

Raytheon
Polar Services

ANTARCTIC VESSEL OVERSIGHT COMMITTEE (ARVOC)

30 June 2010

United States Antarctic Program

**National Science Foundation
PRSS 0000373**

Executive Summary

Action Items:

ACTION:

Marine Manager, Dan Herlihy will put together a spreadsheet showing year-by-year statistics for the vessel use to help determine what is responsible for the overall drop in vessel requests. He will distribute this spreadsheet to ARVOC attendees.

ACTION:

Alex: will investigate the possibility of scheduling an NSF Town Meeting, or a lunch meeting, during the American Geophysical Union (AGU) meeting in December, to solicit community input on ways to increase vessel usage.

ACTION:

Marine Manager, Dan Herlihy will compile any amendments or additions to this document.

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Attendees			
John Anderson (T)	ARVOC	Tom Ellis	RPSC
Matthew Charette (T)	ARVOC	Jeanne Hill-Jurik	RPSC
Bruce Huber (T)	ARVOC	Skip Owen	RPSC (T)
Janet Sprintall (T)	ARVOC	Dave Nelson	RPSC
Sharon Stamerjohn (T)	ARVOC	Dan Herlihy	RPSC
Maria Vernet (T)	ARVOC	Bob Kluckhohn	RPSC
Jessie Crain (T)	NSF	Scott Walker	RPSC
Alex Isern (T)	NSF	Ethan Norris	RPSC
Lisa Clough (T)	NSF	Ross Hein	RPSC
Renee Crain (T)	NSF	Lindsay Powers	RPSC
Roberta Marinelli (T)	NSF	Rebecca Shoop	RPSC
Peter Milne (T)	NSF	Patricia Jackson	RPSC
Bob Farrel	RPSC	Bruce Felix	RPSC
Ken Navarro	RPSC	Chris Kenry	RPSC
Steve Kottemeier	RPSC	Skip Owen	RPSC

Table 1: ARVOC Attendees

I. Welcome/Introductions

ARVOC Chair, John Anderson, welcomed all to the teleconference and gave a brief overview of the day's agenda.

II. NSF Update: Jessie Crain (30 min)

Jessie Crain, NSF Research Support and Logistics Manager, thanked all attendees for taking the time to participate in the ARVOC meeting and gave the following updates on NSF-related issues:

- The NSF USAP contract with RPSC has been extended until April 2011. There is no news about a new contract award.
- Polly Penhale is currently the acting Manager of Environmental Health and Safety at NSF. The position is open.
- The applicant phase for a new Antarctic Infrastructure and Logistics (AIL) Oceans Project Manager has ended and the review of applicants has begun.
- NSF has been looking at acquiring a vessel from the UNOLS fleet to help with peninsula-area logistics and science support.
- The NBP charter ends in 2012 and talks have begun to determine if her charter should be extended, or if a different vessel can be found to replace her.
- Studies for a new Polar Research Vessel (PRV) have begun, and it seems likely that the NBP will be used in the interim.
- NSF OPP is looking at working more with UNOLS, possibly establishing a common tech pool, equipment exchange, etc.
- Budget News: The American Recovery and Reinvestment Act (ARRA) funds have helped with funding over the past few years but FY11 is not looking as good and FY12 could be dire. Budgets will be tighter going forward.
- USCG POLAR SEA problems: The vessel is currently in drydock. A recent article highlighting the vessel's engine troubles was filled with misinformation and was most likely the result of differing opinions within the Coast Guard about the vessel's future; some want it to go away, some want to keep it. The engine damage sustained by the vessel was not as bad as it was implied in the article.

McMurdo Station Break In

John Anderson raised the topic of the recent engine problems with the Coast Guard vessel, Polar Sea, and how that might affect future break ins at McMurdo Station. He also mentioned rumors that the Swedes may not commit the Oden to Antarctic work once their contract expires in 2012-13.

Jessie and Alex reiterated that a recent article highlighting the troubles of the Polar Sea was exaggerated, and that the problems with that vessel are not so dire. They also said the Oden contract will likely be extended, but that isn't definite. It was also noted that NSF will have to pay about \$1 Million to convert the Oden from burning heavy fuel.

