

**Marine Science Drivers for the Polar Regions
UNOLS Polar Research Vessel (PRV) Workshop
February 28, 2011**

Meeting Minutes

Welcome and Introductions

Dr. Rob Dunbar, PRV Chair opened the workshop and set the stage for what we needed to accomplish over the next two days. A review of the timeline and the expected reports to follow were discussed in detail.

See Rob's Power Point presentation outline of the goals of the workshop, stressing the importance of articulating what the science is now and try to project what it will be in the next 30-40 years. Please capture your thoughts in writing and give them to the PRV Committee.

Link to all referenced Power Point presentations can be found at:

<http://www.unols.org/meetings/2011/201102prv/201102prvmi.html>

NSF Opening Remarks

Dr. Karl Erb/NSF-OPP Director welcomed all workshop participants to NSF.

The NSF Board has urged us to build some momentum on this Polar Research Vessel project and NSF thanks the UNOLS office for their efforts thus far.

The MREFC office meets twice a year and this committee evaluates ideas for major facilities, such as the new South Pole station. They will meet next fall and will look at this PRV project.

Congressional budget has the USCG Icebreaker Polar Sea being decommissioned.

The repairs on the USCG Polar Star will continue.

USCG Healy is a capable ship, but is over committed in the Arctic . The USAP ship Laurence M. Gould renewal contract was signed for another 5 years. The Nathaniel B. Palmer contract expires in the summer of 2012. NSF is looking at a lease option for 5 years, with a possible a 5 year extension.

For a new vessel even if we could sent the request to Congress a year from now, it would still be 10 years before a ship would be delivered.

We need to clearly define what the science is that requires a new icebreaker, from there the capabilities will be defined, and we can build a case for the ship. The competition for funding is great which requires a clear statement of what science we could do that we can't do now with our current assets.

This is happening in line with the 15 year study for Antarctica which is an NRC study focused on high-priority science issues, which will be followed by a blue ribbon study.

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This PRV study is on a fast track with a planned interim report completely by June 2011 and a final report due the end of 2011. Primary goal is to clearly articulate what science is driving a specific science mission requirement (SMR).

Questions Asked:

Jamie Austin: Will this ship work in both Arctic and Antarctic?

Karl Erb: Yes, this will be a polar vessel for both the poles.

Question- Will this vessel be a break in vessel for McMurdo

Karl- We don't know the answer to this at this time.

Rob- Is the MREFC the only process we can use.

Karl – Yes, it has to get through MREFC, then to Congress and White House.

NSF Program Office

Alex Isern/OPP provided additional comments and an overview of the PRV study. See the Power Point slides. Alex thanked everyone for coming and let us know the NSB has been supportive. Alex stressed that we need the science that is driving the capabilities that you are asking for. From here we can get a high level picture of the science.

Alex provided brief review of the PRV study which was done from 2002 to 2006. In this new study the operational costs are going to be very important. Alex also provided a possible timeline of the whole project, including an out year phase in table.

Carin Ashjian asked if a spot charter is a viable option.

Reply: NBP replacement lease can be a foreign flag vessel.

Karl Erb reported the Arctic Policy, signed by this administration, has a section on platforms and it stresses that we need to share assets among other countries. We can share access by using foreign ships.

Bernie Coakley- should we discuss whether this be a UNOLS type operation, versus the private contractor?

Alex Isern - Yes, please consider this in your discussions.

Richard Perry- Will you consider life cycle costs versus day rate.

Alex: Yes, total life cycle costs are important and need to be part of the discussion.

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Jamie Austin: The 2006 report was very good, should we consider this as we move forward, even though it wasn't mapped to the science as well as it needs to be?

Alex: yes, by all means. This is the place to start.

Rob Dunbar: The Consortium for Ocean Leadership has a working group on future funding of ships. At our meeting in September 2010 the Joel Perriot/ OMB asked how we got into this problem when we knew the fleet needed to be renewed. On March 10, 2011 the findings of this working group will be presenting their findings to the COL Board.

Review of the PRV Study- Operational Feasibility of desired Features & Specifications

Jim St. John – Science & Technology Inc. presented a Power Point on the history of the PRV project. The 2002 to 2006 study was done in close connection with the ARVOC group.

