Arctic Icebreaker Coordinating Committee (AICC)

Report of Meeting held on Board USCGC HEALY

Seattle, Washington

January 25 & 26, 2001 (Thursday & Friday)

0830 Meeting was called to order by new chair Lisa Clough (East Carolina University). Introductions were made around the room. (List of attendees in Appendix I)

HEALY Commanding Officer, Captain Jeffrey Garrett, welcomed the group and covered administrative matters.

Captain Garrett presented the founding AICC Chair, Jim Swift, with the Distinguished Public Service Award on behalf of the Commandant of the Coast Guard, ADM James Loy. This is the highest award that the Coast Guard can give to a civilian other than for Lifesaving.

Lisa reviewed the agenda for the meeting. (Appendix II)

UNOLS report by Mike Prince: UNOLS is working on important matters for the academic fleet. A long-term plan has been drafted and is in circulation. FOFC has put together a draft plan showing their vision for vessels larger than 135 feet for the next 30 years. The plan is available from the UNOLS web site. Community input is requested and needed.

Also, UNOLS is grappling with the issue of how to institute a quality improvement program. This follows on a high quality program, but community input is needed on how to best schedule and operate research vessels in the future. The UNOLS Office is writing a proposal to support its meetings. The AICC support will probably remain the same - two meetings per year plus some ad hoc work. The issue of any direct technical support coming through that budget is still being resolved.

FIC is pulling together a document which focuses on the state of the UNOLS fleet. An article appeared in Sea Technology. The difficulty lies in predicting future needs for number, vessel sizes, and ship capabilities. Draft expected on the UINOLS web site in spring, final draft by fall 2001.

FIC report by Terry Whitledge: A *Soap Box* article appeared in Sea Technology discussing the need to renew the academic research fleet. FIC is also working to develop the Fleet Improvement Plan. Terry also reported on the Alaska Regional Research Vessel (ARRV). This vessel will have seasonal ice, fishing and general oceanography capability. Concept design has been funded by NSF and will be posted for community comments in April. Initial funding for a preliminary design has been received and will be started as soon as comments on the preliminary design are received. This will probably be designated as an Alaskan Vessel. Woods Hole is a partner in the design process..

Agency Reports:

NSF/OPP Report from Tom Pyle: Do not have a 2001 budget yet and are already working on the 2002 budget with OMB. They are working on an initiative called SEARCH (Study of Environmental Arctic Change). NOAA is leading the interagency working group on this initiative for the 2003 budget.

Tom started a discussion with the AICC about routine observations of easy to carry out, and *useful*, measurements from the icebreakers in the Arctic. Examples might be meteorological measurements, underway T&S, XBT profiler drops, XCTD profiler drops, routine ice observations, visual observations of any unusual features (e.g. sharp boundaries in surface water color, windrows, etc.). NSF is willing to consider programs (perhaps jointly with other agencies or the Coast Guard) to support such a program. AICC was asked to give input on what the scope of this type of program should be and how it might be accomplished.

Vernon Asper mentioned that ARVOC has helped to push through a program to support collection of certain data on certain transects of the Antarctic vessels. The data are collected and provided to a specified scientist, who takes responsibility, whether or not the scientist has a representative on board.

Captain Garrett mentioned that the work load for the on board technicians, in total, should be considered, especially in concert with expected duties for the current science program.

John Freitag mentioned that these are not free data. They take some work and responsibility to ensure quality control.

Phil McGillivary briefly discussed the present status of recording and reporting of routine observations. There are a few systems)underway T&S and fluorometry) that are now supported, but, for example, meteorological measurements are only logged/reported on the request of a science program.

NOAA report made by Tom Murray: He covered the Ocean's Exploration report to the President. They made the case that there was a need for exploration based research in addition to hypothesis based research. NOAA put together an Ocean Exploration Initiative with the objectives to explore the ocean frontiers, find new resources, protect maritime heritage and complete a census for marine life. There are five geographic areas for exploration including the Arctic.

ISARB, the International survey of the Arctic ridges and basins is the initiative for the Arctic Office of NOAA. Tom listed some areas of exploration that will take place in three years of exploration. They are requesting 37.5 million per year for the next few years for all of NOAA's OEI program.

ARVOC report by Vernon Asper: Support shifted from ASA to Raytheon Corporation (RPSC). WHOI was supposed to be a partner with Raytheon, however they are now becoming a vendor of choice for support as needed. Raytheon retained most of the ASA personnel. The ten year contract for the Nathaniel B PALMER expired and it appears that the contract will go to PALMER again. They will move the main crane, install a moon pool and replace Seabeam with a 120 system. They are trying to get a third vessel for the Antarctic. The Gould is so good and so busy doing support for other projects that they are not available enough for support of projects from Palmer station. They are considering a 150 foot vessel to support projects near Palmer Station.

USCG HQ report by George Dupree. Introduced his relief CDR Joseph Bodenstedt who has previously served as XO of POLAR STAR and is currently Chief of the ATON division in HQ.

MST training is a continuing success with an MST on the KNORR, Pelican and one other planned.

OMB efforts to shift money to NSF to pay for Coast Guard time seems to be dormant. Icebreaker visibility in Coast Guard is good and growing. There is interest in making a TV show about icebreaking, perhaps through the History Channel. There is a lot of interest in the Coast Guard to continue the Science of Opportunity (SOO) cruises.

PAC AREA report by Phil McGillivary:

1. Small Boat Status:

HEALY - has taken delivery of new LCVP (Landing Craft Vehicle Personnel).

Arctic Survey Boat has been delivered for testing as of 1/29/01 .

