

1) How were communications with PACAREA (Dave, Don and Phil) and the ship (CO, XO, MSO, MSTC OR MST1) before the cruise? Do you have suggestions for improvements?

Communications were very good. Those with prior experience on HEALY commented that familiarity with crew and protocol made communications better.

SCIENCE SUGGESTIONS:

All funded PI's should have meetings prior to deployment in Seattle on the HEALY with the ship's crew to discuss scientific procedures, equipment use, and logistics for cargo transfer and chemical use.

It would be better to have one person be the contact for overall operations questions.

2) Any environmental or permitting areas that arose during the cruise? If yes, how smoothly did the process(es) go? From the CG side, did the scientists follow procedures to obtain clearances, permits, etc.? Suggested improvements?

NATIVE COMMUNITY:

SBI made trips to Barrow, Wainwright and Point Hope, Alaska to meet with the Alaska Native communities that helped to insure that things went smoothly. They also invited participants from the local communities on our research field cruises.

Although the SBI mooring cruise had permission to be in the area until a certain date, the folks at Barrow were nonetheless anxious for them to finish quickly. As such, several times during the cruise OPS had to communicate with BASC to discuss this. PI was impressed with the tone of these communications---OPS struck a good balance between stressing the need for us to complete our science while acknowledging the wishes of the whaling community.

BASC assistance for community interface set-up and follow-up meetings really helped.

SCIENCE SUGGESTIONS:

Strongly recommend engaging the native community early for future field campaigns.

HAZMAT:

For SBI, shipping hazardous materials was not an issue because of the services provided by Andy Heiberg (UW) who was on site in Seattle for liaison with the ship.

USCG will interface with UW, specifically Katherine Kroglund who has agreed to provide HAZMAT storage services for future cruises.

For NOAA DART, disposing of the batteries from the buoys was the only environmental concern. The alkaline D-cell batteries were stored in the HAZMAT locker on HEALY until the end of the cruise when the batteries were disposed of properly.

SCIENCE SUGGESTIONS:

AICC should help facilitate transfers of HAZMAT to the ship from UW by assisting if necessary with determining the appropriate certifications and procedures that should be in place for transporting HAZMATs to HEALY. For example, the delivery truck/driver should have the appropriate certifications to get material on base.

3) Logistics/cargo - Were the shipments on time? Were special handling requests met (frozen things kept frozen, etc.)?

Logistics were mostly good in 2004. There were some shipments of significant size. For SBI there was a chemical shipment that was not allowed to go directly to HEALY in 2004 although it was in 2002.

A problem with one of the trips was that the crew changed their minds relatively late in the game as to the precise date of the on-load. This caused the science party to scramble in terms of buying tickets, etc.

There were some problems with ship loading/offloading in Dutch Harbor that were issues with the agent there and not HEALY or its crew.

SCIENCE SUGGESTIONS:

The new USCG internet tracking system for cargo and chemical shipments was valuable, but it still needs some improvements. Storage of some shipments on board was not exactly as desired, but these problems were solved or minor.

In the future, the details of the on-load, when not in Seattle, should be discussed more carefully and in a more timely fashion.

Consider making it routine to have the oncoming science party carry a marine radio so that they can contact the ship in case they are called away from port (S&R).

4) Construction - Was anything built or modified on board? How did that go? Damage control/scientist interactions?

NOAA DART: Buoy-specific mechanical items (wood and metal) were constructed on the ship. These are specialty items, but HEALY personnel jumped all over the fabrication and saved the day.

SBI Process: HEALY personnel did an excellent job moving the mounting pole needed for ice thickness studies while at sea. They also built a mud shunt that worked well for directing washed sediments from benthic biological collections off the deck. The aft hose reel room seawater intake system worked again in 2004.

SBI Mooring: Our supply of XBTs dwindled faster than anticipated, and the USCG was wonderfully generous in allowing us to use some of their supply. This was one of many

examples of the crew going beyond the call of duty to help us meet the scientific objectives. **We did offer to pay for the USCG XBT's but haven't been billed.**

NOAA Mapping: We ran a cable to provide NMEA data to our electronic charting application. Serial data (RS-232) came from the Black Box data distribution buffer from the Centurion P-Code receiver. At our request, HEALY crew got the Aloftcon Seabeam display repeater re-installed.

