanded and it is unlikely it will be re-formed, so procurement of commercial services will be the long-term solution. There was some discussion about the ship's need for ice reconnaissance for ship control and whether or not you would always want a helo on board. This year will be a learning opportunity and they may find that the Coast Guard needs the helo on board. For Mayer, he is limited about where he can work. They plan to attempt it and if the ice doesn't allow it, they will go elsewhere.

Dave has requested a plan of daily movements from the PI's so that they can make the initial request for NIC coverage during the cruises. This planning document is definitely subject to change.

Specific cruises:

Grebmeier's cruise is loading this week and the others will load in Seattle or Dutch Harbor.

Margo asked about Lawver's seismic system. They are receiving compressors from USGS storage that belong to LDEO. Because no commercial contractor could be identified, LDEO will provide the seismic system and support its operation (Jay Ardai and Dale Chayes). Based on the experience on the Healy last season, the assumption for streamers is that they will all be destroyed in use. They plan to use the analog stream from John Diebold's high-resolution seismic facility.

Rolf asked if the local communities have been contacted by PI's about this summer's work. Glen Sheehan has been working with the PI's and the local communities. Larry Lawver has attended an Alaska Eskimo Whaling Commission meeting. Bernie thought that based on their experience last year, there is good reason that Lawver will not encounter significant mammal activity.

Margo asked about Reves-Sohn's cruise requirements for using AUVs while the ship is in the ice. This cruise is intended as a field trial of the AUV system which is intended to be used on the Gakkel in 2007. One area of concern is operating AUV's in ice, launch and recovery in the ice, tracking and communications. Launching uses the crane and a sling. The ultra short baseline navigation system and an acoustic telemetry link were tested using transducers temporarily installed in one of the Healy's spare transducer wells during this year's shakedown. Ranging and communication was to a transponder mounted on the CTD. A big challenge is to navigate the AUV under the ice in the autonomous mode, which requires navigation to hold station, find targets. NOAA is still committed to supporting the four days over the Chukchi Plateau.

Ops asked where the helicopter support was coming from for the logistics in Barrow. It is in the requirements document but needs to finalize the specifics with the providers.

2007 Schedule and Dry-Dock Schedule.

Dave showed a spreadsheet with dry-dock schedule options. The Scenario 4 - moderate risk plan assumes the ship gets back a week early from 2006 operations. [Actual schedule is Nov 2006 to Feb. 8, 2007]. Funded work for 2007 includes Reves-Sohn on the Gakkel Ridge, Lovvorn (Grebmeier) second cruise and the BEST program. NSF is exploring the possibility of using a foreign icebreaker if they are already planning to go to the Gakkel Ridge. This would leave *Healy* free to support Pacific side work.

Native communities - article.

Margo asked Renee Crain of NSF/OPP to meet with them later to put together an outline for an EOS article and invited Renee to be a co-author.

Renee reported on Incidental Harassment Authorization's (IHA.) OCE is going forward with a programmatic Environmental Impact Statement (EIS) for all scientific seismic work in the future. This will apply to work in the Arctic as well. This should make the process a little easier and less costly for individual projects. Polar bears may become more of an issue if a pending lawsuit to make them endangered is successful.

There will be qualified marine mammals observers (as required by the IHA) on Lawver's cruise. Renee reiterated the benefit of meeting with the local communities. NSF is also willing to pay for 3 to 5 days of participation by villagers on portions of *Healy* cruises. They are offering per diem, not pay. This is at the discretion of the Chief Scientist/PIs.

Ice Information Support

Discussion about the ice support process. For 2006, there is a Coast Guard Command requirements document, which would be the baseline of support. At cruise planning meetings or earlier, science specific requirements over and above this level should be added to the Coast Guard's requirements document. Also decided that NIC should be invited to the pre-cruise planning meetings. 2006

requirements should be reviewed and modified as needed based on the lack of helo support for the last legs. More discussion and update of requirements between CG, NSF, LDEO and NIC needs to take place.

Debriefs

The summary of debriefs for last year's cruises were discussed and will be finalized into a set of recommendations after the meeting. It was decided that question number 17 was no longer needed.

Action Item: Remove question number 17 (*Miscellaneous supplies (i.e., printers, paper, ink cartridges, etc.))* ***from the debrief***

There was discussion about the need for a debrief of scientists and the ship with NIC. This would be a separate debrief focused on delivery of ice coverage data.

Simon discussed the continuing need to have AICC provide a system analysis for delivery of ice data that would start with the ship's requirements and incorporate science requirements over and above that. Refer to Dale's block diagram.