POLARS - three remaining LCVPs for Polars will be delivered by end of March 01

2. Past Fiscal Year Science Purchases:

1) Inmarsat B upgrades on all three icebreakers

2) Three Autosals purchased (one for each icebreaker); also purchased Computer Interface Boards (for direct reporting to SDN)

3) Spare uncontaminated seawater pumps were purchased for Polars

4) New CTD cable purchased for Polars

5) Replacement/backup sensors purchased for Polars' CTDs (incl. Salin.,salin. Pump, T,D, fluor., O2, altimeter, transmissometer)

6) Debubblers purchased for all three icebreakers, with one backup for each vessel

7) Science Data Network and computer gear purchased for both Polars and Electronic Support Unit (shoreside)

8) Sheave purchased for PSTAR

9) Winch repair contract for all three ships let

10) Winch joystick installed on PSEA (already on PSTAR); forthcoming under contract on HEALY

11) Portable Deck Lights purchased for PSTAR

12) Bathy 2000 upgraded (new computer memory system, software)

13) Terascan upgrade & related computer upgrades (new software, memory systems), incl. Replacement Terascan antenna on PSTAR

14) Uninterrupted Power Supplies bought for icebreakers (4/ship)

15) Incubators purchased, one with, one without internal illumination

16) Low-temperature freezers purchased

17) Spare compressors purchased for all freezers and refrigerators for PSTAR

18) Portable heater for PSTAR hangar (CTD room)

19) CCTVs for winch rooms

20) Communications gear purchased for internal ship comms on HEALY

21) Digital gyrocompass repeater purchased (for met gear and other data recording systems)

22) Thermosalinographs purchased for icebreakers

23) Video camera purchased for helicopter underway (downward-looking) video

24) Turner Flow-through Fluorometers purchased for icebreakers

25) Some met gear purchased for PSTAR (by ship)

3. Current Fiscal Year Science Purchases / Potential Purchases

1) New block, PSTAR

2) Ice Corer (have ice auger, need corer)

3) Canopus DVREX M3 Digital and Analog Non-linear video editing system (@$10K), same as for CG Public Affairs, as soon as it gets on GSA (any time now...), see URL: http://www.canopuscorp.com

4) New diver communications units to allow direct voice onto u/w video

5) Met gear upgrades (incl. Radiometers) - to be purchased by DOE - same units as Barrow ARM site

6) New Coring/Trawling Cable for PSTAR - possibly (@$100K)

7) Whale Avoidance Gear (@$10K) - will be required as soon as available from USCG Research & Development Center

8) Telemedicine equipment - we plan to work with USCG Medical to ensure telemedicine infrastructure is functional on all icebreakers in the coming year. Requires further discussion with them to know potential needs other than dual Inmarsats, which we have already provided

9) Possible purchase of hand-held G-M radioisotope counters (need established, details on training/maintenance unclear...)

10) Coring systems - currently not under discussion for purchase

11) Magnetometer - current not under discussion for purchase

12) Gravimeter - for HEALY - not under discussion for purchase; will pursue discussions for testing of NAVOCEANO unit on HEALY

13) Radiation Van - not under discussion

4. Training

1) UNOLS: one marine science officer (MSO) (from HEALY), and a number of Marine Science Techs have and continue to participate in training on UNOLS cruises. Will seek to make MSO participation in UNOLS cruises a routine part of training.

2) CTD training was provided for MSTs from the Polars at Scripps

3) Terascan training was provided for MSTs from all ships

4) SeaBeam training was provided in San Diego for MST1 Hutchinson (HEALY) and Dave Forcucci (PACAREA)

5) Autosal training is scheduled to be provided by UW Marine Ops personnel in the next month for PSTAR and for other ships as convenient

6) USCG has approved a plan for tele-education; we will ensure icebreaker marine science coordination with this program for training needs for MSTs.

7) Purchase of video editing system (mentioned above) will allow MST training video production to proceed in conjunction with USCG tele-education/training program.

5. Icebreaker Use Interest from Other Agencies

1) Minerals Management Services: are planning to conduct seismic surveys between Barrow and Prudhoe during summer of 2002, may request icebreaker use or COTS vessel. Are interested in icebreaker use for AUV (autonomous underwater vehicle) tracking of bowheads whenever AUVs are ready. Are leaving methane hydrate research up to MMS folks in Gulf of Mexico for next two years.

2) NASA: will continue to request episodic gear testing in relation to extremophile and Lake Vostok/Mars/Europa missions over coming years.

3) NIH: proposals are being prepared by UCSC for benthic invert collection from arctic, but presently work is limited to SOO cruise participation via proxy.

4) USCG-Russian Arctic Oil Spill Training Exercises: these exercises alternate years between field and desk meetings, and between being held in the US and in Russia. Current years' work is a paper exercise around Nome. Next year may be field work in Russian waters similar to that POLAR SEA did off Sakhalin Island in 1999. We may be asked to participate in next years' field effort: Alaskan firms have three times failed to demonstrate oil spill cleanup capability in ice, and State of Alaska has insisted they demonstrate successful ability to do this, i.e. politically a hot topic. Outcome uncertain in terms of USCG ship use at this time.

5) PICES (Pacific International Council for Exploration of the Sea): Chair Dr. Bychov had requested HEALY at October 2001 PICES meeting in Vancouver, B.C., which we were unable to accommodate.

6. Ship of Opportunity Cruise, 2001: POLAR SEA

1) NOAA Marine Mammal Survey: has requested two days for retrieval of marine mammal passive listening buoys south of Kodiak Island and into Gulf of Alaska. They requested work be done enroute north due to expiration dates of batteries in buoys.

2) US Fish & Wildlife Service: Still have funds for helicopter time deposited with USCG in HQ. Would like to purchase DEDICATED ship time for marine mammal / polar bear surveys during summer 2001. Would like east of Barrow if possible.

3) RVTEC training - at annual RVTEC meeting in November at LDEO, discussion of possible use of SOO ship for RVTEC training en route north. This met with approval by Sandy Shor at NSF, but will need further discussion if to take place. More likely next year than this year. Idea would be that it would save USCG money spent shipping people around for training, ensure gear on USCG icebreakers is up to speed and functional, and would provide ready source of material for video training tapes. Worth pursuing, intend to do so. But most likely for next year.