5) Information technology - e-mail, Inmarsat. Radio.

NOAA DART: No complaints (lower latitude helped).

NOAA Mapping: It was good last year and better this year. Our group tends to be self-sufficient when it comes to this category of service.

SBI Process: The reliability of the satellite internet connection seemed to be lower than in the past. It is recognized that there were many more users in 2004 than in 2002. This greatly slowed down the "live internet" connection time. e-mail had constant problems. We needed numerous connections to ftp data to/from shore and the small file size constraint was frustrating.

Having the 24/7 Iridium email is a big improvement over the previous 2hr/day internet connect time on past cruises. Chief scientist access to the USCG network was also very helpful for coordinating events people ashore in Barrow, at NSF and on-ship personnel, including a medical emergency. FTP support for large file transfers was helpful for QA and getting files for scientists from shore.

SBI Mooring: We had repeated problems during our late night connection period. Sometimes e-mail messages were not delivered ashore, yet there was no error message returned to the sender. FTP filesize limitations were problematic.

SCIENCE SUGGESTIONS:

Having the Iridium connectivity become standard in the future is highly desirable. Sending out short emails on Iridium also helped to speed up communications.

It would be nice to see more than 2 hours per day of connectivity given to the science party. Splitting live internet time into two one-hour-long segments improved performance.

NSF agrees that it will be willing to pay for more time if it is needed, so it is recommended that this information be provided to future PI's prior to the cruise.

USCG says that the cruise planning form does specifically request "communications requirements," but it was not well established that the two-hour connections could be increased, even while at sea, with justification.

During the two hours per day that the scientists are allowed access to the internet, if the CG folks can limit their use (which they have available most of the time) then it frees bandwidth for the science party during their limited access time. When this request was made the effect was discernable.

5) Information technology – computers.

USCG provided a large RAID array with several hundred Gbytes of available disk space, which was very useful in backing up, transferring and archiving key data from the cruise.

One notable improvement was that the time to backup data this year was faster than last year.

SCIENCE SUGGESTIONS:

The computer support system needs to bolster its UNIX capability significantly.

The shipboard backup system had a major failure and we lost data at one point, so that system needs work.

Dale Chayes from LDEO was an extremely valuable resource to the SBI PIs concerning ship instrumentation and systems.

USCG also now has a full time person for science data network computer support, who was essential to solve daily computer issues and periodic system crashes, as occurred during the spring SBI cruise. The team support of the LDEO and USCG personnel was a real improvement to general science and computer network support.

6) Laboratory operations - Scientific support for everything from operations to HAZMAT to familiarity with equipment.

The MSTs provided very good (excellent) deck assistance, over-the-side-gear support, as well as assistance for other routine operations. They had positive attitudes and served as advocates for science with the ship.

Special commendations to Don Snider and Glenn Hendrickson.

SCIENCE SUGGESTIONS:

There was some uncertainty about doing non-standard things that were not on the “plan of the day.” An approach for implementing program changes in response to real-time events/findings could be better defined.

We suggest that specific MSTs be assigned responsibility for specific instruments. The USCG should consider how to provide MSTs ratings, schools, rotations, retention, etc. The MSTs do well presently, but a huge improvement in their effectiveness as partners

with the science party is possible. The MST-UNOLS exchange program should be continued. Can the MSTs get more recognition from the USCG hierarchy for the work that they do supporting science?

It would be wise to select officers for deployment on the Polar Class icebreakers partly on the basis of interest in and suitability for science support. Could USCG consider making UNOLS experience part of icebreaker **officers'** training?

7) Laboratory equipment - comments on malfunctions, desires for upgrades, needed new equipment.

NOAA DART: The SB2112 was useful for our program.

SBI Process: Environmental control (temperature stability) in the biochem lab should be brought to specification. Non-cycling temperature stability +/- one degree C temperature stability is needed in this space.

Efforts to clear bulkheads and make space more useful helped and should be continued.

The ice machine in the lab was never connected up.

The deionized water (DIW) system needs improvement. The DIW system in the main lab never rose above ~16.4 M ohms for both trips (~18 M ohms are needed to meet specifications).

UPS system may be inadequate for full science capacity needs.

SBI Mooring: Having the mooring winch this year made a huge difference in our deck operations, versus using the ship's capstan.

