Research Support Plan
B-006-N, George Watters
NBP14-07

U.S. AMLR Program

Timothy McGovern, NSF-PLR, Ocean Projects Manager

2014 Marine-Based Project

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Change Management and Tracking

This table documents and tracks major changes that develop following RSP distribution.

Date	Description
July 1, 2014	Draft RSP issued to PI for concurrence
July 14, 2014	Additions/Changes made between Draft and Final
July 23, 2014	Final concurred RSP distributed

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COMPREHENSIVE RESEARCH SUPPORT INFORMATION

Purpose

This document summarizes and provides information about the resources allocated to the subject NSF-PLR award for the upcoming field season.

The support details have been developed in consultation with the Principal Investigator (PI), National Science Foundation (NSF), and Antarctic Support Contractor (ASC), and are based on the support levels approved in the Operational Notice for the award, and the specific seasonal needs as indicated in the 2014-15 season Support Information Package (SIP).

This document should be reviewed with all field team members. Any discrepancies should be presented to the ASC project point of contact (POC) prior to deployment to Antarctica.

Project Overview

During austral winter of 2014 the U.S. AMLR program will conduct a quantitative survey of the pelagic ecosystem in the vicinity of Elephant Island (Figure 1). The survey will be similar to the 25-year time series of bio-acoustic and net surveys of krill previously conducted by the U.S. AMLR Program.

There are scientific advantages to conducting krill and ecosystem surveys during the austral winter, and, given present budgets, these advantages can ultimately offset the proximate impacts of interrupting the U.S. AMLR Program's 20+ year series of observations during the austral summer. The ecological importance of winter processes is well recognized but has largely been inferred from data collected during the austral summer rather than observations made directly during the winter.

For example, correlations between the proportions of small krill in standard net hauls made during the austral summer and sea-ice extent observed (by satellites) during the preceding winter suggest that recruitment of krill is determined in winter. Similarly, low recaptures of philopatric penguins that are observed as first-time breeders during the austral summer and were banded as chicks suggest that winter processes also determine cohort strength for these birds. Winter surveys thus provide an opportunity to collect data during a season that establishes a template for ecological success in the subsequent summer and influences production at all trophic levels. Furthermore, the commercial krill fishery is now predominantly a winter fishery, and, therefore, winter surveys offer the opportunity to collect fishery-independent data during the period when most krill are caught. Despite the importance of winter processes, we know of no other national Antarctic program that has made a long-term commitment to observe the marine ecosystem during this season. The U.S. AMLR Program is uniquely situated to fill this critical gap.

Cruise Overview

30 days of ship-based fieldwork will make use of technologies aboard the RV/IB Nathaniel B. Palmer. (See Figure 1). Vessel-based sampling equipment and ice-based dynamics will be deployed.

NBP14-07 Cruise dates: August 19 – September 18, 2014

- Conduct a bio-acoustic, oceanographic and net-based krill survey in the vicinity of the South Shetland Islands to map meso-scale features of water mass structure, phytoplankton biomass and productivity, zooplankton constituents, and the dispersion and population demography of krill.
- Calibrate shipboard acoustic system at Admiralty Bay (or other suitable anchorage) prior to conducting the large scale survey.
- Collect continuous measurements of ship's position, sea surface temperature, salinity, turbidity, fluorescence, air temperature, barometric pressure, relative humidity, and wind speed and direction, and other standard data. NO ADCP DATA WILL BE COLLECTED.
- Collect underway observations of seabirds and marine mammals and ice conditions.
- Deploy drifter buoys (20). Five drifters will be deployed on southbound transit at 0.5 degree increments of latitude, beginning at the EEZ of Chile Argentina. Similarly, five drifters will be deployed on northbound transits at the same spatial scale. The remaining drifters will be deployed at the discretion of the Chief Scientist to provide data on the surface circulation during the austral winter cruise.
- XBTs will be deployed at a spatial scale to be determined by the Chief Scientist after examining satellite data immediately prior to the cruise. It is anticipated that the spatial scale will be approximately every 15km during each crossing, and occasionally throughout the cruise to provide additional hydrographic data for analysis regarding the structure of the ecosystem.
- At each of the 100 or so stations that will be sampled, a CTD will be deployed to 750m, and bottles will be tripped at 11 depths. At open water stations a IKMT net tow will be made to 650 or 170m, respectively. The USAP towed camera system being used to look for epi-benthic krill. At ice covered stations, only an IKMT net tow will be made to 170m. Ice coring will be conducted at each ice station that can support placing researchers on the ice. At each ice station, five cores will be taken from approximately 100m from the ship.

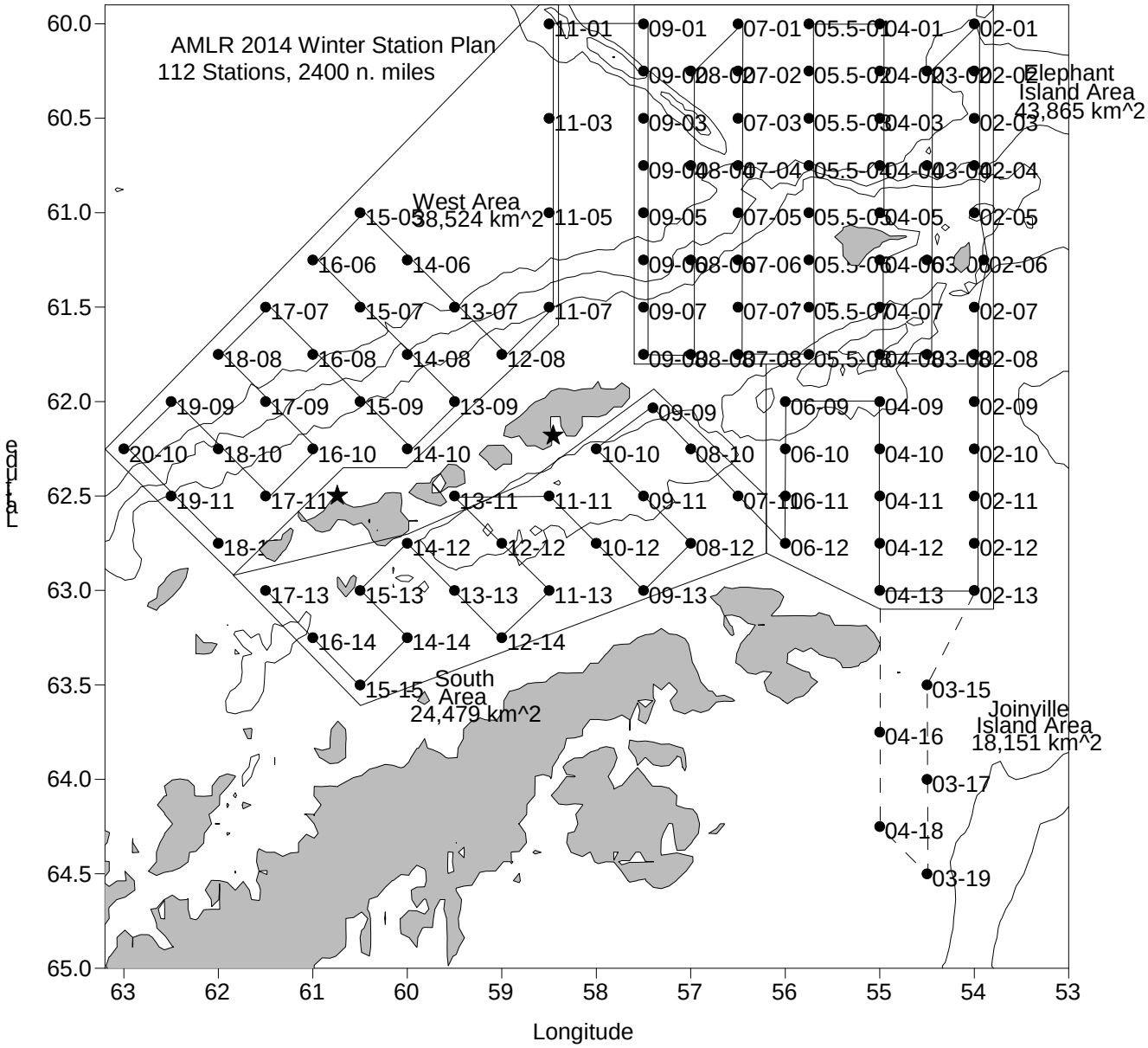

Figure 1: NBP14-07 AMLR 2014 Winter station plan: Black dots indicate station locations; heavy lines indicate transects between stations; thin lines outline stratum; stars indicate locations of Cape Shirreff and Copacabana field camps; depth contours are 1000, 2000, and 3000 m. Surveys will be conducted in the following order: West Area, then Elephant Island Area, then Joinville Island Area, then stations in northwest Weddell Sea (if ice conditions permit), then South Area.

Science Sampling Efforts

Operations

South Shetland Survey (Figure 1). Each leg will consist of a survey of ~112 CTD and net-sampling stations (time and weather permitting), along approximately 2400 n. miles of acoustic transects. Operations will be conducted 24 hours per day (~ 6 stations per day); desired transect speed between stations will be 10 knots, depending on sea state. The survey will be conducted in this order (after calibration) depending on sea state: Elephant Island Area then West Area, then Joinville Island Area, then stations in northwest Weddell Sea if ice conditions permit, then South Area.

A) Acoustic transects. Active acoustic data will be collected continuously using Simrad ES60 echo sounder and hull-mounted transducers (38, 120 and 200 kHz). Data will be logged and processed by computers located in the Computer Room. Continuous supply of vessel position and speed data from the ship's GPS receiver will be required for the EK60system in the Computer Room.

B) CTD operations. CTD casts will be conducted to 750m or 10 m from the bottom using a Seabird SBE-9/11 CTD instrument, dissolved oxygen sensor, carousel, altimeter, fluorometers, light sensors, Niskin bottles and stand. Water samples (11 depths per cast) will be obtained at a series of standard depths.

C) Net sampling operations. During the survey a standard 2 m IKMT fitted with 505-micron mesh net will be used to sample zooplankton and micronekton (including krill). The ship will supply a deck cable terminating in the Computer Room to terminate the AMLR program provided TDR to be attached to the IKMT net.

Primary sample processing for the will be conducted in laboratory compartments within the ship. Antarctic krill (*Euphausia superba*) will be separated from the catch and enumerated; salps (*Salpa thompsoni*) will be separated, counted and morphometric measurements collected from a sub-sample of the catch; other adult and larval euphausiids, ichthyoplankton, and zooplankton material will be identified, counted and preserved. Sub-samples of *E. superba* from each tow will be processed in the onboard laboratory space to determine length distribution of krill, weight, and maturity stage, molt stage, sex ratio, reproductive condition, and gut fullness.

D) Phytoplankton / bacterioplankton operations: At every CTD station, water will be sampled for chlorophyll / bacterioplankton / nutrients and other variables. Samples will be collected at all depths in which Niskin bottles are fired, between 5 and 750 meters. In many cases multiple bottles will be tripped to ensure sufficient water is available for all the different research goals. The PRR will be deployed once a day.

E) XBT operations: XBT and or XCTD probes will be deployed to collect hydrographic data to depths of up to 750 meters, during the Drake Passage transits and at other times during the cruise. The expendable probes are launched from the stern of the ship while underway along a high density line, every 15km, from the polar front (58 degrees South) to the South Shetland Islands during southward transits. On northward transits of the Drake Passage, we will repeat similar deployments. Opportunistic sampling will be conducted between the Shackleton Ridge and Elephant Island, across the Bransfield Strait and along certain AMLR transects at 4km intervals.