Healy science systems - Dale Chayes (Appendix V)

Seawater systems

The new system is a vast improvement. In defining the needs for seawater, many different areas are commingled. There needs to be a clear definition developed of the various needs, including but not limited to incubators, TSG's, sinks, sample washing with ambient temperature water and wash down for cleaning with heated water. There is a need to include adequate water "aft" for sinks, samples, wash down, sample wash, etc. Need to identify all possible uses by getting feedback from AICC and other potential users in the community. This should include adding TSG forward. The TSG could be located in the passageway leading from the labs to the mess deck on the Port side. They are trying to fit this into the work for the 06 dry-dock.

Watch-stander workstations

They plan to update the displays and software, and add a telephone. They also plan to try sunlight readable screens for Aloft con and Aft con.

Walk-in chambers

There are two "controlled" and two "cold" chambers. They perform as specified in the SOR, but this does not seem to be good enough for many science needs. One example is that there are large swings in temperature during defrost cycles. There needs to be a better definition of needs, and then we can design a solution and propose changes as needed. We also need to remember these spaces are used for other needs and we need to not preclude these uses or come up with alternatives. Dale would need help in defining the user community for these spaces in order to get appropriate input. Carin made the point that these spaces were very valuable to many programs.

Lab Space Improvements

- Computer Lab
  - Will not be in DD07, but may still be possible in the 07 off-season.
  - Showed drawing of revised computer lab and rendering.
- Future Lab - after 07
  - Showed drawing
- Met Lab

- Aft Con
  - Lockers, access
  - Improved visibility
  - Showed drawing with locker space just aft of the entry door. Remove some of the console and change the windows on the starboard side to make it easier for the conning officer to see aft and down. The drawing doesn't show the area for the CTD winch operator and other structures that won't change.
- 02 Copier Room - We plan to make better use of this space by:
  - Adding Unistrut,
  - Moving the large duplex printer from the main lab to this space, and
  - Installing the spare large format printer (HP1055CM) in this space.

Multibeam

There are significant problems with the current installation. There will be a lot of O & M money spent between now and 2010. Substantial performance and operational improvements are possible. We need to review the science needs for seafloor mapping from icebreaker for ten years, starting five years from now. Need to look at the structural issues that would impact a future installation. Most scenarios will require larger arrays and bigger holes in the ship, so we need to better understand the structural impacts. Part of this will include an under hull ship check to document the as-built conditions. Earliest realistic change is 2010 and will cost a lot of money. ROM estimates for multibeam changes will follow from the needs of the science community. MLC Pacarea is moving forward with the engineering study and their naval architect support contractor, JJMA-Alion, will be completing an inspection of *HEALY* when the ship is in dry-dock.

Action Item: Determine the science needs for multibeam upgrades and do the structural checks during the next dry-dock period.

Sub-bottom profilers

Healy has had two systems and no spares (Bathy 2000 and Knudsen 320BR). There is a significant cost for training and maintenance because of two different systems. Automatic CG spending was going to upgrade the Bathy 2000, but changed to buying a second Knudsen for less money. Need to make sure that *Polar Star* and *Polar Sea* Bathy-2000 units are not automatically updated.

TeraScan

Upgrading from 1m to 1.5m antenna. This is happening today and they will test and accept it during HLY06TD. In addition to the upgrade, LDEO and the ship will implement the ability to use alternate sources for heading, eventually allowing the selection of gyrocompass, ADU5 and POS/MV. They borrowed the TeraScan license from *Polar Star* for HLY06 to allow image processing independent of the WDS.

Broad band hydrophone

Healy was delivered with a DT-513c that has been re-discovered and mildly tested in the ADCP performance analysis. They did a spectral analysis with this hydrophone and found interference around the 150kHz frequency, which would interfere with the ADCP. The SeaBeam 2112 multibeam may be a source of this interference.

List of spares and equipment repairs.

- SB2112 circuit boards
- LDEO logging and displays

- Sheave spares
- ADCP spares
- Continued troubleshooting of ADCPs

Concerns and issues

- Shipboard power
    - There is a link to a tutorial on Dale's webpage:

http://ilab.ldeo.columbia.edu/Members/dale/how-to/shipboard-power-systems-are-different/

- Improved Internet access for science on *Healy*.
    - Renee suggested taking an incremental approach to improving Internet access. For the short term, Renee does not think it is plausible that allowing the two hours of access to go away would happen.
    - She would pay for it out of education funds if she could/had to.
- Access to the pool of icebreaker science gear:
    - Historically the collection of science gear has been treated as a pool. Star's new status appears to have changed that.

Day Two – April 19, 2006

Action Items from Day One - (Appendix VI)

Item one – passed to Mike Prince. Mike to meet with Liz Tirpak to request that the State Department adjust their procedures for research clearances and port clearances off Barrow and the Arctic coast of Alaska so that BASC is notified when foreign research vessels and icebreakers are working In the North Slope area. Mike to explain BASC to Liz.