4) NOAA ISARB (Intl. Survey of Arctic Ridges and Basins): While NOAA got $4 million for Ocean Exploration program this year, which is intended for five locations, apparently none of it went to the arctic location, so not expecting any such work this summer at this time. Possible instrument testing, however. Still under discussion.

5) Other "normal" SOO participants:

- Katie Reese - undergrad student looking for experience - will hook her up with someone

- Klaus Valentin - Alfred Wegner Institute - picoplankton - easy to accommodate, sets foreign precedent, but GOOD.

- J. Richter-Menge - inappropriate scope of work for SOO; gear test ok, nothing more

- Richard Blidberg - Autonomous Underwater Vehicle work: not totally ready to go yet, testing easily done in US waters, no requirement for testing in Russian waters, although co-PI is from Vladivostok, so an option: MAYBE.

- Chris Fox - marine mammal moorings, as discussed above in 6(1).

- Tikku / Bischof - both Bathy 2000 / coring work, based on last SOO data collection

- Judy Curry, U. Colo. - Autonomous Airborne Vehicle (Aerosonde), SOO not yet submitted, presently ship would merely convey to land site in Alaska, further discussion of shipboard use for ice surveys, etc. to be determined.

- All other SOO proposals received at time of AICC meeting are related to Siberia/Chukotka work.

6) Chukotka work: Work proposed reviewed in Glenn Sheehan (BASC) presentation. USCG has requested AICC Chair participation to coordinate outyear participation by marine science community in US with Russians. Main purpose of effort this year: begin normal relations, establish protocols, familiarize Russian scientists, who will be flow by Russian government to ship (@40 scientists will participate). It is incumbent on AICC and the arctic research community to plan for science in Russian waters in the outyears. That is not the purpose of this mission, which is just to open the door.

AICC will want to consider whether or not to take the seismic air compressors being removed from Atlantis.

POLAR STAR report by Capt. Terry Julich: Glad to have POLAR's included in AICC deliberations. Reported on Deep Freeze and Arctic West operations last year. Plan to do a SLIP program cruise in March with Dr. Jackie Grebmeir in the Bearing Sea.

Captain Julich reported that the Polar Class icebreakers are in good shape for science support. Polar Star has done some science work in the Antarctic and near Samoa. 2000 S.O.O. with Glenn Cota went well, as well as the funded work for Baskaran.

HEALY Summary from Capt. Jeff Garrett: Captain Garrett mentioned that the Healy's contractor work is ongoing, from the trivial to the grandiose, have upgraded the science conference room, CCTV, catwalks to help with wire changes, enlarged the meteorological lab, enlarged computer lab, moved wind sensors outboard, moved the mooring winch system (making the fantail more open). Longer term plans are to study removing the towing bitt and moving the crane to make a major improvement in fantail space. Winch modifications are not yet complete. Contract with ALSTROM has been awarded, and the work should be done by early March. Testing will take place in April. In summary, a lot of progress has been made, and more will be made in the future.

Minutes from August.

Suggested changes to August, 2000 Minutes by Dale Chayes:

In the SCICEX section:

"SCICEX data (unclassified) is available from Johns Hopkins University."

perhaps we can change it to:

"Paul Bienhoff (APL/JHU) offered to provide pointers to the datasets

from the SCICEX cruises. Some SCICEX information is available from

http://www.ldeo.columbia.edu/SCICEX/

Shortly after, in the "Other Business" section, second paragraph it says:

"... The cost of email is in the ..... with the current

communications links (INMARSAT) and coverage may be a problem at higher

latitudes. An M4 Satellite system is being developed..... packets

transmitted."

perhaps could read:

"... The cost of email is in the ..... with the current

communications links (INMARSAT) and coverage may be a problem at higher

latitudes. No other current INMARSAT services (including M4) are likely

to work well at high latitudes. A marine version of the INMARSAT M4 may

be available at the end of 2001, possibly with new pricing structures

that may reduce communication costs in areas covered by INMARSAT."

and leave in the part about exploring other options for high latitude.

HEALY Icebreaking Performance report by Terry Tucker. A brief overview of what they did and how they did it.

Design Requirements. Transit 4.5 ft, 100 psi ice at 3 knots & penetrate 8 ft of ice by backing and ramming. Terry showed the list of test memos and measurements that needed to be completed.

Test Areas: Underway for 2 - 3 week periods with a stop at Nuuk, Greenland. Phase 1 conducted South of Cape Dyer, Cumberland Sound and Phase 2 was planned for fast ice in Holune Bay.

They measured ice properties by going back along the track. Ice thickness was measured with cores and magnetic induction. Measured snow thickness every five meters with a calibrated ski pole. They also measured ice strength properties using a device called the rapid core which was deployed from a crane on the starboard side. The rapid Core is limited to 1.5 meters and started to have problems. They then used a manual coring device that required deploying two people with the core. They also tried to test the bow wash system but that test was inconclusive. Turning radius tests went well and it appears that the turning radius is 1500 times the ice thickness. During the backing and ramming tests the met tower was erected and withstood the pressure and vibrations of ramming ice.. Backing and ramming took 65 minutes and 18 rams through multi-year ice up to at least 7 meters thickness and a mean thickness of 3.3 meters. First year ice with a mean thickness of 5.4 meters and maximum thickness of 15 meters was penetrated in about 15 minutes with 3 ram cycles.

Trial summary:

Healy broke 4.5 ft level ice at 4.7 to 5.5 kts and 5.7 ft of ice at 2 kts

Scale 50 psi ice to 100 psi equals 4.5 ft ice at 3.3 to 3.9 kts

Backed and rammed multiyear ice (100 psi)

Mean thickness 11 ft

Transited pressure ridges

77 Individual tests were conducted

Other Tests included hull loads, propulsion machinery monitoring and trafficability (how long does it take to get from point a to point b under certain types of conditions). The Met tower was erected and withstood the vibration of breaking ice.

Finding test sites: Pre trip and during the test planning was accomplished using NIC and CIS ice specialists, TeraScan and CIS IceVu satellite data and helicopter reconnaissance.