Polar Research Vessel Update

The NBP will be 25 years old in 2012. The vessel will require major renovations to a ship that NSF does not own. NSF and RPSC are currently revisiting and revising all the data

that was acquired on the PRV project in the past. Ideally, the new vessel would be commissioned in 2019. NSF is currently establishing a project office and is gathering community input.

Discussion and conclusions:

NSF wants the new vessel to be considered a Polar vessel, not just an Antarctic vessel.

NSF will be prepared to address congress with this request and will do it in such a way that ECO will not be able to scuttle the request.

The design from two years ago will be revisited and reviewed by the Project Office to determine what is still useful and relevant from the initial study.

Members concurred that this was encouraging news and said they would be glad to help in any way to move the project forward.

Decrease in vessel usage:

NBP has had 200+ days at sea this year, but in recent years the number of sea days has plummeted. This drop will have to be accounted for and explained and might impact projected O&M costs for a new vessel. Possible reasons for this decrease were discussed and it was noted that UNOLS is also seeing drastically reduced requests. Partly it is due to a drop in funding but Alex believes it may be due to a perception is that vessels are not available, or that the funding isn't available. It was agreed that more study of the matter is needed so that NSF has an answer before they get asked.

ACTION:

Dan will put together a spreadsheet showing year-by-year statistics for the vessel use. This might help determine what is responsible for the overall drop in requests.

It was agreed that a meeting to discuss the PRV would be beneficial. John Anderson suggested soliciting community input at the AGU meeting in December.

ACTION:

Alex: will investigate the possibility of scheduling an NSF Town Meeting, or a lunch meeting, during the American Geophysical Union (AGU) meeting in December, to solicit community input on ways to increase vessel usage.

Vessel Business:

RVIB Rebid Project/Effort Update

RPSC Manager, Marine Science, Dan Herlihy gave an update on the RVIB rebid project. This will involve either a new contract for the NBP, or a contract for a new vessel to take the place of the NBP. Dan noted two constraining factors on finding a new vessel:

1. The need for a replacement vessel to have an ABS A2 Ice rating (there are not many A2 hull vessels available), and
2. The requirement that any new vessel be US-built or, if an existing/modified vessel is acquired, the requirement that it has been US flagged for at least three years, and that modifications have been done in the US, per the Jones Act).

Palmer Station Regional Research Vessel (PARV) Update

NSF has requested that RPSC look into the feasibility of acquiring an additional, regional research vessel to take some of the scheduling pressure off the LMG, and to expand scientific research in the peninsula area. Six possible UNOLS vessels have been suggested by NSF for consideration (see Appendix 1)

The needs and uses of the PARV were discussed (see Appendix 2) and it was noted that because the vessel will fall under the governance of Subchapter U of the Code of Federal Regulations, which states that all UNOLS vessels must be used for research and cannot be dedicated to resupply and logistics.

Concerns that were presented and discussed included:

- Need for a vessel able to operate in ice and extreme weather
- Staffing concerns (UNOLS or RPSC, high-latitude experience, working hours, underway equipment maintenance, opportunities for cross-training with USAP vessel techs, etc.)
- Berthing limitations
- How will the boat be supported? Will it be self-sufficient? Dependent on USAP vessels and/or Palmer Station? Will it have a warehouse, or dedicated space in a warehouse, to store items not in use?
- Length of the commitment/trial period
- Possible installation of underway data collection systems (pCO₂, ADCP, etc), and who would service these systems.

LMG Scheduling Efficiencies

John Anderson opened the discussion by asking if the demands on the LMG are such that the use of another vessel is merited?

Alex Isern explained that the decision came out of recent historical data on LMG usage. The vessel has been sailing both science and logistics cruises simultaneously, usually with berthing fully subscribed. Those things do impact science, and an additional vessel would relieve some of the pressure on the LMG. It would be especially useful for biology groups, since it would enable them to move beyond the boating limits of Palmer Station, but the new vessel would also be helpful with the installation of geological field camps.

Although it is not easy to quantify how much time and space another vessel might free up, the hope is that it would create a balance between efficiency and impact. It would also put into use a currently undersubscribed UNOLS vessel, which might otherwise be laid up.

Recent Major Equipment and System Upgrades

ARVOC members were provided a document (see Appendix 3) prior to the teleconference detailing the recent vessel equipment and system upgrades.