New requirements were outlined, ice coverage and problem areas were reviewed and capabilities that are needed were described.

Jim reviewed the Ice Classification System currently in place with the classification societies. The International Association of Classified Societies has a new system. See Jim's Power Point for specific details. The NBP is classed as ABS A2.

Jim discussed various ship design features on different icebreakers which we may want to consider in this refresh project.

- Box Keel on Polar Stern did help with bubble sweep down and green ship technologies such as hull paint can decrease the bubble sweep problems.
- Icebreaking capability is the biggest cost drivers.
- Forty year ship life- you design in a soft patch so that engine components can be changed out as needed or as technologies change.
- Superstructure shape will affect atmospheric measurements. The typical block shape makes it very difficult to get good atmospheric measurements. Flow profile of the house strongly impacts the air going off the house.

General Comments & Questions for Jim

Rebecca Gast asked where the microscope room is placed.

Jim: The lower in the vessel the better.

Lester Lembke-Jene: we are aiming for higher power for the replacement Polar Stern so that we can break ice without ramming. On the moon pool, we are considering one

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for large ROV. What kind of closing system on bottom of moon pool would you have?

Jim- we didn't get that far.

Lester- we are considering a knife edge instead of a box keel

We are having bad experiences with podded props on Merian and we are looking a fixed props for the new Polar Stern, this is an ongoing discussion.

Gene Domack- we are seeing very different types of ice now, and it will impact the hull design.

Terry Whitley- azipods were going to be too noisy to meet the Sikuliaq criteria. Maintenance element on pods needs to be considered.

Steve Ackley- the Arctic conditions have changed dramatically in 5 years. The Chinese almost went to North Pole.

Jacque Grebmeier: we still see heavy ice in different times of the year.

Maria Vernet – How much icebreaking capability do we lose with smaller ships?

Jim- The displacement of ship really drives the ice breaking rating. You need the power, and heavy hull for the icebreaking strength, all of which increases the length of the ship.

Question: Did Jim consider different bow forms for breaking ice?

Jim- I think a traditional hull form is best for all the different types of ice encountered.

Review of PRV Community Responses-

Jon Alberts provided a review of SMR survey which began on January 28th. Initial findings from the survey were reported out. See power point presentation.

Rob Dunbar also presented his review of survey, noting there were lots of “agrees” with over 90% in many areas; this would suggest there is more there. And in reading the comments people wrote there is more there.

Other questions- Is this a bi-polar vessel- Yes, it will on occasion be transferred to the Arctic . Will it be a break in vessel for McMurdo? Rob- we can weigh in on this issue.

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Should this vessel have a box keel?
Will this be fisheries stock assessment vessel?
Will the CG be building a new Icebreaker?

Richard Perry- How will time series studies be affected if ship is in the opposite polar region then you need?

Breakout Groups-

At this point in the workshop the attendees were divided by area of expertise into breakout groups and met in different rooms at NSF. The four groups were:

- Biological Oceanography- led by Maria Vernet & Craig Smith
- Chemical Oceanography- led by Vernon Asper
- Physical Oceanography & Atmospheric Interactions- led by Dale Chayes and Bruce Huber
- Marine Geology and Geophysics- led by Larry Lawver & Gene Domack

Developing Science Drivers-

After a morning session, all workshop participants reconvened to provide a brief overview. Each group leader reported out initial results.

Maria Vernet- Biological Oceanography- See power point highlights from their discussion. It appears that interdisciplinary science will be the emphasis.

Vernon Asper and Rob Dunbar- Chemical Oceanography- see power point
Vernon asked the group to consider: For each discipline, what kind of sampling in each disciplines are we not doing, or is difficult to do with our present capabilities. This needs to be looked at. We need to focus on what needs to be measured in the ocean and what do we need to have to do it?

Physical Oceanography-Bruce Huber- See power point
Lots of interdisciplinary themes-

Larry Lawver/Eugene Domack- See power point
It became apparent how difficult it is to project what the science will be in 10-20 years from now and the science questions being asked now by people may have little relevance since this ship may not come online for 10-20 years.