F) Ice coring and sampling – Within the (loose) pack ice, and where the Captain deems ice and weather conditions are suitable, a team of 4-6 people will be deployed by zodiac boat to sample ice floes in the region determined for sampling by the field team and MPC. The sampling design is aimed to cover needed replication so will aim to sample three floes per station and collect 3 cores per flow. The team will also collect environmental data, snow thickness, ice depth, and if possible take pictures under the floe with a digital video camera. The cores will be sectioned and stored in washed and sterilized buckets for melting on board the ship. The frequency of sampling will largely be determined by sea ice conditions and time available, though we anticipate sampling at a minimum of three stations and a maximum of eight. (Approximately 3 afternoons of shiptime).

Acoustic system calibration. Prior to the AMLR survey the ship will anchor in approximately 25 fathoms of water in a TBD location in either Chilean or Antarctic waters to conduct the calibration. **Ship's**

personnel will be required to run a weighted transfer line under the hull before deploying the anchor. The scientific party will supply all additional hardware and cables required for calibration. Historically, the best and most efficient calibration occurs with propellers disengaged from the shafts so that they do not turn.

Deploying drifters: Drifters will be deployed from the ship. Drifters will be released on three of the four transits between the SSI region and Punta Arenas, south of 58S. Additional drifters will be deployed in the Elephant Island region, in the Weddell, and along transits to the South Orkney Islands, as dictated by the chief scientist.

Seabird and marine mammal observation. Seabird and marine mammal observations will be made from one of the bridge wings or inside the pilot house during inclement weather along transects between stations and during the transits to and from Punta Arenas. Access to GPS position data and electrical power inside the pilot house will be required for a laptop computer.

Outstanding Issues

The US AMLR Program would like to calibrate the EK60 acoustics system during the cruise. The location for this calibration is still pending Chilean and NSF approval.

This will require down-riggers (NOAA will supply) and to have the ship anchored with engines disengaged. The NBP crew will have to run a weighted line under the bow of the ship before calibrating so one of the down-rigger lines can be pulled across to the other side. During the port call a dry run of the calibration setup will take place with ASC, ECO and NOAA staff.

Zodiacs may need to be deployed during calibration efforts to ensure that ice does not interfere with the calibration operation.

Please see the NOAA calibration instruction at the end of the Appendix Section.

Port Call Activities

Marine Lab Technicians

- Prep NBP Lab spaces for grantees
- Set up of microscopes and cameras together with microscope tech in labs or microscopy room on the 01 deck
- Need H20 filtration system in Bio and Hydro labs
- Assist with grantee lab equipment set up
- Verify which centrifuge and rotors are needed.
- Prepare lab refrigerators and freezers (-80C freezer; a refrigerator 4C, and a -20C freezer)
- Locate, inventory and prepare compressed gases
- Prepare and load 2- 50L Dewar
- Begin operation of Liquid Nitrogen plant
- Provide 1-CGA 580 gas regulator for NOAA UHP Nitrogen
- Verify quantity and onload sample packing material (inner sample boxes, UN boxes)
- Verify quantity and onload waste drums and materials
- Verify all science material has been onloaded
- Stow and inventory all chemicals coming onboard
- Assist grantees spectrophotometer in Bio Lab

- Assist grantees with fluorometer setup in Bio Lab
- Setup Portasal for NOAA technician
- Provide 1 50L plastic carboy
- Provide clean HDPE bin (maybe 18x18x12inches) that can be used for NOAA to soak their bottles in a 10%HCL bath for nutrients
- Prepare Big Antarctica for bacterioplankton sampling and set temp at 0C

Marine Technicians

- Load two Zodiac Mark Vs with outboards, two 55 gallons drums fuel and secure for cruise
- Secure all the science sampling equipment on deck for transit south
- Load LN2 Plant
- Setup XBT launcher and assist NOAA staff with launches
- Load wooden sorting table
- Load 10 foot blue MT van to back deck port side quarter TCN 3866-W632
- Load NOAA IKMT nets and depressors to be delivered by AGUNSA
- Load banana Sled borrowed from Cara Ferrier

Electronics Technicians

- Build up standard CTD
- Assist grantees with setting up of calibration gear for EK60
- Build up the Yo Yo camera system
- Terminate the NOAA provided TDR to the .680 EM cable for use on the IKMT net system
- Provide vessel GPS feed to NOAA laptop for the bird and mammal observes on the bridge

Information Technicians

- Set up XBT deployment and data download
- Set up special e-mail account for satellite imagery (suggested e-mail address: images@nbp.usap.gov)
- Set up dedicated e-mail accounts for participants
- Assist NOAA staff with computer setup in NBP labs and work spaces

Local PA supplies from stocked ASC warehouse inventory

- None the AMLR Program is providing all the cruise supplies and chemicals

Note All shore calls to foreign bases must have NSF approval prior to arrival. All visits to shore or other recreational activities outside of approved research is prohibited, please review any plans with the MPC and the ASC Marine Area Manager before allowing any such activity.

Participant Information

Grantee and Support Personnel and Organization

Per contract with NSF/PLR, Antarctic Support Contract (ASC) provides broad planning and operational support for all research projects in Antarctica. Your POC will ensure that all of the various science and logistical objectives are met and will facilitate communications between the science and support parties on the ship.

The fact that the various parties (scientists, ASC, and Edison Chouest Offshore Company – ECO) have varied but overlapping interests and responsibilities means that many cruise decisions will require discussions and general consensus among all these parties. In the event that no such consensus is reached, the NSF may be asked for direction.

The Marine Projects Coordinator (MPC) will organize post-cruise activities and will work closely with the staff in Punta Arenas.

PQ and Travel Status

It is the PI's responsibility to ensure that all dental, medical and travel processing requirements are addressed in a timely manner through the NOAA program regulations. Participants' medical and dental exam results should already be submitted to NOAA to ensure that physically qualified (PQ) status is obtained in time for deployment.

The following participants are deploying for this project:

Ships Complement Grantees and Science Support

Name	Self-Ticketing	Participant Description	Institution	Citizenship
Anthony Cossio	Yes	Scientist	SWFSC	US
Christian Reiss	Yes	Scientist, Chief	SWFSC	US
Christopher Jones	Yes	Scientist	SWFSC	US
Kimberly Dietrich	Yes	Scientist	SWFSC	US
Ryan Driscoll	Yes	Scientist	SWFSC	US
Kate Richerson	Yes	Scientist	SWFSC	US
Rachel Pound	Yes	Scientist	SWFSC	US
Jarrod Santora	Yes	Scientist	SWFSC	US
Abe Borker	Yes	Scientist	SWFSC	US
Elliot Weiss	Yes	Scientist	SWFSC	US
Jennifer Walsh	Yes	Scientist	SWFSC	US
Monika Krach	Yes	Scientist	SWFSC	US
Elena Perez	Yes	Scientist	SWFSC	US
Adrian Dahood	Yes	Scientist	SWFSC	US
Clifford Hoang	Yes	Scientist	SWFSC	US
Paola Reinoso	Yes	Scientist	SWFSC	Chile
Sara Thomas	Yes	Scientist	SWFSC	US

Name	Self-Ticketing	Participant Description	Institution	Citizenship
Emilio Riginella	Yes	Scientist	ISMAR	Italy
Mario La Mesa	Yes	Scientist	ISMAR	Italy
Javier Arata	Yes	Scientist	INACH	Chile
Patricia Ayon Dejo	Yes	Scientist	IMARPE	Peru
Evelyn Paredes Coral	Yes	Scientist	IMARPE	Peru
Philippe Pernet	No	Scientist	DRI	Belgium
Carla Gimpel	No	Scientist	U of Hawaii	Chile

Vessel Science Support Staff

ASC Vessel Staff	Vessel Tech Group
Ken Vicknair	MPC
Tom Sigmund	MT Lead
Matt Ulsh	MT
John Betz,	MST Lead
Barry Bjork	ET Lead
Sheldon Blackman	ET
Sean Drabant	IT Lead
David Cohn	IT

Permits

It is the responsibility of the PI to obtain any necessary permits prior to deployment to Antarctica. If there are plans for collecting any samples that are not noted in the Samples section below, contact the cruise POC, who can provide the necessary application forms. Similarly, if unplanned samples are collected opportunistically during the cruise, cruise participants must inquire with the MPC about getting new permits or amending existing permits.

Please see copies of your project's permits in Appendix.

Antarctic Conservation Act (ACA) Master Waste Permit

Antarctic Support Contract (ASC) holds a Master ACA Waste permit allowing the permanent release of various items to the environment including XBTs and sonobuoys. A copy of this permit will be available aboard the ship from the MPC.

Foreign clearance (EEZ)

No Foreign clearance is required for work in Foreign EEZ's during NBP14-07

USDA APHIS

The US Department of Agriculture's Animal and Plant Health Inspection Service (USDA APHIS) has regulations governing the importation of organisms and samples into the United States. It is the PIs' responsibility to determine if a USDA permit is required for their expected samples. Please refer to http://www.aphis.usda.gov for more information.

Biological Letter

Independent of whether an importation permits from APHIS is required; all samples with a biological component must be accompanied during shipment by a letter on the PI's home institution letterhead indicating the origins, destination, and viability of the samples. Template text is available aboard the LMG or NBP, but scientists should bring an electronic version of their institution's letterhead to the ship.

Environmental Documentation

The Principal Investigator is responsible for ensuring that all required environmental documentation has been completed before deployment.

Please contact your POC for more information, or in the event your POC cannot be reached, contact ASC's Environmental Manager, Kaneen Christensen (telephone 1-800-688-8606 ext. 32235, e-mail kaneen.christensen.contractor@usap.gov). See appendix for more information.

Environmental Releases

The MPC will account for all environmental releases, including accidental or inadvertent releases, to fulfill ASC's stewardship of the Antarctic Conservation Act. For example, recoverable items such as moorings are categorized as "potential" releases when they are deployed, but satellite tags are considered "declared" releases at the time of attachment to the animal.

Hazardous/Radioisotope Waste

Any hazardous or laboratory wastes generated during the cruise will be properly documented and packaged for disposal while aboard the NBP. The Marine Lab Technician will oversee the containment to make sure all waste is captured according to the NSF regulation, whether considered hazardous or not. NOAA Cruise participants are expected to assist the MLT in these tasks and will be responsible for completing hazardous waste information sheets (HWIS) for each waste stream that is generated.

Wastes to be generated for NBP14-07

Constituents	Amount	Unit	Location of use
Methanol	10	liters	Bio lab
Chloroform	1.5	liters	Bio lab
Methylene chloride	1	liters	Bio lab
Seawater and fixatives	0	liters	Bio lab
Formalin	1	liters	Bio lab
O2 titration waste	0	liters	Bio lab
Acetone	1	liters	Bio lab
Hydrochloric Acid (Dilute – 10%)	20	liters	Bio lab
Seawater/fixative 3.7 % formalin/DAPI (Murray)	10	liters	Bio lab
Bleach (Dilute – 2%) (Murray)	5	liters	Bio lab
Hydrochloric Acid (Dilute – 5%) (Murray)	10	liters	Bio lab
100 mM NaCl/50% Ethanol (Murray)	2	liters	Bio lab

Note The NOAA AMLR program is responsible for the containment and disposal of the waste the NOAA team generates on the NBP14-07 cruise. Alison Murray is an NSF-funded grantee; therefore the ASC will be disposing of the Murray waste listed above via the USAP waste stream at the conclusion of the NBP14-07 cruise.