- Electronics Technician, Electronics Tech Supervisor, Bruce Felix briefed ARVOC attendees on electronics-related upgrades,
- Marine Tech Supervisor, Ross Hein briefed them on MT-related upgrades
- Vessel Lab Supervisor Ethan Norris briefed them on MST-related items.
- Manager, Vessel IT, Scott Walker briefed them on IT-related items

Summary of items discussed:

Fleet Broadband

Discussion was raised on the topic of when real-time Internet would come to the vessels. Scott Walker explained some of the difficulties involved, security being the main one since the NSF requires that RPSC continually do audits, and those audits eat into quota. Quota management is also a problem as there is no system in place to distribute that among PIs. There are only 2GB per cruise, and that could go quickly. There is no pay as you go option. Sharon Stammerjohn inquired if quotas include satellite image support. Scott said yes, but that satellite imagery was at a much-reduced cost in comparison to other data transfers.

Trace Metal Clean Rosette

In response to questions about the bottles for the TMC rosette, Ross Hein explained that PIs will be required to bring their own bottles, and that the cost for the bottles should come out of grant monies. The rosette will only accommodate 12 liter bottles.

Winch Systems

In response to questions about plans for updating/replacing the vessel winch systems, Ross explained that technicians from Markey winch made a trip to Punta Arenas during a port call last fall and inspected the winches on both ships. Their assessment was that the winches are in good overall working order, but that the metrox instrumentation on the

NBP needs to be replaced with a more modern system. An LCI-90 system was recommended as that would be consistent with current UNOLS upgrades.

Recommendation

Bruce Sidell would like ARVOC to advocate this upgrade for safety and for enabling new research in new areas.

ARVOC Future Recommendations

OYO-DAS / Seismic

John Anderson raised the question of whether or not there were plans to replace the OYO DAS for seismic, noting that although there are no pending multi-channel seismic operations, it might be advantageous to look into the possibility of leasing one from another institution. Bruce Felix noted that because there has not been much demand for seismic RPSC is losing the knowledge base for conducting it. Ross Hein echoed that fact, but noted that the mechanical side of RPSC seismic capability is still relatively good. Ross added UNOLS is also in danger of losing the seismic knowledge base and expressed hope that USAP and UNOLS could possibly cross-train on any upcoming seismic cruises.

Salinometers

Bruce Sidell commented that he likes the new salinometers and wondered if there were any plans to acquire more for back up. Ethan Norris said there is not currently a plan to acquire more but that he will take it into consideration.

Microscope Cameras

The need for an update on the shipboard microscope camera systems was discussed. Ethan Norris noted that there have been minor upgrades to the software and that he has looked at new camera systems, but camera systems able to withstand heavy vibrations are still cost-prohibitive. Maria Vernet stressed the need for a solution to this as some of the samples that are acquired at sea do not keep well until they can be examined at the home institution so it is important to have a good camera system onboard.

AUV and ROVs

Maria Vernet recommends acquiring some that are more suited to low latitudes. Bruce Sidell responded that the new fiber optic spool would probably help somewhat in that it will enable USAP scientists to do many of the things that are capable with AUVs and ROVs. It would be useful, for instance, with the Benthic Camera System and the SCUD. Ross Hein noted that when this topic has come up in the past, the consensus was that ROV systems are changing rapidly and that the scientists would need to drive what is needed. Alex Isern noted that it may be possible for USAP scientists to borrow AUVs and ROVs from other institutions but that it would not be cost-effective for the USAP to have its own. She recommended that if the PIs feel the assets are needed, they should request them in their proposal.

Satellite Systems

Questions were raised about the availability of satellite systems and how to request them. RPSC Remote Sensing Analyst, Andy Archer was summoned to the meeting to better explain the systems in use. He stated that Polar View and MODIS systems are available for navigation, and that vessel scientists can receive support from the Antarctic Geospatial Information Center (AGIC). Andy recommended that PIs contact AGIC PI, Paul Morin, prior to their cruise, for maps of the area(s) they plan to visit.

Helicopter and Skidoos

ARVOC members noted that helicopters and skidoos were made available for LARISSA and wondered if those items would be available to other PIs in the future.

NSF stated that they are open to requests for those items but would have to see how the requests fit into the ship's schedule and the aviation budget. Alex Isern suggested that those items are better discussed with an NSF representative before submitting them in a proposal.