We had a serious malfunction with the XCTD system, and in the process found out that the rear-hull launcher did not function properly.

It would be useful to provide a more effective display of the ship's navigational data in the lab areas, as well as some of the underway sensor data.

NOAA Mapping: The SB2112 performed better this year than last year due at least in part to the replacement of failed hydrophones. It remains unclear whether performance limitations are caused by the system, ship, or environment. Much of the software and some of the components are outdated and should be upgraded.

The sub-bottom ran full time this year (versus last year).

There were problems with the sound speed data from the thermosalinograph at very low salinity and temperature as well as trying to get the sound speed profiles into the SeaBeam 2112 multibeam for it to use in real-time.

7.1. SEABEAM specific questions:

7.1.a. How much real-time watchstander effort was required?

During the NOAA Mapping trip, the science party provided full-time watchstanding; otherwise no full-time watchstanding was provided. There were three people in each NOAA watch section.

7.1.b. How much ping editing was done in the post-processing?

Full-time ping editing for NOAA mapping, none for other programs.

7.1.c. In both cases, who provided the people (CG or scientists)? Who was responsible for training the people?

The science party provided the Seabeam watch standers and data processors for the NOAA Mapping program; LDEO provided support for all others.

7.1.d. Other Seabeam issues

None, but there was some confusion about who is responsible for other sonars, notably the subbottom systems. There should be a list of who is in charge of which instruments.

SCIENCE SUGGESTIONS:

Consider is a cart/track system to move the CTD rosette in and out of starboard staging bay to launch point.

Add a bathymetry repeater screen for the CTD operator, and navigation and other data displays in the main lab, computer lab, etc.

Regarding hydraulic system capacity - some users had to wait for other users to complete their work. Consider upgrading the hydraulic system.

Use of the SeaSpace Terascan system was a constant headache during the SBI cruises. SeaSpace should make sure that the system is checked out and fully operational and reliable under cruise conditions.

There were three instruments that measured the ship heading and each gave a different answer during HLY04-03. They need to be consistent and correct.

The aft XCTD launch tube is not at a steep enough angle, so the XCTD cannot drop. We could not find the spare hand-held launcher.

AICC/USCG should determine what hull-mounted systems operate on other icebreakers and how they perform before making the final decision about replacing the SB2112.

8) *Science technical services - seawater systems, climate control rooms, winches, etc.*

NOAA DART: The winches were used. HEALY had adequate equipment and expertise to operate them and everything went smoothly.

SBI Process: The new USCG science seawater system (SSW) clogged in heavy ice during the spring HLY-04-02 cruise, thus we reverted to the 2002 solution of filling and using the forecastle ballast tank. The SSW system was connected to the forward ballast tank and this tank was connected to the bow incubators. When the seawater in the ballast tank warmed, the water was dumped in transit and refilled on station. This “dump and pump” technique became standard.

There was some shifting between variable diameter wires for stern deployment when the heavy winch system went down. Additional time was lost having to disconnect to recover from one winch failure. The Totco winch and wire metering system had problems. The 3/8” winch had shaft-coupling problems that required a field repair.

SBI Mooring: The winches worked fine and the seawater system was fine (we were after all in open water for most of the cruise).

NOAA Mapping: Flow problems with the thermosalinograph water led to freezing. The MSTs did a good job taking a couple of CTDs at the request of the science party without outside help or science party supervision.

SCIENCE SUGGESTIONS:

NOAA DART: It would be nice to have faster winches, and we need to reconfirm that the HEALY’s winches are rated for the loads that we had. In the future we may bring out our own winches.

9) *Diving support*

There were no science diving ops, just USCG ops. Divers took pictures that were helpful to ice scientists. They would have done more if required.

10) *Small boat operations*

SBI Process: Small boat ops worked fine. These operations were very helpful with sediment trap deployments and recovery in open water. The small boat crew had a great attitude. One boat was down for most of the summer but we made do with the others.

SBI and NOAA Mooring: We used the small boat in all of our mooring operations and this was very effective. The HEALY crew has become quite proficient at deploying and recovering moorings using the small boat.

11) Helicopter operations

NOAA DART: Only one helo was available, and it was used for personnel transfer only.