There was some discussion about the need for medical review by doctor and having a doctor on board for deep Arctic cruises

Continued Dale's report on science equipment

Returned to discussion of treating the science equipment on *Polar Star* as pooled equipment, which is not allowed by the order to put the ship in Commission, Special status. AICC will support CDR McFarland in an attempt to write a request to make the science equipment pooled and available for *Polar Sea* and *Healy*. Dale will work with Pac Area to generate a specific list of equipment.

Fiber Optic 0.680 tow cable

We have used temporary winch installations for .68 FO programs in each of the last two seasons. The temporary solutions are an expensive compromise, require significant logistic resources and dock-side time and consume substantial deck space. Options include finding out if the FO cable can be stored and used on the existing winch or if a new winch could be installed. The latter option would be very expensive and is probably a mid-life item.

Inmarsat Upgrade

Inmarsat is not the entire answer, especially at high latitudes. CG is exploring upping the bit rate for their installed Inmarsat Ship Earth Stations from 64kbps to 128 kbps. Actual throughput is something less than this, but the upgrade would improve bandwidth. With the 64kbps, they get about 40kbps throughput. With the Iridium link, they get about 9kbps. They are proposing to share the bandwidth in a secure and rate-controllable manner between science and Coast Guard use. Over the next six months or so, they will look at the feasibility of upgrades that should take place for presenting the proposed plan.

Plans and needs for 2007

Assumptions are that we will know by August whether the Gakkel Ridge trip for Reves-Sohn will occur on a foreign icebreaker or not. Also, Dale is assuming that BEST will look a lot like SBI cruises in terms of operations and science needs. Dry-dock upgrades will need to be decided on and funded.

Carin asked if the ADCP problems would be solved by 2007. This is hard to determine until they get a better handle on the effects of interference on the data. They are pushing harder than in the past and making progress.

Action Item: AICC needs to provide a prioritized list of items.

During the dry-dock/maintenance period for 2007, the seawater system and computer lab upgrades are in the queue for funding. We should establish a process that allows for a continually updated list. AICC should rate the science importance or value of each item and perhaps rate the urgency of each item. The best thing to do would be to make this happen so that we are looking ahead more than in the past and to review the list on a regular basis.

Long-term plans

Serious mid-life planning needs to start now for 2015. High latitude communications, including improved Iridium, Vsat and TDRS will be important. For high latitude navigation, Dale has been working on Globally Corrected Differential GPS, which could give sub-meter accuracy for navigation.

Big-ticket items for the future include the multibeam, fiber optic cable and winch, winches, cranes, and major upgrades to the labs.

Captain Russell asked about the computers for the SeaBeam. Dale replied that in the short term they are ok with working computers. At the moment, the software only works on specific computers. For the mid-term, they will try to get permission to migrate the software to Linux operating systems.

Coast Guard Electronic Support Unit (ESU) – Richard Saunders (Appendix VII)

Richard reviewed what ESU is and what they do. He also covered issues and challenges.

Discussion about data policies

OPP data policy was last updated in 1997, and needs to be revised. Dale suggests that AICC review the OPP policy and comment on it. OCE data policy is a little more specific. Dale is proposing that for ship collected data; such as underway data that is regularly collected by the operator using on-board data systems, should be sent to archives by the operators rather than by the Principle Investigators.

Icefloe website – Dave Forcucci

Dave reviewed features of the icefloe website. Margo complimented him on the positive changes. Changes to the *Polar Sea* and *Polar Star* information would also go through Dave.

Science support

Dale reviewed the people who will sail on the various legs. The first leg is set, but subsequent legs may change. Dale plans to submit a three year proposal, but there needs to be a long term system for how this support is provided and funded.

Other Items

Showed the IPY cruise website, Arctic Ship Coordination during IPY (ASCI). Agreed that we should send a note to Arctic Info about this webpage.

Margo received some feedback from the committee regarding her presentation to the Arctic Research Commission. She will include some information on the Arctic Observing Network and observing networks in general.

New Members - Margo Edwards

There are five applicants so far. The physical oceanography and MG&G positions are covered by these applicants, but the satellite and meteorology field is not represented. Suggestions for other possible candidates include Sohn Ngiem, Ron Kwok and Julienne Stroeve. Margo will solicit more applicants and then circulate the names to the committee for their vote by May 1st.

Chair will be selected at the next meeting. Carin has expressed interest.

Future Meetings

Discussed the possibilities for the next meeting. Focused on December after AGU or January 8th week. Pre-cruise meetings could take place the same week, except for the BEST group, which should probably take place the first part of December. Invitations for pre-cruise meetings should go out as soon as PIs are identified for the BEST program.

Decided on the week of 8 January 2007 for AICC meeting in Seattle. We will look at hosting the meeting at UW.

Discussed set timing for meetings. Meetings should focus on improving *Healy* science operations so timing should be dependent on the availability of ship's personnel and will probably be held in Seattle from now on unless there is a reason to do otherwise.