LARISSA Knowledge/Planning Base

Bruce Huber and Sharon Stammerjohn both noted that much forward planning went into LARISSA and that much of that planning should be archived for use on future projects.

New Multibeam Sonar Policy

A draft policy regulating the use of the multibeam sonar system was distributed to ARVOC members (see Appendix 4). This policy was created to ensure that the multibeam is used for science, and that science is not impacted by demands for navigational support.

Discussion:

ARVOC questioned if there was a specific incident, or incidents, that provoked this policy. Vessel IT tech, Kathleen Gavahan explained that the bridge crew on the NBP has come to rely on the multibeam for navigational purposes. They used it extensively on the LARISSA cruise (NBP10-01). On the following cruise, there was not a multibeam technician on board and the bridge crew refused to go to some locations because multibeam maps of those areas were not available. RPSC is being asked to use scientific equipment for basic navigation, which should be the responsibility of the charterer. In summary, ECO is too reliant on RPSC/NSF for navigational sonar and maps that they are themselves contractually obligated to provide.

ARVOC members expressed concern that new PIs might be unaware that they may be denied access to certain areas if they have not requested multibeam support on their cruise and suggested that the POCs make sure new PIs are aware of that possibility.

All ARVOC members approved of the draft policy and ARVOC chair, John Anderson, wanted to stress that the document is fully supported by ARVOC

ACTION:

Any amendments or additions to the document should be sent to Dan Herlihy, who will compile the information.

Appendix 1: Palmer Station Regional Research Vessel Update for ARVOC

- NSF has offered up the possibility of utilizing a UNOLS regional class vessel seasonally based out of Palmer Station
- Six vessels have been suggested by NSF due to under-utilization within the UNOLS fleet. Some of these vessels are now being utilized in the Gulf in response to the BP oil spill. NSF has suggested that we focus on NSF owned vessels.
 - The R/V Cape Hatteras – Duke University
 - Length: 135'
 - Cruising speed: 10 knots
 - Range: 7000 nautical miles
 - Endurance: 25 days
 - Maximum science berths: 13
 - Ownership: NSF
 - The R/V Hugh R. Sharp – University of Delaware
 - Length: 146'
 - Cruising speed: 10-11 knots
 - Range: 3500 nautical miles @ 7 knots
 - Endurance: ~14 days
 - Maximum science berths: 14
 - Ownership: University of Delaware
 - The R/V Pelican – LUMCON
 - Length: 116'
 - Cruising speed: 7-8 knots
 - Range: 3490 nautical miles
 - Endurance: 18 days
 - Maximum science berths: 14
 - Ownership: LUMCON
 - The R/V New Horizon – Scripps Institute of Oceanography
 - Length: 170'
 - Cruising speed: 10 knots
 - Range: 9,600 nautical miles
 - Endurance: 40 days
 - Maximum science berths: 17
 - Ownership: SIO
 - The R/V Robert Gordon Sproul - Scripps Institute of Oceanography
 - Length: 125'
 - Cruising speed: 9 knots
 - Range: 4300 nautical miles
 - Endurance: 14 days
 - Maximum science berths: 12
 - Ownership: SIO

- The R/V Point Sur – Moss Landing Marine Lab
 - Length: 135'
 - Cruising speed: 9.5 knots
 - Range: 6,800 nautical miles
 - Endurance: 21 days
 - Maximum science berths: 10
 - Ownership: NSF

 - Potential uses of this type of vessel include:
 - Local fishing
 - Local diving
 - Support of regional scientific monitoring equipment e.g. weather stations, GPS stations, permafrost stations, VLF antennae
 - Deploying and recovering Automated Underwater Vehicles (AUVs)
 - Supporting work outside of the boating limit area
 - Put-in and take-out of field camps along the Peninsula
 - Medevac to Frei Base
 - Facilitation of increased international collaborations with other regional bases
 - Expansion of existing and planned science

 - Concerns identified by RPSC
 - Preferably minimally ice classed
 - Must have ice and blue –water experienced crew
 - Capacity to support expected science
 - The vessel must use a fuel compatible with the station/fleet
 - Staffing issues involved with UNOLS vessels. How would the vessel be staffed? UNOLS vessel staffing regulations are institution dependent. The crew must be able to operate 24 hours which reduces space for science.
 - 10 + Berthing spaces for science
-