Reports are being collated and will be published in the summer of 2001. Viewgraphs of Terry's presentation can be downloaded as a Power Point Presentation (This is a large file @ 36MB) at: http://archive.unols.org/meetings/2001/200101aic/reports/ice_trials.ppt

The presentation is also available in a smaller black and white pdf file (8MB) http://www.unols.org/meetings/2001/200101aic/reports/ice_trials.pdf

Terry thinks that this was the finest set of ice trials ever done for any icebreaker. Hethanked the officers and crew of the HEALY for being flexible and accommodating. It was also possible because the funding and time was made available.

We should work to make sure that the best possible intelligence is available on board the US icebreakers when being deployed into the ice. We need better than a weekly ice analysis. Terra Scan gets you most of the way there but more is needed to be completely effective. Helicopter surveys with direct feed back to a GIS system on the ship would be very effective.

There is a meeting with Terra Scan and RADAR SAT with the Intelligence people at PACAREA about getting data for the Coast Guard. The RADAR SAT images are expensive ($5 -6000 per image) . Efforts in various areas such as real time downlinks from Helos, SAR radar on HELOS and Autonomous Aircraft are being considered. The Coast Guard is buying three Autonomous Aircraft, one of which will be tested from HEALY in May.

SCIENCE SYSTEM TESTING:

Report from Jack Bash on what needs to be done.

Winch System needs to be re-tested after modifications are completed.

ADCP is a problem which will have to be dealt with in the future. At present there is no more reason to test equipment until it is upgraded.

We need the report as to how the ADCP system actually works so that we are speaking about facts. The 300 khz broad band will not work through the acoustic window at the current thickness. The 150 khz works but is probably attenuated considerably due to the window. After phased array systems are more thoroughly tested on other vessels, then installation of one of these systems should be investigated.

Jim Swift discussed the progress of the report from the Science Testing program. Jim has been rethinking how this report will be produced. There was a discussion about what the report should reflect, whether or

not there should be an ongoing report or a report of what was done or both. Jim will see that the report of the test program is completed in March. Need to work on the cruise planning document now.

Jack needs to spend his money by 30 April but may be able to pass more to MLML or get an extension. Discussion about follow on input on the testing of the installed systems. Do we need to bring back testers for upcoming test cruises.

Jeff asked what the organization of the report generating process was and how it is tied to plans for future tests. What steps are going to be taken.

Each system has a slightly different report structure.

Jack reported on the training videos which are being completed at OSU. Two fifteen minute videos are being created, one on coring and one on towing science equipment from the 20 hours of recorded video.

A working group consisting of Lisa Clough, Jack Bash , John Freitag, Jim Swift, Todd Adrian and MSTC Hendrickson are to work out the details of preparing a historical report of the testing program that is layered under the cruise planning documentation. Terry Whitledge also recommended linking ice trials results to the cruise planning manual.

Need to start by ground truthing the cruise planning manual with the results of the testing programs.

Phil needs input on his budget for equipment purchases for the next year. It is not clear what is needed yet from AICC and the test reports. He has to submit a budget by the end of March. Need to develop a system that is in sync with Coast Guard and NSF budget cycles. Also need to develop a process that helps determine what equipment the Coast Guard would provide versus agencies that are supporting the science projects.

Two short shakedown cruises, late March and early April for basic ship systems, propulsion tests, helo ops and winches (if ready). Last week of April, depart Seattle to deep water. Test deep dredging and other science ops that will be used during this summer's cruise. Will take Peter Michael and Jim Broda (if available). The test cruise will end in San Francisco for PR and test of AAV (Autonomous Air Vehicle). There may be some time on the trip back for more tests.

Depart for Norway in mid to late June. They had a good planning meeting in Germany with the PI's and Germans. Michael's cruise will be up to 64 days depending on fuel use. After that there will be a 30 day cruise for Jim Bellingham and JPL. Their return to Seattle through the Panama Canal will be in mid December.

Jack needs to know when testing personnel are needed on board. Capt. Garrett needs to look once more at the schedule for the test cruise and will get back to Jack ASAP.

Started a discussion about the equipment and technician needs for Peter Michael's cruise. A letter has been put into Peter Michael's program manager requesting support for two sea beam technicians, three pingers and -80 degree freezers. He also talked about the possible need for a gravimeter. Simon Stephenson believes that these needs will be supported by the program manager.

There was a discussion about the expectations of the PI's in this program. There was a consensus that the sea beam experts will be needed. This still does not get rid of the need for someone monitoring the sea beam during data acquisition.

Began a discussion about Jim Bellingham's AUV program. This program is very experimental in nature and is scheduled for the worst weather window possible. There are concerns about the success ratio for this project.

SCIENCE MODIFICATIONS AND EQUIPMENT

Winch modifications are being completed.

SDN modifications: need to verify that the checklist of items of concern for the SDN have been addressed by the installation of the NOAA Science Computer System (SCS).

The list of science related improvements includes**:**

1. Putting equipment on UPS power
2. Bathy 2000 equipment consolidated to one room
3. ADCP rack mounted with other computers
4. Acoustic windows for Transducers-not removed, cleaned and resealed
5. Catwalk access for wire run sheaves and Niskin bottle storage.
6. A-Frame controller moved to same location as capstan controller for better view.
7. Cheek plates added for self-alignment of wire in sheaves to prevent jumping out.
8. Mooring winches removed to create more space on fantail, will allow moving crane outboard.
9. Starboard deck drainage added
10. Climate chambers on separate circuit
11. Non-skid added to freezers.
12. Thermister on SW system
13. Clogging of uncontaminated seawater system (Palmer)
14. Uncontaminated SW discharge relocated, removed dead end branch.
15. Video cameras redone
16. Computer lab bulkheads removed to make more room.
17. Brand new 911 seabirds and rosettes

Barrow Arctic Sciences Consortium (BASC) report by Glenn Sheehan:

BASC provides logistic support to NSF funded programs at no direct cost to the end user.