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3:45 Reconvene from Breakout groups

Report Out and General Discussion/Comments

Maria Vernet- Biological Oceanography report- see Power Point presentation.

Carin Ashjian- This is a need for year round sampling and this requires an icebreaker.

Alex Isern- The NBP used to be operated at 250 days/year, and in recent years the schedule has been lighter. There doesn't appear to be a lot of winter work. Why not more winter work? Rob Dunbar commented that these proposals just aren't being funded.

Bruce Huber- Physical Oceanography- see power point

We had a wide ranging discussion. The three overarching issues within physical oceanography are: sea ice, atmospheric science, and year round access.

Parameterization in the poles is important; we are very far behind in this.

Vernon Asper- Chemical Oceanography- see power point.

Vernon presented the science themes followed by a list of sampling requirements.

Short term events, huge winter storms that we run away from for good reason but this is when things should be measured.

Gene Domack- Marine Geology and Geophysics- see Power Point

We listed 12 science questions, and then listed capability needed to address these science questions.

Lester Lembke-Jene/ Alfred Wegener Institute- Lester provided a very extensive power point presentation on the Aurora Borealis project. This is available upon request due to the size of the file.

Capt. Mattias Peterson Master/IB Oden provided an overview Power Point of the Swedish Icebreaker fleet and future directions this group is working on.

Jonathan Berkson USCG – minutes as provided in e-mail on 4/28

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Currently US Coast Guard is involved in four studies related to Arctic issues. Three are per direction of Congress:

1. High latitude study - an analysis of the functional requirements to carry out USCG's eleven statutory missions in the polar areas and includes an analysis of operational gaps and ways to address those gaps. This is in review by DHS and OMB.
2. Business case analysis- How to recapitalize the USCG icebreaker fleet. This study is in progress.
3. Department of Homeland Security (DHS) Icebreaking Acquisition Analysis. This study is included in the 2012 President's Budget. If it is included in the enacted budget, DHS will reach out to all agencies to analyze all Federal icebreaking needs in Polar Regions.
4. The National Ocean Council is preparing Strategic Action Plans for the nine priority objectives identified in the Final Recommendations of the Interagency Ocean Policy Task Force. This effort is in progress and USCG and other agencies are assisting in the preparation of Strategic Action Plan #8, Changing Conditions in the Arctic.

Tues 1 March 2011- Westin Hotel

The workshop reconvened at 0800 with an initial goal to review the science questions which were developed on the first day. And then how to take these science questions and develop and create a Science Mission Requirements (SMR) table.

Translating Science Drivers into Science Mission Requirements

Annette DeSilva/UNOLS provided an extensive explanation of the UNOLS Science Mission Requirements, (SMR) process. This included the process, history, and the importance of setting priorities. See Power Point

General Discussion followed-

An open discussion followed with all workshop participants engaged. This was moderated by PRV Chair Rob Dunbar. Various issues were brought up that the PRV report needs to address.

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Dan Oliver/UAF offered that with the Sikuliaq, a lack of prioritization in the SMR's impacted us in the final design review. With extra work, the SMR was kept current in the design process and the final SMR document was updated. Maintaining a cap on the cost was an issue. With increased capabilities, the ship size grew, and costs increased.

Dan recommends bringing marine technicians into the process earlier.

General Comment on endurance- we need to be careful how we define endurance- it all depends on how much ice breaking we are doing. So it is hard to say for example, 50 days as it all depends on the ice coverage.

General Comment on stern ramp- Yes, it is useful on the Polar Stern.

Larry Lawver- we need to reach the larger audience to convince them why we need this ship, bring the issue home, i.e. what will sea level rise do to the Potomac River.

Jamie Austin-was concerned about developing SMR's at this time. We need to articulate why existing assets don't do what we need to do right now. What areas we can't reach now with the ships and tools we have. We need to stress the great things we have done in the past 20 plus years with what we have. Jamie was involved in the greatest hits document for ODP. We enlisted a science writer, after the Ch Sci's submitted the highlights of their research.

NSF held a panel last summer, 2010 on the research themes of the next ten years. Sea Level rise was on the top of the list. Rob, yes, this is going to be something we need to push on as a need.