Appendix 2: Polar Research Vessel: Past Planning and Future Steps

Polar Research Vessel
Past planning and future steps

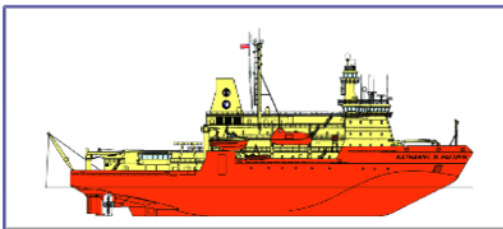


OPP Office Advisory Committee
May 2010

Nathaniel B. Palmer An Essential Polar Research Asset

NBP Success Stories

- Two-vessel cruise with IB ODEN - Amundsen Sea multidisciplinary oceanography
- Western Arctic Shelf-Basin Interaction - physical and biogeochemical processes that link the arctic shelves
- SHALDRIL I and II -Paleo-evolution of the Antarctic margin in the Ross Sea
- LARISSA - interdisciplinary approach to understanding abrupt environmental change in the Larsen Ice Shelf System
- Pine Island Glacier seafloor and water column property mapping with Autosub
- Collection of seafloor bathymetry data critical to many areas of research
- Multi-platform oceanographic data collection increased understanding of the influence of ocean circulation on ice-sheet evolution



Polar Research Vessel

- At the end of the current charter the NBP will be 20 years old
- Appropriate time to review science requirements for the coming decades
- Build on work completed as part of the "New Generation Polar Research Vessel" Study

"Science at Sea" NRC 2009

"The need for coordination between the high latitude oceanographic research supported by NSF OPP and that supported by NSF GEO and other agencies is likely to increase as a result of the growing interest in high latitude research requiring icebreaker or ice-strengthened capabilities."

"This includes research such as the role of sea ice loss in climate change and exploration of polar marine ecosystems, which are national ocean research priorities outlined in the Ocean Research Priorities Plan"



PRV Study (2002-2006)

Over 270 individuals were involved in the PRV effort

- Two Workshops – Requirements for Southern Ocean Science
- U.S. Maritime Administration and Science Technology Corporation contracted to explore vessel designs
- ARVOC Created a 15-member Committee to assist design process
- ARVOC hosted Town Hall meetings
- ARVOC surveyed the community for input on science requirements

PRV Design Study Documents

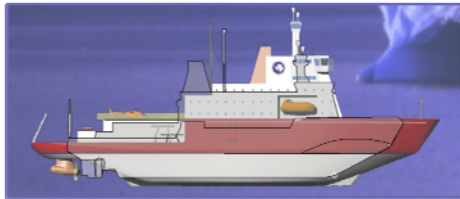
<http://www.usap.gov/usapgov/vesselScienceAndOperations/PRVSection.cfm>



PRV Study (2002-2006)

Science Themes

- Understanding Antarctica's role in global change: year-round access to the ice sheet margin
- Past history of the ice sheets: drilling sedimentary archives
- Food web and ecosystems of the Southern Ocean



Science Requirements

- Enhanced ice breaking capabilities (4.5 feet same as USCG Healy)
- Increased endurance (to 80 days)
- Increased accommodation and lab space (50 scientists)
- Moon pool for drilling and access to the water column (no ice, limited surge and turbulence)
- Ability to tow during ice-breaking
- Acoustically quiet
- Capability to conduct autonomous underwater
- AUV/ROV Operations
- Jumbo piston coring (50m)
- Reduced emissions from diesel engines and incinerator; "greener" ship. Greater fuel efficiency.

Future Planning



- Work with the research community to update the existing PRV feasibility study
- Construct a new PRV using MREFC funding

	2010	2011	2012	2013	2014	2015	2016	2017	2018
Current NBP charter	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Proposed NBP charter renewal									
Conceptual Design Phase									
Community planning/development of conceptual design	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Conceptual Design Review			1						
Readiness Stage									
Vessel design				1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Integrated Baseline Review							1		
NSF Approves Submission to NSB							1		
Construction Phase									
Final Design Review							1		
Construction of Vessel								1 2 3 4	1 2 3 4
Commissioning, Testing and Acceptance									1