Glenn discussed the possibility of a cruise by the POLAR STAR to Chikota, Russia for a variety of reasons related to establishing a logistics and research center similar to BASC in Russia. They are working with various federally funded projects that need access to Chikota and nearby portions of Alaska and the Arctic. The SOO request is to some extent a demonstration cruise, but there are some people with specific projects that could be accomplished during this cruise.

The SOO cruise applications were discussed along with how the BASC/Russian proposals fit into the planning. It was thought that there would be two legs that would have the Russian visit come after the Arctic West cruise. The AICC will review the other requests after the deadline tomorrow.

POLAR STAR update:

LCDR Trivers, Operations Officer reported: A five year contract with INTEROCEAN for maintenance, training and upgrades for all three ships has been entered into. This should improve winch upkeep.

Lab renovations on POLAR STAR: The FWD wet lab will have increased bench space and other improvements based on user input. Also there are some improvements to the Dry Lab taking place in the near term. Other labs and the Photo lab will get improvements in the future and the Photo Lab will be used for other purposes. They are currently using it for the salinometer.

Dry Lab work is about 80% done and will be completed by the March Cruise. The "fume" hood is not very good and will be replaced with two hoods, one for organics and one for corrosive materials. Kelly Faulkner recommends fiberglass or acrylic hoods that are robust, inert and are better for maintenance. Kelly will provide information on recommendations. Also recommended was to make the hoods removable.

Other changes include the science data network being changed to NOAA SCS and Arcview, an RM Young WX package, a new CTD/rosette along with the old one as a backup and Oceanographic deck

lighting upgrades. Terascan upgrades include a new antenna and controller. These systems have had continuing problems.

Issues include space and accessibility in labs for large equipment. In order to maintain the corporate oceanographic experience the POLAR's must be kept busy doing science missions. They will continue to send technicians and junior officers on UNOLS ships. They are looking for PI's to give them feedback post cruise.

Update on SLIP cruise: Plan to depart Dutch Harbor on March 15 to vicinity of St. Lawrence Harbor to do CTD, vertical net tows, van beam grabs and duck hunting at 25 stations in two weeks. They will take thermosalinograph data for the whole trip.

LCSE Trivers' presentation is attached as an appendix.

EQUIPMENT PURCHASES: HEALY will have two CTD's with spares, the POLARS will have one with a shared backup. Larry asked about whether or not the HEALY will get a gravimeter. There is a spot to mount one, but it will be tight. There are no current plans to purchase one, but it is possible to install one if needed and one is available for NAVO or elsewhere.

Simon's suggestion for an AICC role in the equipment purchase process would be to take input from funded PI's and with community input set some priorities for equipment purchases in the future. ARVOC has the ship operator buy and maintain the equipment which has good and bad points. AICC members could easily look at different areas and determine what equipment needs are needed.

Discussion about equipment funding and planning including:

Long range planning for major equipment purchases

Mission to mission equipment acquisition

Long range cruise planning infrastructure

Contract for services with an oceanographic institution

Simon will consider funding equipment but will ask what the long term maintenance program will be and how it will be allocated.

2002 schedules:

It is likely that the Canadians will do the third SBI cruise and there will probably be a request for a POLAR for the September time frame.

POLAR STAR is scheduled for RIP and POLAR SEA is in work-up for Deep Freeze during the September 2002 time frame. SBI moorings were scheduled to go out in September. If the moorings could go out in early July then they could be done from a Polar if Kegwin could go on a UNOLS vessels or fit in the HEALY schedule.

Block schedule for SBI and Lloyd Kegwin from Dave Forcucci. Kegwin is set in time with cruises from June 22nd through July 12th and from September 1st through September 22nd. SBI has blocks from early May to June 15th and for July 17th through August 25th .

Dr. Robert Ballard has come up with a month of funding and will try to fit a cruise in the January, February, and March 2002 if he comes up with three months of funding. This will be a project to locate the submerged hull of the ENDURANCE in Antarctic waters.

A POLAR may also support the Southern Ocean Iron Experiment.

OTHER ISSUES:

Dive Manual for the Coast Guard**:** LT Ed Price at Coast Guard HQ's is responsible and will work to have dive certification requirements put into the cruise planning manual. Lisa Clough will circulate the request from Ed Price to review his proposed criteria for science diving.

Navy Submarines**:** The US Arctic Research Commission is putting together a presentation to again try to convince the Navy that it is important to have Arctic Research done from Submarines. They may try to have submarine science in conjunction with an Ice Camp in the Beaufort Sea.

ASLO Meeting February 8th and 9th. Poster and/or room in Albuquerque.

ARCUS is updating the Arctic Logistics Support Plan. This helped a lot with resources. Getting input into the report regarding future equipment needs for the HEALY and POLARS.

AICC Membership:

Lisa Clough reviewed AICC membership. Glenn Cota and Dan Lubin will cycle off in September 2001, Jim Swift and Kelly Falkner will cycle off in September 2002. The RVOC slot has moved to an *ex officio* position, opening up one regular membership slot. RVTEC representation will also be on an *ex officio* basis. The AICC will be canvassing its members, UNOLS, the scientific community, and the funding agencies for suggestions for new members including publishing articles in Arctic Info and in the UNOLS Newsletter advertising the need for AICC members.

FRIDAY, January 26

Captain Garrett introduced Captain David Visneski, who will be his relief later this year. Captain Visneski has a lot of arctic icebreaker experience as an engineering officer and executive officer on the POLARS, and will take several short trips on board HEALY before assuming command.

Lisa reviewed agenda items for the second day:

POPDIV

High Latitude Communications

Underway data

Cruise planning guide

5yr plan

testing draft report

Polar Star Tour

Canadian Waters

MST Program w/in CG

Next MTG

AICC Post cruise Role

Shakedown Dates

2002 Comments

Healy Modifications/tour

Polar Operation Division, Helicopter Support (POPDIV)

CDR Bob Kaylor (rkaylor@atc.uscg.mil; 334-441-6043; fax -6860) (and Kyle Anderson) from the Polar Operations Division, made a presentation covering Arctic helicopter support. The Coast Guard has agreed to a reduced aviation group for some Healy cruises, but the number of personnel assigned depends more on the planned pace of aviation operations. The group is based in Mobile, Alabama at the Coast Guard Aviation Training Center, and typically joins the polar ships in Seattle.