Cargo

Southbound and Northbound Cargo

Southbound Cargo	# of Items	WT (lbs)	ROS to PTH	ROS to PA	Shipment method
Fish boxes (8) of gear, sample jars, computers	8	3,500		8/7/2014	NOAA Container
Tools	1	500		8/7/2014	NOAA Container
Lipid gear	1	300		8/7/2014	NOAA Container
Bacterial gear	2	50		8/7/2014	NOAA Container
20 Drifters	4	400		8/7/2014	NOAA Container
Chemicals	1	200		8/7/2014	NOAA Container
Alison Murray gear (TCN's 4006-2001 to 2007)	7	200	6/3/2014	8/7/2014	COMSUR

Northbound Cargo	# of Items	WT (lbs)	ROS to PTH	NB Cruise	COMAIR?
Alison Murray gear	4	200	12/6/2014	NBP14-07	No

*Only Alison Murray gear is supported by ASC, TCN's listed above, other gear listed is for informational purposes

The NOAA AMLR program is responsible for shipping all their southbound science cargo and consumables to Punta Arenas for the NBP14-07 cruise.

The NOAA AMLR team is shipping their science cargo items to PUQ for NBP14-07via a single container to their agent AGUNSA. The 40 foot container will be delivered to the NBP on the morning of the 17th of August 2014. All stevedores, fork lift support will be arranged via AGUNSA by the NOAA AMLR team.

The NOAA AMLR frozen samples (-20 to -80C) shipments northbound after the NBP14-07 cruise will be shipped and packed through the USAP cargo system.

All other northbound retro science cargo and consumables coming off NBP14-07 cruise will be the responsibility of the NOAA program.

Call-Forward Materials and Equipment

The below list of cargo is to be called forward and loaded aboard the NBP for NBP14-07. The NOAA team will work with AGUNSA and the ASC agent DAMCO to have the below items delivered to the NBP.

TCN	Description
From AGUNSA warehouse	AMLR IKMT depressors
3006-W305	Chemicals in Box
3006-W306	Nitrogen Evaporator
3006-W307	NOAA Lab Supplies from NBP13-09
3006-W308	NOAA Lab Supplies from NBP13-09
3006-W309	NOAA Lab Supplies from NBP13-09
3006-W310	NOAA Lab Supplies from NBP13-09
8833-W034	NOAA Lab Supplies from NBP13-09

TCN	Description
3246-W300	NOAA Lab Supplies from Vernet
3016-W500	NOAA Lab Supplies from Vernet
4006-2001 to 2007	Alison Murray science cargo shipped via USAP system

Samples

The below is a summary of items listed in POLAR ICE for northbound transport directly after NBP14-07:

Specimen Description	Temp (0C)	# of ISB	# of AcuTemp	Other Shipping Container	ROS to LAX	Destination	Hazards
Zooplankton	N/A			Fish box, 500 lbs	12/6/2014	Home Inst.	5% Formalin
Myctophid fish	KF -20		1 Large		10/2/2014	Home Inst.	Ethanol
Water samples	N/A			10"x12"x8" boxes, 22 lbs	12/6/2014	Home Inst.	1% Formalin
Nutrient samples	KF -70		1 Large		10/2/2014	Home Inst.	
Bacteria	KF -70	1 Large	1 Large		10/2/2014	A. Murray	
Bacteria	KF -20	1 Large	1 Large		10/2/2014	A. Murray	
Zooplankton	KF -20	1 Small	1 Small		10/2/2014	Home Inst.	
Demersal finfish	N/A			1L Jars, total 1,000 lbs	12/6/2014	Home Inst.	5% Formalin
Demersal finfish	N/A			1L Jars, total 1,000 lbs	12/6/2014	Home Inst.	75% Ethanol
Fatty acid samples	KF -20	1 Large	1 Large		10/2/2014	Home Inst.	Chloroform
Zooplankton	KF -70	1 Small	1 Small		10/2/2014	Home Inst.	
Zooplankton + HPLC	KF -70	1 Small	1 Small		10/2/2014	Home Inst.	
Bacteria	KF -70	3 Large	2 Large		10/2/2014	A. Murray	

*All non-temperature sensitive samples will be shipped via COMSUR

Note 1liter sample jars will be in cardboard boxes (12 per box) and then placed in a UN box for secondary containment. This will be shipped back to the US. Fish samples may be in UN plastic buckets (2L or 3L) as well. The bacteria samples will be shipped to a Chilean location.

Post cruise cargo

The Grantees will leave science equipment in the AGUNSA warehouse after NBP14-07 for storage

ASC Supplied Systems and Equipment

Please see the attached NBP14-07 Equipment Allocation Spreadsheets for the laboratory instrumentation and ship's systems that will be provided. Please read over this sheet carefully and inform your POC of any changes or additions.

Radioisotope Use

There is no radioactive work on NBP14-07

Compressed Gases, LN2, Ice

Cryogens will be available for the NBP14-07 via the LN2 Plant:

- MLT provide 2- 50L transfer Dewars

Computers and Communications

Voice communications

Voice calls from the ship, including world-wide personal calls, can be made via the public-use iridium satellite phone. At present there are no restrictions to this government-provided system other than an expectation of general standards of propriety.

Email

All data and email transfer from the vessel use the INMARSAT communications system high-speed satellite data channel. Outbound e-mail is collected on the ship's mail server and transmitted to ASC HQ in Denver; from there it is forwarded on to its final destination. Email bound for the vessels is stored on a server at ASC headquarters in Denver. E-mail is exchanged with Denver and is scheduled for every 30 minutes. The vessels follow the USAP enterprise standard of a 10 MB/message limit and no daily quotas are imposed.

All scientists will be provided with an individual e-mail account as part of their network account. The address will be of the form: **firstname.lastname.guest@nbp.usap.gov**

E-mail and network access will be made available 24 hours before departure and will end no later than 24 hours after arrival in port following the cruise so that workstation and network maintenance can begin.

While the vessel e-mail system is quite robust and implements several safeguards against lost mail, the nature of shipboard satellite communication means that losses can still occur. Scientists should request written confirmation of receipt from their correspondent for any vital e-mail; "Return Receipts" are not always reliable and should not be used aboard the NBP.

USAP scientists and support staff on USAP research vessels may use the vessel email systems for both program and private email reception and transmission, subject to general email policies for the USAP as described in the Enterprise Rules of Behavior. If non-email data transfers are required, arrangements must be made with the POC prior to the cruise.

In case of an emergency, the NBP may be contacted by iridium satellite phone by dialing 1-808-659-5076 (the MPC office) or 1-808-659-5077 (the bridge).

Cruise Specific IT Requirements

Grantee provided computers for NBP14-07

LAN connections needed for grantee provided computers:

7 – Each PC, Win 7/ SP 1

VHF Radios

Radios will be provided by ASC ET staff to maintain Comms between lab and deck on the ship and between ship and field crews conducting ice coring operations

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ASC Supplied Lab Supplies and Chemicals

The US AMLR Program is providing all the Lab Supplies and Chemicals for NBP14-07

Major Systems, Laboratory Instruments and Equipment

Electronic Instruments and Sensors

Product	Cruise Total
Remote Sensing/Ice Imagery	
Total ice concentration as a percentage, TeraScan satellite-imaging, SSMI data, resolution 15 km per pixel.	1
Visible/Infrared DMSP imagery, TeraScan, satellite-imaging, resolution up to 0.55 km per pixel.	1
Visible/Infrared HRPT imagery, TeraScan satellite-imaging, resolution 1.1 km per pixel.	1
Hull-mounted Sonars	
Hull-mounted 3.5 kHz and 12 kHz sonar, Knudsen 320 B/R; 3.5 kHz for sub-bottom profiling or 12 kHz for bottom-tracking	1
Hull-mounted ADCP, RDI, 150 kHz Narrow-Band, VM-150, for current profiling and measuring backscatter in water column - shallow and high-resolution (400-M).	1

Product	Cruise Total
Hull-mounted Bioacoustics Sonar, 38kHz, 120 kHz and 200 kHz, Simrad EK-60, 38kHz for bottom tracking and biomass measurements (acoustic backscatter), 120 and 200kHz for biomass measurements	1
Underwater Imagery	
"Yo-Yo" camera frame including: Bottom contact shutter trigger 10 cm scaling lasers WETLabs transmissometer Benthos Altimeter	1
Benthic Digital Still Camera, Ocean Imaging Systems DSC-10000 with OIS strobe Note: Images stored on camera for download at surface: not real time	1
CTD Sensors	
Conductivity and Temperature sensor, depth rating 6800-M, Sea-Bird Electronics (includes both primary and secondary sets - 4 sensors total)	1
Dissolved Oxygen sensor, depth rating 7000-M, Sea-Bird Electronics (primary and secondary)	1
Fluorometer, depth rating 6000-M, WETLabs	1
PAR sensor (Photosynthetically Active Radiation, 400-700nm), depth rating 1000-M, Biospherical Instruments.	1
Pressure sensor, depth rating 6800-M, Sea-Bird Electronics	1
Pumps, depth rating 6800-M, Sea-Bird Electronics (primary and secondary)	1
Transmissometer, (25cm pathlength), depth rating 6000-M, WETLabs	1

Deck Equipment and Systems

Product	Cruise Total
Ice Coring Equipment	
Ice thickness measuring kit	1
Handsaw	1
Kovac corers	2
Power heads (Jiffy or Badger)	1
Core catchers (longitudinally sliced PVC tube mounted to wood)	2
Shovel	1
Sled	1
Dredges	
Dredge Chain, small, scallop type	1
Dredge, USAP basket dredge	1
Plankton Nets and Trawls	
Flow meter, General Oceanics 202-R	2
Otter Trawl 18-foot for moderate to hard seafloor	1
Otter Trawl 30-foot for moderate to hard seafloor	1
Otter Trawl 30-foot with rock hopper gear for rocky seafloor	1
Blake Trawl, 5 foot Frame	1

Product	Cruise Total
CTD Rosette and Bottles	
Rosette Frame, 24 Position, Sea-Bird Electronics 32 (with standard configuration)	1
Sample bottle, 12-L, Ocean Test	24
Hydrographic and Trawl Winches	
0.322 EM cable, 3 conductor, for DUSH-5	1
0.322 EM cable, 3 conductor, for DUSH-5-5	1
0.680 coaxial cable	1
Winch, Deep-Sea trawl, DUSH-9-11, Max Drum Capacity 10,000 m .680 EM coax/fiber hybrid cable or 10,000m 9/16" 3x19 wire rope	1
Winch, hydrographic, located in Baltic room, DUSH-5, for CTD deployments, Max Drum Capacity 10,000m .322 EM cable	1
Winch, hydrographic, waterfall, DUSH-5-5, Max Drum Capacity 10,000m .322 EM cable	1