Appendix 3: Recent Major Equipment & System Upgrades

No.	Department	Item	Description
1	Marine Tech	New Markey Trace Metal Winch	Continues under construction at Markey in Seattle; expect delivery and installation on board NBP in time for NBP10-05 PUQ departure 12/10.
2	Marine Tech	New 10,000-meter 0.680 Hybrid EM/Fiber Oceanographic Cable	Currently on hand in PUQ; preparations being made to support spooling it on the NBP's DUSH9-11 winch.
3	Marine Tech	New 12-L Ocean Test "Improved" Niskin Bottles	CTD bottle standardization complete with both vessels now carrying 24 front line 12-liter Ocean Test "improved" Niskin Bottles with Teflon-coated springs.
4	Marine Tech	New Ocean Instruments BX-650 Box Corer	New replacement box corer field tested and proven to fit existing inventory spares; requested customization performed well on LARISSA cruise with a "snow shoe" addition demonstrating successful sampling in very soupy sediments.
5	Marine Tech	Jumbo Piston Corer Improvements	Field tested on LARISSA cruise with high success; powder coated barrel resulted in increased seabed penetration with reduced pullout tensions increasing both safety and science efficiency; o-ring sealed liner sections performed well preserving the piston's "hydraulic grip" on the sediments while also preventing mud from escaping at the joint sections and filling the space between the liner and barrel.
6	Marine Tech	Twelve (12) New Fishing Pots	Added to replace worn pots currently in inventory.
7	Marine Tech	Otter & Blake Trawl Nets	USAP-standard 18-foot Otter trawls and Blake trawl nets continue to fish well aboard both vessels.
8	Electronics Tech	New Kongsberg-Simrad Seapath 330 3D GPS	Currently in progress replacement of the LMG's old, unsupported Ashtech system to bring it up to the same standards as the NBP; system to be installed, surveyed in (Motion Reference Unit) and commissioned prior to start of LMG10-06 (09/10).
9	Electronics Tech	Refurbished SCUD Towed Camera System w/ Digital Video Recorder	New camera and LED flood lights installed and successfully deployed operationally during LMG10-04 cruise.
10	Electronics Tech	New Hybrid EM/Fiber Slip Ring, Transceivers, Fusion Splicer & Optical Time Domain Reflectometer	Required to install, maintain and repair new 10,000-meter 0.680 hybrid EM/fiber oceanographic cable to be installed in the NBP's DUSH9-11 winch.
11	Electronics Tech	New Complete MOC-1 System + Full Suite of MOCNESS Electronic Spares	Multiple Opening/Closing Net with Environmental Sensing System
12	Electronics Tech	New Seabird SEACAT 19+ Profiler	Portable CTD
13	Electronics Tech	INMARSAT Fleet Broadband Installations on LMG and NBP	Enhanced satellite communications provide significantly increased e-mail connectivity (every 30 minutes on average).
14	Electronics Tech	Kongsberg-Simrad Hydrographic Workstation (HWS) and Seafloor Information System (SIS) software for EM-120 Multibeam Sonar System	Replaces previous obsolete and unsupported HWS and Merlin software for operation of EM-120 multibeam sonar system.

No.	Department	Item	Description
15	Electronics Tech	Caris HIPS / SIPS Professional Hydrographic and Sonar Data Processing System	New multibeam sonar processing software to complement MB-System and GMT.
16	Electronics Tech	Two (2) New WET Labs ECO Fluorometers	For added use on CTDs.
17	Electronics Tech	Two (2) New Benthos 916A Altimeters	For use on CTD rosettes to track distance off the bottom.
18	Electronics Tech	New MK21 USB XBT System	For the NBP
19	Electronics Tech	New SIMRAD EK-500 Echoview Software	For more efficiently recording and displaying SIMRAD EK-500 Bioacoustic Sonar Data on the NBP.
20	Electronics Tech	Two (2) New 2KVA Solid State Frequency Converters	For supplying Euro power on the LMG and/or NBP, or U.S. power on the ODEN.
21	Marine Science Tech	Two (2) Guildline Portasal 8410's	Used to precisely measure the salinity of water samples; one unit each for the NBP and LMG.
22	Marine Science Tech	Allegra X22-R Refrigerated Centrifuge	Maximum RPM 15,500; sample size range 1.5- 250mL with appropriate rotor.
23	Marine Science Tech	Eppendorf 5417R Refrigerated Centrifuge	Maximum RPM 16,400; sample size range 1.5- 2mL with appropriate rotor.
24	Marine Science Tech	Aqua Solutions Reverse Osmosis/ De-Ionized Water System	Replacing broken Barnstead E-Pur water system on the NBP in the aft dry lab.
25	Marine Science Tech	Satlantic FIRE (Fluorescence Induction and Relaxation Fluorometer)	For measuring Chlorophyll A&B; second system for the USAP due to its heavy request load.
26	Marine Science Tech	Four (4) Scott SCBAs and Additional Spare Tanks	For responding to hazardous material spills; replacing old units which could no longer be certified.
21	Marine Science Tech	Two (2) Guildline Portasal 8410's	Used to precisely measure the salinity of water samples; one unit each for the NBP and LMG.