POPDIV does not have its own aircraft, instead drawing from the Coast Guard's pool. Typical missions are ice reconnaissance, wildlife surveys, basic logistics (people, equipment, and supplies), and direct science support. The norm for Helicopter detachments includes 2 Helos, 4 pilots and up to 10 crew.

On a typical mission weight and aircraft configuration are the main considerations. Useful load is 1700 lbs, but with 1200 lbs of fuel, leaves payload for scientists and gear of 500 lbs for 75 mile radius. This 1700 lbs can be traded off in various directions.

Speed limitations include:

Maximum Speed 140 knots

120 knots with skis

100 knots with doors open

90 knots with external load

Landing on ice affected by conditions of weather, ice and communications with ship.

"Modifications": Operations with other icebreakers or with other helicopters are feasible, can mount cameras and sensors in compact packages that have already been flight tested, NAV link GPS to computers is feasible. Modifications similar to past requests take ca. 1-month approval, minor changes take ca. 3 months, new modifications take longer.

Past approvals include: Landing on other ships and other Helos landing on CG icebreakers. Russian Icebreakers and NS Borough Helos have landed on CG Icebreakers

Externally mounted cameras, other equipment.

Lisa Clough pointed out that the rules for deployment of scientific equipment during aviation operations should be explored and the information made available to scientists. Captain Garrett mentioned that in general policies are becoming more liberal/common-sense, but that the policies are not standardized or well understood. He and Bob Kaylor will talk about this issue, and try to come up with a standardized policy. It may be a ship-specific document.

Kelly Falkner asked about NSF support for helicopter operations. The Coast Guard includes a blanket cost - flat rate - for helicopter support in its cost structure, no matter the size of the aviation group or the science use of the helicopters. So there is no disincentive for scientists to use the helicopters, and no extra charges to investigators or the funding agencies. Simon Stephenson asked that this information be made clear in the Cruise Planning Guide. Captain Garrett said the information may already be there; he will check on this.

Discussed web site at Mobile and linking it to HEALY cruise planning manual. UNOLS shiptime request now includes a check block for HELO use.

Discussed the idea that a more utilitarian aircraft might be considered in the future for POPDIV.

Discussed the idea that pre-cruise discussion or dissemination of guidelines on how flight ops will affect over the side work. A note in the cruise planning manual is needed to ensure that limitations placed on science ops during flight ops is clearly understand. Capt. Garrett, Capt. Julich and Phil M. will take as an action item to develop clear guidelines.

High Latitude Comms: Dale Chayes started a discussion on high latitude communications and the impact on the ability of PI's to do their science and keep up with the rest of their life commitments. Dale is concerned that the options for data communications may not provide the bandwidth or data capability needed and that if HF radio is used it will cause interference in science systems.

There is no easy solution. INMARSAT will be good to at least 75 North. There are some satellites that can be used in certain areas. There have been some EMI surveys that indicate that HF will not adversely affect science systems. This is not thoroughly tested.

The Coast Guard is working on a complete data transmission protocol. The SDN will be linked to the CG's internal system so that internal communications take place with out external transmission needed.

John Berkson mentioned experiments with the NOAA (?) TIEDRAS (???) satellite, and will provide information to the Coast Guard. Phil McGillivary mentioned that this was a possible partial solution under discussion. Captain Garrett said that if the ship can get email in/out (say once a day), that same capability will be provided equally to the science party. The Coast Guard is looking into the costs, and providing information to the scientists ahead of time on the cost and billing structure. He said that in summer 2001 the Polarstern and Healy will have electronic links for voice, messages and data.

Managing the expectations of the science party will be a big part of the current solution.

Dale Chayes remarked that the AICC might think about the impact on science by high latitude communications issues. Pressure from institutions and agencies for scientists at sea to maintain their shore obligations has increased pressure on the needed bandwidth for communications. In the absence of a working system, neither Iridium or HF radio work particularly well.. In the case of the latter, RF interference is a real issue for science equipment, including, at present, the winch controls.

DATA Discussion: Dale Chayes provided an overview of the logging information for underway data. Data which have been calibrated, had scale factors applied, and converted to engineering units and have been validated are what scientists call "data". They can be used, archived, etc., and the data pathway must allow for feedback to improve the product, much of which lies in the ability to understand and change the scientific data via feedback, which may take place on various time scales from near real time to years. Hence the information about the complete system, all factors, all calibrations, all scale factors, etc. - what is called metadata - must be archived with the "data", or the archived numbers may well be useless. A diagram of Data Management Flow is located at:

http://www.ldeo.columbia.edu/~dale/dataflow/

MST1 Hutchinson discussed what the HEALY does now. Sea Beam is on unless ice is heavy or in shallow water such as portions of the Bearing Sea and output is saved to disk. The Thermo Salinograph is on, except in ice. This is not watched or checked on a regular basis. XBT are dropped to calibrate Sea Beam data.

This moved to a discussion of present policies on USCGC Healy. The SeaBeam data, thermosalinograph, etc., are logged on the SDN. At the end of a mission, the data stay on the ship’s computer at present.

Jim Swift discussed saving data in the JGOES format and put on a CD for the scientist.

Jim Swift mentioned that at SIO a policy has begun to record a "JGOFS" standard format underway data stream and provide a copy of this to the Chief Scientist and retain a duplicate at SIO from which future copies can be made.

There needs to be a protocol for collecting, saving, and presenting data to embarked scientists and for archiving data. Collecting and disseminating data on a continuous basis for the general community should also be considered.

AICC should make recommendations and endorse a plan for continuous collection of data when underway. In the long term someone will have to write a proposal to manage this type of effort. Phil discussed what the Coast Guard has plans to do with NOAA receiving some data, reviewing the Meta Data and archiving it.