Laboratory Equipment and Supplies

Product	Cruise Total
Balance	
Balance, Motion Compensated, Accuracy ± 0.1g up to 0.3kg; ± 0.2g up to 0.6kg; ± 0.5g up to 1.5kg, 12cm diameter pan, POLS S-182	1
Autoclave	
Autoclave, Sanyo Sterilizer, 75L capacity, Sanyo MLS-3782L	1
Centrifuge	
Centrifuge, clinical, non-refrigerated, 3300 rpm max, 1580 xg max Clay Adams Dynac	1
Centrifuge, clinical, non-refrigerated, Max RPM 5100, Max g = 3400x g, Fisher 225	1
Rotor 24 place for 10-15mL tubes	1
Rotor 6 place for 50 mL tubes	1
Rotor, fixed, 24-place, for 15ml tubes, for Clay Adams Dynac II	1
Rotor, fixed, 4-place, for 50ml tubes, for Clay Adams Dynac II	1
Fluorometer	
Filter kit, Chlorophyll-a in Vivo & extractive (Acidification), Turner Designs, 10-037R	1
Fluorometer, Benchtop, Turner TD700, rotating drum for multiple filter sets	1
Freezer/Refrigerator	
Freezer, -20ºC, Flammable storage upright, Fisher Isotemp	1
Freezer, -20ºC, upright, 15 cu ft, 17 x 50 x 23"D, Fisher Scientific	1
Freezer, ultralow, -40º to -80ºC, chest, 20 cu ft, 70L x 19W x 26"D, Revco	1
Freezer, ultralow, -40º to -80ºC, upright, 15 cu ft, five compartments, Revco	1
Refrigerator, underbench, 4 cu ft, with 0.5 cu.ft. freezer	2
Refrigerator, upright, 11.8 cu ft, w/2.1 cu ft freezer, Baxter FSR54AOC, Helo Workshop	1

Product	Cruise Total
Homogenizer	
Generator, Safety sealed chamber assembly, stainless steel, 70ml, 1" blade, treatable volume 10-65ml	1
Homogenizer, w/stand, for sample vol. 0.3ml-20L, 10000 to 30000 RPM, Pro Scientific 250	1
Hood	
Hood, fume, 32Dx48"W working area, Fisher Hamilton Safeair, installed in Bio Lab	2
Hood , Snorkel portable, ceiling mounted	1
Ice Maker	
Ice maker - shaved ice - installed in Hydro Lab	1
Microscope	
Camera, Canon 60D Camera with microscope adaptors (fits eyetube on E800, Axioskope 50, Standard 25, M3C)	1
Illuminator, fiber optic, two arm, Dolan-Jenner MI-150F	1
Microscope Imaging, Digital Camera, Spot Insight (fits E800, Axioskope 50, Standard 25, M3C)	1
Microscope, compound, Brightfield, DIC, Epi-Fluorescence, Phase Contrast, Objectives (10X Ph1, 20X Ph2, 40X Ph2, 100X Ph3) Zeiss Axioskop 50	1
Reticle, dia 26mm, 100 div grid, Klaraman KR-406A	1
Microscope, Compound, Brightfield, DIC, Epi-Fluoroscent, Phase Contrast (10X), Objectives (10X Ph1, 20X, 40X, 60X, 100X) Nikon E800	1
Epi-Fluoroscent Filter, Nikon E800 - BLUE LP (Chroma filter 11001)	1
Epi-Fluoroscent Filter, Nikon E800 - DAPI (Chroma filter 31000)	1
Epi-Fluoroscent Filter, Nikon E800 - FITC (Chroma filter 31001)	1
Reticle, dia 26mm, 100 div grid, Klaraman KR-406A	1
Reticle, dia 26mm, full x hairs, Klaraman KR-301	1
Reticle, dia 26mm, linear 0-100um, Klaraman KR-207	1
Vibration free table, installed in Microscope Room	1
Mixer	
Mixer, vortex	1
Oven	
Oven, Gravity convection, 40º to 200ºC, ID 20x17.5x28", VWR 1326	1
pH Meter	
pH meter, 0-15.99, resolution 0.001/0.01/0.1, temp -5º to 100ºC in 0.1ºC, Beckman PHI34	1
Pipettor	
Pipettor, adjustable volume, 0.5-10uL	1
Pipettor, adjustable volume, 100-1000uL	2
Pipettor, adjustable volume, 2-20uL	2
Pipettor, adjustable volume, 50-200uL	2
Pipettor, adjustable volume, 500-5000uL	1
Pump	
Pump, Peristaltic, Masterflex L/S motor	2
Pump, Peristaltic, Mini Low Flow Rate: 0.03 to 8.20mL/min, Gas or Liquid, Fisher 13-876-1	1
Pump, vacuum, diaphragm, Gast DOAP104AA	2

Product	Cruise Total
Vacuum Trap, 20L heavy-duty polypropylene carboy	1
Refractometer	
Refractometer, salinity, handheld, temperature compensated, Reichert-Jung (Leica) 10419	1
Salinometer	
Salinometer, Portasal, Guildline 8410A	1
Square sample bottles (Please specify how many bottles)	48
Spectrophotometer	
Labsphere, Perkin-Elmer RSA-PE-18	1
Spectrofluorometer, scanning, HORIBAJOBIN YVON Fluoromax-3, red sensitive PMT, fully automated emission shutter, Thermostated 4-position sample holder, Datamax software	1
Spectrophotometer, UV/VIS, Scanning, dual beam, Perkin Elmer Lambda 18	1
Thermometer	
Thermometer, digital, waterproof, C/F, 1.0º degree resolution, K-type probe, Fisher 1507714	1
Water Filtration	
Filter holder, for pressure filtration, 142mm, ss, 1.5L capacity, 125 psig inlet, 9/16" ID, silicone gasket, Millipore 316	3
Filtration Assembly, polysulfone, 200mL funnel with 25mm base, twist	3
Filtration manifold, 3-place, stainless steel	1
Filtration manifold, 6-place, PVC	1
Glass base, 25mm fritted glass	1
Glass base, 25mmstainless steel screen	1
In-line 47mm filter holder	
Water Purification System	
Water Purification System, Aqua Solutions RODI-C-12-AL, Ultra low TOC, High flow R/O + DI system installed in Aft Dry Lab	1
Water Purification System, Barnstead Diamond UV, virtually TOC-free, installed in Hydro Lab	1
Uncontaminated Seawater System	
Required in Hydrolab (see lab diagrams under Laboratory/Lab Space)	1
Required in Wetlab (see lab diagrams under Laboratory/Lab Space)	1
Walk-In Cooler (Constant Temperature Room)	
Constant Temperature Room, opens to main corridor and to Biolab, temperature to -10ºC +/- 1ºC, "Big Antarctica"	1

Small Boat Support

Product	Cruise Total
Zodiac Mark V, 19 ft.	2

Zodiac support will be available for NBP14-07 if requested and NSF safety policies will be enforced. The policies state that “all boats must maintain a safe distance from icebergs and glaciers; at least three times

maximum height, and greater than 300 meters from all actively calving ice faces. Extra precaution should be maintained when maneuverability is restricted by brash ice." Please contact the cruise POC if you wish to see a copy of the policy. A deploying Zodiac will have two VHF handheld radios.

NOAA AMLR Supplied Equipment and Supplies

- Electronic depth sensor to be used on IKMT
- 4 dissecting microscopes with light sources
- XBT's for Drake transit
- 1- Nitrogen gas cylinder
- IKMT net system with a suit of 505um mesh nets
- Portsal standard seawater
- Hazardous waste containers drums and carboys
- EK 60 calibration rig
- All cruise lab consumables and supplies

Spatial Analysis, Remote Sensing, and GIS Support

GIS Support is now being handled by the Polar Geospatial Center (PGC). Please contact PGC with any support related questions:

Cole Kelleher
Cartographer and Support Coordinator
email: kell1026@umn.edu

Terascan

Terascan imagery of sea ice conditions is available aboard the RVIB *NATHANIEL B. PALMER*. Details of imagery types, areal coverage will be worked out between the vessels IT staff, Chief Scientist and the MPC. SSMI Terascan Sea Ice concentration remote imaging has very limited support at this time.

Current available Terascan products include:

Visible/Infrared DMSP imagery, TeraScan, satellite-imaging, resolution up to 0.55 km per pixel.

Visible/Infrared HRPT imagery, TeraScan satellite-imaging, resolution 1.1 km per pixel.

Materials and Supplies Procured for NBP14-07

The US AMLR Program team is providing all cruise chemicals, materials and supplies for NBP14-07

Closeout Procedures

- Cruise scientists shall return all equipment and/or instruments borrowed from the USAP/ASC. Scientists shall also inform the MPC or MLT of any missing, damaged or non-functional equipment or instruments.
- The Chief Scientist and PIs shall ensure that all wastes are packaged and labeled according to USAP procedures. The MLT will assist as needed.
- All cruise scientists shall clean their lab spaces prior to departing the vessel. This includes the proper disposition of all regular and hazardous wastes, swiping of spaces where radioisotopes were used (if applicable) as well as thoroughly cleaning the floor and counter tops and bringing burnable trash to the incinerator. The MLT shall check out each lab with the PI prior to the PI's departure.
- All science cargo shall be properly documented, labeled and stowed (if applicable) at least four days prior to the vessel arriving in port.
- All cruise scientists shall collect and return all ECW gear as directed by the MPC.
- The MPC or MLT must be informed of any planned sample shipments to the US.

ADDITIONAL INFORMATION AND TABLES

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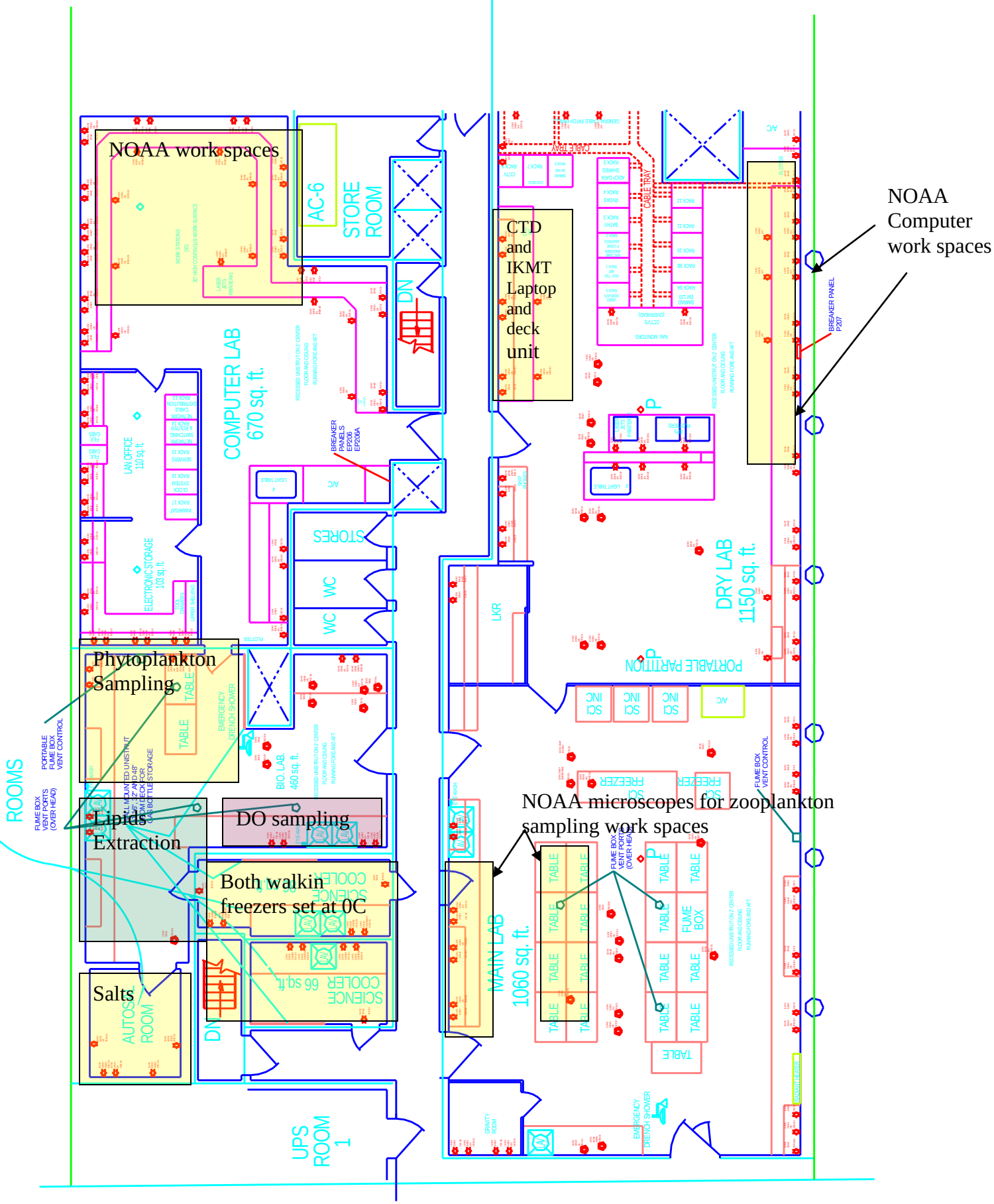
NBP14-07 Deck Layouts