Table 2: Recent Major Equipment & System Upgrades

Appendix 4: Draft Multibeam Policy



UNITED STATES ANTARCTIC PROGRAM

RVIB NATHANIEL B PALMER Multibeam Operations Policy

USAP POLICY #: AIL-XX-X
Effective Date:
September 15th, 2010

I. PURPOSE

Establish a uniform policy for the operation of the *R/VIB NATHANIEL B PALMER (NBP)* research Kongsberg EM 120 multibeam sonar (MB).

Define the limitations of operation when un-funded or un-planned operation is requested.

Define the roles and responsibilities of the cruise participants (grantees, contractor personnel and vessel deck officers).

II. SCOPE

This policy applies to all activities and operation of the Kongsberg EM 120 multibeam sonar. It addresses disallowed uses, planned and unplanned multibeam operations.

III. BACKGROUND

The Kongsberg EM 120 multibeam sonar collects data for scientific research which has been approved and funded by the National Science Foundation Office of Polar Programs. The Kongsberg EM 120 multibeam sonar on the NBP is a research tool and is not a navigational tool.

IV. ROLES AND RESPONSIBILITIES

- Chief Scientist. The chief scientist understands all science project goals and requirements and represents the project PIs assigned to the cruise. The chief scientist is the co-arbiter of conflicting requirements and the final decision-maker on behalf of the PIs.

- Marine Projects Coordinator (MPC). The MPC understands science project logistics and vessel operational needs and limitations, and both represents and supervises onboard contract staff. The MPC is the co-arbiter of conflicting requirements and the final decision-maker on behalf of RPSC onboard staff and RPSC generally.
- Marine Manager. The marine manager is responsible for discussions between RPSC Denver office, ECO, and NSF.
- Vessel Captain. The vessel captain is responsible for vessel operations including safety, adherence to regulations and managing ECO crew. The captain will review cruise tracks provided during the planning process and provide comments on accessibility.
- Marine science cruise planner. The cruise planner works with science grantees on all science projects assigned to the cruise. With project PIs, planners identify cruise tracks for submission to ECO for comments on accessibility. The Marine Cruise planner will work with the grantees and MB support staff during the planning stages to identify all multibeam requirements for the Kongsberg EM 120 multibeam sonar.
- Principal Investigator. The PI for each science project assigned to the cruise will work with the chief scientist and cruise planner to identify cruise tracks, science goals and operational requirements to fulfill the science goals.

V. POLICY

All operations of the EM120 shall be at the discretion of the Chief Scientist.

Planned Multibeam Operation

Multibeam operation, calibration, data logging, data editing, and mapping will be planned and outlined in the Research Support Plan (RSP), cruise synopsis, concept of operations, and/or other documents that outline support to be provided and science operations to be conducted during the cruise. Early identification of the multibeam requirements ensures the necessary allocation of resources required for successful multibeam operations.

Data collection, use and distribution

1. Deck officers, contractor staff, and grantees on the vessel shall fully recognize the Chief Scientist's proprietary rights to new data for two years or longer as managed by NSF guidelines. Any use of cruise data (multibeam data included) during the proprietary holding period is at the discretion of the chief scientist who collected the data and the NSF OPP.
2. Grantees must provide any previously collected data they wish to use to supplement the multibeam data collected on the current cruise. There should be no expectation that previously collected data will be on board the NBP. If previously collected data exists on the NBP, the multibeam technician (MBT) may make archived vessel data available for reference if that data has been released by the collecting PI and the data is clear of any other restriction or QA/QC concerns.
3. When practical, it shall be standard practice by the vessel to navigate near the edge of known transit lines in an effort to increase the NBP multibeam data set. This practice is the best known way to expand knowledge of the Antarctic bottom topography.