Simon Stephenson said that the AICC can endorse concepts for underway data logging and archival, but the work itself may require a proposal, with professional responsibility for the data. Identify the appropriate data centers, data types, etc. to be considered for this.

Glenn Cota emphasized the point of high standards, calibrations, recording all this info, etc.

Dale Chayes discussed the roles of the different ground. The ship and its company get the data and the metedata. The data originator has an obligation to do everything reasonable to assure that the data are not lost, including multiple backups, attention to data safety, etc. Every science sensor system on the ship needs an explicit plan for maintenance, data collection, metadata required, and resources required (even if that plan is that nothing will be done). There are different levels of scientific needs, and it is probably not be resource efficient to maintain the highest levels of support for all customers. Certainly a route should be found to discuss the underway data support requirements with science parties well in advance of each mission.

Phil M. says that the CTD's are calibrated before every cruise. Salinometers will be calibrated according to procedures used by most of the RVTEC.

There needs to be a sensor by sensor set of baseline standards that is published and managed. The AICC will, as an Action Item, work with the Coast Guard to review the present systems, sensor by sensor, to identify the resources needed to meet certain expectations or specifications, and to examine a realistic plan for logging underway data. The policies of a few UNOLS institutions in this regard might also be considered.

CASPR update: Captain Garrett hopes that on the basis of the ice trails the Healy's initial icebreaker classification might be modified to get into more stringent CASPR zones. Ruben Shineberg has been asked to help make contacts to look into this.

Tour of the Polar Star

The AICC enjoyed a tour of the science spaces on the Polar Star and a Starbucks coffee break in the wardroom.

AICC letter to the Coast Guard re the MST program

AICC briefly discussed drafting a letter to the Coast Guard highlighting some of the AICC's suggestions and concerns for the MST program on the three icebreakers. The AICC agreed to try to address the full range of concerns. The Coast Guard does not foresee itself hiring civilian (academic) techs to be part of the crew, but the Coast Guard is open to having UNOLS ride-alongs (to facilitate training), UNOLS techs to support specific science functions for cruises where required, etc., but cannot at present provide the support for most of it. Simon Stephenson mentioned that NSF normally would pay for participation by UNOLS techs.

Dates for the shakedown cruises:

Monday March 26th through April 6th for general shipboard training, system testing and science testing to the extent possible.

April 23rd through April 30th or May 1st for science testing in deep water, oriented towards science testing. Hope to get Peter Michael and Jim Broda on board. Plan to end in San Francisco. (Have a PR visit in SF, with a short day cruise.) Then back to Seattle. Early-mid June depart for Norway.

Post-cruise briefing

Following the lead of ARVOC, the AICC agreed to consider a post-cruise briefing, by telephone, of investigators from funded Arctic cruises on Coast Guard vessels. This will supplement the on-board debriefing. This could be a telephone conversation between the Chief Scientist and the AICC Chair. Another method, in use by ARVOC, is a conference call between NSF, the investigator, and ARVOC representatives after the cruise. Simon Stephenson said that the concept of the briefing is good, and said NSF will consider whatever format the AICC recommends.

Captain Garrett, on inquiry from Lisa, said that he is willing to share the result of the on-board "plus-delta" meeting with the AICC.

Jack Bash and others reiterated the importance of the briefing, by conversation, after the cruise. Vernon Asper said that the participation in the briefings by ARVOC is crucial because otherwise information tends to get filtered. In the Antarctic, the contractor's reimbursement is partly dependent on quality of performance.

ARVOC does an onboard debrief including Captain, Crew and contractor's representative. Then there is a follow up conference call involving NSF, ARVOC representative and Contractor representative with the Chief Scientist. They use a standard set of questions. Debriefings should be documented in writing.

Should AICC put together a similar model of follow up feedback from the scientists, post cruise. Get standard set of questions from Vernon Asper.

2002 cruise schedule (revisited)

2002 Schedule action items are: to determine if an alternate vessel would work for Kegwin in June/July? Does SBI need a mid - April start? Will a Canadian vessel be needed and available for SBI in September along with a POLAR Class vessel?

Nome is used for turn-around for SBI due to daily air service and shorter steaming to/from the study region. The issue of (not) requiring an icebreaker for the Bering Sea Kegwin cruise was again raised. Captain Garrett would like the schedule to be broadened a bit (start earlier, end later) to allow a mid-summer port stop in Seattle, if feasible, because of much cheaper/better fuel, food, etc. situation. The AICC recommended to Simon Stephenson that Mike Prince explicitly be invited into the NSF/Coast Guard 2002 scheduling process, including attendance at meetings, as an observer for UNOLS. The availability of a Polar-class icebreaker in the Arctic in the summer of 2002 is unclear. Simon Stephenson, in response to a question from Kelly Falkner, said that if a fundable 2002 proposal - not necessarily SBI - makes it through NSF, that NSF would be willing to potentially consider helping to fund the investigator on a Canadian vessel. Regarding the proposal to ONR from Jacqueline Richter-Menge, the AICC recommended NSF, the Coast Guard, and ONR together examine the ship support needs for this if it is funded.

5-year plan

Mike Prince updated the committee on the 5-year plan that Jim Swift put together a year ago. UNOLS is now keeping track of the status of the plan. The problem is that maintaining the present 5-year plan is a totally manual operation. UNOLS is considering modifying the Ship-Time request Form to allow its use for planning ideas as well as real requests. Investigators would then be required to use the on-line form, for example this would be stated in the regular AICC solicitations for planning ideas. This would make it

possible for UNOLS to monitor the planning ideas. The form allows the distinction between a planning idea and an actually submitted proposal, but the identification of funded proposals must be done manually, and it isn't always easy to find out what has been funded. The AICC supports the UNOLS Office in making these changes.

AICC meeting

The next AICC meeting will be during the week of September 10-14, 2001, at NSF in Arlington, VA, in conjunction with other UNOLS meetings. The Monday and Tuesday of that week (9/10-11) are tentatively identified as the AICC meeting dates.