SBI Process: Helicopter ops were great. For our program, two helos were necessary; they were used for science operations, ice reconnaissance and logistic support.

SBI Mooring: This aspect of the cruise was excellent. There were several times when we wanted river samples, etc., and the aviation department did a great job fulfilling our scientific needs.

NOAA Mapping: Only one helo was available, and it was used for personnel transfer only.

SCIENCE SUGGESTIONS:

As mentioned previously, USCG needs to improve communications to some places (like vans on the fantail) so that scientists are aware of helo ops that might affect their work/safety. NOAA Mapping would have preferred to have two helos available.

12) Food Service

The food was very good and the service was great.

SCIENCE SUGGESTIONS:

It would be nice to have more food and more selection for mid-rats.

13) Housing/janitorial

This was fine.

SCIENCE SUGGESTIONS:

Consider new traffic patterns on the 200 deck near science conference room so that day sleepers on that deck can sleep. Soundproofing could also be implemented in the affected staterooms.

Improve the sewage/toilet situation (long, daily shut-downs were the norm), particularly on the spring cruise, so by the second cruise, the problem had abated.

Make sure that stateroom, head, and lab cleaning supplies are kept in good order, and that scientists know where the appropriate cleaning items are located for each space.

There should be adequate towel racks, lights, and storage space for full 3-person occupancy in the staterooms.

Some standard method for linen washing should be implemented to streamline the offload of personnel, considering the early departure time often required. Encourage people to bring their own sheets – this would reduce the problems with getting linens clean prior to offload.

14) Safety - particularly deck ops (this includes scientists' and CG's views)

NOAA DART: Buoy recovery is not necessarily dangerous, but it's a tricky operation. CWO Robertson was so good at these operations that we taped how things were done on HEALY and now use that tape as an example of how to perform these operations.

SBI Mooring: Excellent procedures during mooring recoveries. Communication between our mooring technicians and the ship's crew was very good. The fact that the aft conning station was used during the mooring recoveries made great sense and helped to make the entire operation more efficient and safe.

SBI Process: Scientists had to be reminded to use hard-hats and full Mustang suits, rather than just float coats, particularly in the warm weather.

The last safety drill occurred right when scientists were packing and trying to move gear down to the hold. This timing was problematic.

During deck ops, whenever the MST (with the radio) needs to be off the deck, there is no way to communicate with the winch operator. You can't really see the winch operator from the aft deck.

SCIENCE SUGGESTIONS:

When gear is over the side protocol should insure there is someone on deck with a radio.

15) Miscellaneous equipment and supplies (printers, projectors, paper, etc.)

The LCD projector in the science lounge had color problems.

There was a problem with not being able to send a fax, but it was scanned and emailed.

CG: We aren't supporting fax machines.

16) Medical

Science and USCG personnel agree that electronic submission of medical forms is problematic, especially when the ship is underway. Suggest that "bring a paper copy" should be the standard approach.

Some contractors who support scientists have concerns about patient confidentiality issues and were not willing to fill out the forms.

17) Travel

NOAA Mapping: Minor confusion this year when HEALY left port for a Search-and-Rescue (SAR) event that happened at the beginning of the first leg out of Nome. There were some extra costs related to extra hotel rooms that could have been avoided with better communications.

SCIENCE SUGGESTIONS:

In the event of future SAR events, we recommend that USCG set a time for “standby” so that science personnel can make hotel arrangements if necessary and avoid them if not.

18) Ship operators - interactions between bridge and scientists, nightly meetings, etc.

Unanimously viewed as great. The great success this past year was the direct result of command leadership. Some PI’s had some trouble figuring out the chain of command.

Not all ship drivers are of the same experience, perhaps due to the turnover rate. Things have gotten better over time. Although this can be an issue on UNOLS vessels too (so it shouldn’t be considered a complaint against USCG or HEALY in particular), the HEALY has more people in training mode and thus differences in ship driving experience are more readily observed.

For non-chief scientists onboard, interaction with command can be harder than for the chief scientists.

SCIENCE SUGGESTIONS:

USCG should bear in mind the central role that command plays in science program success when its time for officers to rotate.

Nightly meetings are imperative to program success!

19) Any other comments?

All compliments to ship, officers and crew.

AICC will be adding new question at USCG request: Percentage of objectives met?