4. The Kongsberg EM 120 multibeam sonar requires frequent monitoring to ensure optimal data quality. The MBT will provide training in basic multibeam operation to the grantees and the grantees will monitor multibeam operations.
5. Grantees will be responsible for editing the data. The MBT will provide training and will check the edited data to the grantee specified level of quality. The editing and quality checks require 48 hours after GMT midnight of the day the data was collected. The fully edited data becomes available at that time.
6. Any multibeam data recorded to hard disk or collected to other permanent storage at any time during the current science cruise must be distributed to the Marine Geophysical Data System (MGDS). The standard cruise data distribution includes:
 - a. 3 copies for the science team
 - b. 1 copy for the contractor's home office
 - c. 1 copy for the NBP
 - d. 1 copy for archive at MGDS
7. A multibeam cruise report is completed at the end of the cruise and typically includes a cruise track plot; work area plots; a description of the multibeam data collection, format and processing, and information about the data distribution.

Unplanned Multibeam Operation

Use of the Kongsberg EM 120 multibeam sonar that has not followed the full planning process must meet the following conditions:

1. Unplanned use must be requested by chief scientist and approved by the NSF ANT Program Manager, NSF Antarctic Infrastructure and Logistics (AIL) Research Support Manager and the NSF's Manager, Technology Development, AIL. The request should be coordinated with the Marine Manager and Marine Project Coordinator (MPC).
2. Startup and operational management of the system will be conducted by trained contractor staff embarked on the vessel. The MB operation shall be secondary to their primary job (i.e. network administration). If trained staff is not onboard, the multibeam will not be turned on.
3. The grantee team must provide personnel who shall be trained in the most basic Kongsberg EM 120 multibeam sonar operations. Those personnel will be responsible for monitoring the system during normal use. The MBT will guide and monitor grantee teams' operation of the equipment.
4. All MB operation requests will be forwarded to the MPC 24 hours in advance of the operation for review, discussion with the Chief Scientist, and assignment to the MBT.
5. Editing, gridding and mapping, or other processing of current or previously collected multibeam data is time consuming and cannot be done during the cruise. Data can be collected but all processing is the responsibility of the PI post cruise. This restriction includes grids and images loaded into the real-time display.
6. Calibration of the system requires sound velocity profiles obtained from XBTs or CTDs. XBTs may not be available depending on previous or future MB operations for that season.

- a. If XBTs are available sound velocity profiles may be generated but only on a non-interference basis with the planned science object and/or the MBT primary responsibilities.
 - b. If XBTs are not available and CTDs are not being performed, the sound velocity profile will be set for 1500m/sec.
7. Any multibeam data recorded to hard disk or collected to other permanent storage at any time during the current science cruise must be distributed to the MGDS.
 8. The multibeam data distribution will only be available after the port call following the cruise via U.S. mail or similar means.

Disallowed Uses

Data shall not be collected specifically for navigation or as a substitute for navigational charts of Antarctic waters.

1. The NBP officers are welcome to review real time multibeam data and update bridge charts with positioning of known features and depths of those features. Whenever possible, multibeam data will be displayed to the bridge. However, the accuracy and availability of the multibeam data provided to the bridge is not guaranteed and may not be available for a variety of reasons, including but not limited to, maintenance, science review, and operational activities.
2. The vessel shall navigate known waters using commercial charts and navigation equipment. These may be augmented by previously collected multibeam data with the understanding from the bridge that the multibeam data was not collected for navigation purposes and may not be accurate.

VI. IMPLEMENTATION

This written policy will be distributed to NSF, ARVOC, marine science principal investigators, prime contractor staff (both full-time and contract) and other relevant parties. When applicable, it will be referred to by cruise documentation such as cruise synopses and sailing plans.

VII. ADJUDICATION

Problems or issues arising from a cruise participant not adhering to this policy during deployment will be addressed by the MPC, the Marine Manager, and the NSF. Problems arising following deployment will be addressed by the Marine Manager and the NSF.

VIII. EFFECTIVE DATE

This Policy shall become effective September 15th, 2010.