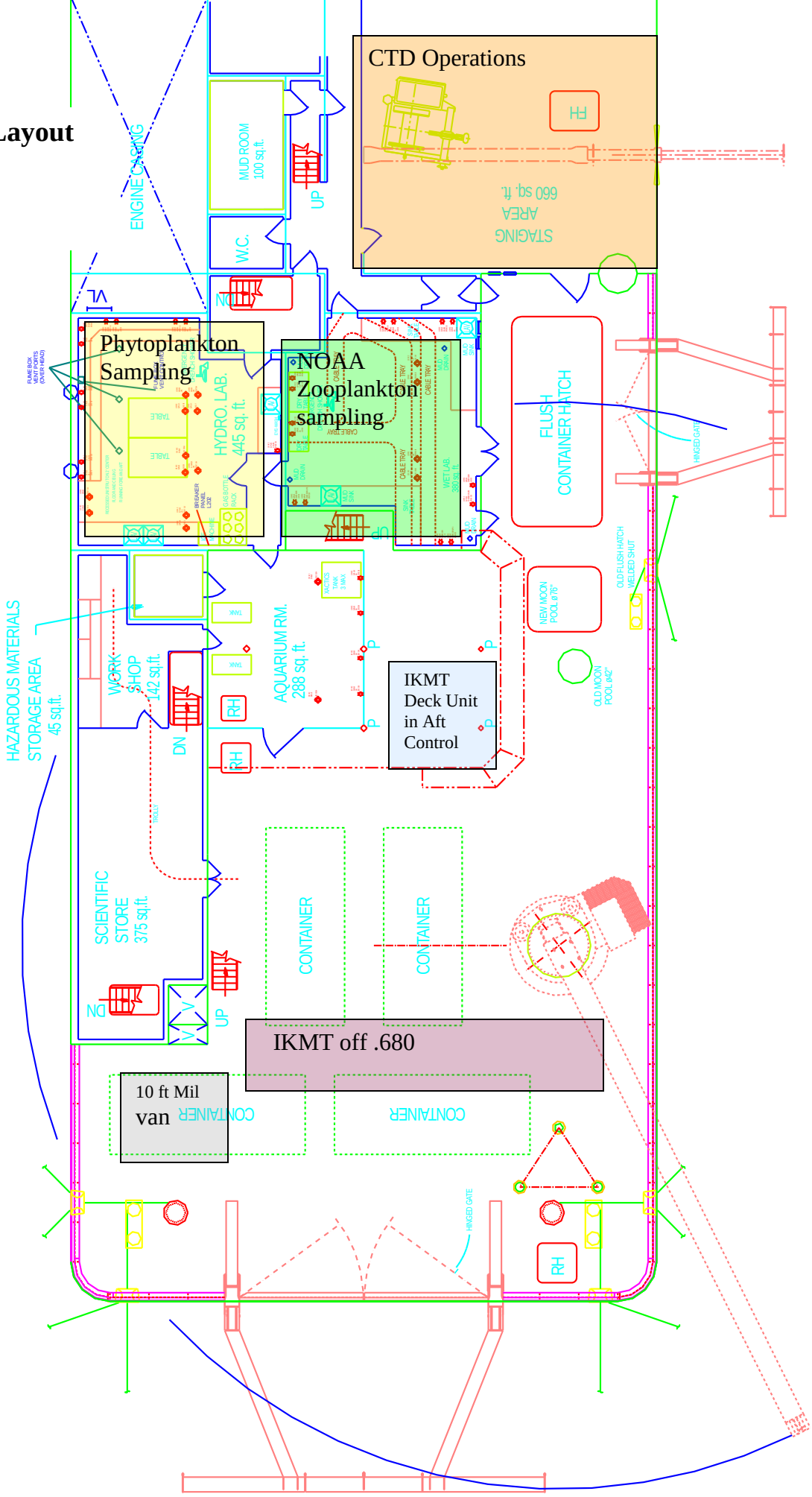
NBP14-07 Main Deck Layout

NBP14-07 After Deck Layout

NBP14-07 Main Deck Layout



NBP14-07 After Deck Layout



EK 60 Calibration Procedures

SIMRAD EK60 CALIBRATION PROCEDURE Derek Needham – 20 Sept 2004

Note: These notes are a personal procedural summary/checklist and not intended to replace the calibration procedures, as covered in the Simrad manuals and ER60 Help function.

Setting Up The Calibration Equipment And Deploying The Sphere

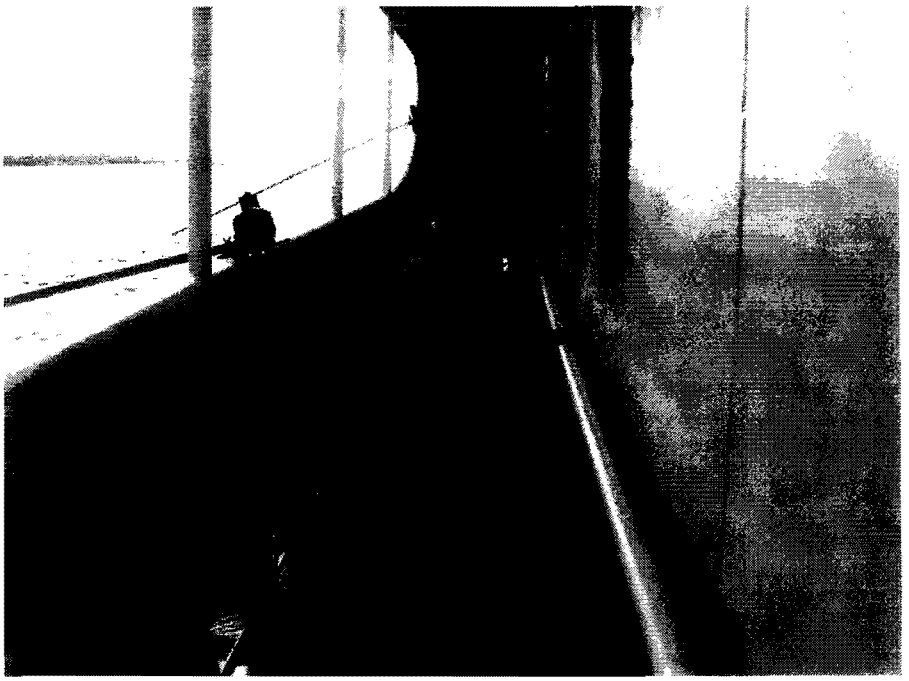
1. Assemble and test the calibration reels. Check that all three lines are reeled in under tension and marked with a swivel at 20m from the end and then another swivel 5m further (25m). All three line ends must have a knotted loop of about 50mm diameter. Keep all knots as small as possible.

2. Steam to a sheltered anchorage with a bottom sounding between 30 and 40m.

3. Set up the calibration rods with the single rod ("Mid" rod) on the side of the ship that has the transducer fairing, exactly on the athwartship's line that runs through the center of the transducer cluster. On the opposite side of the ship, set one rod 4m forward ("Fwd" rod) of this line and one rod 4m aft ("Aft" rod) of this line. Secure the rods to the gunwales using G-clamps. Double secure the rods with a length of parachute chord. Push the two levers on the reels inwards towards each other. Connect the electrical cables between the reel motors and the calibration rig deck unit.

Oscar Elton Sette Starboard Side Mid Rod Position

Oscar Elton Sette Port Side Fore And Aft Rod Setup



4. Run a weighted parachute chord under the ship's hull by steaming forward at 0.5knts and having two people swing the chord forward, over the ship's bulbous bow, letting it sink a few meters and then walking it down the port and starboard sides of the ship to the position of the transducers. Once the chord is in place, drop anchor at the calibration site.

5. Fix the mid rod's line end, and a diving weight, to the parachute chord. Set the ratchet on the reel, release the brake (push forward lever forward) on the reel and lower the weighted line into the water, while someone pulls in the parachute chord from the opposite side of the ship.

6. Detach the parachute chord and weight off the mid line, bring the end of the fore and aft lines to the mid line. Loop the calibration sphere through loops at the ends of the three lines. Loop a 2m length of monofilament line through the loops of the three lines (NOT THE SPHERE'S LOOP). Attach a small weight at the end of the 2m line, depending on current strengths and sea conditions.

7. Immerse the sphere, and surrounding lines and knots in a soapy solution (this reduces bubble retention on the sphere and lines). Lower the weight and sphere into the water, without touching the sphere and surrounding lines. Set the reels' ratchets and release the brakes and slowly run all three lines out to the 25m mark.

8. Shift both levers, of all three reels, in towards each other and switch off the reels' ratchets. If not in this position while the motors are running, THE REELS WILL BE DAMAGED.

9. Using the control unit, set the sphere at 20m under the center of the transducer to be calibrated.

1. Switch off bridge sounder, ADCP and other sounders.

2. Run the Simrad ER60 software.

3. Click Install, Transceiver. Select first GPT (eg. 38kHz). Click Transducer Parameters and enter 2Way Beam Angle and 3dB Beamwidths values from the Simrad Transdcuer Measurements sheet that is supplied with the transducer. Repeat this for the other frequencies.

4. Calculate sound speed by clicking Install, Environment. Enter Sea Water Temperature and Salinity. Set Absorption by typing in the frequency and PRESSING ENTER (bug in software). The Absorption will be calculated (eg. 120kHz @10°C 35ppt = 37.44). Press Apply to apply the Sound Speed and Absorption. These figures can be double checked on the Sound Speed in Sea Water and Sound Absorption tables in the Calibration sections of the Simrad manuals.

5. Right click on the Depth display. Set Bottom Detection approximately 10m deeper than the bottom sounding at the calibration station.