General Comment: This ship will enhance national security as well as provide a vehicle for ground truthing satellite images.

Biodiversity and the gene pool in Antarctica . Needs to be investigated, very particular gene pool and a rich source for the planet-

Using geology to look back, need to understand the geology under the ice sheet which can be done by sampling in the near shore region. That way will help to understand the modern setting and its future.

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In this icebreaker we need the most flexibility to enable us to take advantage of the changing technology in the future

UNOLS operator versus commercial operator still needs to be in the report

Coast Guard heavy icebreaker is still needed in addition to the Polar Research Vessel

Deep Ocean Heat Content- Doug Martinson slide shows how ocean has heated in the past 50 years from 1955 to 2005.

Ice Class- how much ice needs to be broken and how many cruises per year will this happen.

Jim St. John reviewed ice classes again- see his Power Point

- PC Ice classes were developed with all international ice classification groups and then adopted through IMO.
- PC 5- medium first year ice, 2-4 feet. ABS-A2 now, year round ops
- PC 4- thick first year, 4-6 ft, year round ops
- PC 3 – 8 ft, upper and higher bounds

Your capability doesn't have to match your ice class; there are times when ice class is higher. IMO regs are changing and Dan Oliver and Jim St. John are good sources of information.

If heavy ice operations are a minimal component of your ship's profile, maybe it should be done as a two-ship operation to achieve access into those high ice areas.

FAQ- A section on Frequently Asked Questions needs to be at the end of report. For example, people say ice is going away, why do we need more icebreakers, we need to address that.

PC4 ice class-4.5 ft seems agreeable to all in the room-

Endurance- 80-90 days- Agreeable to all

McMurdo Break in- Agreeable that this ship would lose too much science if the McMurdo break in was part of it's mission.

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Use of outside contractor to do heavy work, but question was asked if these outside contractors exist. There is a cruise scheduled on Polar Star in January which hasn't been able to take place.

We need to be explicit in what geographic areas are still going to be problematic and that there are some science objectives we can't do.

PRV Report should be helpful to the CG report now being generated.

Community accepts contracting for higher capacity needs, which feeds into the CG Capabilities.

Operating Models- Our report recommends rethinking on which model to use, i.e., the University- UNOLS model or a commercial charter.

Moon Pool & AUV/ROV Handling Systems

We are proposing outside guidance on this issue.

Chris German- I think we should get Sweden and German input to this question.

Rob Dunbar- I think we all agree a moon pool of some size/type/spec will be needed on this PRV.

Performance issues- handling, motion criteria, cruising speed- should we consider going faster than the usual 12 kts.

Noise issue-

Azipods transfer noise into the water. We are still intent on reducing noise into the water.

Lester has reports on noise-

Helicopters- they are very expensive but important for certain missions.

Capt Mattias Peterson commented that helos can save lots of fuel.

Dale Chayes: There is a dimension we are not talking about and that is there is a force multiplier when having a helo on board.-

Jacquie Grebmeier: There are good safety aspects as well as an increase in measurements, i.e. during walrus tagging-

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Craig Smith: there isn't a penalty on the NBP to having helo capability.

What's next-?

PRV committee interim report is due in June. But we are the voice of the community, and need your input and compelling diagrams.

Rob: we need to fold in the PRV with the national research vessel needs. We need to do a better job to show we are organized as a community and this is not an us versus them. We need to reach out to COL and have them take this need to the Hill.

Jamie Austin- we need a timeline to this push-
We need to leave this room with one voice- but we all know that's not the way our community works, we all love controversy.

Kate Moran- This work we are doing now ties in well with all the studies going on right now. National Ocean Policy- Action plan on logistics is coming in the next 9 months. Rob will stay in touch with Kate-

Scott Borg/NSF provided the Closing Remarks-

Thank you to all who participated. This is a very important effort and we still need your help. We were challenged to articulate after the first ten years of the NBP as to what the science was that further justified the second ten year charter. We need to do this again, and we need to do our homework, by having workshops and meetings like this.

Things have changed in a few years, the review of the Antarctic program is going on and NSF/OPP is supportive of this.

Your voice is very important. It will be widely read-