Cruise planning guide

Captain Garrett is trying to get a revised draft of the Healy cruise planning guide up on the web in about two weeks. Looking for advice on changes and corrections from the AICC in the next week (email to Todd Adrian and Captain Garrett), and will gladly consider long-range goals for changes, additions, and improvements. Kelly Falkner noted that the date/version of the document should always be clear. The AICC agreed to send comments directly ASAP, within one week.

Manual will be put on MLML server and graphics will be added. UNOLS Office will put a redirect to the new location.

EOS article: Jim Swift agreed to begin to put together a draft of an EOS article about the testing program, including the post-PSA shakedown tests, beginning in March, with assistance from Kelly Falkner and Jon Berkson. Dr. Swift will contact Terry Tucker for assistance with the description of the ice testing.

Meeting adjourned.

After lunch the Action Items from the August 2000 AICC meeting were reviewed by Lisa Clough, Jim Swift and Mike Prince.

Jim Swift agreed to continue attending ARVOC meetings as the AICC representative.

Discussion about UNOLS role in the post-shakedown tests noted that the emphasis has switched to the preparations for the first science cruises. There is clearly a need for involvement of Dale Chayes, John Broda, and Bill Martin. Should Chris Moser be along? Yes.

Re equipment to be purchased by NSF for the 2001 cruises, it appears that the equipment should be funded through the University of Washington, but be located on the Healy (and the Polar-class icebreakers), but be serviced by the University of Washington as part of their pool. Whatever the mechanism, there are vehicles and precedents for small or large items. Knowing where to draw the line between NSF and Coast Guard funded equipment will take some years of experience. Regarding technical support from UNOLS technicians for 2001, it appears to the AICC that supplemental technicians - say SeaBeam processors - should be funded via subcontracts/supplements to the PI's grant.

After-lunch discussion of the Science Test Program science report & cruise planning manual

Re the Cruise Planning Manual, the Coast Guard needs to supply the graphics for the draft so that the AICC can complete the review. The cruise planning manual is quite close to what is needed. It could benefit from a good index and an FAQ page. Needs clear path for reader to contact appropriate Coast Guard personnel for additional information. Much of this is there, but in such specific form that it will be soon out of date. But the Coast Guard is apparently not allowed to create generic email addresses, say, for the chief marine tech regardless of who was assigned. Some suggestion of trying to tier the information. The ADCP document from Jules Hummon: (http://currents.soest.hawaii.edu/reports/healy_report/Healy_adcp.html) is a good example of tiered levels of information. It could be more clear what level of support is provided to the investigators for various

science systems and in routine tasks at sea.

Regarding the Science Test Program Report drafted by Jim Swift, Mike Prince and Jack Bash agreed to examine the document, see what materials are missing and seek them out, and to help assemble a revised version. It is agreed that an executive summary is needed, and that will be provided for the final version by Swift

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Agenda

1. General business & reports.

Review and approve minutes of last meetings: http://archive.unols.org/aicc/aicmt008/aicmi008.html

Chair report.

UNOLS report.

FIC Report (Terry Whitledge)

Agency Reports

* NSF/OPP (Tom Pyle/Simon Stephenson), NOAA (Tom Murray), ONR, NSF/OCE, & others if present

ARVOC report. (Vernon Asper)

Coast Guard Icebreaker Operations (Headquarters) report

Coast Guard PacArea report(s)

Coast Guard Commanding Officer's summary (if desired)

2. Healy testing program

Status of test memos report. (Capt. Parsons)

AICC report on the Healy science systems test program. (Jim Swift)

Review, modifications, and dissemination of the AICC report.

Icebreaking Trials report (Terry Tucker) (TENTATIVE)

Plans for March Shakedown test cruise

Schedule

Technician support, testing plan, Jack's Budget

Plans for further AICC action in 2001

3. Science Modifications, Infrastructure and Equipment

HEALY

Status of recently completed ship modification

Any further changes planned before 2001 science season.

Plans for next Winter

AICC role in commenting on planned ship modifications, adding to the list,

prioritizing the list, and/or assessing suitability completed modifications.

Science equipment operational status report (Jack, John, and MST's)

POLARS

RIP program status and plans

Winch systems

Lab renovations

POLAR STAR plans

POLAR SEA plans

TOUR OF POLAR STAR (Time to be determined with Capt. Julich)

EQUIPMENT PURCHASES

Coast Guard's plans for acquisition of science equipment for HEALY and POLARS (Dave, Phil & April)

Identification of 2001 (& 2002) Arctic icebreaker scientific equipment requirements.

ADCP equipment replacement

Status of WAGB small boats replacements.

4. Arctic icebreaker scheduling and planning for 2001 and 2002.

HEALY Schedule and operations

POLAR STAR Schedule and operations

POLAR SEA Schedule and operations

BASC Update (Barrow Arctic Science Consortium- Glenn Sheehan)

2001 SOO requests and planning.

2002 scheduling process

5. Science operational and technical support

Identification of 2001 (& 2002) Arctic icebreaker technical support requirements.

Status of technical support proposal(s) for 2001 scheduled cruises.

Process for future technical support proposals

Status of science planning documentation ("HEALY Cruise Planning Guide").

Hard copies will be provided upon arrival at the ship.

Training videos

Helo support for Arctic Science cruises (POPDIV presentation)

Science Diving

Continuous Data Collection requirements

6. Arctic icebreaker long-term science and logistics planning

Fall AGU icebreaker townhall planning meeting - report (Jim Swift).

Overview of future Arctic icebreaker user ideas. PDF file of user ideas on the web.

Status of Healy transits and science ops in Canadian open and ice-covered waters

Possible opportunity in 2003 for science from an ice camp in the Beaufort Sea and, possibly, a submarine (Paul Bienhoff)

7. Other business

AICC membership - Starting item for Friday morning

Adding one science member

New members

RVOC and RVTEC representation

Future Meetings

Dates, venue, agenda