6. Set Ping Interval to 1 second to simulate real survey conditions (1 second for every 250m eg. 500m =2 seconds)

7. Right click on color scale bar and set Color Scale to –70 to –34 (-80 for plankton work).

8. Right click echogram window and select Surface and TS 40 log TVG (single point target). Note: after calibration switch back to Sv 20 log TVG mode for volume backscatter work.

9. Select Normal, Operation, Depth = 0.0m. Set all frequencies at the pulse lengths and power levels that you want to calibrate. Press OK.

10. Right click on Layers on RHS of screen. Delete All Layers. New Layer. If sphere at 20m, set layer at 19m, 2m (maximum 4m) wide. If sphere stays within this layer it will be in the crosshairs on LHS of screen.

11. Right click crosshairs. Single Target Detection. Min Threshold = –60dB, Min Echolength = 0.8, Max Echolength =1.8, Max Phase Deviation =8, Max Gain Compensation =6.

12. Click Calibration.

13. Click File, New. In the Record window, type in:
    a. Transducer Serial Number off the Simrad Transdcuer Measurements sheet
    b. Target Reference TS, obtained from the Tungsten Carbide (WC) 38.1mm calibration sphere's TS versus frequency and sound speed table
    c. Target Reference Deviation = 10dB. (10dB clear conditions and 6dB if fish targets expected during calibration)
    d. Target Depth Limit Upper = 19m and Lower = 21m
    e. Comments

14. Press OK to start calibration

15. Start a new .raw file by clicking the ER60 record icon.

16. Line up sphere in the center of the crosshairs and then move the sphere with the calibration reels to cover as much of the beam as possible.

17. Click Stop.

18. Click File, Save As, ES 120-7C 200904_1(2,3....)

19. After saving the updated calibration figures will be in RHS text window of calibration program.

20. Don't Update Beam Data. Note TS Gain and Sa Correction and enter these in Install, Transceiver, Transducer Parameters, under the correct pulse duration setting. (the beam angle updates should not be entered as this calibration is using one unknown to determine another unknown)

21. Repeat calibration for different pulse lengths and power settings if required.

22. If the other frequencies' transducers are mounted close to the calibrated transducer and have been set up with the correct pulse lengths and power settings and run while the first frequency is being calibrated, they can be calibrated by replaying the files saved during the calibration of the first frequency.

Additional notes from a Calibration with the old EK60 software:

38kHz footprint at 30m = 3.67m
Lines from ends = 5m, swivel, 20m
In EK60 Calibration program:
After Save updated calibration figures will be in RHS text window of calibration program.
If RMS is over .5 then discard. (.2 is good, .27 bad)
Close program = Alt F4
Uninstall GPT and Reinstall, before new settings take effect
Check in Advanced transceiver menu for updates

NOAA Drifter Buoy Deployment Protocols

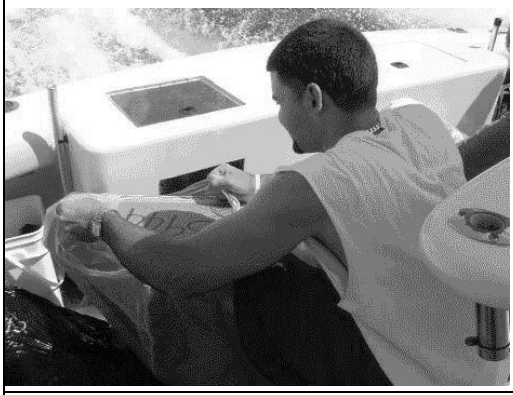
DEPLOYMENT INSTRUCTIONS

Read Carefully

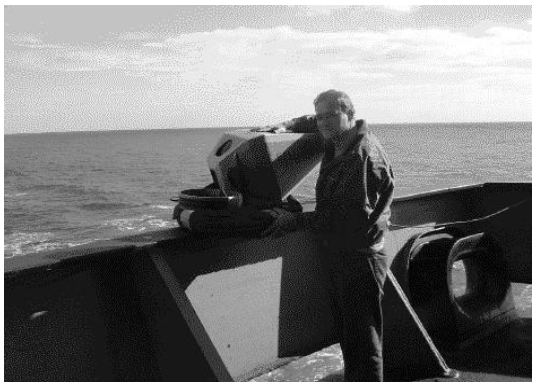
ID # 114563

FOLD

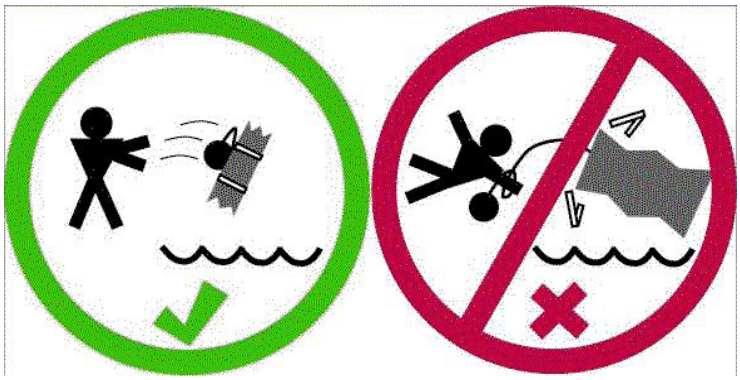
1. Remove plastic wrap



2. <u>DO NOT REMOVE</u> paper tape, cardboard, or anything BUT plastic.



3. Throw buoy in water.



Version 7.00

DEPLOYMENT INSTRUCTIONS
SVP AND SVP-BAROMETER DRIFTERS

1) Remove the buoys from the shipping container. **REMOVE ONLY** the plastic shrink-wrap.
2) **DO NOT REMOVE** paper tape securing the drogue and tether. **DO NOT REMOVE** cardboard surrounding the float.

***DANGER*: DO NOT REMOVE** the paper tape securing the tether and drogue. If you do, the drogue and/or tether can unfurl during deployment and cause injury!!!

3) Record the five digit ID number of the drifter. This number can be found on the shipping container, the plastic shrink-wrap or the protective cardboard box. It is also inscribed on the surface float.

4) If testing the buoy is desired prior to deployment, the magnet can be removed from the buoy by separating it from the float through a hole in the box surrounding the float. This action will start the ARGOS transmitter for testing. Re-attaching the magnet in the same position will turn off the transmitter and reset the program starting point. The transmitter will restart on its original program when the magnet is again removed.

5) Throw the buoy from the stern, lowest possible deck (preferably less than 10 meters including heave), into the sea. The ship may be traveling between 2 - 25 knots. The tether and drogue are secured with paper tape that will dissolve in the water.

6) Record the date, time (GMT) and location of deployment as well as the five digit ID, and send this information to the Global Drifter Program.

Thank you very much for your help!

CONTACT PERSON:

Shaun Dolk, Global Drifter Program
NOAA/AOML/PhOD
4301 Rickenbacker Cswy
Miami, FL 33149, USA
Tel: 305-361-4546 Fax: 305-361-4366
E-mail: Shaun.Dolk@noaa.gov

Web site: http://www.aoml.noaa.gov/phod/dac/dep_form.html.

****

Sample log sheet

ID xxxxx	Date mm/dd/yy	Time (GMT) hh:mm	Latitude DD mm.mm N/S	Longitude DDD mm.mm E/W
_____	____/____/____	____:____	____ _____ __	____ _____ __
_____	____/____/____	____:____	____ _____ __	____ _____ __
_____	____/____/____	____:____	____ _____ __	____ _____ __
_____	____/____/____	____:____	____ _____ __	____ _____ __

Version 7.00

Pre-Deployment Information

Medical

It is the PI's responsibility to ensure that all dental, medical and travel processing requirements are addressed in a timely manner.

Upon receipt of this RSP, participants should have already submitted medical and dental exam results to ASC. The status of the field team's PQ processing is available in the POLAR ICE application.

Medical Care and Costs While in Port

While in port, any non-emergency health or injury needs will be handled by local health care providers. Contact the MPC to arrange for any needed medical services.

In addition, all USAP scientists, including ECO and ASC employees, subcontractors, and cruise scientists are responsible for any and all medical bills incurred while traveling or in port. This usually means paying the bill at the time services are rendered and seeking reimbursement from the insurance carrier at home. The port agent will not pay any medical bills. Medical emergencies or extenuating circumstances will be handled on a case-by-case basis.

Punta Arenas Operations

Clothing Issue

All cruise scientists will receive standard Extreme Cold Weather (ECW) clothing from DAMCO at the warehouse in Punta Arenas. The ECW includes items such as gloves, parka, hats, footwear, and thermal underwear. Each participant is encouraged to try on every item to ensure proper fit. Scientists may bring along any personal gear they wish to use to supplement the USAP-issued clothing. Once the ship departs port, there will be no opportunity to exchange clothing items.

A Mustang suit or float coat, provided onboard the ship, are required while working on the main deck of the vessel. Safety footgear, such as steel-toed boots, are recommended but are not provided.

At the end of the cruise all ECW gear issued will be collected by ASC staff and returned to DAMCO.

Pier Security

Pratt Pier is a secure port, ID required for entry. Pedestrian and vehicle security gates limit entrance to the port area for Pratt Pier in Punta Arenas, where personnel will board the vessel.

Science Party Access to the Ship

Pre-cruise

Cruise scientists are permitted to move aboard the vessel no earlier than the day prior to sailing. However, starting on the first full day after the vessel arrives in port all cruise scientists will be allowed onboard to begin pre-cruise preparations such as setting up equipment in the labs. The noon meal may be taken aboard the ship the day pre-cruise preparations begin. However, plans should be made for both morning and evening meals off the ship as only the noon meal is provided to scientists prior to their formally embarking the vessel.

Post-cruise

At the end of the cruise, scientists may stay on board the night after the ship arrives in port. After this time, they will be formally disembarked, which means that sleeping quarters, meals and

network access, including email will no longer be available. Special arrangements can be made with the MPC if the disembarked scientists need to work on board to complete packing of gear and samples.

General Research Vessel Information

Generally helpful information for participants deploying on the USAP research vessels can be found at the following address:
http://www.usap.gov/USAPgov/vesselScienceAndOperations/documents/ThingsYouNeedToKnow.pdf.

Miscellaneous Shipboard Policies and Procedures

The MPC will be responsible for disseminating departure and arrival times after input from all vested parties.

Vessel policy strictly prohibits consumption of alcohol on board.

Cargo loading and securing will be done by the ASC marine staff, supported by the ECO crew. (Scientists may be asked to participate.)

Cabins are outfitted for double occupancy, with four-person berthing vans available for transits as needed. The MPC may request assistance from the Chief Scientist to make cabin assignments. Sheets, towels, pillowcases, and laundry facilities are provided on board.

Vessel Support Personnel and Organization

Per contract with NSF/PLR, ASC provides broad planning and operational support for all research projects in Antarctica. Pre-cruise planning is the responsibility of a Point of Contact (POC) from ASC, who will ensure that all of the various science and logistical objectives are understood and communicated to all appropriate parties in advance of the cruise. The POC may or may not deploy on the cruise.

Operationally, vessel support is the responsibility of the ASC Marine Projects Coordinator (MPC), who supervises the ASC vessel staff and works with the Chief Scientist and vessel Captain to facilitate communications between the science and support parties on the ship.

The fact that the various parties (scientists, ASC, and ECO) have varied but overlapping interests and responsibilities means that many cruise decisions will require discussions and general consensus among all these parties including science groups. In the event that no such consensus is reached, the MPC's decision will be final, as per contract and as directed by the NSF. The NSF may be asked for direction when necessary.

ASC's Chilean agent DAMCO provides direct port support for USAP research vessels. The MPC works closely with ASC logistics staff and with the DAMCO staff in Punta Arenas to make sure all port support needs for the cruise are met. (DAMCO also handles meet-and-greet support and local transportation in Santiago and Punta Arenas. Tasking for this is directed by ASC's Deployment Specialist Group.)

Technical support on the cruise is the responsibility of the various technicians as directed by the MPC and as outlined below under ASC Technician Support.

Edison Chouest Offshore Staff

Edison Chouest Offshore (ECO) owns and operates both USAP research vessels. ECO is under contract to ASC as per the formal charter agreement specific to each vessel. The Captain and crew (engineers, mates, and deck hands) are employees of ECO and attend to maintenance and provision of all propulsion, navigation and hotel services on board.

ASC Onboard Staff

The ASC staff on board consists of the Marine Projects Coordinator (MPC), the Marine Technicians (MTs), Marine Lab Technicians (MLTs), and Electronics Technicians/Marine Computer Instrument Specialists (ET/MCIS). On the NBP, network administrators and systems analysts from the ASC Vessel IT department also sail each cruise. Vessel IT staff sail occasionally on the LMG, as needed.

Shipboard Safety and Security

The Ship's Master has the final authority for all safety-related matters posing any danger to the ship and/or anyone aboard it. Additionally, if the Marine Project Coordinator (MPC) or the Chief Scientist finds that an unsafe condition exists, he or she has the authority to stop any related shipboard science until the situation is corrected. This would include, for example, issues of industrial, marine or laboratory safety.

Emergency Contact Information

The vessel MPC can be reached at the following phone numbers. If there is no answer, you may leave a message.

NBP:	1-808-659-5076	
NBP VOIP:	720-568-2860	only accessible while ship is in port
LMG:	1-808-659-5074	
LMG VOIP:	720-568-2850	only accessible while ship is in port

Shipboard Security

The USAP vessels must comply with U.S. Homeland Security Department regulations. Everyone embarking the vessel must provide picture ID to the guard on duty at the gangway guard shack. The ID can be a driver's license, student ID, passport, etc. There are no exceptions to this policy. Upon check-in, each scientist will receive a vessel security badge. This badge is to be worn in plain view at all times while onboard the vessel. The badge is to be turned in to the guard shack each time an individual leaves the vessel.

In addition to the sign-in procedure, the oncoming luggage is subject to screening by the Captain or Chief Mate. The extent of the screening is dependent on the Marine Security (MARSEC) Level.

End of Science Operations

A meeting will be held between the Chief Scientist, MPC, and the Captain to discuss when science operations will end for the cruise. It is critical to the follow-on cruise, and ship operations in general, that port be reached on the morning of the day the ship is due to arrive. In the past, not adhering to this policy has adversely affected the setup for subsequent science projects.

Permits

Samples will not be permitted to leave the ship until all necessary permits are obtained. If unplanned samples are collected opportunistically during the cruise, cruise scientists must inquire with the MPC about the possibility of getting new permits or amending existing permits.

Antarctic Conservation Act (ACA) permits are required to enter Antarctic Specially Protected Areas (ASPA). For ACA application procedures and forms, please contact Nadene Kennedy at NSF, nkennedy@nsf.gov. ACA permits require three months processing time.

The United States Department of Agriculture (USDA) http://www.aphis.usda.gov/ regulates importation of samples into the US. It is the responsibility of the PI to determine if a USDA permit is required. Permits can take up to 16 weeks for clearance.

Regardless of USDA permit requirements, all samples with a biological or geological component must have one or more letters on the letterhead of the scientist's home institution and with the scientist's original signature AFFIXED TO EACH BOX to facilitate entry into the United States (US). Different standard letters are required by different US and foreign governmental entities. Inquire with the project POC for current requirements. It is the responsibility of the PI to obtain any required permits **before** deployment **and to bring copies of these permits to Antarctica.**

Cargo Shipment Information

Participants will be required to fill out a Retrograde Packing List Form (TL-FRM-0005), also known as "north bound proforma", for all north bound cargo and samples entering the USAP cargo system. It is recommended that the Grantee Packing List Form (TL-FRM-0004) for south bound USAP cargo be used as a reference while filling out the retrograde form. ASC staff can assist with filling out the north bound proforma; however, it is the responsibility of the participants to ensure the accuracy and to complete the forms within four days of the vessel arrival into port. See Packing & Shipping Instructions (TL-MAN-0002) for more information.

Occasionally, during the field season it is determined that additional cargo/samples need to be shipped. If this is the case, the additional amounts will need to be approved by the NSF if it is to be shipped via the USAP cargo system. All cargo/samples being shipped outside the USAP cargo system will be the responsibility of the participant.

All cargo and non-temperature sensitive samples being shipped north via the USAP cargo system will be shipped to Port Hueneme unless it is more cost effective to ship directly to the final destination. All shipping costs from Port Hueneme to the final destination will be the responsibility of the participant. Shipping costs associated with temperature-sensitive science samples will be paid for by ASC and will only be shipped to the PI's home institution unless otherwise specified in the Cargo section.

Safety

Antarctic Support Contractor is dedicated to safe operations in all USAP locations. While deployed to Antarctica the entire research team will be expected to maintain a high awareness of safe conduct and comply with safety and health related guidance from the NSF and ASC management.

Environmental Documentation

To comply with the Antarctic Conservation Act, the PI or designee is required to track and report planned or accidental disturbances to the environment resulting from their research. Please be prepared to track and report geographic locations of disturbances that result from the project's field work (e.g. tent camps, helo landing sites, sampling sites, etc). An environmental end of season report template will be provided to each team upon arrival in Antarctica.

Additional Information: Lab Instruments and Equipment

Calibration

All SIP-requested instruments and sensors will be calibrated as needed before the beginning of the cruise/field season. Calibration certification for these instruments will be provided to the cruise participants at the end of the cruise as part of the Cruise Report. All calibration certifications are filed in the Electronics Technician's office or Marine Lab Technician's Office and can be accessed at any time on the ship's network. Post-cruise calibrations are performed for most instruments, but should be specifically requested if required to ensure that they are forwarded to the grantee's home institution.

Radioisotopes

Radioisotope Use Pre-approval

All Radioisotope users must be pre-approved via USAP standards. More information on general USAP radioisotope use can be found in POLAR ICE. All radioisotope use on the vessel is absolutely restricted to the radioisotope laboratory vans (rad vans). Prior to using radioisotopes on the vessels, all users are required to attend an on-site radioisotope user orientation, given by the Marine Lab Technician (MLT) on the vessel.

- Each field team member requires approval by the NSF/PLR Safety Officer before use of radioisotopes.
- Prior to using radioisotopes, all users are required to attend an on-site radioisotope user orientation.
- Written approval from the PI's Radioisotope Safety Officer is required prior to shipping unused radioisotopes and/or radioactive samples back to the home institution.

Post-cruise Shipment of Stock Radioisotopes

The USAP cargo system will not ship stock radioisotopes from the vessel to the scientist's home institution. However, if the scientist would like to ship radioisotopes back to their institution, they can make arrangements using a non-USAP shipping operation. Prior to shipment, written approval from the PI's home institution Radioisotope Safety Officer is required.

Scientist Responsibility

Documentation

The scientists are responsible for documenting their radioisotope use in their copy of the RADTRAK database and in their radioisotope usage logbook.

After each use

Swipe testing must be completed by the scientists each time they use radioisotopes. Swipe testing may be confined to the work area and does not need to include the entire van.

Once a week

Weekly swipes will cover high use areas including door handles (both inside and outside), phones, waste carboys, floors and refrigerator handles. Results must be filed in the group's Rad Usage Notebook, which is kept in the rad lab van.

Note The MLT can conduct a swipe test at any time. If contamination is found, the scientist, not the MLT, is responsible for cleaning it up. If contamination is found during post-cruise swipe tests, your departure may be delayed until the rad vans are cleaned and all paperwork is completed.

MLT Responsibility

Daily check: The MLT monitors the progress of the group's RADTRAK copy on a daily basis.

Cruise start/end: The MLT will carry out a very thorough swipe test of the entire lab (counter tops, carboys, door handles, refrigerators, centrifuges, ovens, water baths, pipettes etc.) at the beginning and end of the cruise to assure the van is clean. All equipment used from lab stores must be swiped and cleaned before it can be returned to ship stock.

Once a week: Review of scientist's weekly swipe tests.

Computers and Communications

Ship's Network

Each vessel has a local network to enable the movement of data among the ship's systems and individual workstations. Linux, Windows and Macintosh workstations are available for public use. Each scientist will receive a network account that grants access to e-mail, applications and shared drives across all supported platforms. All laboratory spaces and most cabins have network drops available.

E-mail and Data Transfers

All data and email transfer from the vessel use the INMARSAT communications system high-speed satellite data channel. Outbound e-mail is collected on the ship's mail server and transmitted to ASC HQ in Denver; from there it is forwarded on to its final destination. Email bound for the vessels is stored on a server at ASC headquarters in Denver. E-mail is exchanged with Denver and is scheduled for every 30 minutes. The vessels follow the USAP enterprise standard of a 10 MB/message limit and no daily quotas are imposed.

All scientists will be provided with an individual e-mail account as part of their network account. The address will be of the form firstname.lastname.guest@nbp.usap.gov or firstname.lastname.guest@lmg.usap.gov, depending on the vessel. E-mail and network access will be made available 24 hours before departure and will end no later than 24 hours after arrival in port following the cruise so that workstation and network maintenance can begin.

While the vessel e-mail system is quite robust and implements several safeguards against lost mail, the nature of shipboard satellite communication means that losses can still occur. Scientists should request written confirmation of receipt from their correspondent for any vital e-mail; "Return Receipts" are not always reliable and should not be used aboard the research vessels.

USAP scientists and support staff on USAP research vessels may use the vessel email systems for both program and private email reception and transmission, subject to general email policies for the USAP as described in the Enterprise Rules of Behavior. If non-email data transfers are required, arrangements must be made with the POC prior to the cruise.

Data Archiving

The full data distribution from the cruise includes the RVDAS underway data, the multibeam data and the science of opportunity data. A copy of the full data distribution will be provided to the Chief Scientist at the end of the cruise. In addition, a copy will be sent for archiving to the Marine Geoscience Data System (MGDS) at http://www.marine-geo.org/ . Data sent to this database will not be downloadable until the Chief Scientist has released the proprietary hold.

Software Availability and Installation

Public Windows XP and Macintosh workstations are preloaded with Microsoft Office and several other commonly used applications. Additional software such as ArcGIS, Google Earth, GMT, Matlab, Adobe Photoshop, Illustrator, and Acrobat are also available. Information about any additional software for installation on public workstations should be provided to the cruise POC. Any software must be approved by the Network Administrator and the installation media scanned for viruses before installation on USAP systems.

Scientist-owned Computers

Personal computers may be brought onboard the vessel and configured for connection to the vessel network by the ASC staff, provided they are capable of cabled TCP/IP networking and run anti-virus software with current virus definitions. Wireless networking is not available for the ASC

shipboard network. All personal computers shall be screened prior to connecting to the vessel network.

Every attempt will be made to provide network access and printing services on personal computers, if requested, but there may be situations where outdated hardware, software and missing drivers make support of a computer impossible. All mission-critical equipment (equipment needed to support science-related cruise objectives) brought to the vessel must have current hardware and software, the original installation media, and a full system backup must be included.

Windows XP is the ASC standard operating system on the vessels for PC/Intel platforms and provides the most seamless integration with our network. However, MacOS X, Linux, Windows 7, and Windows Vista, have all been tested and will work. Users bringing Windows, Mac and Linux systems must remember to get the administrator password from their home institution's network administrator or it will be impossible to support these machines.

In general, software, hardware and removable media will not be provided unless specifically requested and approved in advance of the cruise.

Public Computers

Computers available for public use on both vessels include Macintosh and Windows XP systems. The NBP also has Linux computers available for public use.

Numbers and locations vary from vessel to vessel. The E-Lab on both vessels has several public computers running both Macintosh and Windows Operating Systems. The LMG also has public use Windows XP computers in the 02 Lounge; the NBP's 03 Conference has several Windows XP computers for public use.

The public workstations on the vessel are permanently mounted to prevent damage during vessel operations. Scientists may not move these workstations or any peripherals attached to them (monitors, Zip drives, etc.) unless the move is approved by the MPC.

Voice Communications

Personal, non-cruise related voice calls can be made via the public-use IRIDIUM satellite phone. This phone is located in the E-lab on the NBP and in the lounge, gym, and environmental room on the LMG. Pre-approved or emergency science voice communications can be conducted on other business lines (either IRIDIUM or INMARSAT).

While the LMG is at Palmer station, the wireless network connection there also provides VoIP phone service through the USAP network. A public use VoIP phone is located in the Environmental Room.

Underway Data and Cruise Data Distribution

While at sea, the vessel's Data Acquisition System (DAS) continuously collects data from a suite of on-board instruments. Two processed data sets are produced each day during the cruise, MGD77 and JGOFS. These processed data are made available on a public drive soon after processing is completed. The raw data is posted to a public drive just after 0:00 GMT of the day on which it was collected. Several options exist for the real-time display of acquired data. This can be arranged through the MPC onboard.

All general underway data (thermosalinograph, fluorometer, transmissometer, and meteorological data) collected on the vessel will be public data after the cruise and available to anyone who requests it. Neither the funded science groups onboard nor ASC have exclusive access rights to these data,

Data acquisition will cease when the vessel enters another country's EEZ or at least 24 hours before the end of a cruise so that all the acquired data for the cruise can be archived and documented in preparation for writing to DVD or tape for distribution. Up to three dataset copies

will be provided by ASC at the request of the chief scientist. Additional datasets may be provided by coordinating with the POC during the planning process (prior to the cruise).

Note Turnover for the next cruise begins immediately upon arrival in port. Any requests for data distributions after that time are at the discretion of the Network Administrator and MPC.

ASC will send a copy of the complete dataset to the Marine Geology Data Management System (mgDMS) at Lamont Doherty Earth Observatory. MgDMS will hold the data as proprietary for two years. After this period, mgDMS will contact the PI to ask if their data can been released. If the PI declines, mgDMS will note that they contacted the PI and that he/she was not willing to release the data. NSF will be informed of the PI's decision. MgDMS will never release the data without permission from either the PI or the NSF. For Antarctic mgDMS data, go to http://www.marine-geo.org/antarctic/ and click Data Link.

IT Security Guidelines

Computer Security

The USAP addresses U.S. federal government security and operational practices for computing systems by screening all computers (including science experiments, mission operation systems, workstations, PCs, servers, laptops, and portable notebooks) prior to connecting to the USAP network. The following system requirements and operating system specifications apply to all computing devices, including smart phones, tablet devices and Personal Digital Assistants (PDA), which could connect to the USAP network. These requirements are aligned with the *NSF Computer Security Policy.*

A computer system must continuously maintain compliance with these computer requirements. A system that falls out of compliance such as falling behind in anti-virus definitions, patches, or vulnerability remediation may be disconnected without notice if the NSF determines there is an unacceptable level of risk or threat to the USAP environment.

Please direct inquiries to the USAP Help Desk at (720) 568-2001 or helpdesk@usap.gov.

System Requirements

Operating System and Software Patches

Devices running an operating system (OS) must be running at a version currently supported by the vendor, and be updated with the most current patch level of the OS, including the latest security patches. Applications running on the system must also be patched when patches are released by the software vendor.

Microsoft

Ensure the following conditions are met:

- Windows XP Service Pack 3 (SP3) plus all hot fixes. Windows Vista (SP1) with all hot fixes or Windows 7 (SP1) with all fixes.
- Current antivirus software with latest virus definition files (DAT files).
- Complete/full system virus scan within the previous two weeks.

Special Notice Regarding Microsoft XP Sunset April 8, 2014

Microsoft will be ending support for Windows XP on April 8, 2014. It is important for all USAP participants to begin planning now to migrate to a newer OS such as Windows 7 or Windows 8. As of April 8, 2014, machines running Windows XP will not pass computer screening and will not be permitted to connect to the USAP network. Additional information is available from Microsoft at **http://www.microsoft.com/en-us/windows/endofsupport.aspx**

Administrator Access

Obtain administrator username and password for computers prior to deployment. Screening technicians must have the authority to log on to the computer at an administrator level to accurately review the system configuration and run screening software. To maintain the security of your system it is recommended that you set a temporary administrator username and password for use during computer screening. If the administrator username and password are not available, the screening process, as well as the ability to connect to the USAP network and its resources, will be delayed.

Antivirus

All devices must have antivirus software running at the current version and be configured for auto-updates. Computers must be virus free prior to connecting to the USAP network and maintain the current DAT version as updates are available.

Connectivity

Participants must provide all the equipment necessary to connect the computer system to the USAP network, including the Network Interface Card (NIC), external dongles or attachments used by the NIC, device drivers, etc. All equipment must be in working order.

Patches

All computing devices should be updated to the current levels for the operating system and security patches. Applications should also be updated, as provided by the manufacturer to include the latest security patches.

Client and Server Software and Data Transfer

- Permitted for use are Client software used for the purposes of email and web browsing, and other client software, such as SSH and SFTP.
- Not permitted for use are protocols that transmit data in the clear (i.e., Telnet and FTP). We recommend replacing these protocols with secure versions. Software that is not permitted for use on the USAP network includes but is not limited to:
  - Peer-to-peer (P2P) software, e.g., BitTorrent, KaZaA, Gnutella, Freenet
  - Email server software that provides SMTP/POP port services some examples include but not limited to: Exchange, Eudora, send mail
  - Web server software that provides HTTP/HTTPS/FTP services some examples include but not limited to: IIS, Apache, Lightppd
  - Network management servers, such as DNS and SNMP
  - Network or port scanning software, such as Nessus
  - Unauthorized wireless access points
- Software requiring NSF approval for use on the USAP network for official business purposes (such as educational outreach) includes Skype and other network bandwidth intensive applications such as video and audio streaming software.

If your system has embedded software or can only be patched when the vendor releases an update, notify USAP IT several months in advance of deployment to design your science support requests or mission support requests to receive a preliminary connection determination. The system will be evaluated to determine if it is secure, robust, and able to withstand continuous security, maintenance, and network management activities that occur on the USAP network.

Computer Screening Process

Screening technicians gather the following information during the computer screening process. System operators who connect to the USAP network without a screening rating of *Pass* are in violation of USAP information security policy and may be disconnected without notice. A *Fail*

rating indicates the system owner is responsible for remediating the system as soon as possible in order to remain connected to the USAP network.

Data Collected By Computer Screening	
▪ Computer make and model	▪ Wireless MAC address
▪ Computer hostname	▪ OS version and patch level
▪ MAC address	• Antivirus software version and DAT file date

Vulnerability Scanning

All systems on the USAP network are periodically scanned to detect vulnerabilities. If a vulnerability is detected on your system, ASC Information Security, the IT station manager or designee will send you an email providing information on the vulnerability and identifying the timeframe you have to respond to the notification or to remediate the issue.

Vessel Electrical Service

The vessel is equipped with standard 110v/60Hz AC receptacles. In addition, 208V and 480V 60Hz power is also available in certain locations. Voltage/frequency converters are not provided. All cruise scientists should bring any adapters necessary.

Underway Science Programs

There are several permanently installed and funded underway science systems on board the vessels that will be used during the cruise. All data collected from these systems will be included in the End of Cruise Data Report provided to the Chief Scientist. ASC personnel monitor these systems as part of their normal duties. These are funded NSF-PLR projects and the equipment may not be relocated without the consent of the PI.

Acoustic Doppler Current Profiler (ADCP)

The ADCP is a hull-mounted system that has been in place for several years on the NBP. The transducers operate at acoustic frequencies of 38 and 150 kHz. Dr. Eric Firing, University of Hawaii, is the PI responsible for data quality and data archiving obtained on the both the NBP and the LMG.

pCO2 System

A system measuring the concentration of dissolved CO2 in surface seawater is installed in the Hydro Lab on the NBP and in the LMG's Wet Lab. It draws water from the uncontaminated seawater system and requires several cylinders of compressed gas, and a small amount of maintenance by an ASC technician on board. PI responsible for data collection is Colm Sweeney, NOAA.

Gravity Meter – NBP only

The gravimeter occupies a small room in the Aft Dry Lab and is part of the NSF equipment pool. As part of the normal upkeep of the gravimeter, a gravity tie will be performed prior to and after the cruise. No individual PI is responsible for data collection.

Terms and Acronyms

Term	Definition
ACA	Antarctic Conservation Act.
ANT	Antarctic Sciences
ASC	Antarctic Support Contractor. The support contractor providing logistical support to grantees in Antarctica.
ASMA	Antarctic Specially Managed Area
ASPA	Antarctic Specially Protected Area.
COMAIR	Commercial Air
COMSUR	Commercial Surface
CONUS	Continental United States.
DNF	Do Not Freeze
ECO	Edison Chouest Offshore, the private company that owns and operates the research vessels under contract with ASC
ECW	Extreme Cold Weather. The clothing and personal gear loaned to participants during their Antarctic deployments.
ET	Electronics Technician
FRG	Fragile
Implementer	The person assigned to your project for planning the logistical support that will be provided to you by ASC during your fieldwork.
KD	Keep Dry
LMG	Laurence M. Gould, an icebreaking research vessel
MCIS	Marine Computer Instrument Specialist
MCM	McMurdo Station.
MLT	Marine Lab Technician
MPC	Marine Projects Coordinator
MT	Marine Technician
NBP	Nathaniel B. Palmer, an icebreaking research vessel
NSF	National Science Foundation
PI	Principal Investigator.
PLR	NSF Polar (Division of Polar Programs)
POC	Point of Contact. The person assigned to your project for planning the logistical support that will be provided to you by ASC during your fieldwork. Your on-ice POC may be different from the one assigned during the planning phase of your logistical support.
PPE	Personal Protection Equipment
PQ	Physical qualification.
ROER	Record of Environmental Review
ROS	Required on Site
RSP	Research Support Plan. This document describes the support to be provided to field parties.
SIP	Support Information Package. An online form that describes support logistics, equipment and supplies requested by science groups.
S&TPS	Science and Technical Project Support
TBD	To Be Determined
USAP	United States Antarctic Program.